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Improving Students' Digital Literacy Skills Through the Use of Online Learning Resources Assisted by Collaborative Discussions

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Abstract: This study aims to improve students' digital literacy skills through the utilization of online learning resources combined with collaborative discussions. The research employed Classroom Action Research (CAR) with two cycles involving 32 eighth-grade students of MTsN 2 Jember, divided into 16 small groups. Each group carried out structured discussions with specific role distribution, namely information seeker, information evaluator, recorder, and presenter, so that each member had a clear responsibility. Data were collected through observation, interviews, and documentation, then analyzed descriptively and qualitatively. The findings revealed a significant improvement in four indicators of digital literacy. The ability to access digital information increased from 66% in the first cycle to 87% in the second cycle; the ability to evaluate information rose from 29% to 52%; ethical use of information improved from 31% to 60%; and the ability to create digital content increased from 43% to 72%. These results demonstrate that a learning strategy based on online learning resources combined with structured group discussions can foster students to become more critical, ethical, and creative in utilizing digital technology. Therefore, this model is relevant to be applied in developing students' digital literacy skills while preparing them to face the challenges of the 21st century.

Keywords: Collaborative discussion; Digital literacy; Online learning resources

Introduction

The rapid development of information and communication technology in the 21st century has brought significant changes to almost all aspects of life, including education. The advent of the internet, smart devices, and various digital platforms has enabled information to flow quickly, without the constraints of space and time. This situation requires every individual, especially students, to have the ability to manage and utilize information effectively amid the flood of available data. In today's digital age, digital literacy has become an essential skill that students must possess in order to access, select, and utilize information wisely. Digital literacy not only encompasses technical skills in using digital devices but also the ability to think critically, collaboratively, and ethically in the digital world (Cynthia et al., 2023). Many students find it difficult to assess the accuracy of information obtained from the internet (Purba et al., 2024). According to Fitrianti (2023), Students tend to accept information at face value without verifying its source. This situation is exacerbated by the prevalence of fake news (hoaxes), misinformation, and disinformation circulating on various social media platforms, which can influence students' thinking, attitudes, and behavior if not

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properly filtered. Therefore, an educational strategy is needed that not only teaches the use of technology but also equips students with information evaluation skills, digital ethics, and awareness of personal data security. A comprehensive educational approach is expected to foster critical thinking, responsibility, and collaborative skills in a digital environment, enabling students to become smart, wise, and integrity-driven technology user (Malagola et al., 2023).

The use of online learning resources such as e-learning, educational videos, and digital education platforms can be a solution to improve students' digital literacy (Purwanti, 2022). This is because online learning resources provide broader, more flexible access and are able to adapt to students' learning needs in the digital age. Research states that access to online learning resources allows students to acquire broad, up-to-date, and contextual knowledge (Kurniawan et al., 2023). Platforms such as Google Classroom, Edmodo, or Ruangguru have been proven to support independent and collaborative learning (Mujiono, 2024). In addition, the existence of these platforms also provides opportunities for students to interact, discuss, and share ideas more flexibly according to their learning needs. According to Vega et al. (2020), students who have internet access can read complex texts with teacher guidance and potentially help students develop reading comprehension skills, both offline and online. This shows that digital literacy is not only related to technical skills in using technology but also to the ability to critically process, understand, and utilize information. However, the use of technology alone is not enough without being supported by appropriate pedagogical strategies. Therefore, it is necessary to integrate active learning methods that can build students' information analysis skills (Gea et al., 2024), so that technology-based learning processes can truly improve the quality of students' understanding and critical thinking skills.

