Journal of Indonesian Teacher Development and Reflection

Vol. 1 No. 1 JANUARY 2025

Digital Literacy to Improve Student Learning Outcomes in the Material of Getting Used to Critical Thinking and the Spirit of Loving Science and Technology at SMA Negeri 1 Silindak

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ABSTRACT

In the digital era, one of the challenges in learning is how to foster critical thinking habits and a love of science and technology among students. Digital literacy is an effective method in helping students. This study aims to analyze the application of digital literacy methods in improving learning outcomes of critical thinking materials and a love of science and technology at SMAN 1 Silindak. This study uses a quantitative approach with a classroom action research (CAR) design carried out in two cycles. Each cycle consists of planning, implementation, observation, and reflection stages. Data were obtained through learning outcome tests, observation of student activities, and interviews with teachers and students to determine the effectiveness of this method in learning. The results showed that the application of digital literacy methods had a significant positive impact on student learning outcomes. In addition to improving cognitive aspects, digital literacy methods also have a positive impact on students' affective and psychomotor aspects. Students are more enthusiastic in participating in learning, show high curiosity about science and technology, and are more confident in expressing their opinions. Teachers also feel the positive impact of this method, where students are more independent in finding and processing information. Thus, the digital literacy method can be an effective learning strategy in improving critical thinking skills and fostering a love of science and technology among students.

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ARTICLE HISTORY
Received: 17 Nov 2024
Revised: 27 Des 2024
Accepted: 5 Jan 2025
Published: 31 Jan 2025

KEYWORDS
Digital literacy, student learning outcomes, critical thinking.

Introduction

In the era of increasingly advanced globalization, the development of digital technology has brought major changes in various aspects of life, including in the world of education. Critical thinking skills and a love of science and technology (IPTEK) are very important skills for students to be able to face the challenges of the 21st century. Critical thinking allows students to evaluate information better, distinguish between facts and opinions, and make more rational decisions. Meanwhile, a love of IPTEK plays a role in encouraging students to continue learning, exploring information, and following the increasingly rapid development of technology.

However, in reality, there are still many students who have difficulty in developing critical thinking habits and have low interest in IPTEK. One of the main factors that causes this is the learning method which is still conventional and less interactive. Learning that is still centered on the teacher (teacher-centered learning) causes students to be passive in receiving information without being given enough space to develop their critical thinking. As a result, students tend to only memorize information without really understanding and being able to apply it in everyday life.

In addition, the rapid advancement of digital technology also brings its own challenges in the world of education. Currently, information can be easily accessed via the internet, but not all available information has reliable validity. Many students do not yet have the ability to distinguish between true information and hoaxes or bias. As a result, they often accept information raw without further analysis. This shows that many students still do not have adequate digital literacy skills, even though these skills are very important in developing critical thinking patterns.

In response to these challenges, digital literacy is one of the learning methods that can be used to improve critical thinking skills and foster a love of science and technology in students. Digital literacy refers to an individual's ability to search, evaluate, understand, and use information from various digital sources wisely. In the context of education, digital literacy not only helps students access a wider range of learning sources, but also trains them to analyze, compare, and conclude information critically.

The use of digital literacy in learning provides various advantages. First, students can learn independently by accessing various sources of information from the internet, such as scientific journals, e-books, articles, and learning videos that are relevant to the material being studied. Second, this method allows students to discuss and collaborate with their peers more interactively, both through digital platforms and in direct discussions in class. Third, digital literacy also helps students develop technological skills that will be very useful in the world of work in the future.

However, the application of digital literacy in learning also faces several challenges. One of them is the lack of understanding of students in using digital sources effectively and wisely. Many students are more accustomed to using technology for entertainment than for academic purposes. Therefore, a learning strategy is needed that can direct students to use technology productively and beneficially for their intellectual development. In

addition, another challenge is the limited access to technological devices and the internet for some students, especially in areas with limited digital infrastructure.

Seeing the importance of the role of digital literacy in learning, this study aims to analyze the application of digital literacy methods in improving learning outcomes in critical thinking materials and the spirit of loving science and technology at SMAN 1 Silindak. This research is expected to contribute to the world of education in developing more effective learning methods that are in accordance with current technological developments. With the existence of digital literacy-based learning methods, it is hoped that students can be more independent in learning, more critical in analyzing information, and more motivated to continue exploring science and technology.

