

The Influence of Project-Based Technopreneurship Learning and Entrepreneurial Attitudes on Students' Entrepreneurial Interests

Nabilla Umami^{1*}

Faculty of Economics and Business
Universitas Negeri Surabaya
Surabaya, Indonesia
E-mail: umaminabilla126@gmail.com

Retno Mustika Dewi²

Faculty of Economics and Business
Universitas Negeri Surabaya
Surabaya, Indonesia

ABSTRACT

Entrepreneurship is one of the activities that has the potential to minimize unemployment rates while optimizing economic productivity in a country. However, the reality shows that students are not too interested in entrepreneurial activities. In an effort to foster students' entrepreneurial spirit, external and internal factors are needed that influence students' interest in entrepreneurship, including through technopreneurship learning and entrepreneurial attitudes. The purpose of this study is to determine the effect of technopreneurship learning and entrepreneurial attitudes on students' interest in entrepreneurship. The associative causal research method with a quantitative approach was applied in this study, by applying multiple linear regression analysis techniques assisted by IBM SPSS version 25 software. The sample used in this study was 36 students of SMA Semen Gresik in grades X to XII who had participated in the technopreneurship learning program. This study found that technopreneurship learning and entrepreneurial attitudes possessed by students simultaneously influenced students' interest in entrepreneurship. Meanwhile, it was partially found that technopreneurship learning did not have a significant effect on students' interest in entrepreneurship, while entrepreneurial attitudes had a significant effect on interest in entrepreneurship. With the findings of this study, it is hoped that schools will always help maximize the learning process of students, especially in studying entrepreneurship, so that students' interest in entrepreneurship increases.

Keywords: Entrepreneurial Attitude; Entrepreneurial Interest; Technopreneurship Learning



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INTRODUCTION

Indonesia's relatively low entrepreneurship rate of 3.47% in 2023, with the majority of entrepreneurs aged 25-34, demonstrates that the 3.9% target set in the 2020-2024 National Medium-Term Development Plan has not been achieved (Kemenko Perekonomian, 2022). Indonesia's low entrepreneurship rate also contributes to the high unemployment rate. Data from the Central Statistics Agency (BPS, 2024) shows that the Open Unemployment Rate (TPT) based on education level is dominated by high school graduates, accounting for around 9% of the total unemployed in Indonesia. Furthermore, Indonesia's massive population growth also poses a challenge, triggering intense job competition due to globalization and technological developments.

Therefore, one solution to face these challenges is for the younger generation to realize entrepreneurship by creating their own jobs equipped with adaptive, competitive skills, attitudes, and the spirit of an entrepreneur. Entrepreneurship can be a strategic solution, not only in creating jobs but also in increasing economic independence and developing entrepreneurship among young people, especially high school graduates (Costa, 2024). However, preliminary observations indicate that entrepreneurial interest among young Indonesian students remains low. This could be due to external factors such as educational support (Munawar, 2018) and internal factors such as individual mindsets and attitudes toward entrepreneurship (Almadhea & Kamalia, 2024).

Previous research has shown that technopreneurship learning can foster entrepreneurial interest. Research in Indonesia belongs to Mantasia & Samad (2023) which was tested on Applied Electronics Engineering (D4) students, Wahdina (2018), and Supandi (2022) Research has shown that vocational school students who participated in project-based learning models in entrepreneurship education reported increased entrepreneurial interest. However, research by Zuliando et al. (2014) researched students of the Business Administration Education Study Program, Faculty of Economics, State University of Malang, found no effect. The diversity of previous research results and the context of entrepreneurship education, often cited as factors influencing entrepreneurial interest, are the reasons researchers chose project-based technopreneurship learning as a variable influencing entrepreneurial interest.

