

IMPLEMENTATION OF A PROJECT-BASED LEARNING (PJBL) MODULE FOR TEACHERS AND STUDENTS TO ENHANCE CRITICAL THINKING SKILLS AT SMK NEGERI 2 SEMARANG

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ABSTRAK

Kemampuan berpikir kritis siswa Kelas X Pemasaran di SMK Negeri 2 Semarang masih tergolong rendah karena pembelajaran konvensional dan adanya kendala adaptasi pada fase transisi dari jenjang SMP ke SMK. Kegiatan pengabdian kepada masyarakat ini bertujuan menstimulasi kemampuan berpikir kritis siswa melalui implementasi modul inovatif berbasis Project-Based Learning (PjBL) pada mata pelajaran Dasar-Dasar Pemasaran. Mitra kegiatan ini adalah guru kejuruan dan 36 siswa Kelas X PM 1. Metode pelaksanaan meliputi sosialisasi program, pelatihan, penerapan pembelajaran berbasis proyek di kelas, pendampingan terstruktur (scaffolding), serta evaluasi dampak. Hasil kegiatan pengabdian secara deskriptif menunjukkan perubahan positif yang sangat baik pada ketajaman berpikir kritis siswa, di mana nilai rata-rata kognitif berkembang pesat dari 61,11 saat pretest menjadi 90,44 pada posttest. Implementasi modul ini terbukti efektif memberikan kontribusi nyata dalam meningkatkan kualitas pembelajaran, mendorong partisipasi aktif kelompok, menumbuhkan keberanian berpendapat, serta melatih kemampuan siswa dalam mengidentifikasi masalah hingga merumuskan solusi konkret terhadap studi kasus pemasaran nyata di kelas, meskipun efektivitasnya di lapangan masih terbatas oleh durasi waktu intervensi kognitif siswa fase transisi.

ABSTRACT

The critical thinking skills of Grade X Marketing students at SMK Negeri 2 Semarang were relatively low due to the predominance of conventional teaching methods and students' difficulties in adapting during the transition from junior high school to vocational high school. This community service program aimed to stimulate students' critical thinking skills through the implementation of an innovative Project-Based Learning (PjBL)-based module in the Basic Marketing course. The program involved vocational teachers and 36 students from Grade X Marketing Class 1 as its partners. The implementation consisted of program socialization, training, project-based classroom instruction, structured scaffolding, and impact evaluation. The results of the program descriptively demonstrated a highly positive improvement in students' critical thinking skills, as reflected in the substantial increase in the mean cognitive score from 61.11 on the pre-test to 90.44 on the post-test. The implementation of the module proved to be effective in enhancing the quality of learning by promoting active group participation, encouraging students to express their opinions confidently, and developing their ability to identify problems and formulate practical solutions to authentic marketing case studies. Nevertheless, its effectiveness in practice remained constrained by the limited duration of the cognitive intervention during students' transitional learning phase.

INTRODUCTION

Entering the twenty-first century, global challenges require vocational education systems to assume a strategic role in preparing graduates who are highly competent, possess competitive advantages, and demonstrate life skills that are aligned with contemporary developments. Educational practices that focus solely on knowledge acquisition without fostering attitudes, practical skills, and higher-order thinking abilities may produce graduates who are insufficiently prepared to address current challenges (Saputra, 2024). Critical thinking skills are considered essential in the academic process because they transform students from passive recipients of information into active learners who are capable of analyzing, evaluating, and formulating ideas independently. However, the development of students' critical thinking skills in Indonesia remains relatively low, indicating that educational outcomes have not yet met the expected standards (Armansyah et al., 2022). Moreover, monotonous and less engaging learning activities tend to reduce students' motivation and interest in learning, thereby hindering the optimal achievement of national educational goals (Albina et al., 2022).

