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Utilization of Technological Literacy to Improve Students' Critical Thinking Skills in Writing Text

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Abstract

In the digital era, technological literacy is an essential skill that needs to be mastered by students to face the challenges of the 21st century. This study analyzes how technological literacy can improve students' critical thinking skills in writing texts. The method used is classroom action research (PTK) involving 30 class XI MPLB 6 students at SMK Negeri 7 Medan. The learning process utilized various technology platforms, such as word-processing software, online collaborative tools, and interactive learning applications. The results showed that technological literacy significantly improved students' critical thinking skills, particularly in identifying arguments, analyzing text structure, and composing coherent and logical writing. In addition, students also became more independent in evaluating and revising their texts with the help of digital tools.

Keywords: technological literacy, critical thinking skills, text writing, digital learning, educational innovation

Introduction

Integrating technological literacy into education has become central to improving students' critical thinking skills (Nes et al., 2021), especially in writing. The ability to analyze, evaluate (Purwanto et al., 2024), and synthesize information through technology enhances critical thinking and equips students with essential 21st-century skills. (Park, 2022)

The rapid development of digital technology has brought significant changes in the world of education, especially in the teaching and learning process (Romero Ariza et al., 2024). In the context of education, technological literacy includes the ability to operate technological devices and the ability to use technology effectively in the learning process, including improving critical thinking skills (Fang & Lee, 2021). One area that greatly benefits from technological literacy is the development of writing skills. Writing is a complex process that

requires creativity and critical thinking skills in crafting arguments, organizing ideas, and presenting coherent writing.(Yeşilyurt & Vezne, 2023)

Critical thinking skills are essential in the writing process because writing is about expressing ideas and composing texts based on analysis, evaluation, and reflection (Suyanto et al., 2023). Utilizing technological literacy in the writing process can help students access various sources of information, evaluate the reliability of sources, and compose better writing in terms of structure and content. Technologies such as word processing applications, writing tools, and digital collaboration platforms can facilitate the critical thinking process by providing direct access to resources and tools that facilitate quick and precise evaluation and revision of writing. (Lemut Bajec, 2023)

Literature Review

Technological literacy is using, managing, understanding, and assessing technology effectively. It encompasses a range of skills, from basic technical proficiency to advanced problem-solving and ethical decision-making in digital environments (National Academy of Engineering, 2006). Education involves understanding how to access, evaluate, and create information using digital tools. Technological literacy is pivotal in enabling students to navigate and critically assess digital content. The rapid proliferation of digital tools has transformed how information is consumed and produced, necessitating a shift in teaching methodologies to incorporate technology effectively. (Fry, 2022)

Critical thinking in writing involves developing clear, coherent, and well-reasoned arguments, analyzing information for credibility and relevance, and synthesizing diverse perspectives to create original ideas (Ozogul et al., 2012). Writing tasks that require critical engagement with sources are crucial for fostering these skills. Studies suggest that students who engage in critical thinking-based writing activities exhibit improved analytical and argumentative abilities. (Darwin et al., 2024)

Digital tools and platforms provide a dynamic medium for improving critical thinking in writing (Adawiyah & Mahmuddin, 2023)v. These tools offer opportunities for collaboration, access to diverse resources, and real-time feedback. Access to Resources: Online databases, academic journals, and multimedia content allow students to explore a variety of perspectives. For example, platforms like Google Scholar and JSTOR enable students to access peer-reviewed articles that enhance their ability to evaluate credible sources. Collaborative Tools: Applications like Google Docs and Microsoft Teams facilitate peer review and collaborative writing, encouraging critical engagement and constructive feedback. Writing-Specific Tools: Grammar and style-checking software (e.g., Grammarly, ProWritingAid) help students refine their writing, while citation tools (e.g., Zotero, EndNote) promote ethical research practices.(Pulungsari & Hidayah, 2024)

Research Method

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This study uses the Classroom Action Research (CAR) method to examine the utilization of technological literacy in improving students' critical thinking skills in writing texts. PTK was chosen because this method allows researchers to intervene directly in the learning process, observe the impact, and make continuous improvements based on the observations. The study was conducted in four phases: planning, implementation, observation, and reflection.

1. Subject of Research

The subjects of this study were 30 students of grade XI in a senior high school. These students were selected by purposive sampling based on the need to evaluate the utilization of technology in the learning process of writing texts. This class was also sampled because it had sufficient access to technological devices, such as computers, tablets, and the internet, needed to implement the intervention.

