International Journal of Educational Research Excellence (IJERE)
https://ejournal.ipinternasional.com/index.php/ijere
Volume 03, Issue 02, July-December 2024
e-ISSN: 2830-7933
DOI: 10.55299/ijere.v3i2.1081

Implementing Project-Based Learning to Enhance Critical Thinking Skills in High School Students

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Article history: received September 05, 2024; revised September 27, 2024; accepted September 28, 2024

Abstract
The objective of this study is to ascertain student responses and enhance their critical thinking abilities through the implementation of project-based learning models at SMA 6 Jakarta. To achieve these objectives, this research was conducted using the qualitative method. This study focused on 19 students at SMA 6 Jakarta. It examined the application of a project-based learning model and related factors, including students' responses, their critical thinking abilities, implementation constraints, and efforts to address these issues. Data were gathered through a combination of methods, including observation, in-depth interviews, focus group discussions, document recording, questionnaires, and critical thinking tests. The resulting data were analyzed both quantitatively and qualitatively. The findings indicated that implementation of learning at SMA 6 Jakarta using a project-based learning model has led to notable improvements in students' critical thinking abilities. Additionally, the student response to the learning process was largely positive.

Keywords: project-based learning, critical thinking, skills, students

I. INTRODUCTION

The term "education" is a broad one, encompassing a multitude of meanings and interpretations. This understanding is contingent upon one's perspective when evaluating the concept of education. In Indonesia, education is understood as a means of enhancing individual and collective intelligence, with the ultimate objective being the improvement of societal quality of life. (Sitanggang et al., 2024). This is articulated in Law No. 20 Article 3 (2003) on education, which defines it as the enhancement and development of students' abilities. The expansion of the student population in the field of education can be achieved by augmenting knowledge, improving skills, enhancing attitudes, modifying ways of thinking, and other means. (Komara et al., 2023).

Schools are formal institutions comprising a number of interconnected elements, including teachers, students, learning facilities and infrastructure, learning media, learning environment, curriculum, and so forth. (Nurul Maulida & Sukri Adani, 2023). The quality of education is contingent upon the efficacy and efficiency with which learning is implemented, encompassing all elements of the educational process, including learning objectives, educators, instructional materials, pedagogical strategies, physical learning environments, and assessment. (Hifni et al., 2021). The success of training is influenced by numerous factors, with the teacher's commitment to preparing students for learning being a crucial element.

A qualified teacher is an individual who is capable of facilitating student learning. A qualified teacher possesses a comprehensive understanding of both the subject matter and the pedagogical approaches that are most effective in facilitating learning. To achieve this level of understanding, it is essential for a teacher to design classroom experiences that are conducive to student learning and to prioritize the development of skills that are essential for success in life. (Liakisheva, 2024)

The educational process has three fundamental aspects, which serve as the primary objectives and are subsequently developed. These three aspects are cognitive (knowledge), affective (attitude), and psychomotor (skills). (Lestari, 2019). In light of these objectives, it is incumbent upon formal educational institutions, such as schools, to play an active role in enhancing the quality of human resources. In addition, the graduates produced must be qualified, competitive, innovative, creative, collaborative, and possess good character. (Zainal et al., 2022). It is imperative that teachers possess the requisite qualifications to facilitate an engaging, meaningful, and enjoyable learning experience for their students. One strategy to cultivate students' critical and creative thinking abilities is to enhance the learning process, making it more engaging, meaningful, and enjoyable. This approach optimizes student involvement in the learning process, thereby fostering the development of students' cognitive abilities. (Luh Nyoman Gita Acyuta Dewi et al., 2024) (Kiribayeva & Aldamzhar, 2024)

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Efforts to enhance the quality of instruction in academic institutions frequently encounter a number of challenges, one of which is the attainment of student learning outcomes. In such instances, educators assuming the role of learning leaders must demonstrate the capacity to deploy a range of learning models. The utilisation of diverse learning models motivates students to engage actively in learning activities. Furthermore, the learning process necessitates that students adopt a critical mindset to ensure the attainment of learning outcomes that align with the established learning objectives. (Sitanggang et al., 2024). An effective learning process is one that considers the interrelated elements of learning objectives, learning materials, and learning methods (Santoso & Khisbiyah, 2021). Additionally, for a successful learning outcome, educators can integrate elements related to both learning and student behavior.

