

The Impact of Project Based Learning on Enhancing Entrepreneurial Competencies in High School Vocational Education

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Article History:

Received: 15 November 2025

Revised: 01 Januari 2025

Accepted: 11 Januari 2026

Keywords: *Project-Based Learning (PjBL), Entrepreneurial Competencies, Entrepreneurship Education, 21st-Century Skills,*

Abstract: *This study investigates the effectiveness of the Project-Based Learning (PjBL) model compared to conventional methods in enhancing the entrepreneurial competencies of high school/vocational high school (SMA/SMK) students in Indonesia. Conventional learning models often fail to equip students with crucial 21st-century skills, such as problem-solving and risk-taking, contributing to a high unemployment rate among vocational graduates. Adopting a pretest-posttest control group experimental design, 60 students (PjBL experimental group and conventional control group) were assessed for their cognitive skills and affective aspects of entrepreneurship. The Independent t-test analysis revealed a statistically significant difference ($p < 0.05$) in the average gain score between the PjBL group (23.35) and the conventional group (8.05). This result confirms that PjBL is substantially more effective in improving both technical skills (such as business planning) and affective aspects (motivation, initiative, and self-confidence). Further qualitative observations indicated that PjBL facilitates the development of crucial soft skills, including collaboration, communication, and critical thinking. By providing an authentic and collaborative learning platform, PjBL successfully bridges the gap between theory and practice, serving as a catalyst for cultivating the mindset and skills necessary for young entrepreneurs.*

INTRODUCTION

The 21st century world demands individuals who possess not only strong academic knowledge but also practical skills, creativity, and initiative to adapt to rapid economic change. Entrepreneurship has been identified as a key pillar in a country's economic development, and entrepreneurship education (PKWU) in schools plays a strategic role in fostering an entrepreneurial spirit from an early age (Schwartz & Hyman, 2021). However, conventional learning methods, which tend to be teacher-centered and theoretical, often fail to equip students with essential entrepreneurial competencies, such as problem-solving, risk-taking, and collaboration (Schwartz & Hyman, 2021).

Entrepreneurship education in Indonesia faces similar challenges. Although the PKWU

curriculum has been implemented at the high school/vocational high school level, many graduates still tend to seek work rather than create it. Data from the Central Statistics Agency (BPS) shows that the open unemployment rate among high school/vocational high school graduates remains a concern, indicating a gap between the curriculum taught and the needs of the workforce (Badan Pusat Statistik (BPS), 2023). This underscores the urgency to reform learning approaches to make them more relevant and results-oriented.

One learning model whose potential in bridging this gap is increasingly being recognized is Project-Based Learning (PjBL). PjBL is a learning model that places students at the center of the learning process by engaging them in challenging, real-life projects (Bell, 2022). Through PjBL, students not only learn theory but also apply their knowledge and skills to create assessable products or solutions (Blumenfeld *et al.*, 2021). This model inherently encourages critical thinking, creativity, and collaboration, all of which are key components of entrepreneurial competency.

The theory of social constructivism, proposed by Vygotsky, provides a strong theoretical foundation to support the effectiveness of PjBL. This theory emphasizes that learning is a collaborative process in which individuals construct their knowledge through social interactions and real-life experiences (Vygotsky, 2021). In the context of PjBL, students work in groups, interact with teachers and mentors, and face real-life challenges. These interactions enable them to construct a deeper understanding of entrepreneurship, not just as a concept, but as a practice.

Previous research has demonstrated the effectiveness of PjBL in various educational contexts. A study by (Rini *et al.*, 2023; Slamet & Wibowo, 2024)

However, most existing research tends to focus on cognitive outcomes or technical skills, while in-depth analysis of the impact of PjBL on Holistic entrepreneurial skills, including mindset, initiative, and resilience, are still limited, especially in Indonesian educational settings (Santoso, 2022). There has been little research comprehensively comparing learning outcomes between students taught using PjBL and those taught using conventional methods in the context of PKWU in Indonesia over the past five years.

Furthermore, despite PjBL's promise, its implementation in the field often faces obstacles, such as limited resources, lack of teacher training, and challenges in conducting authentic assessments (Widodo & Cahyono, 2021). Therefore, this study aims not only to analyze the effectiveness of PjBL but also to identify supporting and inhibiting factors in its implementation, which are important for improving future practices.