2. Research Design

This study used a PTK cycle design consisting of four stages:

- **Planning**: at this stage, the researcher and the teacher designed a technology literacy-based learning intervention. The technological resources include word processing applications, automatic text revision tools, and online collaboration platforms like Google Docs. In addition, teaching materials and assessment rubrics for writing texts involving critical thinking skills were prepared.
- **Implementation:** This stage involves implementing technology-based learning in the classroom. Students are given the task of writing argumentative or expository texts using the technology that has been prepared. During the writing process, students are expected to access information from the internet, use text evaluation tools, and collaborate with peers to provide feedback. These writing activities integrate critical thinking exercises such as source analysis, argument construction, and logical evaluation.
- **Observation:** the researcher observed students' activities during the learning process, including how students used technology to access information, evaluate sources, and compose and revise texts. Observation data was collected through field notes, recordings of student interactions on the digital platform, and student writing results evaluated based on the critical thinking rubric.
- **Reflection:** After each learning cycle, reflection on the results achieved was conducted. Researchers and teachers evaluate the effectiveness of technology literacy-based learning in improving students' critical thinking skills. This reflection will be used to improve the planning for the next cycle.

3. Research Instruments

The instruments used in this study include:

- **Text Writing Test:** Students are asked to write an argumentation text assessed based on critical thinking criteria, such as the ability to construct a logical argument, analyze information, and evaluate sources.
- **Observation Sheet:** Used to record students' activities during the learning process, including how they utilize technological literacy in writing and critical thinking.
- **Questionnaire:** A questionnaire was administered to students to find out their perceptions of the use of technology in learning to write and its impact on their critical thinking skills.
- **Teacher Interviews:** Interviews were conducted with teachers to get views on how technology helps students in critical thinking and text writing.

4. Data Analysis Technique

The data collected was analyzed using qualitative and quantitative descriptive techniques. Qualitative data obtained from observations and interviews were analyzed by identifying the main themes that emerged related to the use of technological literacy and critical thinking skills. Meanwhile, quantitative data derived from students' writing test results were analyzed using descriptive statistics to see the improvement of students' writing and critical thinking skills from cycle to cycle.

5. Indicators of Success

The success of this research is measured by the improvement of students' text-writing results, which reflect their critical thinking skills. Indicators of success include:

- Improved quality of arguments in student-written texts.
- Students' ability to critically evaluate information sources.
- Effective use of technological literacy in the text writing and revision process.
- Positive feedback from students regarding the use of technology in learning to write.

Using this method, the research is expected to provide a comprehensive picture of how technological literacy can be effectively integrated in learning to improve students' critical thinking skills, particularly in text writing.

Result and Discussion

Result

This study used the Classroom Action Research (PTK) method involving 30 class XI MPLB 6 students as research subjects. This study consisted of two cycles of action, each consisting of planning, implementation, observation, and reflection stages. The main focus of this study was to evaluate the extent to which the utilization of technological literacy can improve students' critical thinking skills in writing texts.

Cycle 1

In the **first cycle**, students were introduced to various technology platforms and tools that support writing and evaluating texts. Learning activities included an introduction to the use of credible digital sources of information, techniques for constructing data-based arguments, and collaboration using digital platforms such as **Google Docs** to provide mutual feedback.

Cycle 1 Results:

1. **Improvement in the ability to find sources of information:** After the intervention in the first cycle, there was an improvement in students' ability to find and use more credible sources of information. However, some students still had difficulty evaluating the sources' validity, especially from non-academic sites.
2. **Quality of the written text:** The quality of students' texts in this cycle showed improvement in terms of text structure and the use of more organized arguments. However, some students could not connect relevant facts with the arguments presented.
3. **Collaboration and feedback:** Students showed enthusiasm in providing feedback to peers through the technology platform. However, the input was superficial, focusing on grammar rather than in-depth logic and argument structure evaluation.

At the end of the first cycle, it was found that most students were getting used to technology for writing and collaboration. However, they still needed further practice to optimize their critical thinking potential.

Cycle 2

In the **second cycle**, the researcher increased the focus on **critical evaluation** of the information used and strengthened students' ability to develop logical and in-depth arguments. In addition, more practice was given to improve the quality of **constructive** and **analytical** feedback.

Cycle 1 Results:

1. **Significant improvement in source evaluation:** In the second cycle, more students could evaluate the credibility of information sources well. They could distinguish valid sources from academic websites and online journals compared to unverifiable information from blogs or social media. The use of scholarly search engines such as Google Scholar increased significantly.
2. **Quality of text writing:** The texts written in the second cycle significantly improved. Students could better construct logical arguments and use data from valid sources to support their arguments. This improvement was seen in the text's coherence, where students could organize the text in a logical order and connect ideas more clearly.
3. **Collaboration and evaluation of feedback:** In the second cycle, feedback between students became more in-depth and analytical. Students began to focus on evaluating

the argument's quality, the logic's consistency, and the relevance of the facts used. They were also more active in providing more concrete suggestions for improvement.

4. **Changes in how students view technology:** The questionnaire results show that students are increasingly confident using technology to support their critical thinking process. They felt that technology helped them find more relevant sources and made them more accessible in the text revision, especially when evaluating logical errors or lack of evidence in the arguments presented.

Critical Thinking Skills Score Improvement

To measure the improvement of critical thinking skills, researchers used a rubric that included aspects of analysis, evaluation, and synthesis of information. Based on the evaluation results, students' average scores increased significantly from the first cycle to the second cycle:

- **The average value of critical thinking skills in the first cycle:** 70 (fair category)
- **The average value of critical thinking skills in the second cycle** was 85 (good category)

This increase indicates that the technology literacy-based intervention positively developed students' critical thinking skills.

