The Enhancing Impact of Online Course on Entrepreneurial Intentions: An Exploratory Study of Mediating Variables

Tianxing Ma[1,*], Hong Zhang[2], Zhiyi Liu[3], Yutong Ren[4]

Chengdu Neusoft University School of Information and Business Management, Chengdu, Sichuan, 611830, China

[*1]matianxing@nsu.edu.cn
[2]ZhangHong@nsu.edu.cn
[3]Liuzhiyi@nsu.edu.cn
[4]2385164995@qq.com

Abstract. Online courses represent one of the directions for the reform of entrepreneurship education, and improving entrepreneurial intention through entrepreneurship education is a focal point of research worldwide. This study explores the facilitating role of online courses on college students' entrepreneurial intention, focusing on analyzing the role of subjective norms and behavioral attitudes in the mediating pathway. Based on the Theory of Planned Behavior, this study introduces a new dimension of online courses and constructs a relational model of how online courses influence entrepreneurial intention. Through a questionnaire survey of 468 college students in China, it was found that subjective norms and behavioral attitudes play a partial mediating role between online courses and entrepreneurial intention, confirming the positive impact of online courses on entrepreneurial intention.

Keywords: Online courses; Entrepreneurial intention; Mediating variables

1 PROBLEM STATEMENT

As entrepreneurship gradually becomes the core of national participation in global competition and economic transformation and upgrading, for countries around the world to aspire to become new centers of the global economy, it is essential to prioritize entrepreneurship in development. How to develop entrepreneurship and enhance entrepreneurial intention has become a classic proposition for invigorating the vitality of the world economy. Consequently, the historical mission and local practices of online entrepreneurship courses have undergone significant changes in various countries. On one hand, the historical mission of online entrepreneurship courses has been endowed with new era connotations. The United States has designated entrepreneurship courses as foundational undergraduate courses, Finland's Ministry of Education and Culture has

M. S. H. Talpur et al. (eds.), *Proceedings of the 2024 4th International Conference on Internet Technology and Educational Informatization (ITEI 2024)*, Atlantis Highlights in Social Sciences, Education and Humanities 27,
https://doi.org/10.2991/978-94-6463-560-7_6

established the "Entrepreneurship Education Guidance Framework," and China has distinctly proposed to accelerate the implementation of an innovation-driven development strategy and vigorously encourage entrepreneurship to drive employment. On the other hand, fulfilling the historical mission of national education with high quality requires continuous development of localized paths for entrepreneurship education in online courses. Rational use of the convenience of localized online courses is essential to achieve high-quality development and innovate logical models[1].

According to Hernawati and Yuliniar, entrepreneurial intention is the inclination of an individual to undertake business actions by creating new products and taking risks through opportunities. Entrepreneurial Intention (EI) among college students refers to their psychological state of willingness to engage in entrepreneurial activities, a state of mind that can evolve into entrepreneurial practice[2]. The entrepreneurial intention of college students reflects their attitudes and behavioral tendencies towards entrepreneurship.

Existing literature primarily focuses on the study of course models for online entrepreneurship education. The intrinsic logical relationship between online courses and entrepreneurial intention has yet to be confirmed, and there is insufficient attention to the mediating effects and strategic traction within this context. Empirical surveys from thousands of universities indicate that while there has been progress in the categories, systems, and resources of entrepreneurship courses, the development pace and completeness of online courses are far from meeting the demands of students and society for entrepreneurship education.

This study is grounded in the actual needs of national economic transformation and business development, based on the idea of enhancing college students' entrepreneurial intentions. It selects 468 college students who have participated in online entrepreneurship courses as research subjects, investigates the impact of online courses on entrepreneurial intentions, constructs a mediation model between online courses and entrepreneurial intentions, further reveals the path patterns and intrinsic mechanisms of online courses on entrepreneurial intentions, and effectively increases college students' entrepreneurial intentions.

2 LITERATURE REVIEW

2.1 Theoretical Background

In explaining entrepreneurial decisions, entrepreneurial intention often plays a significant role[3]. Scholars widely support the concept proposed by Bird that entrepreneurial intention refers to the act of starting a new venture. That is, entrepreneurship is a planned behavior that cannot develop without an appropriate plan.

Many researchers believe that online education has a very positive impact on entrepreneurial intention, and online courses can convey the effectiveness and value of entrepreneurship to students[4]. Currently, teachers have actually developed and presented online courses using the internet. Technologies such as Web 2.0, cloud computing, and artificial intelligence have been utilized to support online entrepreneurship teaching[5].

