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Improving Elementary School Students' Digital Literacy through Culture-Responsive Canva-Based Science Learning

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Abstract
This study aims to describe the implementation of Canva's culturally responsive use in science learning and its effectiveness in improving elementary school students' digital literacy. The study involved 90 fourth-grade students from four elementary schools in the Andang Taruna Banyumas Cluster. This study is a descriptive qualitative study with an ethnopedagogical approach and a case study method conducted through observation, interviews, and documentation studies. The results showed that the initial level of students' digital literacy was still basic to moderate. The implementation of culture-responsive Canva in science learning was carried out through systematic planning, implementation, and evaluation. This implementation was able to improve digital literacy, as seen from several indicators, including Functional Skill and Beyond, Creativity, Collaboration, Communication, The Ability to Find and Select Information, Critical Thinking and Evaluation, Cultural and Social Understanding, and E-safety. Learning in elementary schools became more interactive, contextual, and relevant to the culture of students in Banyumas. This encouraged active student participation and improved understanding of the learning material. The findings of this study confirm that Canva, which is responsive to culture, improves the digital literacy of elementary school students. These findings also show a positive synergy between technology and culture in learning. However, this study also has limitations in terms of internet network quality and differences in the initial abilities of elementary school students. Further research is recommended to develop a culture-based digital learning model for other subjects so that it can support the digital infrastructure in schools to be more optimal.

INTRODUCTION

Indonesian national education serves to develop students' potential so that they become individuals who believe in and fear God Almighty. They also become individuals with noble character. Ultimately, this results in individuals who are healthy, knowledgeable, skilled, creative, independent, democratic, and responsible (UU No 20 Tahun 2003, Pasal 3). The benchmark for educational progress can be seen in graduate competency standards. The achievement of graduate competency standards is influenced by the teaching and learning process, which involves students, teachers, the curriculum, facilities and infrastructure, and the school environment (Andriani & Wakhudin, 2020: 52). Students, teachers, curriculum, facilities and infrastructure, and the environment must be united (Suyitno, 2021: 107). Students are a group of human resources who bring about change due to advances in technology and science, so they must possess 21st-century skills (Aryani, 2024: 2).

21st century skills require complex learning. Among them is technology-based digital transformation learning (Mutohhari et al., 2021: 1229). Digital transformation can lead to digital literacy. Students can process, integrate, evaluate, and analyze knowledge and information. Digital literacy combines various literacies, including knowledge, the internet, the web, and digital itself

(Hildawati et al., 2024: 5). Digital literacy includes critical understanding and digital ethics (Rahmadanita & Hidayat, 2023: 189).

Over time, the main challenge in education is digital literacy. Students need learning media to improve their digital literacy (Pazah et al., 2024: 55). One relevant digital media is Canva. Canva helps students learn to improve their understanding of a subject through a combination of text, images, audio, video, and animation (Alfatih et al., 2024: 129). Canva's features help in creating content from user ideas (Pratama et al., 2023: 187). Canva is equipped with Magic Write, Text-to-Image, Design Suggestions, and Artificial Intelligence Animation (Rindy et al., 2025: 1555). The use of Canva can also develop students' creativity so that they have a good learning experience (Salsabila F., Fitri P. R., 2025: 164).

Canva was used in this study for science learning. The learning objective was to guide students to think scientifically and understand the socio-cultural context within it (Zannah, 2021: 23). Science learning in this study emphasized culture. Cultural development is carried out continuously, convergently, and concentrically (Ki Hadjar Dewantara, 1967: 100). Culture is a characteristic of a society. There are seven elements in culture, namely beliefs, language, livelihoods, social organization, life support systems, arts, and social groups (Handayani et al., 2024: 180). Culture is a reference used in thinking and behavior (Hulu et al., 2024: 5).

