



Healthy and Safe Internet Education to Improve Digital Literacy Among Sixth-Grade Students at Belakang Soya A1 Christian Elementary School in Ambon

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ABSTRAK

This community service program was conducted in response to the increasing use of the internet among elementary school students, which has not been accompanied by adequate digital literacy and awareness of safe online behavior. As a result, students remain vulnerable to various digital risks, including exposure to inappropriate content, cyberbullying, online fraud, and misuse of personal information. The program aimed to improve students' knowledge and awareness regarding healthy, safe, and responsible internet use. The activities were implemented for sixth-grade students at SD Kristen Belakang Soya A1 Ambon using educational and participatory approaches through presentations, interactive discussions, quizzes, educational games, and simple simulations. The learning materials focused on digital ethics, personal data protection, online safety, and responsible internet behavior. Program effectiveness was evaluated through pre-activity and post-activity assessments. The results showed a significant improvement in students' understanding across all evaluation indicators, with the average score increasing from 38.3% before the program to 89.6% after the program, representing an average improvement of 51.36%. The greatest improvement was observed in students' ability to protect personal information and identify suspicious online messages or links. Overall, the program effectively enhanced students' digital literacy, strengthened their awareness of safe internet practices, and provided practical knowledge that supports responsible digital behavior among elementary school students.

INTRODUCTION

Digital transformation has changed the way students access information, communicate, and learn. The internet is no longer used solely as a means of communication but has also become a learning resource that is easily accessible to elementary school-aged children. According to the Indonesian Internet Penetration Survey, the number of internet users in 2024 reached 221.56 million people, or 79.5% of Indonesia's total population, an increase from the previous year. This trend indicates that the use of digital technology is becoming increasingly widespread, including in the field of education. This increased internet access is particularly important to consider for elementary school-aged children because their ability to use digital devices is not always

accompanied by the ability to understand risks, ensure their own safety, and make sound decisions while in the digital space (Saifuddin & Putra, 2024; Willem et al., 2022). Digital literacy is no longer understood merely as the ability to operate devices but also encompasses the ability to evaluate information and make sound decisions when interacting in the digital space (Cowling et al., 2025).

Elementary school-aged children are a group that requires special attention because, at this stage of development, they are becoming increasingly independent in using digital devices, yet their critical thinking skills, self-control, and experience in dealing with risks in the digital space are still developing. These circumstances make children more vulnerable to various risks, such as cyberbullying, online scams, misuse of personal data, interactions with strangers, and age-inappropriate content. Therefore, increased internet access for elementary school-aged children must be balanced with the development of knowledge and habits regarding healthy, safe, and responsible internet use from an early age.

In its survey, UNICEF Indonesia reported that the proportion of children who have received education on digital safety remains relatively low. Therefore, digital literacy must be strengthened through targeted education so that elementary school-aged children can use technology safely, wisely, and responsibly (UNICEF Indonesia, 2025). Research shows that these skills need to be developed starting in elementary school through structured learning, as digital safety and personal data protection are essential components of 21st-century digital literacy competencies (Sajidan, Atmojo et al., 2023).

The selection of sixth-grade students as the target group for this activity was based on the partner's circumstances and the characteristics of technology use within that group. Sixth-grade students are in the final stage of elementary school and therefore interact relatively more frequently with digital devices to support both learning and entertainment activities. At this stage, the need for access to digital information and communication is also increasing. Meanwhile, their ability to recognize risks and determine safe actions in the digital space still needs to be strengthened. Therefore, sixth-grade students are considered a strategic group to receive education on healthy and safe internet use before entering the next level of education, where the intensity of technology use is likely to be even higher.

This phenomenon is not only an issue at the national level but is also reflected in the circumstances of the program's participants the sixth-grade students at Belakang Soya A1 Christian Elementary School in Ambon. Based on initial observations and coordination with school officials, the majority of students have been using smartphones to access the internet for both school-related purposes and entertainment. However, the findings indicate that this usage is not yet fully accompanied by an understanding of digital safety and ethics. Some of the issues identified include students' insufficient understanding of the importance of protecting personal data, their inability to identify credible information, and their lack of ethical behavior when interacting in the digital space. These conditions reveal a gap between the ability to access technology and the ability to use it safely and responsibly. In other words, the problem does not lie in limited access to the internet but rather in the lack of sufficient digital literacy needed to address the risks associated with internet use (Wijayanti et al., 2024).