Icek Ajzen has indicated that from the aspects of subjective norms and behavioral attitudes, it is possible to predict different types of behavioral intentions with high precision[6]. Consequently, TPB is widely used to analyze the factors influencing intentions and to predict intentions. Over the past thirty years, TPB has increasingly served as a theoretical framework for explaining entrepreneurial intention[7]. Some researchers have not only expanded the subject by extending entrepreneurship education to the curriculum field[8].

2.2 Research Variables

In recent years, Chinese universities have placed special emphasis on cultivating college students' entrepreneurial awareness, spirit, and capabilities. Most studies have focused on single aspects of entrepreneurship education. As a course that integrates comprehensiveness, autonomy, practicality, openness, and generativity, online courses can create a richer entrepreneurial culture and business context for students[9]. Based on this, this study introduces online courses as a new dimension to reveal their impact on entrepreneurial intention and proposes the following hypothesis:

H1: Online courses have a significant positive effect on entrepreneurial intention.

The Theory of Planned Behavior is one of the most influential behavioral prediction theories in the field of social psychology and is commonly used to explain the process of individual behavioral decision-making. Ajzen expanded the multi-attribute attitude and Theory of Reasoned Action, proposing that an individual's purposeful, planned rational behavior is governed and influenced by their behavioral intention, hence TPB often focuses on the confirmatory prediction of entrepreneurial intention and behavior[10]. The subjective norms referred to in this study will affect changes in an individual's entrepreneurial intention[11], while behavioral attitudes are the affirmative or negative views that different individuals have towards the activity of entrepreneurship. Therefore, they may have a significant mediating effect. As shown in Figure 1, this study proposes:

H2: Subjective norms mediate the relationship between online courses and entrepreneurial intention.

H3: Behavioral attitudes mediate the relationship between online courses and entrepreneurial intention.

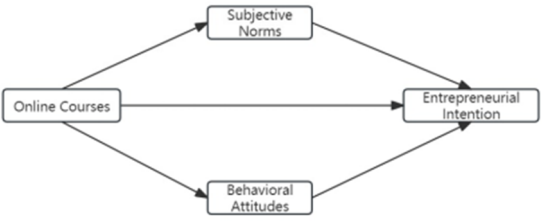

Fig. 1. Theoretical model

3 METHOD

3.1 Questionnaire Preparation

This study developed a rigorous and standardized questionnaire based on the survey method, ensuring precise identification of the research subjects and collection of questionnaire data, which is used exclusively for the analysis in this paper, with no ethical concerns.

Through the organization of established scales, the questionnaire items for each dimension and the sources of questions are listed in Table 1. Based on the guidance of three experts, appropriate modifications were made to incorporate the characteristics of online courses, resulting in the final questionnaire. The questionnaire in this study consists of two parts: one part collects heterogeneous information such as the gender of the respondents, and the other part collects subjective opinions on the impact of online courses on entrepreneurial intention. The latter part uses a Likert five-point scale and collects some data in the pretest phase to conduct reliability and validity analysis of the questionnaire, ensuring the accuracy and effectiveness of the questionnaire.

Table 1. Theoretical sources of the items.

Each dimension test item	Question reference source
Online Course (OC)	Linanf，Cheny W; Youssefab, Boubakers, Dedajb
Subjective Norm (SN)	Venkatesh V, Davis F D.
Behavior Attitude (BA)	R.K. Jena;Icek Ajzen
Entrepreneurial Intention (EI)	Astiana, Melia; Malinda, Maya; Nurbasari, Anny; Margaretha, Meily

3.2 Data Collection

The questionnaire survey for this study was distributed through the Questionnaire Star system, and a total of 469 online questionnaires were collected, with 1 invalid questionnaire, resulting in 468 valid questionnaires actually received. The data collected from the questionnaires spanned across all four years of undergraduate studies, with a gender ratio that essentially achieved a 1:1 balance. Approximately 50% of the respondents had relevant entrepreneurial experiences, while less than 10% were either in the process of establishing a business or had already successfully established a business, which is consistent with the characteristics of the survey population. Table 2 shows the basic information.

Table 2. Basic Data sheet (n=468).