In the Marketing Department, critical thinking skills constitute a fundamental competency, particularly in the Fundamentals of Marketing course for tenth-grade students. Based on preliminary observations and interviews conducted in Grade X Marketing classes, students' critical thinking skills were found to be suboptimal. This condition was reflected in their limited participation during group discussions, their tendency to accept information without critical analysis, and their difficulties in solving problems or case studies requiring higher-order reasoning. The relatively low level of critical thinking skills is largely attributed to students' transitional phase and adaptation process from junior high school to vocational high school. According to school records, students achieved an average daily assessment score of 79.3 in the Fundamentals of Marketing course. Although this score can be categorized as satisfactory, it remains lower than the average achievement in other vocational subjects. Furthermore, the combined average score of the Semester Summative Assessment (PSAS) for Grade X Marketing students was only 63.4, indicating that students' learning outcomes have not yet reached an optimal level.

Interviews with Mr. Sahrul, the Fundamentals of Marketing teacher, revealed that many students experienced difficulties in answering questions requiring in-depth analysis. Similarly, an interview with Mr. Joko, the Head of the Marketing Department, confirmed that a considerable number of students remained passive during classroom learning and demonstrated limited initiative during group discussions. Although student-centered learning has been implemented at SMK Negeri 2 Semarang since the introduction of the 2013 Curriculum (Farihatun & Rusdarti, 2019), its implementation still faces several limitations. Students frequently experience boredom because similar instructional models are repeatedly used across different subjects. In fact, the selection of appropriate learning models plays an important role in encouraging students' active participation during the teaching and learning process (Annisa Rehani & Mustofa, 2023). One of the instructional materials that plays a strategic role in learning is the learning module. A learning module is a concise and specific instructional material systematically developed to achieve predetermined learning objectives (Pratama et al., 2022).

Learning modules play a significant role in enhancing students' critical thinking skills. Through modular learning, students with faster learning paces are able to complete instructional materials and assessments more efficiently, whereas students who require additional time are provided with opportunities to revisit the learning materials until they achieve a thorough understanding. Consequently, academic disparities among students can be minimized (Triandini et al., 2021). Amalia et al. (2023) demonstrated that the implementation of Project-Based Learning (PjBL)-based electronic

modules positively contributes to improving students' critical thinking skills. Likewise, Syarofatin et al. (2022) found that learning modules integrating the PjBL approach effectively enhanced students' critical thinking abilities, as evidenced by improved evaluation scores.

Nevertheless, the implementation of Project-Based Learning and learning modules does not always produce optimal outcomes. The effectiveness of PjBL depends not only on the instructional model itself but also on the learning environment and the readiness of its implementation (Suparmi et al., 2024). These inconsistent findings indicate an urgent need for instructional innovation in Grade X at SMK Negeri 2 Semarang. Therefore, this community service program was conducted to examine and stimulate the effectiveness of implementing a Project-Based Learning (PjBL) module in improving students' critical thinking skills in the Fundamentals of Marketing course.

METHOD

This community service program was conducted at SMK Negeri 2 Semarang in collaboration with the Fundamentals of Marketing teacher as the primary partner and 36 students from Grade X Marketing Class 1 (X PM 1). The program was implemented through five structured stages adapted from the innovative school empowerment framework.

a. Needs Assessment

The first stage involved coordinating with the school principal and the Head of the Marketing Department to discuss the urgency of strengthening critical thinking skills among students undergoing the transition from junior high school to vocational high school. This stage also included synchronizing the implementation schedule of the project intervention. Based on the school's recommendations, a partner teacher was appointed to facilitate the implementation in the experimental class. In addition, in-depth discussions were conducted to identify the initial classroom conditions, which were characterized by relatively conventional and monotonous instructional practices. Appropriate solutions were subsequently formulated based on the identified problems.

b. Socialization and Mentoring

This stage involved introducing the program formally and explaining the initial procedures for implementing the Project-Based Learning (PjBL)-based learning module to both the partner teacher and students. The primary objective was to establish a shared understanding of the program, clarify the project implementation procedures, and prepare students mentally before the classroom intervention commenced.

c. Training and Guidance

This stage represented the core activity of the community service program. Students in Grade X PM 1, who served as the experimental group, began learning through the PjBL-based learning module. The classroom activities were initiated with a pre-test using a validated critical thinking assessment instrument to measure students' baseline critical thinking skills. Subsequently, students were organized into small groups to develop authentic marketing projects. The learning module served as the primary instructional guide for designing product marketing strategies and solving contextual business case studies collaboratively.

d. Evaluation

The final stage involved administering a post-test using the same validated critical thinking assessment instrument to measure improvements in students' critical thinking skills following the implementation of the project-based learning module. A reflective discussion was then conducted with the partner teacher and the Head of the Marketing Department to evaluate challenges encountered during the implementation. These challenges included the limited duration of the

intervention and the relatively short adaptation period experienced by students during their transition to vocational education, which may have contributed to the absence of statistically significant improvements in the parametric analysis.

