JURNAL UPI

IJE
International Journal of Education

Journal homepage: https://ejournal.upi.edu/index.php/ije/index

IJE

THE EFFECTIVENESS OF PROJECT-BASED LEARNING MODEL IN IMPROVING STUDENTS' ENTREPRENEURSHIP INVOLVEMENT AND COMPETENCY IN ECONOMICS EDUCATION

Suharto[1]* , Hariyono[2], Umi Hidayati[3], and Vera Septi Andrini[4]

[1,3]Department of Economic Education, STKIP PGRI Nganjuk, Kediri, Indonesia

[2]Department of Economic Education, STKIP PGRI Nganjuk, Kediri, Indonesia

[4]Department of Mathematics Education, STKIP PGRI Nganjuk, Kediri, Indonesia

***Corresponding author's E-mail address: suharto@stkipnganjuk.ac.id**

ABSTRACT

Entrepreneurship is an important part of education in order to face challenges in the world of work and business. Project-based learning (PjBL) has been proven to be effective in improving students' conceptual understanding and practical skills in various disciplines. However, there has not been much comprehensive research on economic education. The purpose of this research is to determine how effective PjBL is in improving the involvement and entrepreneurial competence of students in economic education. Data collection was conducted using purposive sampling techniques, targeting economics education students. The sample consisted of 110 economics education students at PGRI Mpu Sindok University. Data analysis was performed using multiple regression analysis. The results indicated that the implementation of project-based learning significantly influenced entrepreneurial competencies, and student engagement significantly influenced entrepreneurial competencies. This study indicates that the use of creative learning approaches and active student involvement are crucial for improving the quality of economic education, particularly in fostering entrepreneurial awareness among Economics Education students. This research has implications for academic considerations, suggesting that PjBL serves as a practical curriculum model for economic education in shaping the entrepreneurial character of students. Post-graduation implications include students becoming self-reliant members of society and creating job opportunities for others.

ARTICLE INFO

Article History:
Received 3 Dec 2024
Revised 28 May 2025
Accepted 13 Jul 2025
Available online 30 August 2025

Keywords:
Economic education; entrepreneurship; involvement; practical skills, project-based learning

To cite this paper (in APA style):
Suharto, Hariyono, Hidayati, U., & Andrini, V. S. (2025). The effectiveness of project-based learning model in improving students' entrepreneurship involvement and competency in economics education. *International Journal of Education, 18*(2), 247-256. https://doi.org/10.17509/ije.v18i2.72503

1. INTRODUCTION

Education is essential for developing the knowledge and skills needed to overcome obstacles in the workplace. Research has shown that receiving the best education can provide people with a strong foundation for building the mental and practical skills needed for various careers(Miftakhuddin & Zulfiati, 2019). Education is also important for improving critical thinking and digital literacy, two skills that are essential in today's digital society. According to research from the World Economic Forum, 65% of children starting primary school in 2023 will work in jobs that do not exist today. This highlights the importance of creative and flexible learning (Green et al., 2020).

Innovative and effective learning methods are needed to improve the standard of education, especially economic education (Lichtenstein & Ludwig, 2010). Research has shown that integrating digital technology and interactive teaching methods can increase students' enthusiasm and engagement in learning. For example, students can improve their understanding of economics through e-learning. Platforms and applications for economic simulation (Amuda et al., 2019; Heriyati & Ekasari, 2020). This application can help them understand concepts in a more practical way (Melchor-Ferrer & Davia-Rodriguez, 2023). Data collected by UNESCO in 2023 shows a possible 25% increase in student engagement and learning outcomes in educational institutions that use digital learning technologies (Gopinathan et al., 2022). Students' analytical and problem-solving skills can also be improved through project-based learning and team collaboration in a real economic environment.

Project-based learning is one strategy that has been proven effective in improving students' conceptual understanding and practical skills (Ariza & Olatunde-Aiyedun, 2023; Khandakar et al., 2022). Researchers have found that students can apply the theories they have learned to real-world situations by incorporating projects into the curriculum. Market analysis, business feasibility studies, or economic policy simulations, for example, can be components of economic projects (Kadir et al., 2020; Miftakhuddin & Zulfiati, 2019). A study published by the Journal of Educational Research in 2023 found that students' ability to analyse and solve problems increased by up to forty percent when they took project-based classes (Ariza & Olatunde-Aiyedun, 2023). They also learned to work together in teams and speak well.