An effective strategy to support digital learning activities is the use of collaborative discussions. This strategy not only emphasizes active student involvement but also encourages the creation of an interactive and participatory learning environment. Online learning and collaborative work are important for everyone, including children as they foster a sense of shared responsibility in searching for, understanding, and processing information (Gui et al., 2024). According to Fitri et al. (2024), collaboration through group discussions helps students critically evaluate digital information, so that they do not just passively receive information, but are also able to distinguish between valid and misleading information. Critical thinking skills are crucial competencies for humans in general, and in the context of education, these skills are very important for students to have in facing the rapid flow of digital information (Sofian et al., 2023). However, conditions in the field show that students' critical thinking skills are still not in line with expectations. Therefore, there is a need for learning strategies that can overcome this gap (Elfrida et al., 2023). During discussions, students not only share their opinions but also refine, develop, and perfect their understanding (Sitompul et al., 2018). Discussions also create a space for students to question invalid information and discover the truth through logical arguments (Getenet et al., 2024). Thus, collaborative discussions play an important role in fostering communication, critical thinking, and problem-solving skills. Therefore, the combination of online learning resources and collaborative discussions can create a learning ecosystem that promotes stronger and more sustainable digital literacy (Firdausi et al., 2020).

In addition to cognitive aspects, digital literacy also includes ethical awareness in the use of information technology. According to Aliyah et al. (2024), many students are unaware of the risks of spreading hoaxes, privacy violations, or digital plagiarism. Collaborative discussions serve as an educational space where students learn about digital ethics through case studies and content analysis. According to Syam et al. (2024), when students are trained to discuss digital issues openly, they become more responsible for the information they consume and disseminate. In this case, teachers can facilitate discussion topics that are relevant to the digital world of students.

The use of digital projects such as creating presentations, infographics, or educational videos can also encourage students to create meaningful and informative content. Darwis et al. (2024) found that digital project-based learning activities encourage students to be more critical in searching for information before producing material. This is also a form of productive digital literacy that strengthens 21st-century skills. In the context of collaboration, students can work together in small groups to process digital data responsibly (Utaminingsih et al., 2023). This makes the learning process not only about consuming information, but also about producing ethical and meaningful information (Sangaji et al., 2023)).

Collaboration also strengthens students' social-emotional aspects in the learning process, including empathy, teamwork, and leadership. Explains that students who are involved in group discussions show an increase in digital communication skills and the ability to convey ideas logically. According to Fikri et al. (2021) collaborative discussions strengthen interpersonal skills that are important in the digital world. In an interactive digital learning environment, students learn from each other and develop a strong culture of digital literacy (Susanti et al., 2022). These activities also increase

students' confidence in responding to information and expressing their opinions.

With digital literacy, learning becomes more interactive and contextual, as students can actively participate in online discussions, use educational applications, and develop critical thinking skills through the evaluation of digital information (Al Fiqri et al., 2023). Given these benefits, it is important for educational institutions to design curricula and learning activities that support digital literacy. Rahma et al. (2024) reveal that students' digital literacy will improve if teachers apply technology-based learning models that are integrated with meaningful discussions. This type of learning not only improves academic achievement but also fosters positive digital character. The implementation of learning strategies based on online resources and collaborative discussions can be a concrete step towards education that is relevant to the challenges of the times (Yulianti, 2024). Therefore, this research is important as an effort to overcome learning challenges in the digital age.

Collaboration also strengthens students' social-Based on these findings, it can be concluded that the use of online learning resources supported by collaborative discussions significantly contributes to improving students' digital literacy (Permanasari et al., 2024). Innovation in interactive and participatory learning methods is essential to overcome the challenges of digital technology development in education. In addition, the development of digital literacy must be carried out continuously, covering technical, evaluative, communicative, and ethical skills (Mena-Guacas et al., 2024). The current curriculum has not fully integrated active learning strategies that can train critical, collaborative, and reflective thinking skills. This research is important to contribute to the development of adaptive learning models that are relevant to the needs of the times. Thus, students will be able to become intelligent and responsible individuals in facing the digital era.

Method

This study aims to explore the increased use of digital technology in the learning process and to enhance student engagement and responsibility in groups through digital-based learning media. Data collection methods in this study is a descriptive quantitative approach with a Classroom Action Research (CAR) type conducted in two cycles. This study collaborated with Science teachers at MTsN 2 Jember. The research subjects consisted of eighth-grade students at MTsN 2 Jember, divided into 16 groups.