Not only extrinsic factors such as education, but intrinsic factors such as attitudes, which are a manifestation of feelings and emotions, are also important aspects. In the context of entrepreneurship, a person's desire to start their own business is a result of their mindset toward entrepreneurship. This is consistent with studies conducted by Ardiyani & Kusuma (2016) who researched students of the Faculty of Economics and Business, Ganesha University of Education, and Prasetya & Ariska (2021) at Wijaya Kusuma University, who found that entrepreneurial attitudes significantly influence entrepreneurial interest. However, Karibera *et al.* (2023) who researched members of the social-entrepreneur community of Lakoat Kujawas found that entrepreneurial attitudes did not influence it. This is because most members of the Lakoat Kujawas Community don't understand entrepreneurship. This explains the gaps in previous research findings.

Given the inconsistent research findings, this study provides a novel approach by examining the effect of project-based learning and entrepreneurial attitudes on entrepreneurial intentions. Although previous studies have demonstrated the effectiveness of entrepreneurial learning in increasing entrepreneurial intentions, the results have been inconsistent. Furthermore, there has not been much previous research that consistently and simultaneously examines the variables of technopreneurship learning and entrepreneurial attitudes. Hereby, this study offers a new perspective by simultaneously and comprehensively linking these two variables. Therefore, this research is important to investigate because it not only provides practical solutions for developing

learning methods, but these components also contribute to increasing the entrepreneurship ratio and reducing unemployment rates in the future.

LITERATURE REVIEW

Technopreneurship Learning Based on Project-Based Learning

Project-based learning is a procedure to equip individuals with concepts and skills to identify business opportunities using technological developments tailored to their individual business skills and interests (Saptaria & Setyawan, 2021). Tesalonika *et al.*, (2024) define project-based learning as facilitating students with diverse learning styles in acquiring new knowledge through real-world experiences, such as experiments, model-making, poster-making, and presentation-making.

Referring to the theories outlined, project-based learning is defined as an entrepreneurship education program that integrates technology, intending to develop an entrepreneurial mindset and attitude based on real-world knowledge and experience, realized through outputs in the form of valuable goods or services, thereby creating business opportunities. In this study, the project-based learning technopreneurship learning variables were measured based on indicators according to (Mantasia & Samad, 2023), namely: project selection, project completion stage planning, project monitoring and scheduling, preparation of project reports and presentations, and evaluation of project results.

Entrepreneurial Attitude

Octavia (2015) states that an entrepreneurial attitude is a mental willingness that tends to consistently respond to an object that has a negative, neutral, or positive meaning, encompassing cognitive, affective, and action-inclination aspects, thus being useful for regulating behavior. Meanwhile, according to Dewi (2016), an entrepreneurial attitude is defined as an individual's initiative to respond to entrepreneurial characteristics, such as self-confidence, focus on results, courage to take chances and overcome obstacles, leadership, inventiveness, and forward-looking.

Referring to the definitions of entrepreneurial attitudes by experts, it can be interpreted that an entrepreneurial attitude is an individual's perspective in responding to entrepreneurial objects, which influences their behavior or actions. The emergence of an entrepreneurial attitude is created by an attitude structure consisting of three components: cognitive, affective, and conative (Azwar, 2007).

Entrepreneurial Interest

A strong, consciously expressed belief by an individual that they want to build a business and are eager to do so at a specific time is the definition of entrepreneurial interest, according to Thompson (in Putra, 2024). Meanwhile, Cahyaning (2014) interprets entrepreneurial interest as the will within a person who is brave enough to establish a business for a better life.

Therefore, entrepreneurial interest can be described as a person's inner desire to engage in business activities using the skills they possess to assess, create, and manage business opportunities to achieve a better quality of life. Thus, entrepreneurial interest is not only an internal drive that triggers someone to start a new business, but also a foundation for building economic independence that has a good influence on society as a whole (Efawati *et al.*, 2021). Within this research, entrepreneurial interest was measured

using four indicators, according to Wikanso *et al.*, (2024): feelings of joy, interest, attention, and involvement.