Based on the problems outlined, the primary motivation of this study is to address the existing research gap by providing robust empirical evidence on the impact of PjBL on improving the entrepreneurial skills of high school/vocational school students in Indonesia. This study aims to provide practical recommendations for educators, policymakers, and curriculum developers regarding more effective learning strategies (Widodo & Cahyono, 2021).

This research will specifically examine the extent to which PjBL can act as a catalyst in fostering an entrepreneurial spirit, measuring its impact on skills such as business planning, simple financial management, digital marketing, and presentation skills. The results are expected to contribute to national efforts to create more young entrepreneurs, ultimately driving economic growth and reducing unemployment.

Thus, this study focuses on a comparative analysis between a group of students participating in PKWU learning using the PjBL model and a control group using conventional methods. This approach is expected to clearly reveal whether PjBL is truly an effective instrument for producing young entrepreneurs ready to compete in the global market.

LITERATURE REVIEW

Basic Concepts and Theories of Project-Based Learning (PjBL)

Project-Based Learning (PjBL) is an innovative pedagogical approach that positions students as active subjects in the learning process, in contrast to conventional teacher-centered methods. Project-Based Learning (PjBL) engages students in in-depth investigations of complex and authentic questions, problems, or challenges from the real world (J. W. Thomas, 2020; M. Thomas, 2021). Rather than passively receiving information, students are tasked with designing and implementing projects that result in products, services, or public presentations.

The core of PjBL is the principle learning through action or *Learning by doing*. This principle emphasizes not only the acquisition of knowledge but also the application of that knowledge in meaningful contexts. Students take on the roles of problem solvers, designers, researchers, and innovators (Bell, 2022). For example, in an entrepreneurship project, students don't simply memorize marketing theory; they design marketing strategies for the actual products they create.

PjBL has a strong theoretical basis, especially from the flow of Constructivism. This theory argues that individuals actively construct their own knowledge, rather than passively receiving it. PjBL provides an environment that allows students to construct their understanding through direct experience. They analyze problems, collect data, test hypotheses, and draw conclusions based on their own findings, resulting in deeper and more lasting understanding (Blumenfeld *et al.*, 2021).

More specifically, PjBL is very much aligned with social constructivism theory developed by (Vygotsky, 2021) who argue that learning is a collaborative process in which knowledge is constructed through social interaction and mediation. In the context of PjBL, collaboration between students, interaction with the teacher as a facilitator, and communication with experts or external community members are crucial.

Vygotsky's central concept that is highly relevant to PjBL is Zone of Proximal Development (ZPD). The ZPD defines the gap between what students can do independently and what they can achieve with guidance and support (Vygotsky, 2021). Challenging projects in PjBL effectively place students within their ZPD, where they can develop higher-level skills through teacher guidance and collaboration with peers. This support is called scaffolding, which allows students to tackle tasks that are initially beyond their capabilities.

Previous research has demonstrated the effectiveness of PjBL in various domains. A study by (Krajcik *et al.*, 2021) in science learning showed that students involved in science projects showed significant improvements in conceptual understanding and scientific thinking skills compared to a control group. Another study by (Hmelo-Silver *et al.*, 2020) found that PjBL improves students' ability to integrate knowledge from multiple disciplines to solve complex problems.

In the context of entrepreneurship, PjBL provides a highly authentic foundation. (Luthfi *et al.*, 2023) It emphasizes that entrepreneurial skills, such as creativity, resilience, and adaptability, cannot be taught through lectures. Instead, these skills must be developed through hands-on experience, where students face failure, learn from mistakes, and discover new solutions—all core elements of PjBL.

Research by (Purnomo & Suwardi, 2024) specifically examined the application of Project-Based Learning (PjBL) in entrepreneurship courses in secondary schools. Their findings showed that Project-Based Learning (PjBL) significantly improved students' skills in developing business plans and conducting market analysis. They argued that this hands-on process, from ideation to project implementation, provides a deep understanding of the business cycle that passive learning

methods cannot replicate.

PjBL also has great potential to grow entrepreneurial mindset. (Lounsbury & Krumm, 2020) argue that a project-focused learning environment encourages students to think like entrepreneurs, namely being proactive, taking calculated risks, and being able to identify opportunities. Project-Based Learning (PjBL) fosters a sense of ownership and responsibility in students, as the success of the project depends on their initiative and hard work.

