

## Can the teaching factory model improve the entrepreneurial intentions of vocational high school students?

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### ABSTRACT

Entrepreneurial intentions play an essential role in creating new entrepreneurs. There are many methods of teaching entrepreneurship that aim to form entrepreneurial intentions, and one of them is considered suitable to be applied in vocational high schools, namely factory teaching. This study examined the effect of the teaching factory on entrepreneurial intentions through the theory of planned behavior dimension. There were 280 vocational high school students participated in the study. Data was collected via online questionnaires and analyzed with Amos software using the structural equation modeling method. The teaching factory has been shown to influence students' entrepreneurial intentions both directly and indirectly via mediators of attitudes toward behavior and perceived behavioral control. This study also provided important implications for vocational practitioners to develop a teaching factory learning model as a school business unit based on the needs of the world of work. Good management of the teaching factory is expected to prepare prospective new entrepreneurs from vocational school graduates.

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## 1. INTRODUCTION

The entrepreneurial aspect is vital to improving a country's economy. The promotion and growth of entrepreneurship are considered critical components of economic development [1]–[3]. Even the Indonesian government has made a policy on strengthening entrepreneurship education in vocational high schools. Entrepreneurship education is one of the fastest growing fields in the world due to its ability to connect current business operations with academic theory. The vocational education program at the vocational high school level aims to prepare graduates to be able to work, continue their studies, or become entrepreneurs according to the vocational field they are interested in. Strengthening the entrepreneurship program in vocational school is also to answer the problem of the high unemployment rate of vocational school graduates. According to the Central Statistics Agency, vocational school graduates contribute the highest to the unemployment rate based on educational background [4]. Therefore, it is very natural that the Indonesian government pays great attention to developing entrepreneurship programs in vocational schools, such as production unit programs and engineering factories. Both programs aim to form the entrepreneurial intention of vocational students in their fields of expertise.

Many academics agree that various entrepreneurship education programs can help increase entrepreneurial intentions. Bazkiaei *et al.* [5] showed that entrepreneurship education has a direct impact on students' entrepreneurial intentions. Other studies also mention that entrepreneurship education plays a vital

role in forming entrepreneurial intentions [6]. Although there have been many studies discussing the relevance and practice of entrepreneurship in schools [7], [8], it is still often found that there is a discrepancy between the theory and practice of entrepreneurship and how the subject can be adequately taught [9]. In addition, entrepreneurship education in vocational schools is still faced with the problem of transforming students who can create new business opportunities through practice-oriented learning and targets to develop entrepreneurial skills [10], [11]. The application of entrepreneurship education in vocational schools is very appropriate in the context of vocational education. The reason for this is that vocational students already have the necessary skills to launch a business. Furthermore, entrepreneurship education programs in vocational schools must be developed on the basis of real-world experiences.

Realistic, action-oriented, and competence and experience-based learning are the most successful for learning entrepreneurship [12]–[15]. The experience base of entrepreneurial pedagogy must also be based on entrepreneurship practices [16], [17]. Learning through the development of business-based teaching factories is one of the developments of effective entrepreneurship learning practices in vocational schools. According to previous research, the teaching factory program can increase vocational students' interest in entrepreneurship [18], [19]. In addition, other studies have also suggested that the development of teaching factories is highly recommended to encourage entrepreneurship in educational institutions [20]. In addition, in 2022, the Indonesian government will strengthen the center for excellence vocational high schools by strengthening the teaching factory program, which aims to prepare graduates for entrepreneurship. Through an in-depth and comprehensive alignment of vocational education with the world of work, the center for excellence vocational high school program aims to produce graduates who are absorbed in the world of work or become entrepreneurs [21].

Numerous research on entrepreneurial intention has been published in the literature, covering a wide range of topics. Previous studies have shown that entrepreneurial intention is essential in creating new entrepreneurs [22]–[24]. Scholars have also discussed the importance of instilling entrepreneurial intentions in the school environment in the context of vocational education [5], [25], [26]. Scholars frequently employ the theory of planned behavior (TPB) to interpret entrepreneurial intentions. However, as far as the author is aware, no prior research has been conducted to test the TPB in the context of the current study, namely how to form a culinary business entrepreneurship intention via the teaching factory program.