These initial conditions were then confirmed by the results of the pre-activity assessment. Across the six measured indicators of digital literacy, students' understanding levels prior to the activity ranged from 30% to 45%, with an average of 38.3%. The lowest level of understanding was in the ability to recognize the characteristics of harmful messages or links, at 30%, while understanding regarding personal information that should not be shared stood at 35%. These findings indicate that digital safety issues among partner schools are concrete and directly related to students' basic ability to protect themselves when using the internet (Bickham et al., 2021).

A number of studies indicate that digital literacy education for elementary school-aged children is more effective when delivered through active, interactive, and contextual learning. Support from teachers and the school environment also plays a role in fostering safe and responsible technology use habits (Muhdiati et al., 2025). Learning that actively engages students can enhance their understanding and awareness of responsible internet use. Meanwhile, a contextual approach helps students connect the material to situations they encounter in their daily

lives (Khamcharoen et al., 2026). Nevertheless, research and educational practices in digital literacy at the elementary school level still largely emphasize the use of technology to support learning. Meanwhile, aspects such as digital security, personal data protection, the ability to recognize online threats, and media ethics have not always been the primary focus of educational activities (Kurniawati et al., 2024; Saifuddin & Putra, 2024; Susilawati et al., 2024).

This gap highlights the need for community service activities that not only provide knowledge about internet use but also specifically integrate healthy and safe internet use with digital security, personal data protection, media ethics, and the ability to recognize online risks (Lee & Hancock, 2023). In the context of partner organizations, this need is particularly relevant because students already have experience using the internet but lack sufficient understanding to manage the risks associated with their digital activities. Therefore, this program employs a participatory approach through presentations, interactive discussions, Q&A sessions, case studies, and simple simulations to ensure the material is understood in a way that aligns with the students' characteristics (Reddy et al., 2021).

Given these circumstances, this community service activity aims to improve the digital literacy of sixth-grade students at Belakang Soya A1 Christian Elementary School in Ambon through education on healthy and safe internet use. Operationally, the activity is designed to improve students' abilities in (1) using the internet properly and wisely, (2) identifying personal information that should not be shared, (3) understanding the risks of interacting with strangers online, (4) distinguishing between safe and unsafe behaviors when using the internet, (5) understanding the importance of keeping passwords confidential, and (6) recognizing the characteristics of potentially harmful messages or links. Achievement of these objectives was measured by comparing pre-test and post-test results across the six indicators of understanding: (Hidayat et al., 2023; Sari et al., 2024).

METHOD

This community service activity employs an educational-participatory approach that combines material presentation, outreach, interactive discussions, Q&A sessions, case studies, and simple simulations. This approach was chosen based on initial observations indicating that participants already use the internet in their daily activities but still require further guidance on healthy, safe, and responsible internet use. The use of methods that involve active participant participation is expected to help students understand the material through situations that are relevant to their daily experiences (Alenezi & Alfaleh, 2024).

This activity took place at Belakang Soya A1 Christian Elementary School in Ambon on Thursday, May 7, 2026, targeting 22 sixth-grade students. The selection of participants was based on the results of initial observations and coordination with school officials, which indicated that sixth-grade students had been using smartphones to support their learning and other digital activities. Furthermore, sixth grade is the final year of elementary school; therefore, strengthening students' ability to use the internet safely and responsibly is considered essential preparation before they advance to the next level of education. With these considerations in mind, all 22 sixth-grade students targeted by the program were included as participants.

The activities were supported by presentation slides, multimedia tools, case study materials, and assessment tools in the form of pre-tests and post-tests. The learning materials were designed using simple language, concrete examples, and situations relevant to the experiences of elementary school-aged children so that the content could be understood contextually (Fraillon et al., 2023). Pre-tests and post-tests were used to measure changes in participants' level of understanding before and after the activity (Putri et al., 2024). The activity implementation method consists of the following stages:

1. Identification of Partner Needs

This phase involves initial observations and coordination with the school to identify the conditions, issues, and needs of the participating students as the basis for developing the educational program. The needs assessment focuses on the students' internet usage patterns, their understanding of digital security, personal data protection, and online etiquette, as well as their ability to recognize risks when engaging in digital activities. The results of the needs

assessment indicate that while the majority of students use the internet in their daily lives, they do not yet fully understand how to use it in a healthy, safe, and responsible manner.