RESULTS AND DISCUSSION

a. Needs Identification

The needs identification phase began with a coordination visit conducted by the community service team to the principal and the Head of the Marketing Department at the partner school, SMK Negeri 2 Semarang. The meeting aimed to obtain the necessary permissions and discuss various instructional challenges encountered in vocational classrooms. Subsequently, the Head of the Marketing Department recommended the teacher responsible for the Fundamentals of Marketing course as the strategic partner teacher who would assist in implementing the program in the experimental class.

Based on the interviews and preliminary observations conducted by the community service team in collaboration with the Fundamentals of Marketing teacher, empirical findings indicated that Grade X students in the Marketing Study Program (PM) were still experiencing difficulties adapting their learning culture from junior high school to vocational high school. The students' critical thinking skills had not yet reached the expected level, as evidenced by the school's documentation showing that the average Final Semester Summative Assessment (PSAS) score was only 63.4. Therefore, the community service team initiated the program by introducing a Project-Based Learning (PjBL)-based module as a practical solution to encourage active student participation and transform the previously monotonous classroom atmosphere. The PjBL model has been shown to motivate students to participate actively throughout each stage of the learning process through observation, question formulation, and problem-solving activities (Maharani et al., 2025).



Figure 1. Distribution of the Project-Based Learning (PjBL)-Based Module as a Learning Solution

b. Socialization and Mentoring

The session commenced with a presentation delivered by the community service team, focusing on the introduction of the Project-Based Learning (PjBL)-based instructional module as an innovative solution designed to improve students' critical thinking skills. During this session, the team thoroughly explained the structure of the self-learning module, the role of collaborative project work in enhancing students' understanding of vocational subjects, and how the module components help students simplify complex concepts into more contextual and meaningful learning experiences. A learning module is a systematically designed instructional material equipped with clear guidance that

provides structured learning experiences through organized subject content (Famulaqih & Lukman, 2024).



Figure 2. Socialization of the Project-Based Learning (PjBL)-Based Module Using PowerPoint

During this session, the community service team explained the specific stages of project implementation, including identifying market problems, organizing collaborative group roles, evaluating findings, and independently developing marketing strategy proposals through a self-paced learning approach. The participants showed great enthusiasm because the module integrated contextual case studies closely related to current industrial practices. This introductory activity was intended to ensure that students fully understood the objectives of implementing the PjBL module and could maximize its use to simplify complex vocational concepts into more practical and applicable knowledge.

c. Training and Guidance

The next phase involved training and technical guidance focusing on the implementation of collaborative group projects in the classroom. During this activity, students were assigned to work in groups and began identifying marketing product strategy projects outlined in the vocational module. Throughout the project, students received intensive assistance from both the community service team and the partner teacher to complete each project stage systematically.

The community service team served as facilitators by providing instructional scaffolding to help students overcome cognitive difficulties during their transition period, as they were not yet familiar with independent learning approaches. This guidance was specifically designed to develop key indicators of critical thinking, including students' ability to analyze consumer data critically and evaluate the strength of arguments generated within their groups. Consequently, by the end of the mentoring session, each group successfully produced a systematic marketing project report based on authentic problem-solving.