Philosophically, the research is based on QS Al-Alaq (96:1-5). QS Al-Alaq verses 1-5 teach us that as Muslims, we must read, write, and learn. Verse 1, which reads "iqra," refers to the command to be literate, namely to read (Jayana & Mansur, 2021: 188). The research is also based on the concepts of culture, natural law, and the law of time by Ki Hadjar Dewantara. Education must be in harmony with the culture that originates from human intellect (Ki Hadjar Dewantara, 1962: 343). Education is carried out to achieve natural law and the law of time. The nature of nature is interpreted as meaning that education must be adapted to the social and cultural context of the Indonesian nation. Meanwhile, the nature of the times is interpreted as meaning that education must be able to adapt to the development of science and technology (Ab Marisyah et al., 2019: 1516).

Based on initial observations, students at Gugus Andang Taruna Banyumas have weak literacy skills. This can be seen from their report cards, which show a decline from the previous year. Students use digital devices more for entertainment. They do not yet utilize digital devices for learning. Students' abilities in managing information, being creative, and digital ethics are still limited. Teachers do not sufficiently integrate the use of technology into classroom learning. Teachers use conventional methods. On the other hand, science learning has great potential to integrate culture as a source of learning. However, this potential has not been optimally utilized in developing digital materials. In fact, culture can be used as an identity, a reinforcement of ethics and character that is relevant to building digital awareness rooted in local wealth (Sutawan & Winangun, 2024: 23).

Based on the existing conditions, this study identifies several problems, including low digital literacy among students, lack of integration of technology use in science learning, minimal use of Canva in learning, and lack of cultural integration in learning. Therefore, this study focuses on three areas of study, namely the initial condition of digital literacy before using Canva that is responsive to culture in science learning, the implementation of Canva-based science learning that is responsive to culture, and the effectiveness of its use in improving the digital literacy of elementary school students.

Previous research entitled "The Use of Canva Application-Based Learning Media to Develop Digital Literacy Culture in Elementary School Students" states that the use of application-based learning media on Canva can develop digital literacy culture in elementary school students. This research provides an initial overview of the use of the Canva application in relation to students' digital literacy culture. However, this research has not examined the integration of Canva with culture in science learning (Ningrum et al., 2024: 1500).

This research gap is evident in the lack of studies that integrate Canva, culture, science, and digital literacy based on digital literacy components. The components of digital literacy consist of Functional Skill and Beyond (the ability to use and operate computers), Creativity (creativity in

presenting something), Collaboration (working actively so that one can communicate with others to facilitate the achievement of goals), Communication (communicating in a way that facilitates cooperation in achieving goals), The Ability to Find and Select Information (the ability to explore digital information and select it based on needs and accuracy), Critical Thinking and Evaluation (the ability to analyze and evaluate problems to think critically), Cultural and Social Understanding (social and cultural skills to develop digital space), and E-safety (knowledge about digital space security) (Suryandari et al., 2023: 32). Teachers also have not utilized digital media as a stimulus for students to learn (Arsyad, 2020: 3). This includes supporting contextual learning in the Merdeka Curriculum (Kemendikbudristek, 2022). The urgency of this research is increasingly relevant to the Merdeka Belajar policy, Graduate Profile, Deep Learning, and the Nature of the Times.

In line with this, this study aims to describe the initial conditions of students' digital literacy, analyze the implementation of Canva that is responsive to science learning, and assess its effectiveness in improving the digital literacy of elementary school students. The research results are expected to provide theoretical contributions to the development of a culturally responsive digital learning model, as well as practical contributions to students, teachers, schools, and policy makers in realizing the digital transformation of basic education that remains grounded in local cultural values.

METHODS

This study uses descriptive qualitative research with an ethnopedagogical approach and case study method. Using an ethnopedagogical approach, it seeks to gain an in-depth understanding of the experiences of students, teachers, and principals, as well as the dynamics of learning related to culture and technology. The case study method was chosen because this study focuses on improving digital literacy based on the data collected. This allows for a description of the context, process, and impact of using the culturally responsive Canva as a digital literacy tool in learning.

The research was conducted in four elementary schools in the Andang Taruna Banyumas Cluster. These elementary schools include Karangrau 1 Public Elementary School, Karangrau 4 Public Elementary School, Pasinggangan 4 Public Elementary School, and Kejawar 3 Public Elementary School. These elementary schools are located in Banyumas District, Banyumas Regency. The data sources in this study were primary and secondary data sources. The primary data sources consisted of fourth-grade students, classroom teachers, and school principals. Meanwhile, the secondary data consisted of school documentation, related literature and research, as well as education and government policies.