Group	Item	Frequency	Percentage
Sex	Male	233	49.80%
	Female	235	50.20%
Grade	Freshman	38	8.10%
	Sophomore year	122	26.10%

	Junior	112	23.90%
	Senior	196	41.90%
Major type	Natural science	163	34.80%
	Humanities	305	65.20%
Have any entrepreneurial experience (including participating in innovation and entrepreneurship competitions, etc.)	Yes	218	46.60%
	No	250	53.40%
I am starting a business or have successfully started a business	Yes	45	9.60%
	No	423	90.40%

3.3 Reliability and Validity Analysis

In this study, the primary four dimensions are measured through the use of scales. The data quality of the questionnaire results is tested to ensure that subsequent analyses are meaningful. The overall Cronbach's alpha coefficient for this questionnaire is 0.922, and the specific coefficients for each dimension are shown in Table 3. The scale items used in this study demonstrate good consistency, indicating that the questionnaire has good reliability.

Table 3. Reliability coefficient.

Cronbach Alpha	Clonbach Alpha based on normalised terms	Clonbach Alpha based on normalised terms Number of terms
0.922	0.922	22.000

The validity of the questionnaire in this study was assessed using exploratory factor analysis with SPSS version 24.0. The results shown in Table 4 indicate that the KMO coefficient is 0.925, and the cumulative variance explained exceeds 60%. Additionally, Bartlett's test of sphericity has an approximate chi-square value of 5055.833, with a significance level less than 0.01, leading to the rejection of the null hypothesis. Therefore, the questionnaire is deemed to have good validity.

Table 4. KMO and Bartlett test coefficients.

KMO and Bartlett's test		
KMO Number of Sampling Suitability Measure.		0.925
Bartlett's test of sphericity	Approximate cardinality	5055.833
	Degrees of freedom	231.000
	Significance	0.000

4 ANALYSIS

4.1 Difference Analysis

This study primarily employs methods such as independent samples t-tests and one-way ANOVA to examine the differences in variables across various dimensions. The gender difference analysis of each dimension is shown in Table 5:

Table 5. Analysis of gender and grade differences in each dimension.

	Gender						
Variant	Gender	Number of cases	Mean	Standard deviation	t	sig	Comparison
OC	Male	233	3.738	0.7254	2.475	0.014	/
	Female	235	3.587	0.5862			
SN	Male	233	2.692	0.6267	3.908	0.000	/
	Female	235	2.474	0.5784			
BA	Male	233	3.033	0.6289	3.782	0.000	/
	Female	235	2.819	0.5943			
EI	Male	233	2.459	0.7447	5.125	0.000	/
	Female	235	2.128	0.6514			

Based on the results of the independent samples t-tests mentioned above, the differences in the four dimensions with respect to gender can be observed. The significance test for the online course dimension is 0.014, which is significantly less than 0.05, indicating that there is a significant difference between male and female college students in their willingness to learn through online courses. By the same token, subjective norms, entrepreneurial attitudes, and entrepreneurial intentions all exhibit significant differences in gender. This suggests that gender has a considerable impact on entrepreneurship, with males being more naturally inclined towards risk-taking and females being more conservative, hence males show more interest in entrepreneurship.

The results of multiple comparisons indicate that the attitudes of freshmen, sophomores, and juniors are all less than those of seniors. It may be that in China, the vast majority of seniors go out for internships and experience various forms of inequality in society, leading to more changes in their attitudes towards entrepreneurship. Although the intention to start a business is still not clear, related entrepreneurial intentions are still generated. However, in the vast majority of colleges, entrepreneurship education, including online courses, has been fully taught to all students by the junior year. Yet, the entrepreneurial intentions of junior students have not diverged from those of freshmen and sophomores, suggesting that the current online entrepreneurship courses in our country have not fully played their intended role.

4.2 Pearson Correlation Analysis

This study employed Pearson correlation analysis using SPSS 24.0, as demonstrated in Table 6. Online courses, subjective norms, behavioral attitudes, and entrepreneurial intention are all significantly and positively correlated with each other, which is consistent with previous research findings. This provides further theoretical expansion for online courses and offers empirical support for the impact of online courses on entrepreneurial intention.

Table 6. Correlation analysis of questionnaires.

Variant	PC	SN	BA	EI
OC	1			
SN	0.371**	1		
BA	0.537**	0.517**	1	
EI	0.392**	0.557**	0.565**	1

** At level 0.01 (two-tailed), the correlation was significant.

4.3 Multiple Mediation Effect Test

Initially, this study employs Model 4 in the Process macro program for SPSS, as provided by Hayes (2013), to conduct mediation effect tests under the condition of controlling variables and with a sampling of 50,000 iterations. The online entrepreneurship course is taken as the independent variable, and entrepreneurial intention is the dependent variable, with subjective norms and behavioral attitudes analyzed as mediating variables. The results, as shown in Table 7, indicate that when a single dimension is considered as a mediating variable, only partial mediation effects are displayed. This implies that there may be other factors at play or other mediating dimensions not included in the direct effect.