The development of critical thinking skills enables students to make decisions in a careful, thorough, and logical manner, considering a range of perspectives. The application of a critical mindset enables students to evaluate the opinions of others and express their own opinions. Consequently, educators must instruct students in the techniques of searching, processing, and critically evaluating diverse types of information. This will ensure that students are not overwhelmed by the volume of material they are expected to learn. When students actively seek out and resolve the problems they encounter, the information they receive is more likely to be retained over time. (Tafakur et al., 2023).

The ability to think critically is a valuable skill that enables students to approach problems in a systematic manner, identify and overcome obstacles, generate new questions, and design effective solutions. One effective approach to fostering critical thinking is the Project-Based Learning (PjBL) model.

In order to avoid being left behind in the Project Based Learning (PjBL) model, students must engage in critical thinking. As time progresses and human thought processes evolve, a multitude of exemplary learning models have been devised for students. One learning model that has been demonstrated to stimulate students' thinking patterns is Project Based Learning (PjBL). The existence of Project Based Learning (PjBL) illustrates that learning models are not always teacher-centered, and that they can facilitate students' improvement in their thinking abilities (Sungkono & Ekaputra, 2023).

A teacher-centered learning approach is not conducive to the development of students' critical thinking abilities. In light of these challenges, researchers have sought to address the difficulties encountered by students in developing their critical thinking skills through the implementation of project-based learning models. The Project Based Learning (PjBL) learning model represents an innovative, student-centered approach to education. In this model, the teacher serves as a motivator and facilitator, providing students with the opportunity to engage in independent or group-based learning. The results of the research indicate that the implementation of Project Based Learning (PjBL) in the context of accounting subjects has a notable impact on student learning outcomes. Additionally, other studies have demonstrated that the use of Project Based Learning (PjBL) is associated with improvements in student achievement, performance, and cognitive skills (Sitanggang et al., 2024)

Project-based learning (PjBL) necessitates the creation of projects pertaining to the subject matter, which are typically outlined by the instructor. Project-based learning (PjBL) is predicated on the assumption that students' ideas and thoughts represent an alternative form of problem-solving. This approach allows students to experience the problem-solving learning process directly. (Esilvita, 2023). Project-Based Learning (PjBL) offers several advantages. It can enhance students' creative abilities, foster critical thinking, and facilitate problem solving.

The capacity for creative thinking and effective problem-solving are essential qualities of sound reasoning. It can thus be seen that one of the advantages of the project-based learning model is that it can improve critical thinking in students. (Wahyu et al., 2018). The connection between Project Based Learning (PjBL) and students' critical thinking is the capacity to apply, analyze, synthesize, and evaluate information obtained and process the results of observation, experience, reflection, discussion, or communication. The capacity for critical thinking is not an inborn attribute; rather, it is a cognitive skill that can be cultivated through direct engagement with problems. As students become accustomed to employing the aforementioned skills, their critical thinking abilities are likely to mature. To foster the growth of students' critical thinking, educators must create a learning environment that encourages the application of critical thinking skills.
(Taningrum et al., 2024).

II. METHODS

This study employed a qualitative critical classroom action research design, as delineated by (Saragih et al., 2024). The research was conducted in two cycles of action, each comprising the following phases: planning activities, implementation of actions, observation, evaluation, and reflection. The study involved 19 students from SMA 6 Jakarta and was conducted in collaboration with the school's teaching staff. The researchers and teachers collaborate in planning activities, which entail the preparation of all requisite learning tools in alignment with the project-based learning model. Additionally, learning procedures and outcomes, classroom management, and research instruments are all planned accordingly. In the implementation phase, teachers will facilitate classroom learning activities using project-based models, with the objective of producing student learning products in the form of portfolios. In the observation phase, the researchers observed the implementation of teacher and student actions in the learning process and collected the necessary data through a variety of methods, including observation, in-depth interviews, focus group discussions, document recording, and the administration of student response questionnaires and critical thinking tests. Subsequently, the results were evaluated by comparing them with the anticipated criteria, after which a decision was made.

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Concurrently, reflection activities were conducted to ascertain the strengths and weaknesses of the actions taken, which were then utilized as a foundation for contemplating potential enhancements to the learning process and student learning outcomes.

