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Enhancing Students' Critical Thinking Skills Through Blended and Project-based Learning Approaches

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Abstract

In the era of globalization and rapid information technology advancement, education must continuously adapt to prepare the younger generation with relevant skills. One crucial skill that needs to be instilled is critical thinking ability. This research investigates the influence of project-based learning through blended learning with Canva and Capcut media on enhancing necessary thinking skills. This research employs a quantitative approach through a quasi-experimental method. The research sample comprises students from classes A and B of one of junior high school in West Sumatera who enrolled in the Social Studies subject, where class A serves as the experimental group and class B as the control group. The research findings reveal that project-based and blended learning aided by Canva and Capcut media can enhance students' critical thinking skills.

Keywords
Blended learning, critical thinking skills, project-based learning

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Introduction

In the current era of digitalization, science and technology (IPTEKS) are developing very rapidly. Humans born during the Industrial Revolution era 3.0 and 4.0 are called Generation *Z*. Wahab and Irfan (2024) stated that Generation Z, in solving all problems, tends to rely on the internet because they can easily access information. Additionally, in the era of globalization and rapid information technology advancement, education must continuously adapt to prepare the younger generation with relevant skills. One crucial skill that needs to be cultivated is critical thinking (Roudlo, 2020). This ability is vital in academics, daily life, and professional careers. However, students still face numerous challenges in developing critical thinking skills.

Ferdinan (2021) elucidated that critical thinking is a cognitive process involving creating, evaluating, and analyzing. According to Saraswati and Agustika (2020), critical thinking has six aspects: remembering, understanding, applying, analyzing, evaluating, and creating. It aligns with Brookhart's perspective in 2010, encompassing higher-order thinking skills such as logic, analysis, evaluation, creation, problem-solving, and decision-making. From the insights of these experts, critical thinking skills have become exceedingly important in fostering individual competencies to confront various challenges and adapt to the current times (Gradini, 2019; Syahri & Ahyana, 2021).

Based on observations and interviews with students at SMPN 17 Padang about Social Studies regarding the understanding of continent characteristics, it was found that the current teaching methods inadequately stimulate the development of students's critical thinking skills. The sheer volume of material that must be covered in the formal curriculum often results in passive learning processes, which do not allow students to practice their critical thinking skills actively. This is evidenced by the students' limited ability to identify continents. Therefore, to enhance students' critical thinking abilities, it is crucial to plan instructional strategies to stimulate and develop critical thinking in students.

The project-based learning (PjBL) model is an educational approach that can enhance critical thinking skills through problem-solving activities. The PjBL model focuses on project work activities based on a given problem, encouraging students to explore information through project outcomes to address the issue (Kokotsaki et al., 2016). In the PjBL learning model, students investigate contextual problems occurring in three surrounding environments, providing them with opportunities to think critically while solving these issues (Retnowati et al., 2020). This model facilitates problem-solving processes through product development (Lesh & Harel, 2003). The PjBL model involves several steps for solving a problem, starting with developing a project to explore information and find solutions to the assigned problems.

Anggraeni et al. (2019) revealed that blended learning is an effective instructional method for enhancing students' critical thinking skills. Blended learning combines face-to-face classroom instruction with digital technology as an additional learning resource or collaborative tool (Hapizah et al., 2022). Project-based learning (PBL) has also proven effective in developing students' problem-solving and critical-thinking skills (Sularmi et al., 2018).

Project-based learning begins with formulating fundamental questions that guide the development of a product. The project-based learning approach is rooted in the project

method introduced by Kilpatrick (Ratno et al., 2022). In this method, the steps are as follows: (1) students formulate fundamental questions; (2) students design the project; (3) students plan; (4) students implement the project; (5) the teacher monitors; and (6) evaluation is conducted. In each stage of this model, students are the primary focus of learning and are free to engage in the learning process.

