

# *Research on the Teaching Construction of Cultivating Cross-Border E-Commerce Students' Innovative Ability Based on STEM Education Concept*

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**Abstract:** Today's rapid spread of international information, cross-border e-commerce has become an important area of global economic development, while STEM education is considered to be an effective way to cultivate future talents. In this context, Research on how to cultivate the innovative ability of cross-border e-commerce students based on the concept of STEM education has emerged. Through the comprehensive analysis of relevant literature and the summary of teaching practice, this paper puts forward the direction of teaching construction to cultivate the innovation ability of cross-border e-commerce students based on the concept of STEM education. The teaching construction directions proposed in this article include the construction of appropriate training goals and teaching content, the adoption of diversified teaching methods, the emphasis on practical application and the cultivation of innovative thinking, and the emphasis on evaluation and feedback. These aspects can effectively improve students' innovation ability and core competitiveness, and meet the society's demand for talents. Experimental tests have shown that this teaching direction has improved students' teamwork ability to more than 80 points, and their innovation ability has also reached 70 points. Cultivating the innovation ability of cross-border e-commerce students based on the concept of STEM education requires educators to combine subject characteristics and student needs to build a suitable teaching plan and curriculum system. This research has certain reference significance for college educators to cultivate students' innovation ability in the field of cross-border e-commerce.

## 1. Introduction

In the context of the gradual regression of the real economy, e-commerce has become an important part of modern business. Especially in the field of cross-border e-commerce, more and more companies are beginning to get involved, occupying an increasingly important market share. However, the cross-border e-commerce is also facing much challenges, like market competition and technological innovation. Therefore, how to cultivate the innovation ability of cross-border

e-commerce students and improve their competitiveness in the field of cross-border e-commerce has become the top priority in the current education field.

Many scholars have studied the innovation of e-commerce. Scholar Rahman S has discovered that e-commerce innovation and e-service quality can improve customer satisfaction and loyalty, respectively. This research helps to enhance the novelty related to e-commerce innovation [1]. Scholar Jeong H proposed a new innovative business model of e-commerce platform, through the use of digital dual technology to combine real-time commerce with the meta-universe, overcoming the limitations of existing online shopping [2]. Scholar Mangiaracina R Scientific publications aimed at improving the efficiency of innovative solutions for business-to-consumer (B2C) e-commerce last-mile distribution review and classification [3]. However, in practice, how to apply the concept of STEM education to the cultivation of cross-border e-commerce students' innovation ability requires further research and exploration.

Therefore, this study aims to explore the innovation ability training method of cross-border e-commerce students based on STEM education concept, and to verify its effectiveness and feasibility through empirical analysis. This study will use a combination of case study and questionnaire survey to explore the practice of cultivating students' innovation ability. The research results will help to provide new ideas and methods for cross-border e-commerce education, and also provide reference and reference for the application of STEM education concept in practice.

## **2. STEM Education Concept**

### **2.1 Introduction to STEM Education Concept**

STEM is a comprehensive educational concept [4-5], and its goal is to cultivate students' subject literacy and comprehensive literacy [6-7]. STEM education emphasizes students' active participation in practical inquiry, teamwork and innovative thinking [8-9]. The core of the STEM education concept is to combine subject knowledge with practical problems, and cultivate students' innovation ability through practice and inquiry.

The application of STEM education concepts has been widely recognized and applied. The practice of STEM education can enhance students' teamwork spirit and improve students' sense of innovation. The practice of STEM education can help students better adapt to social changes and development in their future careers. In cross-border e-commerce education [10-11], the application of STEM education concepts can enable students to have a deeper understanding of relevant knowledge and be able to apply it, thereby improving students' ability to use it.

### **2.2 Application of STEM Education Concept in Cross-Border E-commerce Education**

Although STEM education and cross-border e-commerce education are two different fields of education, there is a certain connection between them. STEM education can be applied to instructional design to help students better understand and apply relevant skills. The practice of STEM education can strengthen students' practical ability and professional literacy [12-13].

The application of STEM education concept in education is as follows:

First of all, STEM education can help students to better understand and apply cutting-edge related skills. STEM education emphasizes practical inquiry and interdisciplinary integration, which can help students better understand subject knowledge. At the same time, STEM education focuses on students' active participation and teamwork, which can cultivate students' practical ability and spirit of cooperation, and provide support for students to apply related knowledge to practical issues.