Figure 1. Qualitative Research

III. RESULTS AND DISCUSSION

The incorporation of pedagogical approaches aligned with social constructivism, coupled with a public policy-oriented project-based learning framework, has been successfully deployed within the context of social studies education. The implementation of this pedagogical approach entailed the adoption of specific learning procedures, as outlined below: First, students are assigned independent group work to read and complete tasks within the LKS, including summarizing and reviewing chapters and creating media presentations. Secondly, the outcomes of the aforementioned group assignment serve as a foundation for students in groups to present using a PowerPoint media program that employs a conceptual framework model. Thirdly, the results of this presentation are then followed by class discussion activities. During the class discussion, students who have not yet had an opportunity to present are encouraged to ask questions, provide comments, and offer assessments.

The aforementioned three procedures or learning steps are primarily implemented with the objective of facilitating students' enhancement of their conceptual critical thinking abilities, enabling them to more effectively comprehend the central tenets of the material discussed collectively through group learning activities. Additionally, these procedures can also serve to enhance students' capacity for value reasoning and social skills. Ultimately, as a culminating element of the learning activities, project-based learning practice procedures are developed, particularly with the intention of discussing social issues that are pertinent to the subject matter previously discussed. This enables students to produce public policy proposals.

In this final public policy-oriented learning activity, the following learning procedures or phases were developed. First, students are instructed in the identification and formulation of problems and needs within the community, with particular attention paid to the emergence of public policy issues in social life. Secondly, students are instructed in the exploration of data and information from a variety of learning sources, including books, print and electronic mass media (in particular, the Internet), and learning sources within the local community. The objective of this data and information mining is to identify problems in a more comprehensive and accurate manner, thereby establishing a conceptual framework for developing a hypothetical solution to existing problems. Thirdly, with the capacity to process the data and information obtained by students from a range of learning sources, they then learn to propose a number of alternative solutions to the problems that have been identified and formulated. Fourthly, on the foundation of the aforementioned problem-solving alternatives, accompanied by a value analysis and clarification of the potential efficacy of each alternative, students then learn to formulate and propose constitutional public policies to relevant governmental elements, with the objective of overcoming identified problems. Furthermore, the public policy proposal must be grounded in a rigorous value analysis. In the fifth stage of the process, students are able to propose an action plan to gain support from relevant elements of society and government, thus facilitating the acceptance and implementation of the proposed public policy. Sixthly, students are required to present their social project to the jury teacher for socialization and validation. Ultimately, students and educators can engage in reflection on the learning experience to reevaluate the entire prior learning process. All of the aforementioned learning activities are to be completed by students without leaving the direction, guidance, facilitation, and motivation of the teacher in both independent and collaborative settings.

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It is postulated that the aforementioned learning procedure is predicated on the tenets of social constructivism, which espouses a particular learning approach. This is because the learning process undertaken by students has been conducted both independently and in cooperative groups. This conviction is predicated on the tenet of constructivism, which postulates that learning is fundamentally an independent undertaking by learners to construct their own knowledge. It is evident that this independent learning activity necessitates dialogue with others in groups to construct social knowledge, which is defined by the necessity for consensus among members of the community group (Higham et al., 2022).

In both independent and cooperative learning activities, the acquisition of new knowledge is predicated on the learners' existing experiences and prior knowledge. Accordingly, the development of the learning process must take into account the prior knowledge or initial experience of the students. This is where the initial concepts already possessed by the learners are identified, allowing for their development and transformation into a more complex and rigorous structure. In order to facilitate the development and transformation of initial knowledge into more complex and tested structures, it is essential to provide direction, guidance, facilitation, dialogue, and validation, both among students and in collaboration with teachers. At this juncture, it becomes evident that learning activities, such as modeling by the teacher, learning in groups, presentation activities, class discussions, data and information collection, and reflection on the learning experience, assume paramount importance. These activities serve to facilitate the construction of valid social knowledge structures by students (Higham et al., 2022).

Indeed, this is the process of learning social knowledge that is described by NCSS (2000) as a powerful learning experience based on social constructivism. The learning process and results become more meaningful, integrated, value-based, challenging, and involve students learning actively and participatively.