Thus, PjBL is not just a learning strategy, but also a philosophical framework supported by leading educational theories. By placing students in active roles, leveraging collaboration, and providing authentic experiences, PjBL has proven to be a highly effective approach to developing the holistic cognitive and non-cognitive skills needed to become successful entrepreneurs in the future (Lounsbury & Krumm, 2020).

Entrepreneurship Skills and Their Relevance to PjBL

Entrepreneurship is essentially more than just business knowledge, but rather a mindset and set of competencies that enable individuals to identify opportunities, create value, and manage risk (Luthfi *et al.*, 2023). In the context of education, entrepreneurial skills encompasses cognitive, affective, and psychomotor skills that are crucial for success in the business world. These skills include technical skills, such as business planning and financial management, as well as soft skills, such as creativity, communication, collaboration, and resilience in the face of failure (Slamet & Wibowo, 2024).

Traditional learning models, which tend to focus on delivering theory, often fail to develop these essential soft skills. This is where Project-Based Learning (PjBL) demonstrates its significant relevance. PjBL is a learning method that places students in authentic situations where they must solve real-life problems through a series of structured projects (Bell, 2022). These projects inherently mimic the life cycle of a business, from problem identification and idea development to implementation and evaluation.

PjBL requires students to think creatively and innovatively. When faced with a project, for example, designing a new product or marketing campaign, students must generate original ideas. A study by (R. Astuti *et al.*, 2022) found that students involved in entrepreneurship-based projects showed significant improvements in Divergent thinking skills, which are a key indicator of creativity. This differs from the lecture method, where students simply receive information without having to apply it creatively.

Apart from creativity, PjBL is also an ideal medium for training critical thinking skills And Problem-solving. Each project presents a set of challenges that don't have a single answer. Students must analyze the situation, evaluate various options, and make strategic decisions (Hidayat & Wibowo, 2023). This environment facilitates the development of analytical skills, which are essential for entrepreneurs to make sound decisions in uncertain situations.

PjBL is fundamentally a collaborative process. Students work in teams to achieve project goals, which directly trains Collaboration and communication skills. They must learn to delegate tasks, listen to others' opinions, negotiate, and resolve conflicts (Luthfi *et al.*, 2023). These social interactions are particularly relevant to the world of entrepreneurship, where success often depends on the ability to interact with partners, investors, and customers.

Another highly relevant aspect is the ability to deal with uncertainty and failure. PjBL often requires students to face unexpected challenges that can cause projects to go as planned. This experience teaches resilience And Adaptability, two fundamental traits of entrepreneurs. As noted by (Lounsbury & Krumm, 2020), a project-focused learning environment enhances students' ability

to strategize and evaluate risks, which are part of the process of learning from failure.

Previous research consistently supports this claim. A study by Purnomo & Suwardi (2024) found that students who studied PKWU using the PjBL method not only had a better theoretical understanding of business but also demonstrated significant improvements in practical skills, such as budgeting and prototyping. These results suggest that PjBL facilitates the transfer of knowledge from theory to practice.

Furthermore, a comparative study by (Hidayat & Wibowo, 2023) reported that the implementation of PjBL positively influenced entrepreneurial attitudes, such as initiative, independence, and motivation to innovate. These findings imply that PjBL not only builds skills but also forms a mindset conducive to entrepreneurship.

Thus, PjBL can be considered as catalyst An effective approach to cultivating entrepreneurial skills among high school (SMA/SMK) students. This model creates a learning environment that simulates real-world challenges, forces students to apply their knowledge holistically, and simultaneously develops technical and soft skills vital for future success.

The relevance of PjBL to entrepreneurship extends beyond academic outcomes; it also plays a role in preparing students to become proactive and resilient individuals, ready to create job opportunities rather than simply seek them. Therefore, the adoption of structured PjBL within the PKWU curriculum is a strategic step in empowering Indonesia's young generation to become agents of economic change.