Table 1. Data Groups

Number	Group	Class
1	Naura and Lisa	VIII B
2	Robby and Habib	VIII B
3	Eka and Mutiara	VIII B
4	Iqbal and Tomi	VIII B
5	Novi and Maulida	VIII B
6	Rofik and Annisa	VIII B
7	Dwi and Bidayah	VIII B
8	Adi and Holeq	VIII B
9	Sabil and Zulfi	VIII B
10	Ayu and Taufik	VIII B
11	Iwan and Dina	VIII B
12	Putri and Diko	VIII B
13	Ira and Wulan	VIII B
14	Nazwa and Rio	VIII B
15	Mirza and Vina	VIII B
16	Tia and Linda	VIII B

Based on Table 1, there are 32 students divided into 16 groups. This study cites (Sunny et al., 2023) research, which uses the CAT model developed by Kemmis and McTaggart, consisting of four stages: planning, implementation of actions, observation, and reflection. These stages are repeated to evaluate and improve the learning process until the desired results are achieved.

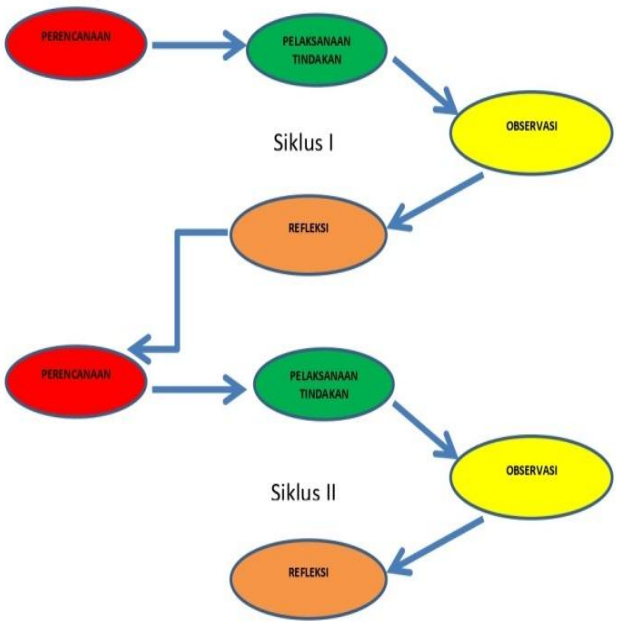

Figure 1. Classroom action research (CAR) cycle

The primary instrument used for data collection was an observation sheet, which served to monitor the activities and responses of student groups during the learning process. Data collection techniques employed included interviews, observation, and documentation. Interviews were conducted prior to the implementation of the intervention to identify the initial conditions of the

student groups and any challenges they faced related to digital literacy. Observations were conducted during the implementation of the intervention in each cycle to directly observe the learning process and record the responses of each group. Meanwhile, documentation was conducted by recording the learning process in the form of photos and videos as evidence of activities and reflection material. Data analysis was conducted qualitatively and descriptively, systematically describing all findings from observations, interviews, and documentation, allowing conclusions to be drawn regarding the effectiveness of the interventions taken in each cycle.

Result and Discussion

Results

This study was conducted in the eighth grade of MTsN 2 Jember in the second semester of the 2024/2025 academic year. The research subjects consisted into 16 students groups. This study was conducted in collaboration with biology teachers at MTsN 2 Jember. The objective of the study was to improve students' digital literacy skills through the use of online learning resources (such as educational articles, YouTube learning videos, and Google Classroom) combined with collaborative discussions both online and offline.

The results of Cycle 1 showed that only some groups were able to follow the teacher's instructions to access digital information effectively, understand the content, and present digital content.

Through reflection on these challenges, in Cycle II, the teaching strategy was improved by limiting the use of digital devices in groups. The teacher provided computers that could only be accessed by each group. This approach made students more focused, encouraged collaboration, and demonstrated high enthusiasm in using technology for learning activities. In this learning process, students used Google Classroom, Google Docs, and PowerPoint to support their learning outcomes reports.