The aforementioned learning procedures will not yield optimal results unless they are adapted to contextual and supported by suitable learning tools and the teacher's capacity to instill motivation for learning. Such guidance facilitates more effective learning, fostering students' self-confidence, positive attitudes, and cognitive strategies. Additionally, it ensures appropriate reinforcement for students' learning efforts. Furthermore, it encourages recognition and appreciation for every student learning outcome, regardless of its magnitude. For this reason, in the implementation of the aforementioned learning procedures, teachers also endeavor to comprehend the progression of student learning motivation, the existence of students with limited intellectual abilities and socio-economic capabilities, and the value of contextual and practical examples. Additionally, learning is facilitated by the use of instructional materials such as textbooks, computer-based presentation software, and digital learning tools. Furthermore, assistance is provided in the provision of learning resources for both print and electronic mass media (the Internet), as well as the utilisation of learning resources within the community. Learning is guided both in terms of the curriculum and within the classroom. Learning is guided both in terms of the curriculum and in addition to the co-curriculum. Learning is guided by the use of self-assessment formats. Learning develops portfolios. Teachers recognise and appreciate every process. Teachers recognize and appreciate every student's learning activities and progress. They foster positive relationships with all students, regardless of status or background. Teachers accept student feedback openly and constructively, ensuring that any negative effects on students are minimal. Teachers are willing to modify their attitudes and behaviors to align with student expectations.

The implementation of the aforementioned procedures and the establishment of a conducive learning environment were observed to have resulted in notable enhancements in students' conceptual understanding and academic abilities, which were classified as "good" in two cycles of action. The enhancement of learning outcomes with regard to critical thinking skills is clearly influenced by a multitude of learning factors. These include independent learning activities with guidance from LKS, learning in groups, learning to present ideas in an unrestrained and inventive manner through the use of presentation media tools, learning through class discussions, learning how to formulate problems, and learning through the extraction of information and data, among others.

In the field, students were able to develop hypothetical conceptual frameworks, create presentation media through the development of conceptual frameworks, identify alternative solutions to problems, analyze and clarify values, make decisions, formulate public policy proposals, create action plans, and present and debate with jury teachers. This type of self-directed learning can be seen as an example of the inquiry-based learning model, which experts have identified as a key approach for enhancing critical, conceptual, and academic thinking.

Such learning has also been observed to enhance students' social skills, including the capacity to mobilize group cooperation, share leadership responsibilities, distribute tasks, communicate orally in presentations and class discussions with teacher judges, resolve conflicts of interest between group members, and demonstrate courage and ability. To contact resource persons, students must learn to communicate intensively with supervising teachers with respect in both curricular and co-curricular activities. They must also develop the ability to defend opinions, the ability to influence the thoughts and beliefs of others orally, and the ability to discuss with group or classmates.

The success of achieving the formation of social skills, as previously outlined, is believed to originate from the intensive development of group learning models and the creation of multi-directional learning relationships between students and various learning resources. This is achieved by providing active roles and student creativity in realizing all their learning potential, which is directed and guided. While this is an insufficient method for producing optimal critical thinking skills, it is a promising approach for fostering social skills. This is consistent with the perspectives and conclusions who posit that integrated learning activities encompassing social, academic, and moral dimensions can facilitate the development of conceptual and academic thinking skills, critical thinking, and social skills, while also enhancing students' value and moral reasoning in a consistent, independent, and meaningful manner.

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Furthermore, the implementation of this learning innovation has been observed to result in increased self-confidence, sensitivity, and social commitment among students. The fostering of positive beliefs and attitudes in students through tutoring can contribute to the development of self-confidence. This is achieved by encouraging students to believe that they can learn effectively and achieve optimal results if they make all effective learning efforts. Providing learning challenges that are relevant to students' abilities can also enhance their self-confidence, including by fostering a positive attitude toward independent learning, learning to present their ideas in class discussions, connecting with direct sources in the community to obtain data and information, and other activities. Student project work is presented and validated in front of teacher judges, with recognition and appreciation given for every progress in student learning success. Furthermore, students are provided with access to communicate intensively with teachers for the benefit of tutoring. The creation of a learning climate conducive to such growth is aligned with the perspective of quantum learning model developers, who posit that fostering learner confidence can enhance academic self-concept and, in turn, amplify learning outcomes (Sayangan, 2024).