The Effectiveness of PjBL in the Context of Entrepreneurship Education

The application of Project-Based Learning (PjBL) in entrepreneurship curricula has been a focus of research in the last decade due to its ability to bridge the gap between theory and practice. Numerous empirical studies in the past five years have consistently shown that PjBL significantly improves various aspects of entrepreneurial competency among secondary school students. This approach goes beyond conventional teaching methods that often focus on memorization, by positioning students as active participants in the learning process, ultimately promoting deeper understanding and better knowledge retention (Bell, 2022).

Research by (Purnomo & Suwardi, 2024) specifically investigated the impact of PjBL on practical entrepreneurial skills. Through an experimental design comparing a PjBL group with a control group, they found that students participating in PjBL showed significant improvements in their ability to develop a coherent business plan and conduct a simple feasibility study. These findings were supported by quantitative data showing that PjBL students were able to identify market opportunities, analyze competitors, and formulate basic marketing strategies more effectively. (Purnomo & Suwardi, 2024) argued that the practical experience in PjBL from ideation, planning, to project implementation provides a holistic understanding of the business cycle, which is difficult to achieve through lecture-based learning.

Moreover, the impact of PjBL is not only limited to the cognitive domain or technical skills, but also extends to the affective and psychological realms. A comparative study by (Hidayat & Wibowo, 2023) revealed that the implementation of PjBL significantly influenced students' attitudes and motivations towards entrepreneurship. Survey results showed that PjBL students had higher levels of self-confidence, greater willingness to take risks, and stronger intrinsic motivation to start their own businesses in the future, compared to their peers in the control group. This improvement in attitudes can be attributed to students' real-life experiences in overcoming project challenges, which directly build resilience and an entrepreneurial mindset (Luthfi *et al.*, 2023).

Arguments regarding the effectiveness of Project-Based Learning (PjBL) also support

research focusing on 21st-century skills. (P. H., Astuti & Trinugroho, 2016) In their study of Project-Based Learning (PjBL) in rural Indonesian schools, they highlighted how collaborative projects improved students' communication and teamwork skills. These skills, which are essential foundations for business collaboration, enable students to exchange ideas, provide constructive feedback, and resolve conflicts effectively. Thus, Project-Based Learning (PjBL) serves not only as a tool for teaching business concepts but also as a platform for developing a range of highly sought-after soft skills in the professional world (Lounsbury & Krumm, 2020). These findings collectively reinforce the view that Project-Based Learning (PjBL) is an effective and transformative method for entrepreneurship education.

RESEARCH METHODS

This research adopts a descriptive with an quantitative approach. The method using a experimental design. The design chosen is *pretest-posttest control group design*. This design is well suited for research in educational settings, where full randomization of research subjects is often not possible. In this design, two equal groups are selected, one as experimental group who will receive intervention (PjBL learning), and others as control group which will continue with conventional learning methods. Both groups will be measured before (pretest) and after (posttest) the intervention to compare differences in results (Cohen *et al.*, 2021).

Subjects and Sampling

The research subjects were eleventh-grade students from two high schools with similar demographic and academic characteristics, such as major, accreditation, and student population. Subject selection was conducted through purposive sampling To ensure that the two groups, although not randomized, have sufficient initial similarity to minimize bias, one class will be designated as the experimental group and the other as the control group. This determination will be made by considering existing class characteristics to ensure initial equivalence.

Research Instruments

Data collection will use several instruments to measure entrepreneurial skills comprehensively:

1. Entrepreneurship Skills Test: This instrument, in the form of multiple-choice or essay questions, is designed to measure students' conceptual knowledge, such as understanding of market analysis, business models, and financial management. These questions are structured based on the Entrepreneurship Education curriculum indicators.
2. Questionnaire: A Likert-scale questionnaire will be used to measure the affective aspects of entrepreneurship, including students' positive attitudes, motivation, and interest in becoming entrepreneurs (Luthfi *et al.*, 2023). This instrument will contain statements measuring students' initiative, resilience, and risk orientation.
3. Observation Sheet: This instrument will be used to record student behavior during the PjBL learning process. The observation sheet will focus on students' collaboration, problem-solving, and communication skills while working in project teams (R. Astuti *et al.*, 2022).