Through the elements in the TPB, the teaching factory program is modeled as the initial factor influencing students' entrepreneurial intentions. In this study, the TPB factor acts as a mediator between the teaching factory and entrepreneurial intentions, specifically attitudes toward behavior and perceived behavioral control. These two factors are thought to have a significant impact as a mediator. For example, attitudes toward behavior and perceived behavioral control have a higher factor loading than social norms [25]. Furthermore, a survey conducted in Vietnam found that attitudes toward behavior and perceived behavioral control have a greater influence than social norms [27]. As a result, the purpose of this study is to investigate the impact of the teaching factory program on the formation of entrepreneurial intentions among vocational high school students via mediator attitudes toward behavior and perceived behavioral control.

## 2. LITERATURE REVIEW

### 2.1. Teaching factory as an entrepreneurship education program in vocational schools

One of the fields in education with the quickest growth is entrepreneurship education, which is gaining popularity due to its capacity to connect contemporary business activities with academic theory. Participatory learning that is connected to civic and corporate efforts defines entrepreneurship education [28]. This indicates that because entrepreneurship education uses an experiential learning methodology, there is a sense of industry linkage. Entrepreneurship education aims to alter students' perceptions of creative and risk-taking business practices [29]. Considering entrepreneurial learning in terms of affective, cognitive, and skill-based outcomes can assist educators in determining whether or not their students' behavior has changed as a result of entrepreneurship education. The teaching factory is one of the entrepreneurship education programs with an educational concept based on industrial production business processes.

The goal of using a teaching factory is to give students the opportunity to learn by tackling related real-world engineering issues in the classroom while creating a realistic manufacturing setting [30]. The knowledge and skills obtained in ordinary industrial practice operations are also utilized to improve instructional activities at actual manufacturing sites. The program's goal is to apply academic knowledge in the business world. New technological concepts that must be validated and used in the workplace are tested and demonstrated on didactic or industrial equipment. The previous study also discussed the relationship between the teaching factory and business activities [31]. Entrepreneurial education, in theory, plays a significant role in entrepreneurship objectives and activity. Several research findings on the relationship between entrepreneurial education and entrepreneurial inclinations are in conflict. Students' entrepreneurial orientation, motivation, and intention improved after being exposed to entrepreneurship education [23], [32].

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Previous research has also shown that entrepreneurship education program implementation influences entrepreneurial intentions via the TPB dimension [33]. In contrast to students in a control group, those who had taken part in an entrepreneurial program showed an increase in self-employment intention [34].

Thus, the implementation of the teaching factory does not only develop industrial concept-based learning concepts but also develops business process-based learning that occurs in an industrial environment. That is, it is believed that implementing the teaching factory in vocational high schools will increase the entrepreneurial intentions of vocational high school students. Entrepreneurship is a career option for graduates of vocational high schools. Thus, the first hypothesis: Teaching factory has a direct positive influence on increasing the entrepreneurial intention of vocational high school students (H1).

## 2.2. The theory of planned behavior in entrepreneurial intentions

A new business is born out of the desire to carry out a business idea. Entrepreneurial intentions are defined as a person's strong desire to start a new business and their deliberate plan to do so in the future [35]. Entrepreneurial intention has been defined as a conscious state of mind that precedes action and focuses experience (and thus action and experience) on a specific object (goal) or means to achieve it [36]. Entrepreneurial intentions are an indicator of how well-prepared and committed a person is to engaging in entrepreneurial action [37]. Many academics stress that the likelihood of new company activities forming increases with the strength of entrepreneurial intention [38], [39]. In general, entrepreneurial action is mostly intentional, and entrepreneurial intention is an important stage in the formation of a company [40]. In the opinion of previous researchers [39], business is what people plan. As a result, it has been demonstrated that entrepreneurial intention is an important component in forecasting future entrepreneurial activity [41].

Many studies have shown that self-reported intentions can explain early behavior in an entrepreneurial setting, supporting the TPB claim that people's behavior is closely predicted by their intentions [42]–[44]. The single, direct, and best predictor of planned behavior and its immediate antecedents is intention toward a behavior. Ajzen's TPB is now the most commonly used model to describe and predict an individual's behavior [42]. TPB is also commonly used in entrepreneurship to forecast people's intentions and behavior. Attitude (AT) is the degree to which people believe a specific behavior is attractive or not. Meanwhile, perceived behavioral control (PBC) refers to a person's perception of how easy or difficult it will be to perform the behavior, and subjective norms (SN) reflect perceived social pressure to execute or not execute the behavior (the behavior). Within the TPB model, there are three major aspects of human behavior.