Furthermore, students can enhance their social sensitivity and commitment by providing them with comprehensive access to comprehend and engage with actual social issues or problems that are emerging within society. The comprehension and consciousness that is cultivated is then confronted with the opportunity for students to actively engage and cultivate their socio-political involvement in order to resolve social issues that exist within the context of community life through the formulation of public policy proposals. Such activities also facilitate the integration of learning opportunities that encourage students to engage in the analysis and clarification of their values. This is done in a manner that allows them the autonomy to make decisions that are both rational and responsible in alignment with their espoused value beliefs. These learning experiences are designed to equip students with the capacity to harmonize their disparate beliefs and values, cultivate positive attitudes and dispositions, and cultivate a desire to actively participate in the resolution of actual as well as controversial social problems that arise within the social sphere (Verawati & Sarjan, 2023).

Ultimately, the implementation of this pedagogical innovation also encounters numerous obstacles in its implementation, with the objective of achieving the optimal learning outcomes. Firstly, this form of learning necessitates a greater investment of time from students than that required by conventional learning models. The number of subjects that students are required to follow restricts the extent to which they can engage in intensive learning. Secondly, this learning model necessitates that students engage in more intensive learning, focus their attention, and participate actively. The conventional learning habits of students who rely on reading as a preparation method for midterm and final examinations represent a significant obstacle to the effectiveness of this learning model. Thirdly, this learning model necessitates a greater emphasis on cooperative and participatory learning. Conventional learning habits, which are typically achieved through individual and passive learning, can impede the transformation of students' learning habits. Fourth, this learning model presents students with a multitude of challenges, necessitates active student involvement, interacts with a plethora of learning resources, and demonstrates student learning outcomes in a multitude of forms. The conventional student learning habits that are passive, lack of challenges, and which utilize learning resources solely from teacher notes or a limited number of source books, and which show learning outcomes in the form of limited objective or essay questions, present an obstacle to implementing this learning innovation (Dewi Wahyuningsih et al., 2023).

Fifthly, this learning model requires that learning facilities be adequate. Such facilities should include a suitable learning room, sufficient learning resources, learning media, and opportunities for guiding students' learning. Unfortunately, the facilities needed are currently limited, so the results achieved are also limited.

These obstacles have been addressed wherever possible, including the following measures. First, the application of learning was contextualized. Secondly, students are provided with considerable motivation to learn, recognition and appreciation for all learning activities and outcomes, and learning is adapted to the changing rhythms of student learning attitudes and behaviours. Third, educators endeavor to furnish students with the requisite learning facilities, including the provision of computers and LCDs, the preparation of worksheets, and the facilitation of access to additional learning resources. Furthermore, there is a need to optimize the learning environment by organizing and adjusting learning space to better align with the evolving needs of students. Fourth, educators prioritize providing students with more attention and access to time for more comprehensive tutoring, encompassing both curricular and co-curricular endeavors (Awaliyah et al., 2024).

IV. CONCLUSIONS

In light of the aforementioned findings and the ensuing discussion, two conclusions can be drawn from the results of this study. Firstly, the implementation of project-based learning at SMA 6 Jakarta in two cycles of action can enhance students' critical thinking abilities. Secondly, the students' responses to the learning process were predominantly positive. The students expressed general agreement and satisfaction with the implementation of the project-based learning model as an innovative approach to social studies instruction. The project-based learning model allows students to develop a range of skills, including the ability to think critically, work in groups, solve problems in the community, present and account for their learning outcomes, and take responsibility for their learning results. The learning process presents a series of challenges, offering opportunities to learn from daily life experiences that extend beyond the boundaries of theoretical learning from books. It encourages the development of critical thinking, the appreciation of group work, an understanding of democratic principles, the ability to solve problems using scientific methods, and the capacity to engage in public policy making for the common good. In light of the aforementioned

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findings, the following recommendations can be put forth. It is recommended that other teachers who encounter similar challenges and circumstances consider implementing a project-based social studies learning model to enhance students' critical thinking abilities and positive engagement in learning. Secondly, it is recommended that the head of SMA 6 Jakarta implement a school policy to encourage other subject teachers who face similar challenges and circumstances to adopt project-based learning models. This approach can effectively enhance students' critical thinking abilities and positive engagement in learning. Thirdly, other researchers interested in investigating the efficacy of project-based learning models in fostering critical thinking and positive learning outcomes can utilize the findings of this study as a foundation for further research and development.

ACKNOWLEDGEMENTS

Author thanks to all people and institution which helped in most cases, sponsor and financial support acknowledgments in this study.

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