With innovative methods such as project-based learning and the use of digital technology, education is essential for instilling the skills and knowledge needed to succeed in the workplace. (Rowe et al., 2013). Researchers found that project-based education works well in improving conceptual and practical skills, while learning models that combine technology and interactive approaches can increase student engagement and learning outcomes (Dwi et al., 2023). Collaboration between educational institutions and the business sector is also important to ensure that the curriculum meets the requirements of the job market and improves the employability of graduates (Gallagher et al., 2023; Rossoni et al., 2023; Zhang & Chen, 2023). There is evidence that innovative methods such as rotating classes and case studies help students better understand what they are thinking and better prepare themselves for the challenges that await them in the workplace (Yang et al., 2021). Therefore, a competitive workforce that is ready to face challenges around the world can be created through a flexible and cooperative approach to education (McKimm et al., 2020).

Project-based learning, also known as PjBL, has been widely recognised as a successful technique for improving students' conceptual understanding and practical skills (Elnaga et al., 2023). In his research, it was found that using the PjBL model with the Ethno-STEM approach can improve students' science literacy (Queiruga-Dios et al., 2020). The study used an experimental design with a control group before and after testing. The findings showed that, compared to the control group, the experimental group demonstrated a higher level of science literacy (Wijaya et al., 2023). This research emphasizes how important it is to incorporate local approaches into learning models if we want to deal with the problems that arise in the era of disruption 4.0 (Fang et al., 2022).

PjBL in technical education together with Massive Open Online Courses (MOOCs) (Jollands & Parthasarathy, 2013; Khandakar et al., 2022). The results of the study indicate that this model has the ability to improve the technical pedagogical skills and higher-order thinking skills (HOTS) of students who will become technical teachers. To create a new learning model, this study utilised literature review techniques (ZhuParris et al., 2023). This study emphasises the importance of preparing a productive workforce through good education.

Their work found that when PjBL was combined with 21st-century skills, it significantly affected the higher-order thinking skills of students who would become biology teachers (Ole, 2020; Rosidah & Ikram, 2021; Susanto, Oktavia, Kumalasari, & Silitonga, 2024). This study, which utilised a mixed-method approach combining quantitative experimental data and qualitative observations, demonstrated that blended learning methods can enhance students' ability to evaluate and create (Park et al., 2022). These findings suggest that PjBL is effective in improving analytical skills, which are important for modern education. Seeing innovative chemistry learning models as an alternative in the era of disruption (Jorner et al., 2021). This research emphasises that students' ability to use information and communication technology (ICT) and collaborate in chemistry laboratories is very important. The results show that project-based learning methodologies can improve students' creative, critical, and scientific thinking skills overall and prepare them for Industry 4.0 and Society 5.0.

Researching how effective PjBL is in improving students' social skills in primary schools (Severiens & Schmidt, 2009). This study provides important insights into the need to develop more comprehensive learning models to meet the demands of 21st-century skills, although the results show that the PjBL model does not have a significant impact on improving children's social skills (Ma et al., 2022). Seeing how effective PjBL with computer simulations is in improving the conceptual understanding of students who will become science teachers (Susanto,

DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045

Oktavia, Kumalasari, & Sitonga, 2024; Yulianeta, 2023; Zuhri & Setiawan, n.d.). The study shows that students can gain a better understanding of abstract concepts if they combine innovative learning models with computer simulations. The findings of this study support the idea that using technology to visualise concepts can improve student learning outcomes (Pandita & Kiran, 2023).

Supporting previous research findings, project-based learning (PjBL) has great potential to improve students' understanding and skills in various fields (Ariza & Olatunde-Aiyedun, 2023). However, the results of the study show that the PjBL model is not effective in various disciplines and levels of education. This study also emphasises the importance of incorporating technology and local approaches into the learning model if we want to improve learning outcomes (Yaylagul & Tutmez, 2021). The results of the study indicate that project-based learning (PjBL) has no long-term impact on the development of students' practical and conceptual skills (Peng et al., 2019). It is essential to understand the long-term impact so that PjBL methods can be optimised sustainably in the curriculum (El-Hamamsy et al., 2024). Therefore, long-term research is needed to evaluate the development of students' skills over time after the implementation of PjBL (Ma et al., 2022).