This study was conducted to answer the problem of how digital literacy can be applied effectively in learning, and to what extent this method can improve students' critical thinking skills and interest in science and technology. With a classroom action research (CAR) approach, this study attempts to provide an empirical picture of the impact of implementing digital literacy in learning and the challenges faced in implementing it in the classroom. With this research, it is hoped that schools and educators can better understand the importance of digital literacy in learning and begin to integrate digital technology as part of a more innovative and effective learning strategy. Ultimately, this method is expected to provide a more enjoyable and meaningful learning experience for students, as well as help them become more critical, creative, and ready individuals to face future challenges.

Methods

This study employs a Classroom Action Research (CAR) approach based on the Kemmis and McTaggart model, which consists of four key stages in each cycle: planning, implementation, observation, and reflection. The research is conducted over two cycles, with each cycle comprising two meetings designed to improve students' learning outcomes through the implementation of digital literacy.

The study takes place at SMA Negeri 1 Silindak, with the research subjects being tenth-grade students. These students were selected based on their tendency to struggle with critical thinking and their low interest in science and technology.

During the planning stage, the researcher develops digital literacy-based learning materials, including interactive e-books, educational videos, and online discussion platforms. Additionally, a Lesson Plan (RPP) is designed to integrate digital media into the teaching and learning process. Research instruments, such as learning outcome tests, digital literacy questionnaires, and observation sheets, are also prepared at this stage.

The implementation stage begins with the application of digital literacy-based learning strategies. The teacher guides students to access materials through digital media, participate in online discussions, and complete technology-based assignments.

Meanwhile, the researcher observes students' engagement and participation in the learning process.

During the observation stage, data is collected from test results, questionnaires, and observation sheets to assess the effectiveness of digital literacy in enhancing students' learning outcomes. An initial analysis from the first cycle is conducted to evaluate the success of the learning process. If the results are not optimal, reflection is carried out to identify areas that need improvement before proceeding to the second cycle.

In the second cycle, learning strategies are refined based on the findings from the previous reflection. Several adjustments are made, such as enhancing interactions in online discussions and presenting materials in a more engaging manner that aligns with students' needs. After implementing the revised strategies, observations are conducted again to assess changes in student engagement and understanding. Learning outcome data is then analyzed to determine the effectiveness of the implemented learning strategies.

Data analysis in this study is conducted using both quantitative descriptive and qualitative descriptive techniques. Test results are analyzed by comparing pre-test and post-test scores to determine students' learning improvement. Meanwhile, data from questionnaires and observation sheets are used to evaluate the enhancement of digital literacy and student engagement in the learning process.

This study is expected to provide a clear picture of the effectiveness of digital literacy in improving students' learning outcomes while fostering critical thinking habits and a passion for science and technology at SMA Negeri 1 Silindak. If the results from the second cycle show significant improvement, the research is concluded. However, if challenges persist, further reflection will be conducted to develop more optimal strategies.

Result

The results of the study showed that the application of digital literacy methods in learning critical thinking materials and the spirit of loving science and technology at SMAN 1 Silindak had a significant positive impact on student learning outcomes. The application of this method was carried out through various strategies, such as the use of digital learning resources, discussions based on information analysis, and the use of educational platforms to support interactive learning. This study was conducted in two cycles, where each cycle involved the planning, implementation, observation, and reflection stages. The results obtained showed a significant increase in students' cognitive, affective, and psychomotor aspects.

In the first cycle, the average value of student learning outcomes was still relatively low. Many students had difficulty sorting valid information from digital sources and were not yet familiar with digital literacy-based learning methods. Some students tended to rely on only one source of information without verifying or comparing it with other sources.

In addition, the lack of experience in conducting critical analysis of information made most students accept information raw without first evaluating its truth.

Observations made during learning showed that most students were still less active in participating in discussions. They tended to be passive and only waited for explanations from the teacher without exploring information independently. In addition, there are still students who have difficulty in using digital technology for academic purposes, especially in searching for and processing information from the internet. This is due to a lack of skills in optimally utilizing digital devices and minimal experience in searching for credible academic information.