Smith and Hill (2019) stated that students who engage in blended learning through collaborative projects could generate creative solutions to real-world problems and better understanding of the subject matter. However, some studies only focus on the impact of single teaching methods without considering the combination of blended learning and project-based learning. Furthermore, few studies explicitly address the application of this model in the context of middle school. Implementing project-based learning in the current era of the Fourth Industrial Revolution will be more dynamic and effective when integrated with a blended learning approach. The blended learning approach aligns well with Generation Z students, who are accustomed to technology in their learning activities.

Blended learning should be accompanied by utilizing instructional media to facilitate the learning process efficiently. In this context, the Canva and CapCut application platforms are relevant choices as instructional media that can facilitate learning. Therefore, this research focuses on implementing the blended learning model through the CapCut and Canva platforms with a project-based learning approach to enhance Generation Z students' critical thinking skills at SMPN 17 Padang.

Literature Review

Blended learning

Blended learning is a learning strategy that combines face-to-face learning activities, where teachers and students carry out learning activities using e-learning, namely online learning media that can be accessed anytime and anywhere (Aladwan et al., 2018). Blended learning can make it easier for students to participate in learning activities because teaching materials and learning resources can be accessed flexibly (Sandanayake, 2019). Blended learning can be interpreted as a learning strategy that combines learning activities directly or indirectly. According to Saleem (2011), learning uses various communication technologies and mobile equipment to obtain information to achieve goals. Blended learning allows lecturers to create a more conducive learning environment. Holt et al. (2013) described blended learning as a learning novel that combines face-to-face instruction with online learning. Serrani et al. (2019) further elaborated, defining blended learning as a process enabling students to study on campus or at home using online media, thereby allowing them to determine the time, place, and method of their studies without direct lecturer interaction. Latchem and Jung (2009) contend that blended learning is particularly well-suited to higher education because it can be implemented without requiring in-class attendance. Therefore, blended learning can integrate face-to-face and online learning methods. It aims to foster a supportive learning environment that promotes student activity and independence. It aligns with Joutsenvirta and Myyry's (2010) assertion that blended learning combines face-to-face and online learning to cultivate active, independent, and flexible learning.

Blended learning is almost any combination of technology, pedagogy, and job duties. It is explicitly explained that there are no specific instructions for integrating technology in blended learning; technology is seen as a learning method and not mentioned directly as part of it. Initially, blended learning focused on combining two or more learning methods to create innovation (Bryan & Volchenkova, 2016). Graham 2006 was the first to define blended learning as face-to-face and computer instruction (Graham et al., 2013). In contrast to Graham and Friesen's views, Howard sees blended learning not in terms of the delivery medium but in the time the learning is carried out. According to Howard, blended learning is a term for the distance learning community introduced to utilize synchronous learning activities, such as face-to-face interaction with instructors and collaborative work with peers, to complement asynchronous learning activities carried out individually by learning participants. Overall, blended learning is a learning model that combines the physical presence of teachers and students (physical co-presence) with the help of technology (technical mediation) and combines synchronous and asynchronous learning as a unified whole. Blended learning is not about the many dimensions used directly or independently but about a particular implementation model (Khachatryan, 2020). In this way, students will be able to develop optimally and be able to face the era of the Industrial Revolution 4.0. In simple terms, it can be said that blended learning combines direct learning (traditional learning where teachers and students interact directly, and both can exchange learning materials), independent learning (learning through different modules), and independent/online learning.