The Influence of Technopreneurship Learning on Entrepreneurial Interest

Wahdina (2018) revealed that the students gain a better understanding of the concept of entrepreneurship through a project-based learning model in the technopreneurship subject. This is because students not only receive theory, but also apply their skills in a project that requires them to learn to process and manage, and to engage in teamwork that encourages them to hone their communication and collaboration skills to produce commercially viable products (McArdle & Koning, 2022; Chaniago & Sayuti, 2022). This experience is what makes project-based entrepreneurship learning able to increase entrepreneurial interest. These findings support Erwantiningsih *et al.*, (2021) and Supandi (2022) who stated that projects presented in entrepreneurship learning have been shown to stimulate entrepreneurial interest. Therefore, it is possible to deduce that the better the realization of project-based entrepreneurship learning, the higher the students' entrepreneurial interest.

The Influence of Entrepreneurial Attitudes on Entrepreneurial Interest

Various studies have been conducted that demonstrate the effect of entrepreneurial attitudes on entrepreneurial interest, reinforcing the statement above. Almadhea & Kamalia (2024) revealed that entrepreneurial attitudes have an impact on students' interest in entrepreneurship. This is relevant to research by Akinwale and Ababtain (2019) and Kusuma & Widjaja (2022). Through attitudes, people evaluate the pros and cons of actions that impact entrepreneurial success. This concludes that the higher or better an individual's entrepreneurial attitude, the higher their interest in entrepreneurship.

The Influence of Technopreneurship Learning and Entrepreneurial Attitudes on Entrepreneurial Interest

Research examining the joint impact of technopreneurship learning and entrepreneurial attitudes was conducted by Isma *et al.* (2023). Their research revealed a significant, positive correlation between entrepreneurship learning and entrepreneurial attitudes on entrepreneurial interest. Similar findings were obtained in Rindrayani (2017) which found a positive and significant correlation, both partially and simultaneously, between the variables of entrepreneurship learning practices, interpreted similarly to project-based entrepreneurship learning and entrepreneurial attitudes, on entrepreneurial interest. This explanation leads to the conclusion that the higher or better the implementation of technopreneurship learning and entrepreneurial attitudes, the higher the entrepreneurial interest.

The research design is presented in the following diagram:

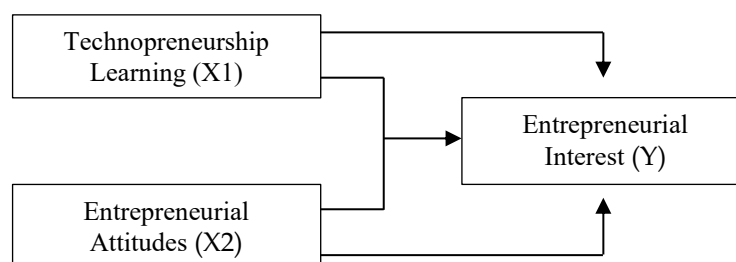


Figure 1. Research Constellation
Source: Own compilation, 2025

The hypothesis of this study to be tested is as follows:

H1: Technopreneurship learning based on project-based learning has a significant influence on entrepreneurial interest.

H2: Entrepreneurial attitude has a significant influence on entrepreneurial interest.

H3: Technopreneurship learning based on project-based learning and entrepreneurial attitude has a significant influence on entrepreneurial interest.

RESEARCH METHOD

This research approach applied in this study is quantitative with a causal associative method. The variables in this study are divided into three: project-based learning and entrepreneurial attitudes as the independent variables (X), and entrepreneurial interest as the dependent variable (Y). The population in this study was 36 students from grades 10 to 12 of Semen Gresik Senior High School, who had participated in technopreneurship learning.

All members of the population were used as research samples in this non-probability sampling technique, which implements a saturation sampling strategy. Saturated sampling is applied when the population size is relatively small, for example, no more than 30 people (Sugiyono, 2023; Chaniago et al., 2023). Multiple regression tests were employed in data analysis with the aid of SPSS software. A g-form questionnaire was utilized as the data collecting technique, and it was disseminated using the WhatsApp app with a Likert scale that had 5 answer options.