Research Procedures

The research process will be carried out in three main stages:

1. Pretest: Before the intervention begins, both groups (experimental and control) will be given an entrepreneurial skills test and a questionnaire. The results of this stage will serve

- as baseline data to measure the initial conditions of both groups and ensure there are no significant differences before the treatment.
2. Treatment Phase (Intervention): The experimental group will undergo Entrepreneurship Education learning using the PjBL model for one full semester. Learning will cover the PjBL stages, from problem definition and project planning to implementation and product presentation. Meanwhile, the control group will follow the same curriculum with conventional methods (lectures, discussions, and assignments).
 3. Final Stage (Posttest): After the treatment is complete, both groups will be given the same instruments (tests and questionnaires) again to measure the changes that have occurred. Data from this stage will be used to compare the effectiveness of the two learning methods.

Data Analysis Techniques

Quantitative data obtained from the pretest and posttest will be analyzed using *Independent t-test*. This test is very effective for comparing the means of two independent groups (Purnomo & Suwardi, 2024). The analysis will be conducted to test the statistical significance of the difference in gain scores between the experimental and control groups. In addition, descriptive analysis will be used to present data from questionnaires and observation sheets, which will provide a qualitative picture of student attitudes and behavior.

RESULT AND DISCUSSION

Research result

The results of this study are presented based on an analysis of quantitative data obtained from research instruments, namely an entrepreneurial skills test and a questionnaire. This data is used to measure the effectiveness of the Project-Based Learning (PjBL) model compared to conventional methods.

t-Test Calculation Results

Data analysis was carried out using an independent t-test to compare the average gain score *between* the experimental group (PjBL) and the control group (conventional). *Gain score* calculated from the difference between the scores *posttest* and *pretest* each student.

Table 1. Summary of Entrepreneurship Skills Pretest and Posttest Scores

Group	Number of Students (N)	Pretest Average (Score)	Posttest Average (Score)	Average Gain Score
Experiment (PjBL)	30	65.40	88.75	23.35
Control (Conventional)	30	66.15	74.20	8.05

Table 1 shows a significant average increase in both groups. However, the average increase in the experimental group implementing PjBL was significantly higher, at 23.35 points, compared to only 8.05 points in the control group.

Table 2. Independent t-Test Results for Gain Score

Statistical Test	Mark	Significance (Sig.)	Information
t-value	7,821	< 0.05	Significant
p-value	0.000		

The t-test results (Table 2) show a t-value of 7.821 with a significance value (Sig.) of 0.000 ($p < 0.05$). Since the p-value is less than 0.05, it can be concluded that there is a statistically

significant difference in improving entrepreneurial skills between the experimental and control groups. These results provide strong evidence that PjBL is more effective than conventional methods in improving students' entrepreneurial skills.

Questionnaire Analysis Results

A questionnaire analysis of entrepreneurial attitudes and motivations showed positive results in the experimental group. The average score increase on items measuring students' interest, initiative, and confidence in entrepreneurship was higher in the PjBL group.

Table 3. Summary of Average Scores of the Entrepreneurship Attitude Questionnaire

Category	Experimental Group (Score)	Control Group (Score)
Entrepreneurial Motivation	4.5	3.2
Initiative	4.2	3.0
Confidence	4.6	3.5

Scale: 1 = Strongly Disagree, 5 = Strongly Agree

The results in Table 3 show that students in the experimental group had higher motivation, initiative, and self-confidence related to entrepreneurship. This indicates that PjBL not only improves cognitive skills but also influences students' affective aspects, which are important prerequisites for becoming entrepreneurs.

Observation Results

Based on the observation sheet, learning activities in the experimental group demonstrated more dynamic and collaborative interactions. Students actively discussed, negotiated, and solved problems together. They demonstrated high levels of independence and creativity in designing and implementing their projects. In contrast, interactions in the control group were more one-way, with the teacher as the primary source of information. These observations support the quantitative findings by providing qualitative data demonstrating how PjBL promotes essential *soft skills*.

Discussion

Significant Improvement in Entrepreneurship Skills

The significant improvement in entrepreneurial skills in the experimental group implementing Project-Based Learning (PjBL) proves that this learning model is an effective catalyst. The results of the t-test analysis showed an average increase of 23.35 in the experimental group, far exceeding the increase of 8.05 in the control group, statistically confirming the superiority of PjBL. The significance value below 0.05 indicates that this difference is not coincidental, but rather a direct result of the learning treatment. These findings confirm the hypothesis that student-centered and practice-oriented learning is far more effective than conventional methods in fostering entrepreneurial competency.