The informants in this study consisted of fourth-grade students, classroom teachers, and school principals. These informants were selected using purposive sampling, which considered the role of informants in digital technology-based learning. This study used a variation of students' digital literacy abilities, consisting of basic, adequate, and good. This variation was not used as the basis for the main selection criteria but to ensure the diversity of data used through the maximum variation sampling approach. The number of informants was determined through saturation point. When there was additional data, it did not provide new information.

The science learning intervention with Canva, which was responsive to culture, was carried out over 4 to 6 meetings, with each meeting lasting 70 minutes. The learning intervention was tailored to the topics in the fourth grade. The learning intervention included an introduction to digital literacy and the use of Canva features, exploration of the local culture of Banyumas (arts, customs, traditional ceremonies, etc.), integration of culture into science material, creation of digital design projects using Canva, and presentation of students' work in class. In the learning intervention, the teacher acted as a facilitator. The teacher helped students integrate science material with culture.

The research instruments used consisted of observation guidelines, interview guidelines, and a digital work analysis rubric. The observation guidelines were designed to observe students' initial abilities, including their ability to operate digital devices, access information, understand information, digital ethics and security, and the use of technology for learning. The interview guidelines were used

to explore experiences, perceptions, and obstacles in using Canva that are responsive to culture based on the perspectives of students, teachers, and school principals. Meanwhile, the digital work assessment rubric analyzed digital literacy components, including Functional Skill and Beyond, Collaboration, Communication, The Ability to Find and Select Information, Critical Thinking and Evaluation, Cultural and Social Understanding, and E-safety. The research instruments have been consulted and validated by education experts and cultural experts.

The data collection techniques used consisted of observation, interviews, and documentation studies. The data analysis technique used Miles and Huberman's data triangulation model. Data triangulation includes data reduction, data display, and conclusion drawing and verification (Sugiyono, 2022: 248). In the data reduction stage, researchers will select, simplify, and organize the data. This is to filter important data related to the use of culturally responsive Canva in science learning and its impact on digital literacy. Meanwhile, in the data presentation stage, researchers compile the data in the form of descriptive narratives. The purpose of this activity is to visualize the relationship between variables such as the use of culturally responsive Canva in science learning and digital literacy skills. The final step is drawing conclusions and verification. Researchers identify patterns, themes, and vnnmeanings from the data and compare them between research subjects or over time. The purpose of this step is to find the main themes.

The validity of the data in this study includes four criteria of data validity, namely credibility, transferability, dependability, and confirmability. At the credibility stage, source, technique, and time triangulation were used. Source triangulation was carried out by comparing and checking the consistency of information obtained from students, teachers, and principals regarding the use of culturally responsive Canva in science learning. Technique triangulation uses interviews, observations, and document studies to examine the role of culturally responsive Canva in science learning. Meanwhile, time triangulation involves collecting data at different times to examine consistency over time. In the transferability stage, the researcher provided a detailed and clear contextual description of the school setting, student conditions, and how culturally responsive Canva was implemented in science learning. In the dependability stage, the researcher ensured the consistency of data on culturally responsive Canva in science learning. In the confirmability stage, the researcher assessed whether the research results were of high quality or not.

This study used three main stages, namely the preparation/pre-field stage, fieldwork, and data analysis. The preparation stage consisted of developing a research design, selecting a field, obtaining permits, exploring and assessing conditions, selecting and utilizing research subjects, preparing research instruments, and addressing ethical issues in research. This stage was carried out from July to September 2025. Meanwhile, the fieldwork stage consists of understanding and entering the field and collecting data. The last stage is data analysis. This stage consists of data reduction, data display, data analysis, drawing conclusions and verification, and improving the validity of the results. The fieldwork and data analysis stages were carried out in October 2025.