Entrepreneurship, according to Krueger *et al.* [37], is a deliberate and well-planned behavior. Many researchers agreed that entrepreneurial intention can predict entrepreneurial behavior and that new business formation is a purposefully designed behavior because entrepreneurial behavior is deliberate [36]. Because entrepreneurship is essentially viewed as a process and a behavior of venture development [45], intention is essential in this process and serves as the first in a series of steps to establish an organization.

Previous research looked at the link between entrepreneurship education programs and TPB. Scholars demonstrate that all aspects of the theory of planned behavior have a positive and significant influence on the intention of the entrepreneur. Intriguingly, students who enroll in university entrepreneurship programs and major in a subject other than business have a more positive attitude toward behavior and perceived behavioral control, which influences their intention to engage in entrepreneurship [46]. Furthermore, other studies show that, with the exception of the influence of subjective norms on entrepreneurial intentions, the relationship in the TPB model is accepted [43].

Also, entrepreneurship education programs affect entrepreneurial intentions through the TPB dimension [33]. The three dimensions of TPB are very suitable to be formed through the education program [37]. Another research examined how a young enterprise company program affected young people in school over the course of one academic year [47]. The outcomes positively impacted the participants' perspectives on venture formation. In a similar vein, Byabashaija and Katono [48] demonstrated through longitudinal research that attitudes may be changed by four-month entrepreneurship training. As a result, we believe that using entrepreneurship education as a teaching factory can increase vocational students' entrepreneurial intention through the three dimensions of TPB. Hence, the proposed hypothesis: i) Teaching factory has a direct positive influence on attitudes towards the behavior of vocational students (H2); ii) The teaching factory has a direct positive influence on the perceived behavioral control of vocational students (H3); iii) Teaching factory positively influences entrepreneurial intentions through attitudes towards the behavior of vocational students (H4); and iv) Teaching factory positively influences entrepreneurial intention through perceived behavioral control of vocational students (H5).

Implementing entrepreneurship education programs through the teaching factory program is vital in preparing prospective entrepreneurs. According to theory and previous research, the teaching factory can strengthen vocational students' entrepreneurial intentions through two TPB dimensions, namely attitudes toward behavior and perceived behavioral control. Figure 1 depicts the model for this study.

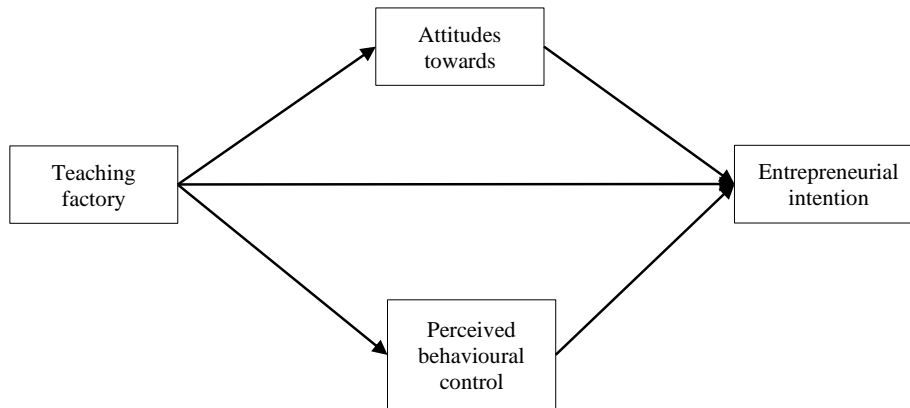


Figure 1. Conceptual model

### 3. RESEARCH METHOD

The respondents involved in this study were students of a state vocational high school in the field of culinary expertise in the city of Surabaya, Indonesia. There were 280 students from five vocational high schools in the culinary skills program have been awarded the center for excellence vocational high school program grant. Determination of the number of samples in this study uses the reference sample size table from Isaac and Michael [49] with an error level of 1%. The number of samples obtained was 280 respondents from a total population of 480 students. There were 57 male and 223 female students completed their perception questionnaire about teaching factory quality, attitude towards, perceived behavioral control, and entrepreneurial intention as described in Table 1. Data on student perceptions of the teaching factory's quality, attitude toward, perceived behavioral control, and entrepreneurial intentions were collected via an online questionnaire administered via a Google Form.