Project-based learning

Project learning can be defined as long-term activities involving students in designing, making, and displaying products to overcome real-world problems. Thus, the Project Learning (PjBL) learning model can be used to develop students' abilities in planning, communicating, solving problems, and making the right decisions regarding the problems they face. AlAli (2024) stated that project-based learning is contextual learning that prioritizes student-centeredness and uses environmental problems to instruct students' knowledge and learning skills. Kokotsaki et al. (2016) noted that the effectiveness of project-based learning is suitable for science learning because it can develop self-efficacy, namely strong self-confidence in conducting tasks. PJBL is a learning process that focuses on a long learning system, focusing on problems and several components in knowledge and scientific disciplines (Pratiwi et al., 2018). From the statements above, when implemented, the PJBL learning model can improve students' critical thinking because applying this model can encourage creativity, questioning skills, independence, a sense of responsibility, self-confidence, and the ability to think. In practice, it does not involve planning that adapts to the characteristics and background of students. The application of the PJBL learning model has several advantages, namely: a) increasing students' learning motivation, b) training students' self-confidence, c) training collaboration between students, d) students becoming more active in learning activities, e) forming students to be able to process resources. Information sources (Azizah et al., 2018). In implementing the PJBL learning model, some steps differentiate it from other learning models, namely: 1) determining basic questions related to the material, 2) designing the project, 3) planning the project creation schedule, 4) monitoring project progress, 5) project assessment,

6) evaluation of project creation experience (Yulianto et al., 2017). From the several explanations above regarding the PJBL model, researchers believe that applying this model can improve students' ability to think critically. Zubaidah (2017) explains that the application of project-based learning is a suitable model for meeting educational goals in the 21st century because it involves the 4C principles, namely critical thinking, collaboration, creativity, and communication. Therefore, this research is important because it is an effort to improve critical thinking skills.

Critical thinking

Critical thinking has also been defined as "meaningful, reasonable, and purposeful thinking" and "the ability to analyze information and ideas carefully and logically from various perspectives" (Huang et al., 2014). Critical thinking is an active intellectual process that consists of skills in understanding concepts, applying, analyzing, synthesizing, and evaluating. All these activities are based on observation, experience, thinking, consideration, and communication results, which will guide the determination of attitudes and actions. Critical thinking is a student's ability to solve problems through an investigation process. Critical thinking can train students to participate actively in learning and gain new experiences because critical thinking allows for conducting learning activities through discovery. Critical thinking can also develop students' thinking patterns in determining the correct action (Facione, 2011).

Critical thinking is the intellectually disciplined process of actively and skilfully conceptualizing, applying, synthesizing, and evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication as a guide to belief and action. Its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or questionable issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications, and consequences; objections from alternative viewpoints; and frames of reference (Jenicek, 2006). This understanding shows that critical thinking can be interpreted as a process and an ability. These processes and skills are used to understand concepts, apply, synthesize, and evaluate the information obtained or produced. Not all information received can be used as knowledge that is believed to be true to guide action. Likewise, the information produced is not always correct. This information must be assessed using clarity, thoroughness, accuracy, reliability, applicability, other supporting evidence, arguments used in concluding, depth, breadth, and reasonableness. Students' critical thinking abilities can be improved by providing complex tasks requiring problem-solving processes.

Anderson and Krathwohl divided into six thinking abilities: remembering, understanding, application, analyzing, evaluating, and creating (Widana et al., 2018). Brookhart (2010) states that high-level thinking skills, one of which is critical thinking, include logical and reasoning abilities, analysis, evaluation, creation, problem-solving, and decision-making. Bakir and Oztekin (2014) stated that critical thinking is a process of producing new concepts that are different from previous concepts. Based on this expert opinion, it can be concluded that necessary thinking skills.

Social studies

Social studies education aims to develop students' basic knowledge and skills valuable for their daily lives. Social studies are closely related to students' preparation to play an active role in Indonesia's development and be involved in global society. Social studies must be seen as a critical component of a child's education. Social studies play a significant role in directing and guiding students towards democratic values and behavior, understanding themselves in the context of today's life, and understanding their responsibilities as part of an interdependent global society. Social studies are an integrated study material that is an organized simplification, adaptation, selection, and modification of history, geography, sociology, anthropology, and economics concepts and skills. Studies pay attention to how people build a better life for themselves and their family members, how to solve problems, how people live together, and how people change and are changed by their environment. However, so far, some people have consistently underestimated social studies subjects, and many people say that social studies are dull and less challenging subjects because most of the material is just memorized. It is a problem for social studies subjects themselves. This problem becomes more serious when faced with the fact that, so far, social studies subjects have not received the proper attention. Social studies are a vital subject because studying social studies can guide students to adapt to their social environment and can help students face social problems that occur in society more wisely.