RESULTS AND DISCUSSION

Results

This section presents the research findings discussing the initial conditions of students' digital literacy, the implementation of culturally responsive Canva in science learning, and its effectiveness in improving the digital literacy of elementary school students. Data were collected through observation, interviews, and documentation studies. Twelve students were involved as key informants with categories of basic, adequate, and good digital literacy. Class teachers and principals at each school were also involved. The results presented in this study focused on changes in elementary school students' digital literacy skills, the dynamics of Canva implementation, and the improvement in students' digital literacy that emerged during the science learning intervention process.

Initial conditions of digital literacy before using Canva, which is responsive to culture in science learning

The initial conditions of elementary school students' digital literacy were analyzed through observation, interviews, and documentation studies. The results of observations conducted at four schools showed that students' digital literacy skills before using Canva, which is responsive to culture in science learning, were still in the basic to adequate category. This was evident in the students' behavior during learning and in observing their interactions. In terms of access to and use of digital technology, five students took longer when the teacher asked them to switch from entertainment applications to learning applications. In terms of the ability to operate digital devices, seven students were hesitant to try learning applications when the teacher gave instructions. In terms of understanding digital information, ten students immediately used the information without considering its credibility. In terms of digital ethics and security, 6 students immediately opened links without considering their security. Meanwhile, in terms of the use of technology for learning, only 3 students had ever created simple content in learning.

The results of interviews with student informants, classroom teachers, and the principal are shown in the table 1.

Table 1. Student Interview Results

No	Aspect	Key Findings	General Category of Competence
1.	Access and use of digital technology	All students have access to digital devices such as mobile phones, either personal or belonging to their parents. The use of these devices is frequent. However, 9 students mainly use them for entertainment activities such as playing games, TikTok, and YouTube, while only 3 students use them to find learning information. Students have also used digital devices during learning activities.	enough
2.	Ability to operate digital devices	Students generally search for information through Google and are able to use learning applications, though mostly for basic activities such as opening applications and watching videos. 8 students have not yet mastered interactive learning applications such as Canva. 4 students can already complete digital assignments but still struggle to upload or save them. When facing difficulties, they usually ask teachers or parents for help.	Basic- enough
3.	Understanding of digital information	Students are not yet able to verify the accuracy of the information they obtain. 7 students have previously received false information (hoaxes) from the internet. Students understand the concept of using news wisely.	Basic
4.	Digital ethics and safety	9 students are aware of the importance of maintaining privacy when using digital media. This knowledge was obtained from teachers' and parents' guidance. However, its application in daily life is still inconsistent.	enough
5.	Use of technology for learning	10 students stated that learning using digital media is enjoyable. However, they are not yet accustomed to creating or being creative with applications. According to them, using the Canva application in learning is very helpful.	Basic

The data obtained shows that most fourth-grade elementary school students have digital devices and internet access. However, they mostly use them to play games, watch TikTok and YouTube. This is in line with the results of an interview with one of the students, "I often use my cell phone, but usually to play games, Ma'am" (S1). Based on interviews covering these five aspects, it was concluded that the students' literacy skills ranged from basic to adequate. Students already have digital devices and are able to use them. However, they are mostly used for entertainment. Understanding of information and digital ethics is also inconsistent. Students are not yet accustomed to using the Canva application. The researcher also conducted interviews with teachers. The results of the interviews with teachers as informants yielded the table 2.

Table 2. Results of Teacher Interviews

Informant	Aspect	Key Finding	General Category of Competence
G1	Initial condition of digital literacy	Students' abilities vary, two students are already able to use digital devices.	enough
G2	Initial condition of digital literacy	Students' ability to use digital devices is still insufficient; two students experience difficulties using Canva.	Basic
G3	Initial condition of digital literacy	Students' skills remain at a basic level in using digital devices for learning; two students are unable to understand digital navigation steps.	Basic
G4	Initial condition of digital literacy	The abilities of two students vary, tending toward the use of basic applications.	Basic

The results of interviews with four teachers about the initial conditions of students' digital literacy indicate that students' ability to utilize digital devices in learning is still relatively basic. G1 stated that two students were able to use digital devices, but their abilities varied. G2 stated that two students had difficulty using Canva, especially when saving their work. G3 stated that two students did not yet understand digital navigation steps. G4 stated that students were accustomed to using simple applications. The researcher then conducted interviews with the principal as an informant, obtaining the Table 3.