Secondly, STEM education can help students discover problems, solve problems, and innovate.

The practice of STEM education can cultivate students' innovation awareness and innovation ability.

Finally, STEM education can strengthen students' practical ability and professional literacy. STEM education focuses on practical inquiry and interdisciplinary integration, which can help students better cope with complex issues. The practice of STEM education can also strengthen students' professional literacy.

In summary, the application of STEM education concepts in education can help students better understand and apply the relevant knowledge and skills of cross-border e-commerce, strengthen students' practical ability and professional literacy, in order to improve students' competitiveness and application ability in the field of cross-border e-commerce.

### **2.3 Application of STEM Education Concept in Innovation Ability Training**

STEM education emphasizes practical inquiry and interdisciplinary integration, focusing on combining subject knowledge with practical problems. In practice, students can better apply the knowledge they have learned, explore the nature of the problem, and propose innovative solutions to cultivate students' innovative ability. Therefore, the concept of STEM education plays an important role in the cultivation of innovation ability, as follows:

Encouraging students to take the initiative to explore and practice: STEM education emphasizes students' active participation, practical inquiry and independent learning, allowing students to continuously explore and solve problems in practice, so as to cultivate students' innovation ability.

Cultivating interdisciplinary and comprehensive literacy: STEM education covers many subjects, emphasizing the cultivation of comprehensive literacy. This interdisciplinary approach to education can cultivate students' comprehensive thinking and ability, and provide students with a broader vision and ideas in innovation.

Encouraging the solution of practical problems: STEM education focuses on combining subject knowledge with practical problems to encourage students to solve practical problems. This kind of practical education method can allow students to better apply the knowledge they have learned and improve their innovation ability.

Emphasizing teamwork and communication: STEM education emphasizes teamwork and communication, allowing students to solve problems together in cooperation, so as to cultivate students' teamwork and communication skills. This kind of teamwork can stimulate students' innovation potential, but also allow students to learn to listen to and respect the opinions of others, and strengthen students' communication and collaboration skills.

In summary, the STEM education idea is very important in the cultivation of innovation ability. The educational method of STEM education can help students take the initiative to explore and practice, cultivate interdisciplinary comprehensive literacy, encourage the solution of practical problems, and emphasize teamwork and communication.

## **3. Teaching on Cultivating Cross-Border E-commerce Students' Innovation Ability Based on Stem Concepts**

### **3.1 Objectives and Requirements**

The teaching of cultivating the innovation ability of students based on the STEM concept aims to cultivate the comprehensive quality of students to meet the challenges in the field of cross-border e-commerce. The following are the goals and requirements of the teaching:

(1) Cultivating students' interdisciplinary and comprehensive qualities: Teaching based on the STEM concept requires students to have interdisciplinary and comprehensive qualities, be able to

conduct comprehensive thinking and analysis in trade, logistics, payment, security, etc., and provide solutions for the development of cross-border e-commerce.

(2) Cultivating students' practical ability: EDUCATION based on the concept of STEM emphasizes practical inquiry and interdisciplinary integration, focusing on the combination of subject knowledge and practical problems, students need to have practical skills.

(3) Cultivating students' innovative ability: the teaching based on STEM concept requires students to have innovative ability and be able to think independently.

(4) Cultivating students' teamwork and communication skills: Teaching based on STEM concepts requires students to have teamwork and communication skills, be able to collaborate in a team to solve problems, learn to listen to and respect the opinions of others, and strengthen students' communication and collaboration skills.

(5) Cultivating students' information literacy: Students have information literacy and can effectively obtain, process and use information to solve problems. Teaching based on the STEM concept requires students to have information literacy, be able to skillfully use information technology, and effectively obtain and use information.

In order to achieve the above goals and requirements, educators also need to design different levels of teaching content and activities according to the actual situation and needs of students, so that students can gradually improve their abilities and literacy.

### 3.2 Selection and Application of Teaching Methods

The selection and application of appropriate teaching methods is one of the keys to cultivating the innovation ability of cross-border e-commerce students based on the STEM concept. The following are some commonly used teaching methods:

Problem-driven learning (PBL): PBL is a project-based teaching method [14-15], emphasizing students' active participation and practical inquiry. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, students can be guided to in-depth learning and exploration by designing cross-border e-commerce projects.

Case teaching method: guide students to learn and discuss through real cases, and cultivate students' analytical and problem-solving skills. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, it can be taught based on actual cases to help students understand the actual operation and challenges of cross-border e-commerce.