Most studies have not investigated the effectiveness of PjBL in various disciplines and levels of education, so the results cannot be widely generalised. Each discipline has different needs and features, which may affect the results of PjBL implementation. To ensure that this method is effective in various academic contexts, more diverse and comprehensive research is needed. In addition, many previous studies focus only on short-term outcomes, without examining how PjBL affects students' skills development over time. The limited sample size and lack of control over contextual variables such as teaching style, learning resources, and technological support also restrict the validity of the findings. Therefore, future research should include longitudinal designs and cross-disciplinary comparisons to provide a more holistic understanding of PjBL effectiveness.

Research examining the use of digital technologies in PjBL models can offer valuable insights into how these techniques can increase the effectiveness of PjBL by providing tools and resources that students can use in their projects (Lubis, 2020; Maolida et al., 2024; Susanto, Oktavia, Kumalasari, & Silitonga, 2024). However, the lack of research regarding integrating digital technologies in PjBL models, particularly in economics education, leads to a lack of empirical data supporting the effectiveness of this technique.

Research on PjBL in the context of non-formal and informal education is minimal. Hence, we do not understand how this model can be applied outside the formal education environment. Non-formal and informal education is often more flexible and adaptable to students' needs. By examining how PjBL is used in these contexts, research can find the best ways to support lifelong learning and broader community participation.

Studies on using PjBL in economics education have not studied how this model can specifically improve students' analytical and conceptual skills. Research focusing on these skills through PjBL can help design a more effective economics curriculum relevant to the job market's needs. Analytical and conceptual skills are essential in understanding and applying complex economic concepts.

The fact on the ground is that economics students at PGRI Mpu Sindok University who are taking entrepreneurship courses are often asked to work on business proposals rather than engaging in hands-on practice to produce actual products. Interviews with several economics education students revealed their desire to start a business through this course. However, other economics education students stated they lacked ideas and were afraid to begin, despite taking the entrepreneurship course. Students who have completed this course mentioned that the course outcome is a business proposal, but the lack of involvement with business practitioners hinders the development of practical skills among students. This is supported by research findings from (Wurdinger, 2015) shows that PjBL research studies in Economic Education are limited to cognitive aspects, while the integration of graduate competencies (such as creativity, risk-taking, and leadership) has not been explored in detail. However, the potential for entrepreneurship in Indonesia lies largely in the creative economy sector, so it is hoped that young entrepreneurs will be able to solve problems through independent business competencies.

The latest issue from the Global Entrepreneurship Monitor (GEM) research results in several countries around the world shows that 44% of respondents in 2019 and 47% of respondents in 2024 stated that they would not start a business opportunity because they were afraid of failure (GEM, 2025). This is also a challenge for higher education graduates because they tend to be required to understand general economic concepts, while entrepreneurship indicators (opportunity recognition, innovative thinking, and business planning) are not yet the focus of learning outcome assessments (Bell, 2010; Lackeus, 2020). Organisations with various fields of work require financial improvement. This can be achieved through organisational business activities. Based on field observations and the needs of entrepreneurship programmes, higher education institutions, particularly economics education programmes, face gaps including: (1) preparing higher education students to take risks in business, (2) fostering the independence of prospective graduates by not relying solely on their professional qualifications, and (4) the job market demands practical and analytical skills from its members rather than theoretical knowledge alone.

This research is essential because economic education today requires a more efficient learning model to improve students' entrepreneurial skills. One of the skills that is very important in the era of globalization, which is full of challenges and uncertainties, is entrepreneurship. Although various learning approaches have been used, many graduates are not ready to work, especially in terms of entrepreneurial skills. Project-based learning (PjBL) effectively improves students' practical skills and conceptual understanding across various disciplines but has not

DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045

been widely researched in the context of economic education. This research is essential because it offers an innovative solution by integrating PjBL to improve student engagement and entrepreneurial abilities, which can help address the gap.