Table 1. Background of participants (N=280)

Attribute	Categories	N	%
Gender	Male	57	20
	Female	223	80
Degree	1st grade	94	34
	2nd grade	87	31
	3th grade	99	35

Online questionnaires were distributed at random to vocational students in Surabaya's culinary expertise program. The total number of students who filled in completely was 280 students. This study's questionnaire was developed using the previous questionnaire; the teaching factory was measured using a questionnaire developed by Adekiya and Ibrahim [50] with eight items (e.g., I think the entrepreneurship education program in this school is the best). Furthermore, Liñán and Chen [41] used attitude toward behavior, perceived behavioral control, and entrepreneurial intention in a questionnaire. There are five components to one's attitude toward behavior (e.g., becoming into a culinary business implies more advantages than disadvantages for me). Six items make up the perceived behavioral control questionnaire (e.g., to start a culinary business and keep it running will be easy for me). Finally, there are six items in the entrepreneurial intention questionnaire (e.g., I am ready to do anything to become an entrepreneur in a culinary business). All instruments employ a Likert scale with five options: strongly agree=5, agree=4, somewhat agree=3, disagree=2, strongly disagree=1. One method used to minimize the emergence of confounding variables is controlling the validity and reliability of questionnaires with unique items in each variable.

This study's data was analyzed using the structural equation modeling (SEM) method and Amos 18 software. The path analysis test was used in data analysis to test the hypothesis. The criteria for determining the hypothesis test are that a hypothesis is accepted if the p-value on the regression path is less than ( $\alpha$ ) 0.05. Meanwhile, a p-value greater than 0.05 indicated that the hypothesis was rejected. At a 90% confidence level, this study employs a bootstrap performance on Amos of 200 samples.

## 4. RESULTS

### 4.1. Validities and reliabilities instruments in this study

The analysis of the validity and reliability of the questionnaire used to collect data is the first step before testing the hypothesis. Using SPSS software, conduct a correlation test to assess the study's validity. Meanwhile, the Cronbach's alpha test in SPSS was used for the reliability test. According to the study's findings, the acquisition of validity values on the teaching factory variables, attitudes toward behavior, perceived behavioral control, and entrepreneurial intentions ranged from 0.519 to 0.782. That is, all items on all variables are declared valid. Meanwhile, Cronbach's alpha value for each variable also showed good gains, ranging from 0.700 to 0.845 as seen in Table 2. Thus, all items can be used for further analysis because they have met the validity and reliability requirements.

Table 2. Validity and reliability of the instrument in this study

Variables (N)	Validity	Reliability
Teaching factory model	.617**~.756**	.843
Attitudes towards the behavior	.630**~.757**	.715
Perceived behavioral control	.519**~.697**	.700
Entrepreneurial intention	.739**~.782**	.845

Note: \*\*=Significant (p=0.01)

### 4.2. The systematic and hierarchical structure of variables influencing entrepreneurial intention

The Amos 18 software is used to run structural equation modeling (SEM) analysis to test the study's hypothesis. SEM analysis is used to test the relationship between exogenous and endogenous variables on a model of vocational students' entrepreneurial intentions. Factor teaching factory functions as an exogenous variable that influences students' entrepreneurial intentions by influencing their attitudes toward behavior and perceived behavioral control. Figure 2 depicts the model being tested for forming vocational students' entrepreneurial intentions.