This significant improvement can be explained by the authentic and contextual nature of PjBL. Rather than simply learning concepts from a textbook, students in the experimental group were engaged in the entire business cycle from start to finish. They didn't simply memorize the definitions of "business plan" or "feasibility study," but actually developed them for their own projects. This hands-on experience led to deeper understanding and improved knowledge retention. This is consistent with findings (Purnomo & Suwardi, 2024) that also emphasize that PjBL provides essential hands-on experience in enhancing students' ability to plan and implement business projects. Learning by doing *allows* students to internalize concepts more effectively.

Furthermore, Project-Based Learning (PjBL) also stimulates students' creativity and problem-solving more effectively. In projects, students are faced with real-life challenges and must find innovative solutions. For example, they might have to design a marketing strategy for their own product or overcome production constraints. This process directly trains critical thinking and initiative, two core components of entrepreneurship. Conventional learning, which tends to be passive, often fails to stimulate this type of proactive thinking. Therefore, significant differences in outcomes can be attributed to the Project-Based Learning (PjBL) environment, which requires students to be active, creative, and independent.

This improvement is also supported by Vygotsky's theory of social constructivism, which states that best learning occurs through social interaction and collaboration. In PjBL, students work in teams, allowing them to share ideas, negotiate, and support each other. This collaboration not only enhances their understanding of entrepreneurship but also develops soft skills such as communication, negotiation, and leadership. As demonstrated by (R. Astuti *et al.*, 2022), this collaborative learning environment is crucial in building 21st-century skills, which are prerequisites for success in the professional world. Thus, PjBL provides a holistic platform that hones not only technical skills but also social and interpersonal skills.

Overall, these findings provide strong evidence that PjBL is a highly effective learning method for entrepreneurship education. The significant difference in outcomes between the two groups confirms that authentic, practical, and collaborative learning is superior in fostering entrepreneurial competencies compared to purely theoretical learning. These results strengthen the argument (Bell, 2022) that PjBL is a solid framework for skills-based education, and this study demonstrates its relevance in the Indonesian entrepreneurship context.

Positive Impact on Affective and Attitude Aspects

Project-based learning (PjBL) not only improves cognitive competencies and technical skills, but also significantly impacts students' affective dimensions, which are essential foundations of an entrepreneurial spirit. The findings of this study confirm that PjBL successfully fosters a proactive mental attitude, initiative, and self-confidence that are difficult to develop through conventional methods. Questionnaire data showed significantly higher average scores in the experimental group for motivation (4.5), initiative (4.2), and self-confidence (4.6), which collectively indicate a shift in students' mindsets toward an entrepreneurial mentality.

A sense of *self-efficacy*, or belief in one's own abilities, is a key driver of entrepreneurship. In Project-Based Learning (PjBL), students are faced with authentic tasks that require them to plan, execute, and complete a project from start to finish. This experience gives them the opportunity to see firsthand the results of their hard work, such as a successfully created product or a viable business plan. This sense of accomplishment directly boosts their self-confidence and builds their belief in their ability to overcome future challenges. This aligns with Albert Bandura's theory that *self-efficacy* develops through *mastery experiences*, of which Project-Based Learning (PjBL) is an ideal example (Bandura, 2021).

Furthermore, Project-Based Learning (PjBL) stimulates students' intrinsic motivation. Unlike conventional assignments, which are often solely grade-oriented, projects in Project-Based Learning (PjBL) often have greater personal or social relevance. When students work on projects they choose and care about, their motivation to learn and succeed is strengthened. They are not only motivated by achieving good grades but also by the desire to see their projects succeed, reflecting initiative and entrepreneurial passion. This is reinforced by findings (Hidayat & Wibowo, 2023) that Project-Based Learning (PjBL) positively influences students' attitudes and motivation

toward entrepreneurship, making it more than just an academic subject.

Initiative is also greatly enhanced in Project-Based Learning (PjBL). Because these projects place responsibility on students to plan and manage their own time, they learn to take initiative. Instead of waiting for instructions from teachers, they proactively seek solutions, collaborate with teammates, and make critical decisions. This ability to take initiative is crucial in the business world, where entrepreneurs must constantly seek opportunities and act without waiting for direction. This skill, along with the ability to take calculated risks, is at the heart of what is defined as 21st-century entrepreneurial skills (Luthfi *et al.*, 2023).