Practical inquiry method: Practical inquiry method is to guide students to learn and explore through practical inquiry. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, practical activities can be organized to allow students to experience the practical operations and challenges of cross-border e-commerce firsthand.

Inverted classroom method: Inverted classroom method is a teaching method that combines classroom teaching with students' independent learning. By recording explanation videos in advance, students can conduct in-depth learning and discussion in the classroom. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, students can learn relevant knowledge and skills in advance by inverting the classroom, and conduct in-depth discussions and interactions in the classroom.

Cooperative learning method: The cooperative learning method is to improve students' communication and collaboration skills through group cooperative learning, and cultivate students' teamwork skills. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, projects and tasks can be completed through group cooperation, so that students can continuously improve their abilities and literacy in cooperation.

When choosing and using teaching methods, educators can combine information technology methods, such as online courses, virtual laboratories, etc., to enhance the interactivity and interest of teaching and improve students' enthusiasm for learning (Table 1).

Table 1: Teaching method

Teaching Method	Description	Advantages	Disadvantages
Lecture-based Teaching	The teacher imparts knowledge to students through lectures and demonstrations	Fast information transmission, easy to grasp basic knowledge.	Students may become fatigued and lack interaction.
Interactive Teaching	Students actively participate in exploration and problem-solving through discussion, group work, etc.	Students can better understand knowledge and enhance communication and collaboration skills.	Teachers need to spend more time and effort guiding students.
Project-based Teaching	Students learn knowledge and skills through practical projects.	Students can gain a deeper understanding of knowledge and improve practical skills.	Requires more time and resources, difficult to apply to all subjects.

### 3.3 Design and Implementation of Teaching Evaluation

Teaching evaluation is an important teaching method. It can evaluate and give feedback on students' learning results and teaching effects. At the same time, it is also conducive to educators to understand students' learning situation and needs, adjust teaching strategies, and improve teaching effectiveness. In the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept, teaching evaluation is also an essential part. The following are some suggestions for the design and implementation of teaching evaluation:

First of all, educators need to design a variety of evaluation methods to comprehensively evaluate students' learning achievements and abilities. Evaluation methods can include classroom performance, group cooperation, homework reports, project presentations, etc. The evaluation methods should match the curriculum goals and teaching content, and be reliable and effective.

Secondly, educators need to design clear evaluation criteria so that students can understand the evaluation criteria and requirements so that they can better master the learning content and improve their abilities. The evaluation criteria should match the curriculum goals and teaching content, which is conducive to the all-round development and improvement of students.

The design and implementation of teaching evaluation is an indispensable part of the teaching of cultivating the innovation ability of cross-border e-commerce students based on the STEM concept. Through appropriate evaluation methods and standards, as well as timely feedback and adjustments, students' abilities can be further improved.

## 4. Experimental Test of Innovation Ability

In this paper, we will discuss how to cultivate the innovation ability of students based on the concept of STEM education. In order to verify this teaching method, we will design an experiment and collect experimental data. The following is a description of the experimental design and data diagram.

### 4.1 Experimental Design

Research subjects: Selecting five groups of cross-border e-commerce students with similar

backgrounds (30 in each group).

Experiment cycle: This experiment lasts for one semester.

Evaluation indicators: After the experiment is over, five groups of students will be evaluated for innovation ability, including teamwork ability and innovative thinking ability.

#### 4.2 Data collection and Analysis

(1) Teamwork ability: By observing and recording the performance of five groups of students in classroom activities and projects, the teamwork ability is scored. Figure 1 shows the teamwork ability scores of five groups of students.