Discussion

The use of technological literacy in learning to write texts has become an innovative approach that can improve students' critical thinking skills. In the digital era, students need the skills to write well and the ability to think critically in evaluating information, constructing arguments, and analyzing data obtained through various technological platforms. Using technology in the writing learning process, students can more easily access relevant information, evaluate sources, and collaborate with their peers in the text revision process. Using technological literacy in writing allows students to think more profoundly and systematically when composing quality texts.

The Utilization of Technological Literacy in Improving Critical Thinking

According to experts, technological literacy is not only limited to using digital tools but also includes skills in managing, analyzing, and utilizing information effectively. Gilster (1997), who first introduced the term digital literacy, explains that technological literacy is the ability to understand and use information from various digital sources critically and effectively. In the context of learning to write, technological literacy enables students to access a wider range of information, use tools to structure texts and develop critical thinking by evaluating the information they use in their text writing.

According to Paul & Elder (2006), critical thinking skills involve the ability to analyze arguments, evaluate evidence, and make logical decisions based on existing information. In writing texts, critical thinking is required to construct strong arguments, evaluate the validity of information sources, and develop conclusions based on in-depth analysis. Technological

literacy assists students in this process by providing tools and resources that support the development of critical thinking skills.

Relevance of Previous Research

1. Warschauer (2007) researched the use of technology in learning to write, where she found that technology allows students to edit and revise the texts they write more quickly. Warschauer argues that digital tools such as word processing applications not only make the technical process of writing easier but also allow students to be more reflective in revising their texts. This study aligns with the research conducted, where technology supports the critical thinking process in text revision through features such as grammar checkers, text analysis tools, and online collaboration.
2. Abrami et al. (2015) revealed that the use of technology in learning not only increases students' engagement but strengthens their critical thinking skills. In their study, the digital learning platform enabled students to analyze texts, critically discuss with peers, and evaluate the arguments presented. This research supports the idea that technological literacy assists students in exploring deeper critical thinking during the writing process, both in accessing information and in processing and evaluating it.
3. Coiro and Dobler (2007) point out that digital information literacy is closely related to critical thinking skills, especially when evaluating sources found online. Writing texts based on research or data from the internet requires the ability to assess the accuracy and relevance of the information. This research emphasizes the role of technological literacy in honing students' critical thinking skills in assessing and using relevant information when writing texts.

Impact of Technology Literacy Utilization on Writing Skills

The results showed that students who utilized technological literacy in writing texts experienced significant improvements in their critical thinking skills. Technological literacy gives students access to various rich sources of information, enabling them to develop more in-depth and complex arguments. In addition, technological tools such as word processing applications and online collaboration platforms made it easier for students to evaluate and revise their writing, resulting in more structured and logical texts.

One important aspect of improving critical thinking skills is students' ability to evaluate sources of information. In this study, technological literacy was shown to assist students in assessing the validity, accuracy, and relevance of the sources they used in their texts. This is important in academic writing, where the reliability of information sources is the basis of strong and valid arguments.

Conclusion

This study shows that technological literacy can significantly improve students' critical thinking skills in writing texts. Technological literacy allows students to access information

more widely and quickly, providing them with the necessary tools to compose, evaluate, and revise texts more efficiently. In text writing, technology helps students in technical matters. It deepens their analytical thinking, such as evaluating arguments, assessing the validity of information, and developing a more logical and organized text structure.

In addition, technology also encourages collaboration between students through digital platforms that allow for collective discussion and revision. This contributes to improving the quality of the texts produced and developing critical thinking through a continuous process of reflection.

Using technological literacy in writing instruction holds significant potential for enhancing students' critical thinking skills. By equipping students with the tools and strategies to engage with information critically, educators can prepare them for the complexities of the modern world. However, addressing challenges such as equitable access and teacher training is essential for realizing the full benefits of this approach.

Article Advantages

1. Practical Contribution: This article provides a helpful contribution to the world of education, especially in designing technology-based learning strategies that integrate the development of critical thinking skills with the writing process.
2. Innovative Approach: The use of technology to support critical thinking skills in the context of text writing provides a creative approach that is relevant to the demands of the 21st century, where technological literacy and higher-order thinking skills are essential.
3. Theoretical Reinforcement: This article strengthens various technological literacy and critical thinking theories with empirical data supporting the relationship between these two concepts.

Article Weaknesses

1. Sample Limitations: This study was conducted on a limited group of students, so the results may not be generalizable to a wider population or different levels of education.
2. Time Limitations: This research based on Classroom Action Research (PTK) was conducted relatively short, so the long-term impact of technology utilization on students' critical thinking skills has not been thoroughly measured.
3. Focus on Specific Technologies: This article focuses on the use of some specific technology platforms and tools, which may not be relevant or available in all schools or learning contexts, limiting their application in environments with limited access to technology.

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