Figure 3. Practical Implementation of the Project-Based Learning (PjBL)-Based Module

This stage marked the beginning of the actual implementation of the community service program in the experimental classroom, involving Grade X PM 1 students at SMK Negeri 2 Semarang. During the first meeting, all participating students completed a pre-test designed to measure their initial critical thinking abilities. Analysis of the pre-test results revealed that the students achieved an average cognitive score of only 61.11. This relatively low score objectively indicated that, prior to the intervention, students' reasoning abilities were still predominantly limited to lower-order cognitive skills, namely remembering (C1) and understanding (C2), which were largely text-based and limited in scope.

d. Evaluation Activities

The evaluation phase was conducted through an interactive question-and-answer session between the presenters and the students to assess improvements in critical thinking skills and understanding of the learning materials. The community service team provided opportunities for each group to present the challenges they encountered, justify their arguments, and ask questions regarding the marketing case studies they had completed. Through this reflective discussion, dynamic two-way communication was established, while simultaneously enhancing students' confidence in expressing logical ideas.



Figure 4. Classroom Discussion During the Question-and-Answer Session

Based on systematic observations and cognitive assessments conducted throughout the community service program, highly positive outcomes were identified. First, students demonstrated a substantially deeper understanding of the importance of critical thinking in making both digital and conventional marketing business decisions.



Figure 5. Final Evaluation: Students Completing the Post-Test

The evaluation findings provide practical recommendations for future instructors to allocate more flexible time during project scheduling and management. Such flexibility would allow critical thinking skills among transitional-phase students to develop more effectively and sustainably.

Based on the pre-test and post-test results of Grade X PM 1 students, descriptive statistical analysis demonstrated the following improvements.

Table 1. Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	36	48	72	61.11	6.869
Posttest	36	76	100	90.44	6.363
Valid N (listwise)	36				

As presented in Table 1, the implementation of the project-based module successfully increased the average critical thinking score of students in the experimental class from 61.11 on the pre-test to 90.44 on the post-test. These findings are consistent with those reported by Rohmatulloh et al. (2023), who found that students using e-modules consistently achieved higher average scores. These results indicate a meaningful improvement in the critical thinking skills of students who participated in learning using the Project-Based Learning (PjBL)-based module in the Fundamentals of Marketing course at SMK Negeri 2 Semarang.

The improvement in post-test scores also indicates that the Project-Based Learning (PjBL)-based module made a positive contribution to enhancing student learning activities. Although the statistical analysis did not reveal a statistically significant difference, the descriptive findings clearly demonstrate the module's effectiveness, as reflected in the post-test achievement of Grade X PM 1 students. Improvements were observed in students' abilities to identify problems, analyze information, evaluate evidence, and draw logical conclusions. The absence of statistical significance is likely attributable to the limited duration of the intervention and the adaptation process experienced by Grade X PM students, who were transitioning from the teacher-centered learning approach commonly practiced in junior high school to the more independent learning environment required in vocational education. The effectiveness of instructional modules at the level of statistical significance is indeed highly dependent on the consistency of implementation time and students' readiness to adapt to new learning approaches (Maulita et al., 2023).

The effectiveness of the module was also reflected in the increased participation and enthusiasm demonstrated by students throughout the learning process. Students who participated in learning using the PjBL-based module became noticeably more active, showing greater enthusiasm, asking more questions, and providing more responses during classroom activities (Winarti et al., 2022). As emphasized by Selasmawati and Lidyasari (2023), the Project-Based Learning model adopts a student-centered approach that positions teachers as facilitators and learning stimulators, thereby providing students with greater opportunities to reason, explore ideas, and develop stronger critical thinking skills.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the data analysis, discussion, and direct field observations regarding the effectiveness of the Project-Based Learning (PjBL)-based module in improving the critical thinking skills of Grade X PM 1 students at SMK Negeri 2 Semarang, it can be concluded that the developed PjBL-based module effectively made a positive contribution to enhancing students' classroom engagement, enthusiasm, and critical thinking skills, as evidenced by the descriptive findings. Classroom observations demonstrated that the implementation of the module successfully achieved the intended learning

objectives by transforming students' roles into more active participants who were able to identify problems, analyze data, and develop creative solutions to marketing case studies compared with students who experienced conventional instructional approaches.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed for fundamentals of marketing teachers, it is recommended to allocate more flexible time during the project orientation and scheduling stages. This is essential to facilitate the adaptation process of students transitioning from junior high school to vocational education. In addition, teachers should provide intensive cognitive stimulation at the beginning of each lesson to encourage active participation during group discussions.

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