Table 3. Results of Interviews with School Principals

Informant	Aspect	Key Finding	General Category of Competence
KS1	Students' initial digital literacy skills	Three students are familiar with digital devices, but their use is still limited to entertainment purposes.	Basic
KS2	Students' initial digital literacy skills	Two students are able to operate digital devices but have difficulty using applications independently.	enough
KS3	Students' initial digital literacy skills	Two students have not yet fully developed digital literacy skills, limited only to searching for information.	Basic
KS4	Students' initial digital literacy skills	Students' abilities vary; two students already use digital devices to search for information.	Basic- enough

Interviews with school principals revealed that students' digital literacy skills ranged from basic to adequate. Students were generally familiar with digital devices. However, they used them mainly for entertainment, with only some using them to search for information. As one principal stated, "Students already have mobile devices, but three students still use them for entertainment rather than for learning" (KS1). To complete the data, the researchers conducted a documentation study, with the table 4.

Table 4. Documentation Study Results

Data Source	Key Findings	General Category of Competence
IPAS teaching module	Three teaching modules focus on content delivery without integrating digital literacy.	Basic
Teaching journals	Ten journals indicate that learning activities are still teacher-dominated.	Basic
Students' digital literacy assessment	Eight students are able to access digital tools but are not yet able to create or innovate with them.	Basic- enough
School programs	Four schools have not yet implemented digital literacy programs.	Basic
Facilities and infrastructure	Four schools already have internet networks and computers, but these are not yet optimally used by students.	enough
Teaching supervision	Two teachers have used digital media but have not integrated it with local culture in learning.	enough
School documentation	Four schools indicate that digital literacy activities are still incidental.	enough

The results of the documentation study show that students' digital literacy skills are still at a basic to adequate level. Science learning has not yet integrated the use of digital literacy. Learning is still teacher-centered. In one teacher's notes, it is written, "Learning has been running smoothly. Students listen to the teacher's explanations. Students also work on LKPD." Facilities and infrastructure are available but have not been optimally utilized by students. In an inventory book from one of the schools, it is written, "There are 4 teacher laptops." The school does not yet have a specific digital literacy program or cultural integration.

Based on the results of observations, interviews, and documentation studies, it can be concluded that the initial digital literacy of students before using Canva, which is responsive to science learning, shows that students' abilities are still at a basic to adequate level. Students are in dire need of Canva-based science learning that is culturally responsive as an intervention to improve the digital literacy of elementary school students.

Implementation of Canva that is responsive to culture in science learning to improve students' digital literacy

The implementation of Canva in science learning that is responsive to culture was carried out through the stages of planning, implementation, and evaluation. The researcher used observation, interview, and documentation study techniques.