The term social studies in elementary schools are the name of a subject that stands alone as an integration of several disciplinary concepts from social studies, humanities, science, and various social issues and problems in life. Social studies material for the elementary school level does not show the disciplinary aspect because what is more important is the educational and psychological dimensions and the holistic characteristics of students' thinking abilities (Nasution & Lubis, 2008).

Methodology

This research used a quasi-experimental method with a pretest-post-test non-equivalent control group design. According to Chiang (2015), a quasi-experiment is an experimental design conducted without randomization but involves assigning participants to groups. The research focuses on two groups: the experimental group engaged in blended learning based on the project with Canva and CapCut (student-centered) and the control group receiving blended learning through Edmodo with a lecture-based approach (teacher-centered). The research subjects are students from classes IX A and B in Social Studies at SMPN 17 Padang. Class A was designated as the experimental group, while Class B was the control group.

The research process involves several stages: (1) initial assessment (pretest) conducted before commencing the learning process; (2) learning implementation, where the experimental group participates in blended learning through Canva and CapCut with a project-based learning approach, while the control group receives blended learning through Canva and CapCut with a lecture method; (3) final assessment (post-test) conducted after the completion of the learning process; (4) the collected data are then analyzed to obtain significant results.

The data in this research were obtained using observation sheets, pretests, post-tests, and specific assignments. The instruments used include test sheets, assignment sheets, and observation sheets. Data analysis was conducted using a one-way ANCOVA test, with a focus on the aspect of critical thinking skills.

Findings and Discussion

The learning process in the experimental class applies a blended learning model through the utilization of the Canva and CapCut platforms with a project-based learning approach, which combines online and face-to-face interactions. Online interactions are conducted through and facilitated by Canva and CapCut, while face-to-face meetings are held at the school. The learning process follows the steps of project-based learning,

- Identifying and formulating the project.
- Planning solutions to complete the project.
- Gathering data.
- Processing data.
- Compiling the results report.

The teaching approach is the key difference between the control and experimental groups. In the control group, a combination of project-based learning is used, while in the experimental group, blended learning through Canva and CapCut is employed. It should be noted that in both online and offline learning components, the project-based approach is not applied in the control group.

The initial stage of the project-based learning process begins with identifying and formulating a project related to understanding continents, involving students in the classroom. During this stage, students are engaged in two critical steps: (1) identifying problems and (2) sharing ideas with their peers. The second step is to develop a project solution plan. Through online activities, students elaborate on the problems identified in implementing the curriculum on understanding continents and seek solutions. The students project involves creating instructional media using Canva and CapCut applications to address the curriculum implementation issues. This project design activity trains students to think critically, as they must conceive a project product to solve the problem. The third step is to gather information. Data collection is done online by accessing various sources of information. This information is necessary to develop the media project to be created. The next step is to process the collected data. Student groups engage in intensive and collaborative discussions to analyze the gathered information. They identify the conceptual framework and develop a problem-solving framework based on their understanding. These discussions can be held in face-to-face meetings and through online and offline interactions using the blended learning approach applied in the research. This helps students practice critical thinking (Habibah et al., 2022; Qalbi & Saparahayuningsih, 2021; Triyanto & Prabowo, 2020).

In this stage, students utilize the Canva and CapCut online learning media platforms (as illustrated in Figures 1 and 2). Through Canva and CapCut, students can use these applications to tackle more engaging and critical problems based on the curriculum content presented offline by the teacher. In this environment, students can also delve deeper into discussing and

analyzing relevant concepts related to the identified issues. Through these discussions, the main goal is to develop a deeper and more critical understanding of the subject matter and formulate further plans for problem-solving, aided by the Canva and CapCut applications.