Table 2. Data Analysis Results for Cycle I and Cycle II

Indicator	Aspects Observed	Student Completion Rate Cycle I	Percentage per Indicator	Student Completion Rate Cycle II	Percentage per Indicator
Accessing Digital Information (Atmojo et al., 2022)	Each group of students is able to use search engines effectively.	11	66%	14	87%
	Students open and explore the online learning platform	10		15	
	Students do not experience technical difficulties when using the device	11		13	
Evaluating Digital (Tzafilkou et al., 2022)	Students are able to distinguish between valid and invalid information.	8	29%	8	52%
	Students demonstrate an understanding of the credibility of sources.	0		7	
	Students avoid hoax or irrelevant information.	6		10	
Using Information Ethically (Dhar et al., 2022)	Students cite sources correctly	8	31%	12	60%
	Students must not commit plagiarism (copying without permission or acknowledgment).	2		8	
	Students demonstrate respect for copyright in presentations or digital works..	5		9	
Creating Digital Content (Gómez-Orjuela, 2021)	Students create interesting presentations (PowerPoint, Canva, videos, etc.) that are relevant to the topic.	8	43%	13	72%
	Students convey information clearly, systematically, and creatively.	5		10	
	Students work together in teams to create collaborative content (e.g., group presentations or educational vlogs).	8		12	

Source: Data Analysis Results

Table 2 shows the results of the analysis of actions in Cycle I and Cycle II, measured using four main indicators: accessing digital information, digital evaluation, using information ethically, and creating digital content. The results indicate a significant improvement in all indicators after the corrective actions

were implemented. In the indicator of accessing digital information, all students in Cycle II achieved mastery, indicating good adaptation to digital media, as evidenced by a 87% rate from the initial 66%. The indicator of digital evaluation of technology also increased from 29% to 52%, reflecting that students are able to discern sources and content well. The indicator for using information ethically showed a percentage of 60% from the initial 31%, indicating that students understand research ethics. The indicator for creating digital content showed an increase from 43% to 72%, indicating that students are better at conveying information and creating engaging content after being provided with an appropriate learning approach.

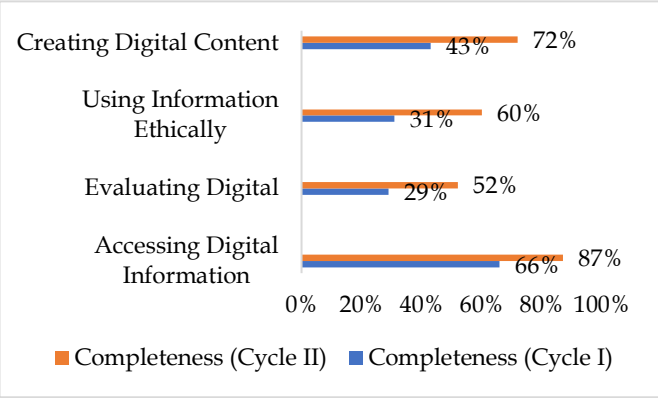

Figure 2. Graph of research results from 2 cycles

The graph above illustrates the completion percentages in both cycles. Of the 16 student groups, it can be seen that in Cycle I, the proportion of students who did not complete the course was still quite low, while in Cycle II, there was a significant increase in the number of student groups who completed the material according to the research indicators, indicating improvements in the learning process.

Discusion

This study aims to improve students' digital literacy skills through the integration of online learning resources and collaborative discussions at MTsN 2 Jember. The results of two action cycles show a significant improvement in all digital literacy indicators. This improvement can be explained through a theoretical approach and supported by findings from various previous studies.

The indicator for accessing digital information in cycle I showed that student achievement in this aspect was at 66%. After improving the strategy in cycle II, there was an increase to 87%. This shows that with proper guidance and the provision of controlled access to digital devices, students became more focused and able to navigate digital learning resources effectively.