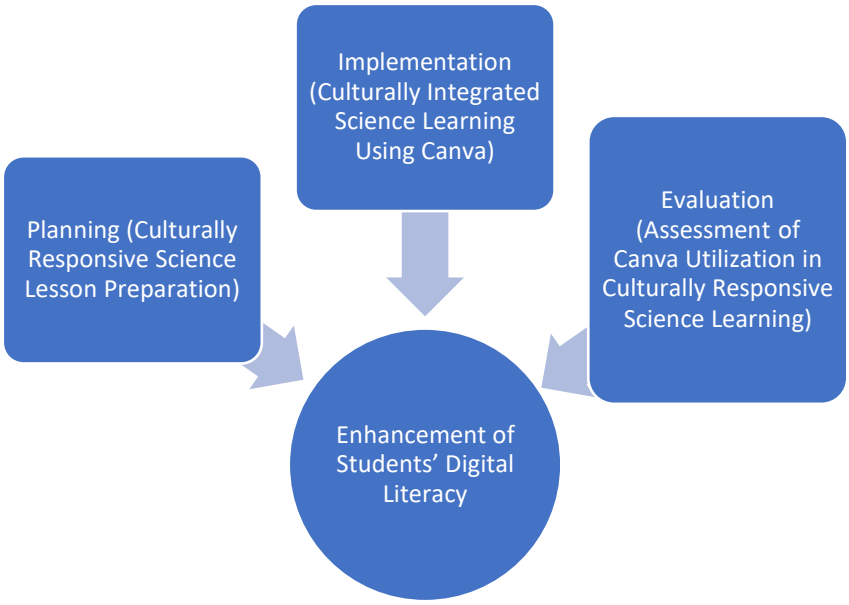

Figure 1. Implementation of Canva in Science Learning

During the planning stage, it appears that teachers prepare science teaching materials by integrating culture and the necessary facilities and infrastructure. Teacher 1 (T1) said, "I prepared a template on Canva containing images of Banyumas culture so that students could start simple designs." The findings are in line with opinions that emphasize the importance of cultural integration in digital literacy in increasing the context of student learning (Rayahu et al., 2023: 211).

During the implementation stage, students used Canva with the guidance of teachers. Of the 12 students, 8 still needed guidance to create basic designs using Canva. However, 4 students were able to follow the teacher's instructions more quickly. Teacher 2 (G2) said, "Most students were using Canva's design features for the first time, so they needed more guidance from the teacher."

During the evaluation stage, the teacher evaluated the students' work, the process, and supervised them. Analysis of student work showed that 5 works were in the high creativity category, meaning they were able to modify Canva templates themselves. Four works were in the adequate

category, as seen from their simple visual composition. And three works were still in the basic category. This finding was reinforced by the statement, "I only changed the colors and images, I wasn't able to change their placement" (S6). This statement shows that the ability to explore Canva's features is not yet evenly distributed, requiring gradual assistance.

The results of the learning process analysis from 4 teachers as informants show that 3 teachers saw an increase in student activity. 3 teachers also saw that students were more skilled in using Canva, and 1 teacher stated that the learning duration needed to be increased. Teacher 3 (G3) emphasized, "Using Canva makes students more skilled."

The results of the principal's supervision conducted by 4 informants stated that the implementation of culturally responsive Canva brought changes to learning practices. It was evident that teachers had used Canva consistently, cultural integration added to the learning context, and student enthusiasm increased. This is reinforced by the statement, "Students appear more confident" (KS 2). The supervision results also found that the internet connection did not reach all classrooms. This certainly hampered the implementation of Canva. A critical analysis of the observation results on the implementation of culturally responsive Canva from planning, implementation, and evaluation shows that the implementation of Canva has a positive impact but is not yet evenly distributed in all aspects of literacy.

The researchers also conducted interviews with students, teachers, and KS to analyze the implementation of Canva. The results of the interviews with students showed an increase in the digital skills of the majority of students. Eight students showed progress in functional skills and beyond. Nine students showed progress in creativity. All students showed progress in collaboration skills. Seven students showed progress in communication. However, the ability to find and select information was still basic. Only 5 students checked the credibility of sources. As acknowledged by student 7 (S7), "I just took it from Google, Ma'am." Critical thinking and evaluation skills are still basic. Only 5 students were able to distinguish between sources. All students possessed cultural and social understanding skills. Understanding of e-safety was not yet evenly distributed. Only 6 students were able to maintain privacy.

Interviews with teachers revealed that all teachers had made lesson plans that integrated Canva and culture. The implementation was carried out in stages. However, teacher 2 (G2) stated, "There are still students who need assistance when uploading." All teachers also evaluated the students' work. Interviews with all principals revealed that the implementation of Canva had been consistent. They assessed that cultural integration is beneficial in strengthening regional identity. However, KS 3 emphasized that "digital ethics must be emphasized to students," because students still lack understanding of security in using images. The results of the documentation study also show that all teaching modules have integrated culture and Canva. Teaching journals have proven to increase student participation. The results of the digital literacy assessment show a good category. However, network improvements need to be made.

Overall, the culturally responsive implementation of Canva in science learning has been successful through the planning, implementation, and evaluation stages. As a result, there has been a significant increase in digital creativity and cultural understanding. However, the evaluation of information and digital ethics needs improvement so that students' digital literacy can develop more comprehensively.