RESEARCH RESULTS

Validity and Reliability Test

To ensure the questionnaire accurately measured the aspects it was intended to measure, we first conducted a pilot test on 30 respondents outside the main sample. According to Sugiyono (2023), a validity test is considered valid if the total correlation is > 0.3 . Based on the pilot test results, for the project-based learning technopreneurship variable, no statements had a total correlation of less than 0.3. Meanwhile, for the entrepreneurial attitude and entrepreneurial interest variables, one statement was found to be invalid. These invalid items were removed and not used in the study. And then, the questionnaire was distributed directly to respondents online using WhatsApp.

A reliability test was carried out to ascertain whether the collected data were suitable for further analysis, with a Cronbach's Alpha value > 0.600 . In our data, the reliability test results showed 0.899 for the project-based learning technopreneurship variable, 0.803 for the entrepreneurial attitude variable, and 0.863 for the entrepreneurial interest variable, indicating that the research instrument was reliable and suitable for use.

Respondent Profile

Table 1. Respondent profile

Description	Demographics	Frequency	Percentage
Gender	Male	7	19.4%
	Female	29	80.6%
Class	X	6	17%
	XI	8	22%
	XII	22	61%

Source: Own compilation (2025)

The table above shows the respondent profile, including gender and distribution across classes. Table 1 shows that this study involved 29 female students and 7 male students. This composition reflects a significantly higher number of female respondents than male respondents. Therefore, it is understandable that most of the respondents in this study were female.

Furthermore, it is known that the respondents in this study consisted of several class levels, including 6 respondents from class X, 8 respondents from class XI, and 22 students from class XII.

The respondents for this study were 36 students from grades 10 to 12 who had participated in technopreneurship learning. These respondent criteria were specifically relevant to the research objective, which was to examine entrepreneurial interest after participating in technopreneurship learning. Students who have participated in technopreneurship learning have a direct understanding and experience of the concept of technology-based entrepreneurship, thus ensuring more accurate and relevant data. By involving all classes from various levels, the researchers were able to obtain a comprehensive and holistic picture of the effectiveness of implementing technopreneurship learning at Semen Gresik Senior High School.

Analysis Prerequisite Test Results

Normality Test

Data is declared to have passed the normality test if the significance value is greater than 0.05. The One-Sample Kolmogorov-Smirnov test, a statistical analysis tool, is also used in the SPSS findings for the normality test. The significance value for variable Y is 0.200, indicating that the sig value is > 0.05, according to the normality test table. Therefore, it is decided that the data are normally distributed.

Linearity Test

Data is declared to have passed the linearity test if the significant deviation from the linearity value is greater than 0.05. Based on the test results, the value was 0.279 for the project-based technopreneurship learning variable and 0.08 for the entrepreneurial attitude variable. A sig. value >0.05 shows that there is a linear relationship between the independent and dependent variables, indicating a good linear regression model.

Multicollinearity Test

The tolerance values for the technopreneurship learning and entrepreneurial attitude variables exceeded 0.1, at 0.660 each. Furthermore, the VIF values for each independent variable did not exceed 10, at 1.515 each. This indicates that there is no multicollinearity.

Multiple Linear Regression Analysis Result

Table 2. Summary of hypothesis testing

Model	Unstandardized Coefficients (B)	t-Value	Sig.
Constant	8.127	1.582	0.123
X1	0.027	0.276	0.784
X2	1.036	7.033	0.000

Source: Own compilation (2025)

Referring to the Table 2, the multiple linear regression is formulated as follows:

$$Y = 8.127 + 0.027 X1 + 1.036 X2 + e$$

The regression equation indicates that the constant value of 8.127 represents students' entrepreneurial interest when both project-based technopreneurship learning (X1) and entrepreneurial attitude (X2) are zero. The regression coefficient for X1 is 0.027, meaning that for every one-point increase in X1, entrepreneurial interest (Y) increases by 0.027, assuming other variables remain constant. Similarly, the coefficient for X2 is 1.036, indicating that a one-point increase in X2 results in a 1.036 increase in Y, under the same assumption.