This finding is in line with the opinion of (Haniko et al. (2023), who states that online learning resources can provide students with extensive and contextual information if accompanied by good teacher facilitation. Additionally, Lestari et al. (2022), also emphasize that digital platforms such as Google Classroom can strengthen both independent and collaborative learning simultaneously. In contrast, a study by Tafesse et al. (2024) reported that students often face difficulties when accessing digital information independently. The research highlighted that without clear scaffolding, students tend to experience information overload and confusion in distinguishing relevant from irrelevant resources. Similarly, Tinmaz et al. (2022) argued that easy access to digital platforms does not automatically translate into effective information use, as many learners still lack the critical navigation skills needed to filter trustworthy content. These findings indicate that increased access does not always guarantee improved digital literacy unless it is supported by structured digital literacy training.

Indicators for evaluating digital information show that students' ability to evaluate the accuracy and validity of information also increased significantly, from 29% in Cycle I to 52% in Cycle II. This is an important achievement because this ability reflects critical thinking skills, which are at the core of modern digital literacy.

This improvement cannot be separated from the contribution of collaborative discussions, in which students correct and respond to the information they find. As explained by Baharudin (2023), group discussions help students develop reflective thinking about digital content. This dialogical process allows students to test the validity of information sources through constructive argumentation. This finding is also supported by Aco et al. (2022), which shows that discussion-based learning encourages the formation of a deeper collective understanding of the material, including the ability to distinguish facts and opinions in the digital world. In line with the results of the study (Nisa et al., 2023), collaboration has a significant influence on increasing student activity in learning. This statement is also supported by research Rubiana (2023), that productive discussions allow students to test their understanding and clarify any doubts they may have.

The indicator of using information ethically showed an increase from 31% in cycle I to 60% in cycle II, indicating the success of learning in building students' ethical awareness of information use. After receiving guidance on copyright, source attribution, and plagiarism, students became more responsible in citing and presenting information.

Findings Hidayat et al. (2024), confirm that digital literacy encompasses not only technical skills but also ethical awareness, such as avoiding the spread of

misinformation and respecting copyright. In this context, collaborative discussions have proven to be an effective educational medium, as noted by Smith et al. (2023), because students can learn about real-life cases of digital ethics violations. Additionally, according to Utaminingsih et al. (2023), digital literacy is crucial in strengthening students' character. The application of digital literacy is expected to support 21st century skills, including critical thinking, communication, collaboration, and creativity. In contrast to the research results Venter (2024) which stated that not all digital collaborations encourage activeness or responsibility.

The indicator of the ability to create digital content increased from 43% in cycle I to 72% in cycle II. This shows that with the right stimulus and learning structure, students are able to produce informative, interesting, and relevant content

The findings of Anggia et al. (2022) state that digital project-based learning encourages students to be more active in the content creation process, while also training collaborative skills and responsibility for the content of information. The results of this study support this statement, as students are not only consumers of information, but also ethical and quality-oriented producers of information. This aligns with research by Oviana et al. (2024), which found that students actively use applications like Canva and PowerPoint to create digital posters and presentations, as well as produce digital reports after laboratory sessions.

Overall, the improvement in each digital literacy indicator in this study cannot be separated from the collaborative discussion strategy. Discussions encourage active participation, collective responsibility, and social interaction that enrich the learning process. This is reinforced by Barokah et al. (2024), who state that collaborative discussions enhance digital communication skills, leadership, and empathy.

Such learning shapes students' digital character, making them not only technically proficient but also ethical and reflective, as expected in the 21st century literacy model.

Conclusion

The improvement in all digital literacy indicators in this study indicates that the use of online learning resources combined with collaborative discussions is an effective and relevant approach to addressing learning challenges in the digital age. Learning is not only a means of transferring information, but also an interactive process that shapes critical thinking skills, cooperation, responsibility, and digital ethics.

These findings reinforce previous research results and provide new contributions to technology-based learning practices. Therefore, this learning model can be recommended as an innovative and applicable learning strategy to be implemented in other educational contexts.

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