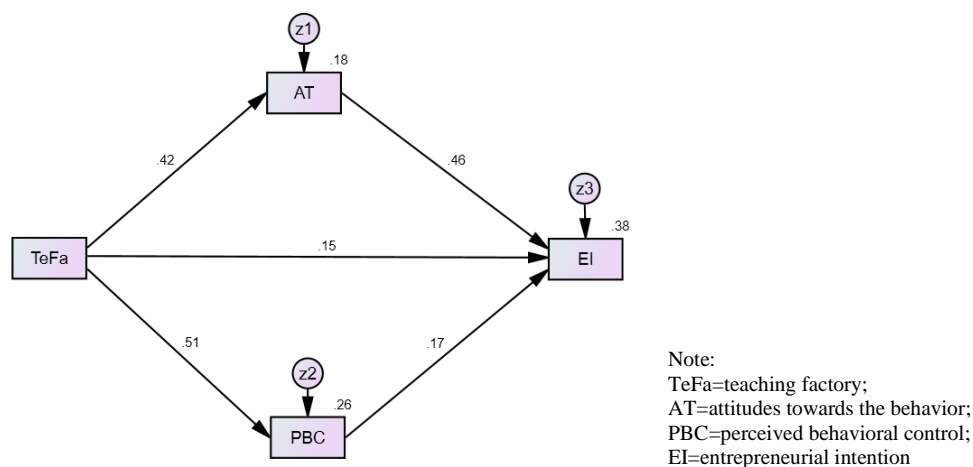


Figure 2. Measurement model of entrepreneurial intention in vocational school

Table 3 displays the results of the regression tests on the direct influence path. With a p-value of 0.009, the teaching factory (TeFa) has a direct influence on the formation of entrepreneurial intentions (EI) among vocational high school students (first hypothesis is accepted). The second hypothesis test seeks to determine the impact of the teaching factory on vocational high school students' attitudes toward behavior (AT). The path analysis of the regression test results revealed that the p-value was less than 0.05 (p-value=\*\*\*), indicating that the second hypothesis was accepted. Implementing the teaching factory program in vocational high schools has successfully influenced students' attitudes toward their behavior. The test results for the third hypothesis, which aims to test the direct influence of the teaching factory on perceived behavioral control (PBC), show that a p-value less than 0.05 was obtained (the third hypothesis is accepted). This finding implies that the teaching factory program's implementation has a direct influence on the formation of perceived behavioral control in vocational high school students.

Table 3. The results of the path analysis among variables

	Estimate	S.E.	C.R.	P	Result
TeFa→AT	.270	.035	7.708	***	Significant
TeFa→PBC	.383	.039	9.903	***	Significant
TeFa→EI	.110	.042	2.607	.009	Significant
AT→EI	.541	.066	8.263	***	Significant
PBC→EI	.174	.059	2.939	.003	Significant

Note: \*\*\*=Correlation is significant at the 0.001 level

Attitudes toward behavior and perceived behavioral control are two other antecedent factors that shape entrepreneurial intentions. The fourth hypothesis test, which investigates the impact of attitudes toward behavior on students' entrepreneurial intentions, demonstrates this. The test results show that vocational high school students' attitudes toward their behavior regarding entrepreneurship plans can shape their entrepreneurial intentions (p-value=\*\*\*, the fourth hypothesis is accepted). In addition, the antecedent factor proven to influence entrepreneurial intentions is perceived behavioral control. This hypothesis test shows the acquisition of a p-value of 0.003, which means the hypothesis is accepted. Thus, perceived behavioral control directly affects the entrepreneurial intention of vocational high school students.

The indirect effect of the teaching factory on the entrepreneurial intentions of vocational high school students is also investigated in this study. According to the model test, the factors that act as mediators are attitudes toward the behavior and perceived behavioral control. The mediation role test results show that attitudes toward behavior and perceived behavioral control mediate the influence of the teaching factory on cultivating entrepreneurship intentions in vocational high school students (p-value=0.012) as presented in Table 4.

Table 4. The result of bootstrapping in testing the mediator

	Path	TeFa→EI	TeFa→AT	TeFa→PBC	AT→EI	PBC→EI
Standardized direct effect	Estimate	.146	.419	.510	.464	.174
	P-value	.035	.018	.028	.020	.038
Standardized indirect effect	Estimate	.283				
	P-value	.012				
Standardized total effect	Estimate	.429	.419	.510	.464	.174
	P-value	.032	.018	.028	.020	.038

## 5. DISCUSSION

Preparing new entrepreneurs for vocational high school graduates is critical to resolving the vocational high school graduates' unemployment problem. There are various ways to prepare new business actors through educational programs, and one of them is the involvement of vocational high school students through teaching factory activities in schools. Previous studies have shown that students involved in entrepreneurship education programs (e.g., teaching factory) can increase their intention to become new entrepreneurs after graduation. Although many studies have discussed the importance of entrepreneurship education programs in instilling students' entrepreneurial intentions, they are still limited to discussing the effects of implementing teaching factories on the entrepreneurial intentions of vocational high school students. As a result, the purpose of this study is to investigate the role of the teaching factory in the formation of entrepreneurial intentions among vocational high school students.