Figure 1. *The results of using the Canva application done by students related to projects given by teachers at school*

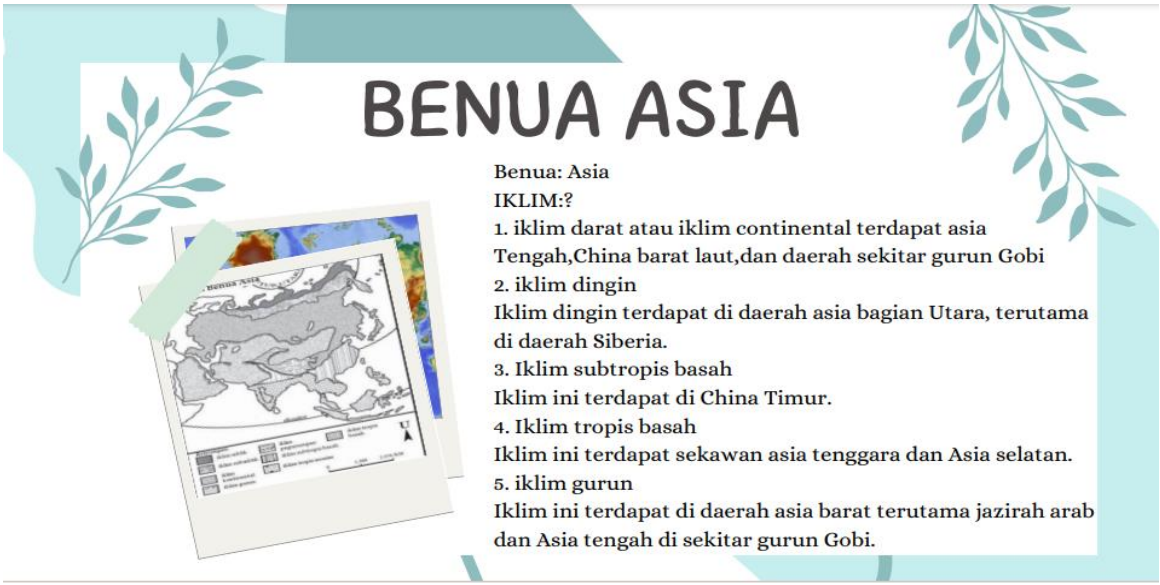
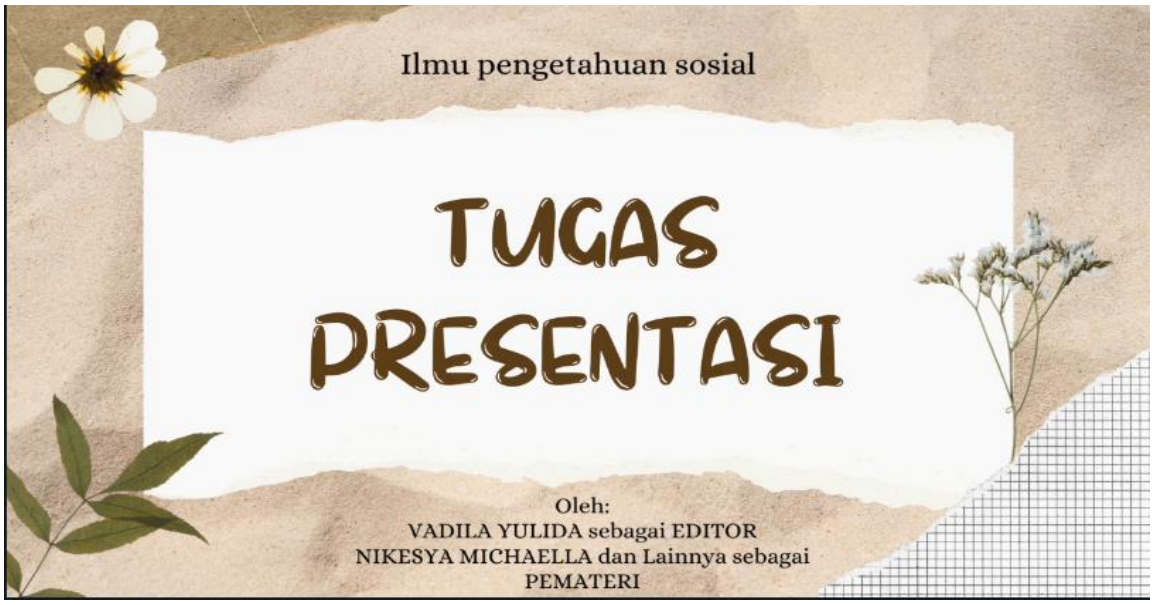