2. Activity Preparation

During the preparation phase, the community service team developed educational materials, learning resources, and assessment tools based on the results of the partner's needs assessment. The materials covered healthy and responsible internet use, digital safety, and how to identify potentially harmful messages or links. The materials were then developed in the form of simple examples and case studies relevant to the participants' daily lives, such as determining what personal information should and should not be shared online, dealing with messages from strangers, keeping passwords confidential, distinguishing between safe and unsafe online behaviors, and recognizing the characteristics of suspicious messages or links. The materials were designed to suit the characteristics of elementary school-aged children so that the learning process is communicative, contextual, and easy to understand (Opria & Momanu, 2024).

3. Implementation of Activities

Before the activity began, the Community Service Team distributed an evaluation tool in the form of a pre-test to the students to assess their initial understanding of the educational material to be presented. The pre-test and post-test instruments each consisted of six questions based on six indicators of understanding, with each question representing one indicator, namely: (1) understanding how to use the internet properly and wisely; (2) knowing what personal information should not be shared online; (3) understanding the dangers of talking to strangers online; (4) being able to distinguish between safe and unsafe behaviors when using the internet; (5) understanding the importance of keeping passwords confidential; and (6) recognizing the characteristics of dangerous messages or links.

These six indicators were used consistently in both the pre-test and post-test so that changes in participants' understanding could be compared before and after the activity. Each question item was scored 1 for a correct answer and 0 for an incorrect answer. Thus, the maximum score a participant could achieve was 6, and the minimum was 0. The scores obtained were then converted into a percentage of understanding by comparing each participant's score to the maximum score.

Furthermore, the activity was conducted through presentations combined with interactive discussions, case studies, and Q&A sessions. Topics such as personal data protection, digital security, and media ethics were presented using concrete examples relevant to the experiences of elementary school-aged children such as safeguarding personal information and passwords, recognizing suspicious messages or links, and distinguishing between safe and unsafe behavior when interacting in the digital space. Case studies were used to train participants to make appropriate decisions when facing digital situations. After the activity concluded, participants took a post-test using the same indicators as the pre-test to measure changes in their level of understanding before and after the activity. This aimed to enhance participants' participation, engagement, and understanding (Zahroh et al., 2025).

4. Activity Evaluation

After the material was presented, participants took a post-test to evaluate changes in students' level of understanding following the community service activity. The results of the post-test and pre-test were used to determine changes in the level of understanding for each indicator as well as overall. In addition to the written evaluation results, the community service team also observed participant engagement during the activity, which was used as part of the evaluation.

5. Data Analysis

Data were collected through observation, evaluation results in the form of pre-tests and post-tests, and documentation. Pre-test and post-test results were calculated based on the percentage of correct answers across the six measured indicators of understanding. Each correct answer was scored as 1 and each incorrect answer as 0, so the maximum score for each participant was 6. The percentage of understanding was calculated by comparing the score obtained to the maximum score and then multiplying by 100%.

RESULTS AND DISCUSSION

The community service activity was held at Belakang Soya A1 Christian Elementary School in Ambon on Thursday, May 7, 2026. The event lasted 2 hours and involved 22 sixth-grade students. The activity began with coordination with school officials and an assessment of the school's needs to ensure that the material presented was appropriate for the students. The results of the needs assessment showed that most students already use the internet in their daily activities, both for learning and entertainment, but do not yet have a sufficient understanding of how to use the internet in a healthy, safe, and ethical manner.

Based on these conditions, the activities were conducted through presentations, interactive discussions, question-and-answer sessions, and simple simulations tailored to students' digital experiences (Soulthoni & Harnia, 2025). This series of activities positioned students as active participants in identifying risks, responding to them, and determining appropriate actions in simulated digital situations. The use of participatory and contextual activities in digital literacy education for elementary school students has also been reported to support student engagement and understanding during the learning process (Subiyakto & Haris, 2026). Thus, the description of the activity implementation serves as the initial context before the evaluation results and analysis of changes in students' understanding are discussed.

The results of the needs assessment indicate that the partners' challenges are not only related to students' limited knowledge of safe internet use but also to the lack of established habits for recognizing and avoiding digital risks. Therefore, the program's activities are designed to strengthen students' knowledge while providing them with practical experience in handling real-world digital situations.