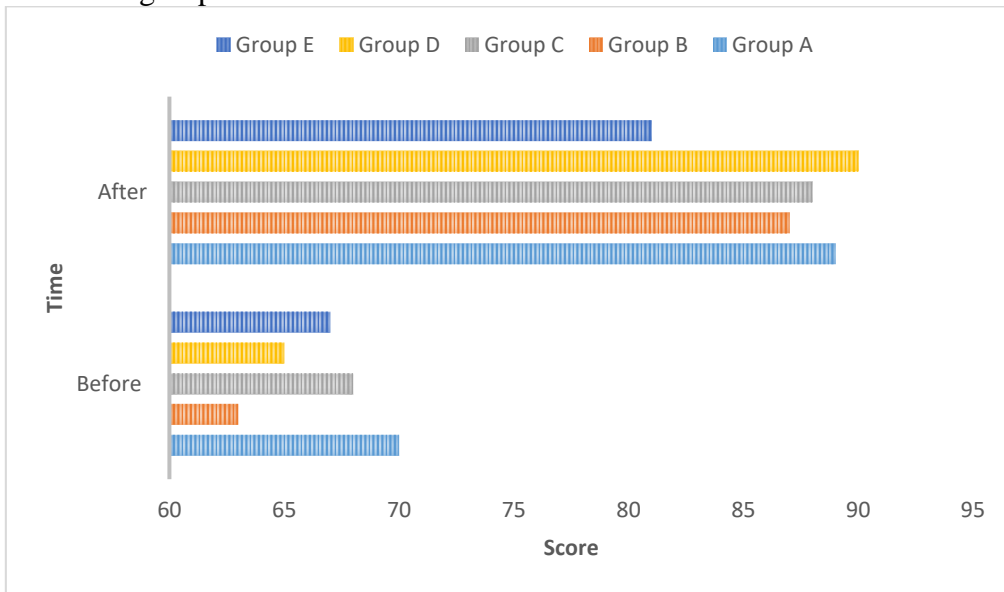


Figure 1: Team collaboration ability score

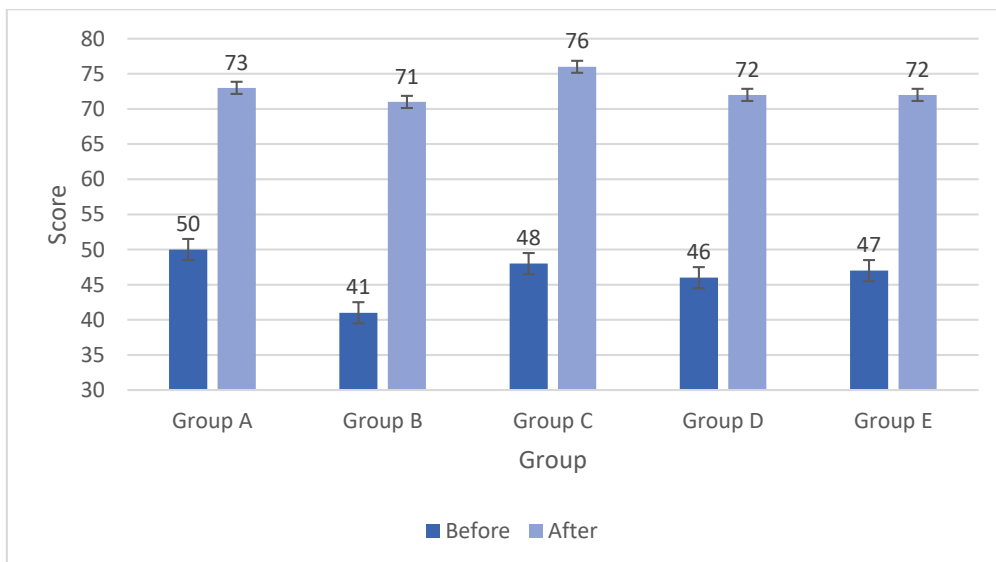


Figure 2: Score of innovative thinking ability

From Figure 1, we can see that after training, the score of teamwork ability has improved greatly, and the scores of the five groups have all increased to more than 80 points.

(2) Innovative thinking ability: By scoring the project ideas submitted by five groups of students,



their innovative thinking ability is evaluated. Figure 2 shows the ability scores of five groups of students.

From Figure 2, we can clearly see that the teaching of cultivating students' innovative ability based on the STEM concept is of great help to students, and their thinking ability is greatly improved. In summary, the direction of teaching and training can improve students' abilities well.

## 5. Conclusion

Through the comprehensive analysis of relevant literature and the summary of teaching practice, this paper puts forward the direction of teaching construction for cultivating cross-border e-commerce students' innovation ability based on the concept of STEM education, and conducts experimental tests on innovation ability. The results show that through the cultivation of practical application, students' practical operation ability and innovation ability have been significantly improved. At the same time, through diversified teaching methods and the emphasis on evaluation and feedback, students' interest in learning and independent learning ability have also been improved. These test results show that the direction of teaching construction to cultivate the innovation ability of students based on the concept of STEM education is feasible, and can improve the innovation ability and the core competitiveness.

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