Figure 2. *The results of the use of the CapCut application carried out by students related to the project given by the teacher at the schoo**l***



The fifth step involves the preparation of a report. The results of the activities conducted earlier to solve the problem are then used as the basis for report preparation. This report has been prepared and worked on within the defined scope. After collecting data from both groups, statistical analysis is conducted to compare critical thinking abilities between the two groups. The following are the research results.

Table 1. *Comparison of average scores on the preliminary test and final test of critical thinking ability*

Group	Average Preliminary Test Score	Average Final Test Score
Experiment	70	85
Control	68	72

Based on the results of analysis, there was a significant increase in students' critical thinking abilities in the experimental group after implementing the PBL-based blended learning method. Their mean final test score increased from 70 to 85, while the control group only increased slightly from 68 to 72. This research indicates that applying PBL-based blended learning improves students' critical thinking skills. This learning method provides opportunities for students to actively learn through solving real-world problems. During the implementation of project-based learning with the help of digital media, Canva, and CapCut, an evaluation was carried out to measure students' critical thinking skills in producing media products. This evaluation process is carried out using critical thinking. Findings from the review show that students demonstrate a positive level of critical thinking skills.

Table 2. *Results of student's critical thinking abilities*

No	Indicator	Criteria	Percentage
1	Fluency	Mention/write five or more different ideas, suggestions, or alternative answers	85%
2	Originality	Mention/write some interesting unique ideas that are logical, new, and relevant to the given problem	83%
3	Elaboration	Explain some logical details of existing ideas so that the formulation of ideas becomes clearer and can be implemented more easily	81%
4	Flexibility	Write several alternative answers that are logical and relevant to the problem given from different points of view	80%
5	Metaphorical thinking	Combine several ideas, modify, and explain the formulation of ideas using logical and coherent analogies	79%

Based on these results, it can be observed that students have more striking critical thinking skills in the following ways: 1) Put forward or write down several ideas that are unique, logical, relatively new, and related to the given problem; 2) Generate five or more ideas, suggestions, or various alternative answers; 3) Write alternative answers that are logical and relevant to the problem from various points of view; 4) Explain in detail several logical aspects of the existing

idea to clarify the formulation of the idea and make its implementation more manageable, and finally, 5) Combine ideas, make modifications, and formulate them with logical and coherent analogies.

These results show that project-based learning is learning that emphasizes student-centered activities and implementing problems that exist in the surrounding environment (Yustina et al., 2022; Pratama & Shodiq, 2021; Qalbi & Saparahayuningsih, 2021). Project-based problem learning is learning that develops students' constructivism in knowledge and skills in solving problems (Dewi et al., 2023; Handayani & Sinaga, 2022; Odja et al., 2022; Ratno et al., 2022; Sularmi et al., 2018; Yudiana & Sari, 2022). The results show that blended learning based on project-based learning assisted by Canva and Capcut media can improve students' critical thinking abilities.

The analysis results reveal significant differences in critical thinking skills between students who participated in project-based learning with Canva and CapCut media (the experimental group) and those who received a combination of project-based learning without these digital tools (the control group). This discussion aims to delve deeper into these findings, exploring the implications and significance of the observed differences in critical thinking abilities.