Using Amos SEM analysis to test the first hypothesis in this study, it was discovered that the teaching factory program increased the entrepreneurial intention of vocational high school students. This finding indicates that implementing a good teaching factory program has successfully encouraged students' interest in pursuing careers in business after graduation. The program's success is highly dependent on the extent to which the teaching factory program's quality is implemented. The quality of teachers who teach is also the primary key to success in instilling entrepreneurial intentions in students through the teaching factory program. Even the students also said that the teaching factory program could help students realize and strengthen their business plans.

The findings of this study reinforce previous studies which state that entrepreneurship education programs can influence students' entrepreneurial intentions [33]. Mortzis *et al.* [31] revealed that the teaching factory program is closely related to business activities. Thus, applying entrepreneurship learning in schools through teaching factories is appropriate. Teaching factory provides benefits in academic and business aspects. In the academic aspect, providing real experience for students is helpful. In the business aspect, getting benefits that can be used for school development is beneficial.

Another finding of this study is that the teaching factory program has an indirect influence on entrepreneurial intentions as well. However, the teaching factory has an indirect effect on vocational high school students' attitudes toward behavior and perceived behavioral control. This means that the TPB dimension has a significant impact on the formation of students' entrepreneurial intentions. Martins, Perez, and Novoa [33] discovered that entrepreneurship education programs influence entrepreneurial intentions via the TPB dimensions. TPB has three theoretical dimensions: attitudes toward the behavior, perceived behavioral control, and social norms. However, only two dimensions are considered to influence students' entrepreneurial intentions in this study: attitudes toward the behavior and perceived behavioral control.

Regarding attitudes toward the behavior, the experience of students involved in teaching factory learning encourages their positive attitude towards careers as entrepreneurs. For example, students find a career as a business person interesting for their future life. The students believe that a career as a businessperson will provide them with a better life. Meanwhile, in the aspect of perceived behavioral control, students have the perception that they believe they can start a business. For students, confidence in business management abilities is considered easy and can be mastered. The belief formed results from student involvement in the teaching factory program. The teaching factory experience encourages them to believe in mastering the planned business field. In this context, teachers need to design a teaching factory learning model that can maximize the strengthening of their positive attitudes and beliefs about entrepreneurs.

Furthermore, this study demonstrates that attitudes toward behavior and perceived behavioral control have a direct influence on entrepreneurial intentions. This finding is significant because Chang, Wannamakok, and Kao [46] discovered that attitudes toward behavior and perceived behavioral control directly influenced entrepreneurial intentions. Students' entrepreneurial intentions can be shaped by positive attitudes and strong beliefs about entrepreneurial abilities developed through entrepreneurship education programs. In comparison to the impact of these two TPB dimensions on entrepreneurial intentions, this study reveals that attitudes toward behavior have a greater influence than perceived behavioral control.

Based on the findings of this study, teachers should be able to develop positive, real-world learning through teaching factory business activities. Instilling entrepreneurial intentions in the vocational education environment should provide real experience in every form of learning. The teaching factory learning approach is thought to be the best for providing students with real-world experience related to their vocational and entrepreneurial skills. The business concept developed must be relevant to the student's area of expertise so that the skills students can be the principal capital for the business processes that will be run. The primary key to ensuring students' full participation in the teaching factory business process is the involvement of teachers as mentors and facilitators. There are a few key points to remember when implementing the teaching factory in Indonesian vocational schools. The majority of them are still limited to the concept of school needs, which means that the implementation of the teaching factory is not based on the needs of the workplace. As a result, the application of the teaching factory concept must be integrated with the industrial world in the future. The school's products and services must be based on industry demand.

## 6. CONCLUSION

According to the findings of this study, the use of the teaching factory is critical in increasing the entrepreneurial intentions of vocational students. The teaching factory program has been shown in this study to influence the entrepreneurial intentions of vocational high school students via two dimensions of the TPB, namely attitudes toward the behavior and perceived behavioral control. Attitudes toward behavior have a greater influence on entrepreneurial intentions than perceived behavioral control. The findings of this study show that the teaching factory program, attitudes toward behavior, and perceived behavioral control influence the entrepreneurial intention of vocational high school students. The findings of this study have important implications for the development of a teaching factory that encourages the strengthening of entrepreneurial intentions among vocational high school students. Furthermore, more research on a comparative study of various entrepreneurship education programs and teaching factory programs is required to determine the most effective program for instilling entrepreneurial intentions in vocational students.

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