The effectiveness of Canva's responsiveness to culture in science learning in improving students' digital literacy

Student interview results

Based on interviews conducted with students, they stated that using Canva provided a fun and meaningful learning experience. They found Canva easy to use, making it easier for them to understand culture. This is because Canva media is presented using attractive and interactive visual designs. They are now more skilled in using digital devices. They find it easier to search for and use information to complete their digital assignments. However, they still need guidance in filtering

information sources. Students also showed an increase in awareness of the wise and responsible use of technology. Students are more careful in sharing personal data. Students are also more enthusiastic about learning using Canva, both individually and in groups. They even want to use Canva again in their next lessons.

Teacher interview results

Interviews with teachers revealed that Canva makes it easier for students to understand science material and develop various skills. However, teachers also face challenges, including limited internet access and differences in student abilities. Teachers help students by providing gradual guidance but also hone their critical thinking, collaboration, creativity, and digital communication skills. Teachers assess that Canva greatly helps students understand culture.

Results of interviews with the principal

From interviews with the principal, it was stated that the use of Canva in local culture-based science learning strengthens students' digital literacy. The principal assessed that the use of Canva had a positive impact on students' digital competence.

Results of the documentation study

Based on the results of the documentation study, it appears that the assignment sheets and student work show an increase in students' ability to use Canva so that they understand the material and the use of accurate information. The learning objectives in the teaching module were also achieved. From the teachers' teaching journals and digital literacy assessments, there was an increase in students' digital literacy skills. The school program and facilities and infrastructure strongly support the sustainability of digital literacy activities. This is reinforced by school documentation showing digital literacy activities.

Overall, Canva is an effective medium for improving students' digital literacy, supported by continuous guidance, infrastructure readiness, and the application of appropriate pedagogical strategies.

Discussion

Initial conditions of digital literacy before using Canva, which is responsive to the culture of science learning

The results showed that the initial conditions of students' digital literacy were still basic to adequate. Students already had access to digital devices, albeit for entertainment. According to teachers, most of the students' abilities were still at a basic level of use. The principal also stated that students were familiar with digital devices, although their use was not yet optimal. This is in line with the opinion that elementary school students are more likely to use technology for non-academic activities, especially in rural areas (Hamuni et al., 2022: 30). This finding is an important starting point in understanding students' readiness for the implementation of learning using interactive digital media in learning.

In terms of their ability to operate digital devices, students are capable of performing basic activities. However, their ability to use interactive learning applications such as Canva is still limited. Confirmation from teachers shows that 8 students are still confused when saving and uploading results to Canva. This condition shows that students have digital skills that are not yet fully developed.

In terms of understanding digital information, students still have limited ability to assess the accuracy of information sources. 7 students explained that they had received hoax news but were unable to verify the information. This condition is the basis for the need for project-based learning. In terms of digital ethics and security, 9 students already understand the importance of maintaining privacy, but their application of this knowledge is not yet consistent. This knowledge was obtained from teachers and parents. This shows that digital ethics has not yet become an important part of learning. In terms of the use of technology for learning, there is positive potential. Students feel happy when learning, even though they are not yet accustomed to being creative using digital

applications. According to the students, the use of Canva helps them understand science material. This shows that there is intrinsic motivation in digital learning.

Findings from the documentation study show that teaching modules developed by teachers have not integrated digital literacy, learning is still teacher-centered, and school programs are not yet focused on strengthening digital literacy. This data explains that digital literacy needs to involve the learning ecosystem in schools. Thus, overall, these findings confirm that there is a great need for learning interventions that use technology. When linked to ethnopedagogy, the initial condition of students' digital literacy reflects great potential for developing innovative learning models that can combine technology and local culture. This research reinforces the findings of Ningrum et al. in 2024. It also fills in the gaps that have not been thoroughly researched, namely the integration of Canva, culture, and science learning. This is in line with Ki Hajar Dewantara's concept of the nature of nature and the nature of the times. This is to develop digital technology (nature of the times) without leaving behind culture (nature of the natural world).