Enhancing critical thinking through project-based learning

The findings indicate that project-based learning, emphasizing student-centered activities and real-world problem-solving, substantially impacts the development of critical thinking skills. The experimental group, engaged in project-based learning with Canva and CapCut, demonstrated superior essential abilities of critical thinking compared to their peers in the control group.

One notable aspect of improved critical thinking in the experimental group is their ability to generate unique, logical, and innovative ideas when confronted with a given problem. This aligns with the fundamental principles of critical thinking, which involve thinking outside the box, considering alternative perspectives, and devising creative solutions. Project-based learning encourages students to explore diverse solutions and engage in open-ended problem-solving, fostering a mindset conducive to generating novel ideas.

Furthermore, the experimental group exhibited a higher capacity to generate multiple ideas and alternative answers to problems. This critical thinking component is crucial, reflecting the ability to consider various perspectives and approaches to a given challenge. Project-based learning's collaborative and exploratory nature encourages students to brainstorm, discuss, and synthesize some ideas, enhancing their critical thinking capacity.

The experimental group's ability to provide logical and relevant alternative answers from different viewpoints underscores their proficiency in critical thinking. Critical thinking generates ideas and evaluates their validity and relevance to the problem. Project-based learning prompts students to analyze and justify their proposed solutions, leading to a deeper understanding of the problem and its potential resolutions.

Moreover, the experimental group demonstrated a comprehensive grasp of various logical aspects of their ideas. This meticulous examination of ideas allows for a more precise formulation and implementation of solutions. Critical thinking entails dissecting complex

issues into manageable components and evaluating each component logically. Project-based learning's iterative process encourages students to refine and articulate their ideas, honing their critical thinking skills.

Finally, the experimental group excelled in combining ideas, modifying, and formulating coherent analogies—an advanced facet of critical thinking. This ability to synthesize information and draw connections between concepts is a hallmark of progressive critical thinking. In project-based learning, students are challenged to integrate information from various sources, adapt their solutions, and draw insightful parallels. This practice undoubtedly contributes to their enhanced critical thinking abilities. This successfully implemented the blended learning based on project-based learning method, which has proven to be effective.

Implications and significance

The findings have several implications for education, particularly in the context of the modern classroom and the ever-evolving digital landscape. First and foremost, they underscore the effectiveness of project-based learning as a pedagogical approach for nurturing critical thinking skills. By immersing students in real-world problems, project-based learning compels them to engage in higher-order thinking, problem-solving, and decision-making. The results support the idea that project-based learning should be further embraced as a means of fostering not only subject knowledge but also the essential life skill of critical thinking.

Integrating digital media tools such as Canva and CapCut enhances the project-based learning experience. These platforms provide students with accessible and user-friendly means of creating and presenting solutions. The findings affirm the value of leveraging technology to facilitate collaborative learning and creativity in problem-solving contexts. It highlights the importance of incorporating digital literacy and media skills into the modern curriculum to empower students for success in the digital age.

Furthermore, the observed differences in critical thinking skills between the experimental and control groups emphasize the need for teacher training and professional development. Educators should have the knowledge and skills to design and implement project-based learning experiences that effectively promote critical thinking (Walker, 2014). It includes integrating digital tools and platforms to enhance learning outcomes.

From a broader perspective, the results suggest that educational institutions should consider adopting a more holistic approach to developing students' critical thinking abilities. While content knowledge remains essential, cultivating critical thinking skills should be integral to the educational agenda. This research demonstrates that project-based learning offers a promising avenue for achieving this goal.

Conclusion

In this research, the application of blended learning based on Project-based Learning (PBL) with the help of Canva and Capcut media was proven effective in improving students' critical thinking skills. Apart from that, the vital thinking abilities of students who use blended learning techniques are higher than in classes taught using conventional learning models. It can be seen from the post-test that the average score of experimental class students was higher

than that of the control class. The analysis results show a significant increase in the experimental group compared to the control group. Through this innovative approach, students' critical thinking abilities will further develop and be ready to face real-world challenges.

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