Therefore, this study aims to determine how effective project-based learning models are in improving student engagement and entrepreneurial skills in economics education. Researchers will investigate how the implementation of PjBL can influence students' analytical skills, problem-solving abilities, and their readiness to face entrepreneurial challenges. In addition, this study will investigate the role of student engagement in the learning process and how this engagement can contribute to the overall development of entrepreneurial skills. The novelty of this study is (1) research on project-based learning models with student engagement in entrepreneurial competencies in the field of economic education has not been widely conducted, (2) it provides curriculum design implications for prospective teachers through entrepreneurship courses using the PjBL model, thereby strengthening prospective graduates who are not merely teachers, (3) students in the field of education, particularly economic education, are able to engage in creative and independent entrepreneurship through the PjBL learning model. Therefore, this study is expected to provide practical implications for educational institutions to develop curricula that are more aligned with changes in the job market and the business world.

2. METHODOLOGY

This research was conducted using a correlational research design. The purpose of this design was to correlate and find the value of the correlation coefficient between the variables used in the study. Entrepreneurial competence was the dependent variable in this study, and the project-based learning model and student involvement were the independent variables presented in Figure 1.

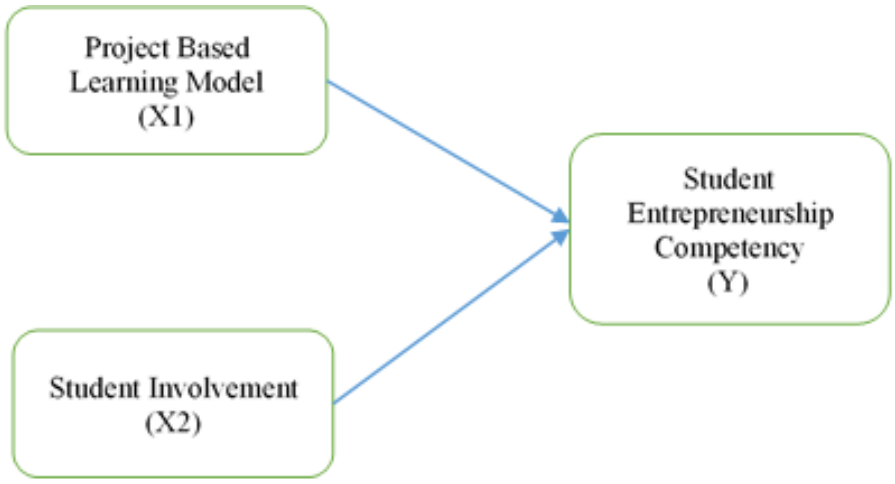

Fig 1. The Research Design

This study had a population of 275 economics education students at PGRI Mpu Sindok University. The sampling technique used was purposive sampling, based on the fact that the economics education students were taking business practice courses. The sample size for this study was 110 fourth-semester students.

Data collection was conducted using a research instrument, namely a questionnaire, to measure the variables of project-based learning model implementation, student involvement during the learning process, and entrepreneurial competencies of students. The questionnaire used a Likert scale. Instrument validity and reliability were tested using Cronbach's Alpha. The analysis techniques employed descriptive analysis and classical assumption tests, such as normality tests and multicollinearity tests. This was followed by inferential analysis, including multiple linear regression analysis to analyze the research model's predictions, t-tests to analyze the influence of independent variables on dependent variables, and F-tests to assess whether all independent variables collectively influence the dependent variable.

3. RESULTS AND DISCUSSION

This study produced descriptive analysis tests with an average value of project-based learning media usage (X1) of 3.947731, student engagement (X2) of 3.921818, and entrepreneurial competence (Y) of 3.848485. The normality assumption test in linear regression, the distribution of residuals from the regression model is shown in the graph in Figure 2. The results of the classical assumption test consist of (1) a normality test that produces normally distributed residual data (p = 0.0849) and a multicollinearity test that produces VIF X1 = 1.000168 and VIF X2 = 1.000168 values, indicating that there is no correlation between the independent variables in this research.

DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045

The regression equation \ (Y = 0.197 + 0.587X1 + 0.341X2 = 0.4053 \) was obtained through multiple linear regression analysis. The R-squared value is 0.4162 and the adjusted R-squared value is 0.4053. The t-test indicates that the effect of the independent variable X1 on the dependent variable Y has a p-value < 0.05, so H0 is rejected and the effect is significant. The effect of the independent variable X2 on the dependent variable Y has a p-value < 0.05, so H0 is rejected and the effect is significant.