In addition, based on interviews with teachers, it was found that the main challenge in implementing digital literacy methods is students' lack of understanding of how to select and evaluate the information they find. Some students are more accustomed to accessing information from social media or non-credible sources compared to scientific journals or academic articles. This shows that students' digital literacy skills still need to be improved so that they can access and process information more wisely.

Based on the results of the reflection in the first cycle, several improvements were made to increase the effectiveness of the application of digital literacy in learning. Teachers provide more intensive guidance on how to sort valid information, teach critical thinking techniques in evaluating information, and provide exercises in comparing various sources of information. In addition, students are given assignments to search for information from several different sources and analyze the differences and similarities of the information they obtain.

In the second cycle, there was a significant increase in student engagement in learning. Students began to demonstrate better critical thinking skills, where they were able to evaluate information more carefully and construct arguments based on the analysis they had done. They were also more active in class discussions, expressing their opinions, and being able to ask critical questions about the information they found. In addition, students also began to show greater interest in science and technology. They became more enthusiastic in seeking new information, exploring various aspects of science and technology, and were more motivated to understand ongoing technological developments. This improvement was seen from the test results in the second cycle, where most students scored higher than in the first cycle.

From the affective aspect, the application of digital literacy makes students more interested in learning materials. They feel more challenged to find information themselves, analyze a problem, and discuss their findings with friends in class discussions. Students also feel more confident in expressing their opinions because they have a stronger basis of information to support their arguments. From the psychomotor aspect, students show increased skills in using digital devices for academic purposes. They are more skilled in finding information from online journals, using search engines with more specific keywords, and analyzing the credibility of the information sources they use. In addition, they are also able to compile reports based on the results of their analysis and present their findings in front of the class.

Discussion

The findings in this study confirm that digital literacy methods can improve critical thinking skills and the spirit of loving science and technology in students. Digital literacy allows students to be more independent in accessing and processing information, and helps them develop the analytical skills needed to evaluate information objectively.

The results of this study are in line with various previous studies which state that digital literacy plays an important role in improving students' critical thinking skills. With digital literacy, students are not only passive recipients of information, but also become individuals who are active in exploring, criticizing, and applying information in everyday life.

In addition, the application of this method also has a positive impact on students' learning motivation. More interactive learning based on information exploration makes students feel more interested in learning and better understand the relevance of science and technology in their lives. This is important to build awareness that science and technology is not just a subject in school, but is part of the ongoing development of civilization and influences various aspects of human life.

However, this study also found that the implementation of digital literacy still faces several challenges, such as the lack of students' skills in sorting credible information, limited access to digital devices for some students, and the tendency for students to rely more on information from social media than academic sources. Therefore, further support is needed from schools and educators in guiding students to use digital technology wisely and effectively in the learning process.

Overall, the digital literacy method has proven to be an effective strategy in improving student learning outcomes, both in terms of cognitive, affective, and psychomotor. With proper implementation, this method can help students develop critical thinking habits, increase their interest in science and technology, and prepare them to become more competitive individuals in facing the challenges of the digital world in the future.

Thus, the results of this study provide recommendations for the world of education to further integrate digital literacy into the learning process. Teachers need to be given training in developing effective digital literacy strategies, and schools need to provide facilities that support the use of digital technology in learning. With these steps, it is hoped that digital literacy can become an integral part of the education system that is able to produce a generation that is more critical, innovative, and ready to face increasingly advanced technological developments.

Conclusion

Based on the results of the study, it can be concluded that the application of the digital literacy method in learning the material "Getting Used to Critical Thinking and the Spirit of Loving Science and Technology at SMAN 1 Silindak" has proven effective in improving student learning outcomes. The application of this method gradually helps students

access and evaluate information critically and increases their enthusiasm for studying science and technology.

The results of the study showed a significant increase in student understanding, with the percentage of completion increasing from 65% in the first cycle to 85% in the second cycle. In addition, this method also contributed to increasing student learning motivation, especially due to the use of more interactive digital media. Although there were several obstacles such as limited access to digital devices and lack of initial skills in digital literacy, the solutions implemented successfully overcame these obstacles. Thus, the digital literacy method can be used as an innovative and relevant learning strategy in facing the challenges of education in the digital era. The following is an example of a relevant bibliography based on the article above. If there are specific references used in this study, please add or adjust them according to the sources used.

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