Table 7. The mediating role of two dimensions.

Intermediary Variable	Step	Implicit Variable	Independent Variable	R	R-sq	F	β	t
SN	Step 1	EI	OC	0.392	0.154	84.713***	0.425	9.204***
	Step 2	SN	OC	0.371	0.138	74.355***	0.343	8.623***
	Step 3	EI	OC	0.592	0.35	125.388	0.233	5.345***
			SN				0.56	11.861***
BA	Step 1	EI	OC	0.392	0.154	84.713***	0.425	9.204***
	Step 2	BA	OC	0.537	0.288	188.569***	0.502	13.732***
	Step 3	EI	OC	0.575	0.331	114.834***	0.135	2.774***
			BA				0.577	11.082***

By integrating the two models and placing the mediating effects of both dimensions within a single model, the multiple mediation test is still conducted using Model 4 in Process, it was found that the combined mediating effects of the two dimensions altered the results. Under the joint influence of both dimensions, what was previously a partial mediation effect from one dimension became a full mediation effect. This implies that under the influence of a single mediating dimension, there are other factors that can enable the online course to affect entrepreneurial intention without the mediation present in the model. However, when the two dimensions jointly constitute the mediating effect, they can fully mediate, completely explaining the influence of experiential courses on entrepreneurial intention, thereby validating the original model of this study.

According to the bootstrap mediation effect test results presented in Table 8, it can be observed that in the first step of the test, there is a significant impact of the online course on entrepreneurial intention (β=0.425, $p<0.01$), indicating that the total effect is established. In the second step of the test, the online course has a significant impact on subjective norms and behavioral attitudes ($\beta1$=0.343, $\beta2$=0.502, $p<0.01$). In the third step of the test, the influence of the online course on entrepreneurial intention is not significant (β=0.033, $p>0.05$), while subjective norms and behavioral attitudes have a significant effect on entrepreneurial intention ($\beta1$=0.128, $\beta2$=0.255, $p<0.01$). Therefore, it is demonstrated that the mediating roles of subjective norms and behavioral attitudes in the model are established, and they act as full mediators. The mediating effect of the mediating variable in the model was tested using the bootstrap technique. It can be observed that the indirect effect value is 0.392, with a 95% confidence interval of [0.318, 0.470] that does not include 0, thus indicating that the indirect effect is established. In contrast, the confidence interval for the direct effect includes 0, indicating that the direct effect is not established. Based on the calculation of the proportion of effects, the proportion of the mediating effect accounts for 92%.

Table 8. Bootstrap mediation analysis.

Step	Implicit Variable	Independent Variable	R	R-sq	F	β	t
Step 1	EI	PC	0.392	0.154	84.713***	0.425	9.204***
Step 2	SN	PC	0.371	0.138	74.356***	0.343	8.623***
Step 2	BA	PC	0.537	0.288	188.569***	0.502	13.732***
Step 3	EI	PC	0.737	0.543	137.622***	0.033	0.796
		SN				0.128	2.537**
		BA				0.255	5.237***
		PBC				0.416	11.185***

5 DISCUSSION

The introduction of subjective norms and behavioral attitudes from the Theory of Planned Behavior in this study indicates that the direct effect of online courses on en-

trepreneurial intention is no longer significant. Instead, an indirect effect on entrepreneurial intention is exerted through the combined mediating roles of subjective norms and behavioral attitudes. The path coefficients for subjective norms and behavioral attitudes on entrepreneurial intention are 0.560 and 0.577, respectively, both of which are significant at the 5% level, indicating a positive correlation between subjective norms, behavioral attitudes, and entrepreneurial intention.

However, none of the dimensions can fully explain the direct effect of online courses on entrepreneurial intention. This implies that online courses do not directly affect college students' entrepreneurial intentions but achieve this indirectly through two mediating dimensions: First, the sole mediating effect of subjective norms, where online courses influence college students' entrepreneurial intentions through the mediation of subjective norms. Second, the sole mediating effect of attitudes, where online courses influence college students' entrepreneurial intentions through the mediation of attitudes. The direct predictive effect of online courses on college students' entrepreneurial intention is not significant, and the research hypothesis H1 is not supported. The reason may be that online entrepreneurship courses are a mandatory part of education for all Chinese college students and may constitute only a very small part of the factors influencing entrepreneurial intention, playing a more indirect role.