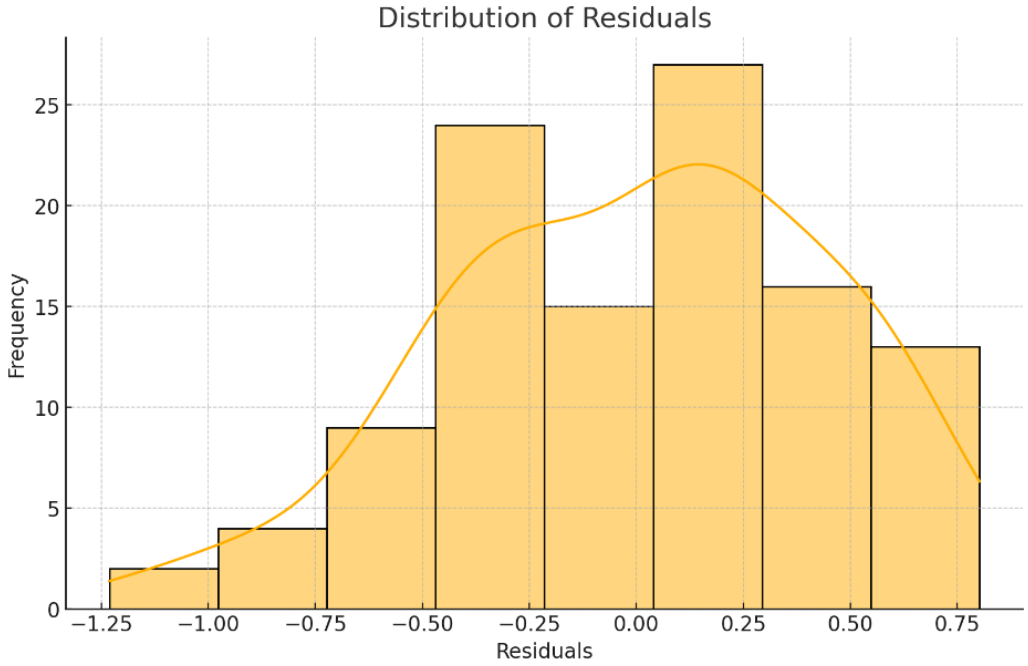

Fig 2. The Result of the Distribution of Residuals

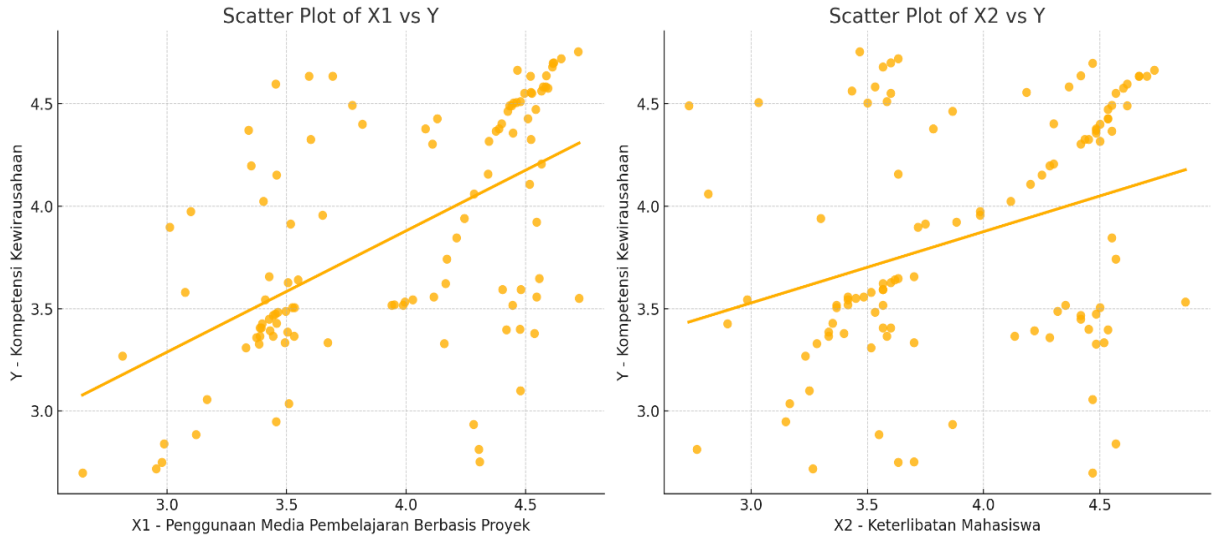

Fig 3. Scatter Plot Graph of the Effect of Variable X1 on Y and X2 on Y

Figure 3 shows that the use of project-based learning media (X1) and student engagement (X2) have a positive effect on entrepreneurial competence (Y), in accordance with the results of the regression analysis that has been conducted. The research results based on the test results and path coefficients indicate that the project-based learning model (X1) has a positive and significant correlation with entrepreneurial competence (Y). The graduate competence variable can be increased by 58.7% due to the influence of the project-based learning model variable. The student involvement variable (X2) has a positive and significant correlation with entrepreneurial competence (Y). The entrepreneurial competence variable (can increase by 34.1% due to the influence of student

DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045

involvement (X2) in the learning process. The F-test results show that overall, the model, both the influence of X1 on Y and X2 on Y, has a p-value < 0.05, indicating that this research model significantly influences the relationship between independent and dependent variables.

This study shows that the implementation of a project-based learning model affects entrepreneurial competence. This is in line with research findings that PjBL can provide long-term benefits in developing students' conceptual and practical skills if applied consistently (Peng et al., 2019). Moreover, the entrepreneurial competence in the second business practice course in Economics Education has learning outcomes in entrepreneurial theory and the practical application of that theory. Constructivism theory states that active learning through real projects helps students internalise knowledge more deeply (Coombes et al., 2023). However, differences in the effectiveness of PjBL across different levels of education and disciplines often cannot be generalised (Gil-Galván et al., 2021; Peng et al., 2019; Trullàs et al., 2022). However, according to educators, an interdisciplinary learning approach can increase the flexibility and adaptability of the PjBL method (Englund, 2018; Wise et al., 2022). This shows that PjBL can be used effectively in various academic contexts. Thus, the findings of this study enable PjBL to be used in various disciplines to ensure that this method can meet various educational needs.