Hypothesis Test Results

T-Test

The t-test results, as seen in the Sig. column in Table 2, it can be explained that the p-value for variable X1 is $0.784 > 0.05$, meaning H1 is not accepted. Therefore, no partial effect exists of project-based learning technopreneurship learning (X1) on entrepreneurial interest (Y). The p-value for variable X2 is $0.000 < 0.05$, meaning H2 is accepted. Therefore, there is a partial effect of entrepreneurial attitude (X2) on entrepreneurial interest (Y).

F-Test

Table 3. F-Test Result

Model	F	Sig.
Regression	39.230	0.000

Source: Own compilation (2025)

Based on the results of the simultaneous hypothesis test (F-test), a significance value of 0.000 was obtained, which is < 0.05 . Therefore, the conclusion is that H3 is accepted, indicating a simultaneous influence between project-based learning-based technopreneurship (X1) and entrepreneurial attitude (X2) on entrepreneurial interest (Y).

Coefficient of Determination Test

Table 4. Coefficient of Determination Test Result

R	R Square	Adjusted R Square
0.839	0.704	0.686

Source: Own compilation (2025)

Based on the results presented in Table 3, the Adjusted R Square value of 0.686 indicates that 68.6% of the variance in entrepreneurial interest can be explained by the independent variables, namely project-based technopreneurship learning and entrepreneurial attitude. The remaining 31.4% is attributed to other factors not examined in this study.

DISCUSSION

The Influence of Technopreneurship Learning on Entrepreneurial Interest

Referring to the statistical analysis's findings, it was found that technopreneurship learning had a positive but insignificant influence on entrepreneurial interest. This indicates that other elements dominate the formation of entrepreneurial interest, and in fact, technopreneurship learning was unable to maximize the entrepreneurial interest of students in this study.

This result aligns with studies by Nuraida *et al.* (2020) and Johny & Katherin (2017) which found no significant effect of entrepreneurship education or learning on entrepreneurial interest. Conversely, this finding contradicts studies by Roy *et al.* (2020) and Castro & Zermeño (2021) which suggested that project-based entrepreneurship learning or courses significantly increase entrepreneurial interest. This finding also contradicts the Theory of Planned Behavior, which explains that subjective norms are one component that shapes a person's interest. The component, which reflects the variable of technopreneurship learning, suggests that external factors can influence individual behavior. However, in this study, technopreneurship learning has not been able to influence a person's interest in entrepreneurship.

After further review and linking it to actual conditions in schools, researchers identified several factors that could contribute to technopreneurship learning not influencing entrepreneurial interest. First, the school's policy of integrating all grade levels into the learning process. This potentially reduces learning effectiveness, as each grade level has different levels of understanding and learning needs. Therefore, integrating classes without appropriately adapting the material and learning strategies can result in the material being mismatched to the abilities of some students. This can reduce learning effectiveness, which in turn impacts students' entrepreneurial interest.

Second, there are time constraints. The limited interaction between teachers and students limits knowledge transfer, thus impacting learning effectiveness (Zannah & Ghina, 2024). Observations revealed that learning is often not delivered on time, resulting in inadequate delivery of material. Rifai & Sucihatiningsih (2016) stated that to achieve success, individuals must be disciplined in all their activities. Relevant to the above conditions, time discipline is crucial for students. By implementing time discipline, students will be more focused and productive, thus helping them achieve success.

With this, schools can optimize students' entrepreneurial interest by evaluating the implementation of technopreneurship learning programs, including considering the integration of different grade levels in the learning process, implementing interactive and effective learning methods, prioritizing time efficiency, and revitalizing learning support elements. The conclusion is that entrepreneurship learning programs do not always succeed in building students' character and entrepreneurial will. Nurikasari (2016) stated that educational programs cannot be a definite standard in fostering the ambition to launch a business.

The Influence of Entrepreneurial Attitudes on Entrepreneurial Interest

Referring to the analysis conducted, it was found that entrepreneurial attitudes positively and significantly influence students' entrepreneurial interest. This means that the more positive a student's attitude toward entrepreneurship, the higher their interest in entrepreneurship. This is relevant to the assertion of Kusuma & Widjaja (2022), which states that the better an individual's attitude toward entrepreneurship, the greater their entrepreneurial interest.