Table 1. Mapping of Program Issues and Solutions for Partners

No	Partner Issues	Initial Conditions	Program Solutions
1	Understanding of healthy internet use remains low	Some students do not yet understand the benefits, risks, and how to use the internet wisely	Education on healthy and safe internet use through teaching materials, discussions, case studies, and simulations of digital scenarios that closely mirror students' experiences. Teachers are provided with key points and case examples that can be reused in lessons or when guiding students.
2	Awareness of digital safety remains limited	Students do not yet understand the importance of protecting personal data and digital media ethics	Education on personal data protection, password security, digital media ethics, and the distinction between safe and unsafe behaviors. Teachers and school administrators are guided to reinforce digital safety principles through ongoing guidance and practice following the activities.
3	Students' ability to select positive content remains low	Students are not yet able to distinguish age-appropriate content	Guidance through case studies, educational games, and exercises helps students distinguish between safe and inappropriate content. Schools can continue these exercises through brief classroom discussions and by reinforcing rules regarding device and internet use on school grounds.

Table 1 shows that problem-solving does not end with providing material to students. Schools play a crucial role as an environment that reinforces educational messages after the activity is over. Teachers can review the material through simple case studies during lessons, while the school can reinforce lessons on internet ethics and safety when students encounter relevant digital situations such as (a) receiving a suspicious link via WhatsApp, (b) being asked to share account passwords with other students or strangers, or (c) knowing how to respond when encountering bullying comments on social media. In this way, the knowledge gained during the

activity is more likely to be retained and applied in students' daily lives, rather than only surfacing during community service activities.

Next, the activity was carried out through a series of systematically organized steps, as shown in the following figures.



Figure 1. Stages of Presenting Activity Materials



Figure 2. Group Photo with Partners

Figure 1 illustrates the process of delivering educational material interactively through a combination of explanations, question-and-answer sessions, discussions, and activities that engage participants. The material is not presented solely in the form of a lecture but is linked to situations students may encounter when using the internet. When discussing personal data protection, for example, students are guided to identify information that should not be shared with others. Similarly, when discussing the safety of links and messages, participants are given examples of situations that allow them to determine whether an action is safe or risky. This approach gives students the opportunity to connect digital safety concepts to the decisions they must make in their daily use of the internet.

Figure 2, meanwhile, shows the involvement of students and school officials at the end of the activity. The school's involvement throughout the entire series of activities is crucial because the sustainability of digital literacy education cannot rely entirely on the community service team. Teachers and school officials interact with students on a regular basis, giving them a strategic position to reinforce messages about digital literacy, remind students of internet etiquette, and provide guidance when students face issues related to digital activities.

Student engagement was evident in their responses to questions and case studies, as well as their participation in community service activities. This indicates that digital safety material can be presented in a contextual manner tailored to the characteristics of elementary school students. However, the engagement observed during the activities has not yet led to lasting behavioral changes, as students still require consistent practice and guidance both at school and at home. A learning approach that incorporates interactive and collaborative activities can support student engagement while fostering the development of digital literacy in elementary education (Nevrelova et al., 2024).

The assessment was conducted through a pre-test and a post-test, each consisting of six items that reflected the six aspects of digital literacy measured in the activity. The same 22 students took

both the pre-test and the post-test, allowing for a direct comparison of changes in achievement. The assessment results showed changes in achievement across all measured aspects, as presented in Table 2.

Table 2. Results of the Evaluation of Students' Understanding Before and After the Activity

No.	Indicators of Student Understanding	Before the Activity	After the Activity	Improvement (%)
1	Understanding how to use the internet properly and wisely	40%	87%	+47
2	Knowing what personal information should not be shared online	35%	90%	+55
3	Understanding the dangers of talking to strangers online	45%	92%	+47
4	Able to distinguish between safe and unsafe actions when using the internet	38%	92%	+54
5	Understands the importance of keeping passwords confidential	42%	92%	+50
6	Recognizing the characteristics of malicious messages or links	30%	85%	+55
Average		38.3%	89.6%	+51.36

Based on Table 2, the average level of student understanding increased from 38.3% before the activity to 89.6% after the activity, representing an increase of 51.36%. This improvement was observed across all measured indicators. Since the evaluation was conducted descriptively without inferential statistical tests, these results indicate an increase in students' understanding of internet safety, ethics, and responsible internet use.

The most significant improvements were seen in the indicators related to personal information that should not be shared online and the ability to identify harmful messages or links, each of which increased by 55%. For the personal information protection indicator, the achievement rate rose from 35% to 90%. Prior to the activity, this low achievement rate indicated that students were not yet fully able to distinguish between information that is personal in nature and information that is relatively safe to share. Presenting the material using examples such as full names, passwords, addresses, phone numbers, personal photos, and family information helped clarify the consequences of sharing such information with others in the digital space.