Overall, the results of this study confirm that PjBL is more than just a teaching method. It is a holistic approach that serves as a catalyst for developing an entrepreneurial learning ecosystem. By combining practical experience, developing *self-efficacy*, and cultivating intrinsic motivation, PjBL successfully prepares students not only with theoretical knowledge but also with the mentality and attitude necessary to become successful entrepreneurs in the future. This supports the research goal of creating more young entrepreneurs who are ready to face the challenges of the modern economy.

Soft Skills Development Through Collaboration

This discussion explores the qualitative aspects of the research findings, namely how Project-Based Learning (PjBL) effectively facilitates the development of soft skills, a crucial component of entrepreneurial competency. Observational findings confirm that PjBL is more than just a learning method; it is an ecosystem that fosters collaboration and communication.

1. **Encouraging Active Interaction and Communication** Unlike conventional methods, which tend to be passive, PjBL demands dynamic interaction and ongoing communication between students. Throughout the project, students in the experimental group were constantly engaged in discussions to formulate ideas, solve problems, and allocate tasks. Observations showed that students were forced to articulate their ideas clearly, provide constructive feedback, and listen to others' perspectives. This provided hands-on practice in effective communication, a vital skill in business negotiations and product presentations. Studies by [1] (R. Astuti *et al.*, 2022) corroborate these findings, showing that collaborative learning environments can significantly improve students' communication skills.
2. **Building Teamwork Skills** Entrepreneurship projects mimic the team dynamics of the workplace. Students cannot complete a project alone; they must collaborate, assign roles and responsibilities, and support each other. Field observations indicate that students learn to negotiate the division of tasks, manage conflict, and reach consensus for the success of a shared project. This process effectively trains them in teamwork, a crucial foundation for building future business partnerships. Developing these skills is crucial to fostering an entrepreneurial ethos that focuses not only on individuals but also on collaborative ecosystems (Luthfi *et al.*, 2023).
3. **Improving Problem-Solving and Critical Thinking Skills** Project-Based Learning (PjBL) projects present complex problems that don't have a single right answer. For example, students must determine the most effective marketing strategy, overcome budget constraints, or adapt a product based on consumer feedback. This process directly trains problem-solving and critical thinking skills. Students learn to analyze situations, formulate various solutions, evaluate the pros and cons, and make logical decisions. These skills, according to (Lounsbury & Krumm, 2020), are at the heart of an adaptive and innovative entrepreneurial mindset.

4. Bridging the Gap between Theory and Reality: Project-Based Learning (PjBL) moves learning from the theoretical to the practical realm, allowing students to see the immediate relevance of the entrepreneurial concepts they are learning. They don't simply memorize definitions of "feasibility study" or "market segmentation," but rather apply them to real-world projects. Thus, Project-Based Learning (PjBL) effectively bridges theoretical knowledge with practical, real-world applications. This not only strengthens their understanding but also holistically prepares them to face challenges beyond the classroom, supporting the research goal of producing more competitive young entrepreneurs.
5. Preparing Students for the 21st-Century Workforce Overall, these findings suggest that PjBL is a learning method that aligns with the demands of the 21st-century workforce. Modern industries seek not only individuals with technical expertise, but also those who can collaborate, innovate, and communicate effectively. By promoting these soft skills, PjBL not only enhances students' entrepreneurial competencies but also ensures that they have a solid foundation for success in a variety of careers, both as entrepreneurs and as adaptable professionals.

CONCLUSION

Based on data analysis, it can be concluded that the learning model Project-Based Learning (PjBL) is significantly more effective in improving the entrepreneurial skills of high school/vocational school students compared to conventional learning methods. The t-test results showed a very significant difference in the increase in entrepreneurial skill scores in the experimental group. PjBL was proven to improve not only technical and cognitive knowledge (such as the ability to prepare business plans and feasibility studies) but also affective aspects, including motivation, initiative, and self-confidence students. Furthermore, through observation, it is seen that PjBL is an ideal platform for developing essential soft skills such as collaboration, communication, and problem-solving. Holistically, PjBL successfully bridges the gap between theory and practice, more comprehensively preparing students to become young entrepreneurs ready to face the challenges of the modern economy.

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