This finding is in contrast to a study by Karibera *et al.* (2023), which found no connection between entrepreneurial attitudes and entrepreneurial intentions. Conversely, this study is relevant to Almadhea & Kamalia (2024) and Suehara Vanity M. Barit (2023), who stated that entrepreneurial attitudes significantly influence an individual's entrepreneurial interest. The findings of this investigation strengthen the construct of attitude toward behavior proposed by Ajzen (1991) in the theory of planned behavior. The attitude toward behavior construct explains that humans will predict the positive or negative impacts of their behavior. When linked to research results, this indicates that students have a positive attitude toward entrepreneurship. Feelings of enthusiasm and

optimism make them believe that entrepreneurship will be profitable, thus increasing their interest in entrepreneurship. This agrees with Sigit *et al.* (2016), who stated that positive attitudes such as interest in business opportunities and the courage to face risks trigger the growth of entrepreneurial intentions.

The Influence of Technopreneurship Learning and Entrepreneurial Attitudes on Entrepreneurial Interest

The simultaneous influence of variables X1 and X2 on variable Y indicates that if these two factors are applied simultaneously to students, they will contribute positively, increasing their interest in entrepreneurship. The relationship between these two independent variables is supported by Mariamah & Anilawati (2024), who stated that a person's interest in entrepreneurship is influenced by various external and internal factors. In this study, technopreneurship learning reflects external factors originating from educational institutions through school support, while entrepreneurial attitudes are an internal factor originating from within the individual. This is reinforced by Rindrayani (2017) who stated that entrepreneurial practices and entrepreneurial attitudes simultaneously influence entrepreneurial interest.

The variable with the greatest influence in this study is entrepreneurial attitude. This is described through cognitive, affective, and conative aspects. In this study, the cognitive component describes an individual's understanding, knowledge, and beliefs regarding entrepreneurship. The affective component relates to an individual's feelings, emotions, and attitudes regarding entrepreneurship. Meanwhile, the conative component relates to an individual's intentions and actual behaviors in entrepreneurship. These three elements interact with each other in shaping a person's attitude toward the behavior they engage in, including interest or desire to become an entrepreneur. This research supports the findings of Munawar, (2018), Isma *et al.* (2023), Barit (2023), and Akinwale and Ababtain (2019) who revealed that entrepreneurial attitudes significantly influence entrepreneurial interest.

CONCLUSIONS

Based on the research, it was concluded that project-based technopreneurship education did not affect students' entrepreneurial interest. Therefore, an evaluation of the program's implementation is needed through initial and final surveys. Schools can also organize activities that can accommodate students' ideas and abilities, such as business competitions, to motivate them to develop their business ideas.

The next finding was that entrepreneurial attitudes influence students' entrepreneurial interest. Therefore, entrepreneurial attitudes are a crucial component in fostering entrepreneurial interest. Therefore, schools must provide a platform for developing positive attitudes toward entrepreneurship in students, such as participating in business competitions inside and outside of school or trying to start a small business.

Last, it was found that both project-based technopreneurship education and entrepreneurial attitudes influence students' entrepreneurial interest. Therefore, these two variables need to be implemented simultaneously because they have the potential to stimulate the growth of students' entrepreneurial interest.

Directly, project-based technopreneurship learning provides students with the technical and managerial skills needed to start a business. Students with a positive entrepreneurial attitude are more motivated to take the initiative and dare to try and explore new ideas. Meanwhile, indirectly, experiences in technopreneurship learning can shape students' entrepreneurial attitudes. For example, success in a project can increase

confidence and a positive attitude towards entrepreneurship. Therefore, simultaneously, technopreneurship learning and entrepreneurial attitudes reinforce each other and create an ecosystem that supports entrepreneurial interest. The combination of the two not only provides skills and knowledge but also builds the motivation and courage needed to start a business.

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