This differs from the results of research from (Wurdinger, 2015) shows that PjBL research studies in Economics Education are limited to cognitive aspects, while the integration of graduate competencies (such as creativity, risk-taking, and leadership) has not been explored in detail. In addition, higher education graduates tend to only be able to understand economic concepts rather than entrepreneurial indicators such as opportunity recognition, innovative thinking, and business planning as an assessment of learning outcomes (Bell, 2010; Lackeus, 2020). Although the results of this study indicate that project-based learning models increase students' entrepreneurial competencies by 58.7%, these results are consistent with the findings of PjBL research, which shows that it improves students' problem-solving and analytical skills, both of which are important skills in economics (Peng et al., 2019). This study supports the idea that learning methods involving practical application and in-depth analysis can improve students' conceptual understanding (Maskiewicz et al., 2012).

Furthermore, several previous studies discussing the integration of digital technology in PjBL models, particularly in the field of economic education (Dziubaniuk et al., 2023). It has been proven that the use of project-based learning media combined with digital technology improves students' entrepreneurial skills (Zang et al., 2022). By using digital technology, students can access more resources and increase the level of interactivity in learning (García-Martínez et al., 2020). Assistive technology can aid cognitive development and enhance learning experiences (Jamil et al., 2023; Yan & Li, 2023). These results indicate that educational institutions should adopt digital technology in the PjBL model to improve student learning and engagement. This study shows that the influence of student engagement variables increases entrepreneurial competence by 34.1% because some students directly experience business practices with business practitioners, while others engage in independent entrepreneurship. Therefore, student engagement can be developed through digital entrepreneurship activities and collaboration with business practitioners to motivate students and achieve entrepreneurial competence in economic education.