Subjective norms mediate the relationship between online courses and entrepreneurial intention. The positive predictive effect of online courses on subjective norms is significant, and the positive predictive effect of subjective norms on entrepreneurial intention is also significant, supporting research hypothesis H2. This suggests that online courses can stimulate the constraints of subjective norms among college students, thereby influencing entrepreneurial intention. It indicates that participation in online courses can change an individual's perception of social pressure to adopt a specific behavior. At the same time, subjective norms positively predict the entrepreneurial intention of online course participants. This result aligns with Chinese policies that emphasize the need for higher education institutions to strengthen entrepreneurial education to cultivate more innovative and practical talents, thereby promoting entrepreneurial intention.

Behavioral attitudes mediate the relationship between online courses and entrepreneurial intention. That is, online courses enhance college students' attitudes towards entrepreneurship, thereby significantly promoting entrepreneurial intention, supporting research hypothesis H3. The mediating role of behavioral attitudes suggests that college students' entrepreneurial behavioral attitudes directly affect their entrepreneurial willingness, which is similar to the conclusions of many studies, that the more positive the behavioral attitude, the harder the individual will strive to perform a certain behavior.

In the teaching of online courses, college students can better understand and experience entrepreneurship. Relatively speaking, the cost of entrepreneurship in college is also much lower than that of peers in society, thereby increasing the probability of entrepreneurial intention and even the occurrence of entrepreneurial behavior.

6 CONCLUSION

This study, grounded in the Theory of Planned Behavior, introduces "online entrepreneurship courses" to construct a relational model of how online courses influence entrepreneurial intention. It analyzes the interrelationships between behavioral attitudes, subjective norms, and entrepreneurship education, thereby verifying the role of the Theory of Planned Behavior in factors affecting entrepreneurial intention. The main conclusion of this study is that the validation results of the model demonstrate the feasibility of incorporating online courses into the Theory of Planned Behavior model. It also effectively proves the impact and significance of online courses on behavioral attitudes, subjective norms, and entrepreneurial intention. The findings not only enrich the research on the relationship between online courses and entrepreneurial intention but also provide empirical support for the Theory of Planned Behavior to a certain extent.

This study strives for scientific rigor and precision, but due to some objective limitations, there are the following shortcomings: First, there is a limitation in the number of research subjects. For the convenience and feasibility of the survey, only a portion of college students from certain schools in China were surveyed and studied, which limits the selection of research subjects. Second, the study has not yet considered the impact of chain mediation effects. If chain mediation effects are considered, there may be interdependent relationships between behavioral attitudes and subjective norms. The aforementioned issues await subsequent research to address and resolve.

REFERENCES

1. Yang D. (2022). Meta-hypothesis, internal logic and systematic strategy of curriculum construction in university innovation and entrepreneurship education. Contemporary education forum, 4, 71–82.
2. Shu D., & Feng C. (2019). The preparation of the Questionnaire of Entrepreneurial Intention of college Students and its enlightenment to entrepreneurial education. Research on higher education in Heilongjiang Province, 37(12), 114–119.
3. Lv, Y., Chen, Y., Sha, Y., Huang, Y., & Huang, L. (2021). How entrepreneurship education at universities influences entrepreneurial intention: Mediating effect based on entrepreneurial competence. Frontiers in Psychology, 12, 655868.
4. Xiong, Q., Li, W., Chen, X., & Li, Z. (2022). Research on the Relationship among Interaction，Experience Value and User Stickiness of Online Teaching Platform: A Moderated Mediation Effect Model. Management Review, 34(6), 153.
5. Chen, L., Ifenthaler, D., & Yau, J. Y.-K. (2021). Online and blended entrepreneurship education: A systematic review of applied educational technologies. Entrepreneurship Education, 4(2), 191–232.
6. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.
7. Neneh, B. N. (2022). Entrepreneurial passion and entrepreneurial intention: The role of social support and entrepreneurial self-efficacy. Studies in Higher Education, 47(3), 587–603.
8. Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. Academy of Management Learning & Education, 16(2), 277–299.

9. Sun J., Huang S., & Wei L. (2024). Entrepreneurial extracurricular activities, entrepreneurial mind and graduate entrepreneurial intention. Journal of University of Science and Technology Beijing, 40(1), 33–44.
10. Mukhtar, S., Wardana, L. W., Wibowo, A., & Narmaditya, B. S. (2021). Does entrepreneurship education and culture promote students' entrepreneurial intention? The mediating role of entrepreneurial mindset. Cogent Education, 8(1), 1918849.
11. White Baker, E., Al-Gahtani, S. S., & Hubona, G. S. (2007). The effects of gender and age on new technology implementation in a developing country: Testing the theory of planned behavior (TPB). Information Technology & People, 20(4), 352–375.