For the indicator on recognizing harmful messages or links, the achievement rate increased from 30% to 85%. This change is relevant to the students' initial condition, as the ability to recognize digital threats was one of their weakest areas before the activity. The use of examples of suspicious messages and links provided a more concrete understanding of risks that had previously been understood only in the abstract. Students were not only introduced to digital security terminology but were also guided to pay attention to specific characteristics before responding to or opening a link.

The ability to distinguish between safe and unsafe actions increased by 54%, from 38% to 92%. Meanwhile, understanding of the importance of keeping passwords confidential increased by 50%, from 42% to 92%. Both results indicate that material directly related to practical decisions is relatively easy to understand once students are provided with examples and opportunities to discuss situations that resemble their own internet usage experiences (Nurhayati et al., 2024; Rahman et al., 2024). Students gained an understanding that digital security is not only related to technology but also to simple decisions such as not sharing passwords with others, not clicking on links indiscriminately, and considering security before providing information (Yudha & Utami, 2024).

Among other indicators, the use of the internet in a responsible and prudent manner, as well as awareness of the dangers of interacting with strangers online, each increased by 47%. These results indicate an increase in understanding; however, the relatively smaller magnitude of change compared to several other indicators also suggests that the ability to make decisions in digital social situations is not sufficiently developed through an understanding of the concept of (Siddiq

[et al., 2024](#)). Students need repeated opportunities to discuss various situations, including how to respond to invitations, requests for information, or communications from strangers.

Overall, the evaluation results show that the community service activity brought about positive changes in students' level of understanding regarding the six basic aspects of internet safety and ethics. However, the increase in post-test scores cannot be equated with lasting changes in digital behavior. The post-test was administered immediately after the program, so the results better reflect students' understanding of the material presented. Meanwhile, changes in digital behavior are not immediately apparent because they are tied to students' repeated internet usage habits, including when they are not under the supervision of teachers or the community service team.

It is important to note this limitation because students may recognize that a link is dangerous, but that knowledge is not necessarily always applied when they encounter a link that catches their attention or is sent by someone they know. Similarly, students may understand that passwords must be kept secret, but consistently maintaining that secrecy requires practice. Therefore, the results of this activity are best viewed as the formation of initial knowledge and awareness that need to be reinforced through ongoing guidance. A follow-up assessment after several weeks or months can be used in subsequent activities to determine the extent to which this knowledge has endured and begun to be reflected in students' digital behavior.

The results of the activities indicate that improving students' understanding must be followed by reinforcement in both the school and home environments so that the knowledge gained does not end with the post-test results. At school, teachers can reinforce the material through brief reminders about personal data protection, password security, wise internet use, and how to identify suspicious links both during lessons and in student guidance sessions. In this way, teachers do not merely serve as facilitators during the program but become key figures who can independently continue to strengthen digital literacy even after the program ends.

Supervision at home is also necessary because students use the internet outside of school supervision. Parents can build on the material their children have learned by asking about their digital activities and guiding them when they receive messages from strangers or encounter suspicious links and content. This approach allows supervision to focus not only on the duration of internet use but also on children's ability to make decisions when faced with digital risks.

As a follow-up, schools can periodically reinforce the material and reassess students' understanding after a few weeks or months. Colleges and universities can provide ongoing guidance to evaluate how the material is being applied and update case studies based on the digital risks students face. This step is important because an increase in post-test scores reflects short-term changes in understanding, whereas changes in digital behavior require a longer period of habituation and guidance ([Batubara et al., 2024](#)).

CONCLUSION

An educational activity on healthy and safe internet use for 22 sixth-grade students at Belakang Soya A1 Christian Elementary School in Ambon improved their understanding across all six indicators of digital literacy. The average achievement score increased from 38.3% on the pre-test to 89.6% on the post-test, representing a 51.36% increase. This improvement primarily strengthened the students' understanding of personal data protection, password security, caution when interacting with strangers, and the ability to identify harmful messages or links.

Furthermore, the results indicate the development of a foundation of knowledge and awareness among students for using the internet more safely and responsibly. Since the evaluation was conducted immediately after the activity, the post-test results do not yet reflect long-term changes in digital behavior. Reinforcement through consistent practice at school, parental guidance at home, and follow-up evaluations are necessary for this understanding to develop into consistent digital behavior.

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