Research result from (Kamal & Khusna, 2023) shows that the PjBL model can also be used effectively outside of formal educational settings. This study supports the idea that project-based learning can be adapted to various types of education, including more flexible ones such as non-formal and informal education. Moreover, a flexible, learner-centred approach to learning can increase student motivation and learning outcomes (Tzenios, 2022). Although this study was limited to formal education, it shows that further research is needed on the application of PjBL in non-formal and informal contexts to support lifelong learning.

Project-based learning models and student engagement together have a positive impact of 41% on entrepreneurial competence, so this research can be used as a reference for economics education curricula using project-based learning models combined with student engagement, such as the use of digital business technology and training in business leadership within work teams. Learning activities such as collaborating with business practitioners and industry provide opportunities for economics students to be directly involved in business projects.

To address the lack of research on PjBL in the context of non-formal and informal education, future researchers could design specific studies that examine the use of PjBL outside of formal education settings. This could be achieved by involving learning communities and non-formal educational institutions as research samples. In addition, collaboration with the public and private sectors could provide a broader understanding of the real-world application of PjBL.

The findings of this study further indicate that the successful implementation of PjBL depends not only on the learning design but also on the extent of students' reflective engagement during the learning process. Reflection enables students to connect theoretical knowledge with real entrepreneurial experiences, strengthening their capacity to make informed decisions and manage risk. When students are encouraged to analyze their project outcomes, identify challenges, and propose innovative solutions, they develop the entrepreneurial mindset needed to sustain creative ventures beyond academic contexts. This process also cultivates self-efficacy and adaptability—two essential attributes for navigating dynamic business environments. Therefore, educators play a pivotal role as facilitators who create authentic learning situations, guide reflection, and ensure that assessment practices emphasize both cognitive and behavioral dimensions of entrepreneurship.

DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045

Furthermore, the integration of project-based learning into entrepreneurship education contributes to the development of collaborative competencies that mirror real-world business teamwork. Through shared project responsibilities, students learn to negotiate, lead, and cooperate in achieving collective goals, thereby strengthening interpersonal and leadership skills. These collaborative experiences not only increase motivation and engagement but also prepare students to operate effectively within professional networks and entrepreneurial ecosystems after graduation. In the long term, this approach can foster the growth of a new generation of educators and entrepreneurs who are creative, independent, and socially responsible, aligning higher education outcomes with the demands of Industry 4.0 and Society 5.0.

4. CONCLUSION

This study concludes that both the project-based learning (PjBL) model and student engagement significantly enhance entrepreneurial competence, jointly contributing to substantial improvement in the entrepreneurial skills of economics education students. Active participation through project-oriented tasks strengthens conceptual understanding, nurtures creativity and independence, and equips students with the capacity to identify and develop innovative business opportunities. The integration of PjBL into economics education curricula is therefore an effective pedagogical approach to preparing future educators who are also capable of becoming self-reliant entrepreneurs and contributors to sustainable economic growth.

Theoretically, this research reinforces the view that active, contextual, and collaborative learning fosters higher-order thinking and entrepreneurial competence. It demonstrates that authentic project experiences help students internalize knowledge more deeply and develop practical problem-solving abilities. Practically, the study provides empirical support for incorporating PjBL into teacher education programs as a means of strengthening students' entrepreneurial mindset and readiness to apply economic concepts in real-world contexts.

Nevertheless, this study has several limitations. It was conducted only within formal education settings, the sample was restricted to one semester of business practice courses, and the research did not yet include interdisciplinary integration or digital entrepreneurship components. These limitations highlight opportunities for future studies to extend PjBL implementation in non-formal and informal learning contexts, adopt longitudinal designs to observe sustained competency growth, and explore the potential of digital-based entrepreneurial projects.

Future research should also investigate interdisciplinary approaches that integrate economics, technology, and creative industries to further enhance entrepreneurial competence across different educational domains. Strengthening partnerships between universities and industry is recommended to provide students with direct exposure to entrepreneurial ecosystems and authentic business practices. Such efforts will not only address the current study's limitations but also expand the theoretical and practical understanding of how project-based learning can effectively foster engagement and entrepreneurial competence in higher education.

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DOI: https://doi.org/10.17509/ije.v18i2.72503
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DOI: https://doi.org/10.17509/ije.v18i2.72503
p- ISSN 2528-1410 e- ISSN 2527-8045