The implementation of culture-responsive Canva in science learning to improve students' digital literacy

The results of the study show that the implementation of culture-responsive Canva in science learning was carried out through three main stages and proceeded systematically. The three stages include planning, implementation, and evaluation. All three stages demonstrate the synergy between technology and culture. In the planning stage, teachers prepare teaching tools that combine digital media and culture. This shows that teachers play a role as innovators of meaningful and contextual learning. This is in line with opinion that media functions as an intermediary in conveying messages from teachers to students (Lestari, P. & Arsyad, A, 2022: 105) .

The implementation stage showed variations in students' abilities when operating Canva. There were still 8 students who needed assistance. Meanwhile, 4 others were quick to follow instructions. Nevertheless, there has been an improvement in the creativity of 9 students. There has also been an improvement in collaboration shown by all students. The evaluation stage shows that creativity has improved. However, there are weaknesses in the aspects of information evaluation and digital ethics. Based on the analysis of the works, 5 students are in the high creativity category and 3 are in the basic category. The credibility of the sources was low. The results of supervision by KS and documentation studies show that the school provides support for strengthening digital literacy. However, limited internet access and differences in student abilities remain challenges.

When compared to the research by Ningrum et al. in 2024, this research has a broader scope. Canva can strengthen Indonesian cultural identity. From an ethnopedagogical perspective, the culturally responsive implementation of Canva is a tangible manifestation of the education taught by Ki Hadjar Dewantara (1962), namely the nature of the times and the nature of the universe. Overall, the implementation of Canva in culture-based science learning was carried out well and contributed to improving students' digital literacy.

The effectiveness of culturally responsive Canva in science learning in improving students' digital literacy

The findings of this study indicate that the use of Canva integrated with culture is effective in improving digital literacy in science learning. The results of interviews with students show that 12 students stated that the use of Canva provided a pleasant learning experience, making it easier for students to understand the material. Teachers also confirmed that the use of Canva can help improve creativity, collaboration, and critical thinking skills. However, intensive guidance is still needed. This is in line with the opinion that the use of digital platforms can facilitate 21st-century skills, but requires differentiated guidance from teachers (Kim & Li, 2022: 66).

The results of the interview with KS also mentioned that the use of Canva had a positive impact on students' digital competence. This includes supporting a school culture that is adaptive to technology. This is in line with the view that the success of digital literacy is greatly influenced by the

ecosystem within the school. It is not only learning interventions (Livingstone, 2021: 201). Documentation data also shows concrete evidence of improved literacy skills, as seen in students' digital work and digital literacy assessment sheets. Students' work shows improvement in the quality of selecting accurate information and in presenting creative cultural content. Thus, Canva not only helps with cultural understanding but also encourages functional skills and critical thinking. However, school facilities, including supervision, must be encouraged.

Compared to previous studies, these findings certainly expand on the assessment of Canva, which has so far only been used to improve literacy. This study proves that Canva can be combined with culture. However, differences in students' digital skills show that the effectiveness of using Canva also depends on student readiness, teacher support, and the learning context. This confirms that technology must work together with pedagogy and culture to improve digital literacy.

CONCLUSION

This study concludes that the initial digital literacy of students at Gugus Andang Taruna Banyumas is still basic to adequate. This is especially true in terms of information comprehension, digital security, and device utilization. The implementation of Canva was carried out through the stages of planning, implementation, and evaluation. The culturally responsive implementation of Canva has been proven to increase student engagement and strengthen the components of digital literacy.

The integration of culture in digital-based projects greatly helped students connect science material with the cultural identity of Banyumas. It also fostered ethical awareness when using technology. Thus, Canva as a digital learning medium effectively supports the realization of culturally responsive contextual learning transformation. The limitations of this study are the limited number of informants, covering only four schools in the Andang Taruna Banyumas Cluster. In addition, the learning focused only on science. The duration of the learning intervention was also limited.

The research recommendations emphasize that teachers should develop culturally responsive digital learning modules for other subjects. Schools need to conduct digital literacy competency training for teachers. The government and schools must ensure the availability of digital infrastructure. Overall, this study has confirmed that the integration of Canva with culture not only improves digital literacy but also strengthens character and culture as a digital learning ecosystem in the 21st century.

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