ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

Curriculum Reform and Model Construction of Logistics Management Major Based on STEAM Teaching Concept

Hao Chen

School of Economics and Business Administration, Yibin University, Yibin 644000, China

Abstract

With the development of society and the continuous deepening of the new curriculum reform, teaching requirements focus on students and promote their comprehensive development. The logistics major belongs to an interdisciplinary discipline, and its professional curriculum teaching should actively adopt diversified teaching methods to create a good learning atmosphere and environment for students. STEAM mode teaching integrates interdisciplinary knowledge well, reflecting the strong practical application characteristics of logistics courses. It is carried out in the form of school enterprise cooperation, changing the original teaching mode, increasing students' interest in learning, enabling students to actively and quickly integrate into teaching, and continuously improving students' learning enthusiasm and autonomy. This article conducts a comprehensive analysis on the reform and model construction of logistics courses under the STEAM model, hoping to improve students' learning efficiency through the innovation of teaching methods.

Keywords

STEAM mode, Teaching logistics major, Course reform mode, Construction.

1. Introduction

This indicates that the construction of the "Four New" is closely related to the optimization of disciplines and majors, the improvement of innovation ability, the integration of industry, academia, research and application, and the cultivation of new talents in the era. Afterwards, the "Four New" construction began to move towards paradigm change based on the exploration of early models, becoming a landmark measure leading China's higher education reform and innovation.

STEAM is Science, Technology, Engineering, Arts, and Mathematics. STEAM is an educational concept that differs from traditional single subject, textbook based education methods. STEAM is an interdisciplinary educational concept that emphasizes practice. Integrating STEAM education concepts into curriculum teaching perfectly aligns with the connotation of the "Four New" construction. However, from the existing research, the current research on STEAM teaching philosophy is more focused on primary and secondary education research, or on public courses in higher education. However, the application of STEAM teaching philosophy in university professional courses is still relatively small.

In the context of the "Four New" construction, this article takes the logistics management professional course as the research object, explores the teaching philosophy and design reform mode of this course, and summarizes the experience to promote it to other professional course teaching. Through the integration of interdisciplinary knowledge, it reflects the strong practical application characteristics of logistics courses. In order to avoid the problem of low student learning enthusiasm in previous teaching, the STEAM teaching concept is used as a guide to design teaching content, and teaching is carried out in the form of school enterprise cooperation, changing the original teaching mode and enhancing students' interest in learning.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

2. Curriculum Design Reform of STEAM Teaching Concept under the Background of "Four New" Construction

The logistics management major itself is a multi-disciplinary integration discipline, which requires the study of interdisciplinary courses such as science and engineering and management. Whether it is the understanding of basic knowledge or professional planning and design, students need to have a broad understanding of management science, machinery, transportation, computer, mathematics and other related knowledge. Therefore, the cultivation of single knowledge and skills cannot meet the talent needs of the modern logistics industry.

Design teaching content guided by the STEAM teaching philosophy, guided by social needs, and reform course teaching methods through a combination of online and offline, and diversified cooperation between schools and enterprises. Create an exploratory learning model, enhance students' interest in learning, and cultivate talents with comprehensive knowledge and practical abilities. In the teaching of logistics courses, first of all, teachers on campus need to conduct in-depth interviews and research with logistics enterprises to identify the industry's demand for talent capabilities. Then, schools and enterprises collaborate to develop teaching content, design teaching plans, and provide actual logistics project cases as teaching resources. According to the established teaching content, theoretical teaching will be conducted on campus and practical teaching will be conducted in enterprises. Theoretical teaching integrates relevant basic subject knowledge into professional theoretical knowledge using the STEAM teaching philosophy, cultivating students' comprehensive abilities. Practical teaching is organized by enterprise teachers, with a focus on solving practical problems in the enterprise. Students have a deep understanding of the logistics business of the enterprise, fully understand the layout and selection of facilities and equipment, and then use their knowledge to design logistics solutions and solve practical problems in the enterprise. The plan is jointly evaluated by both the school and the enterprise. The basic idea of curriculum reform is shown in Figure 1.

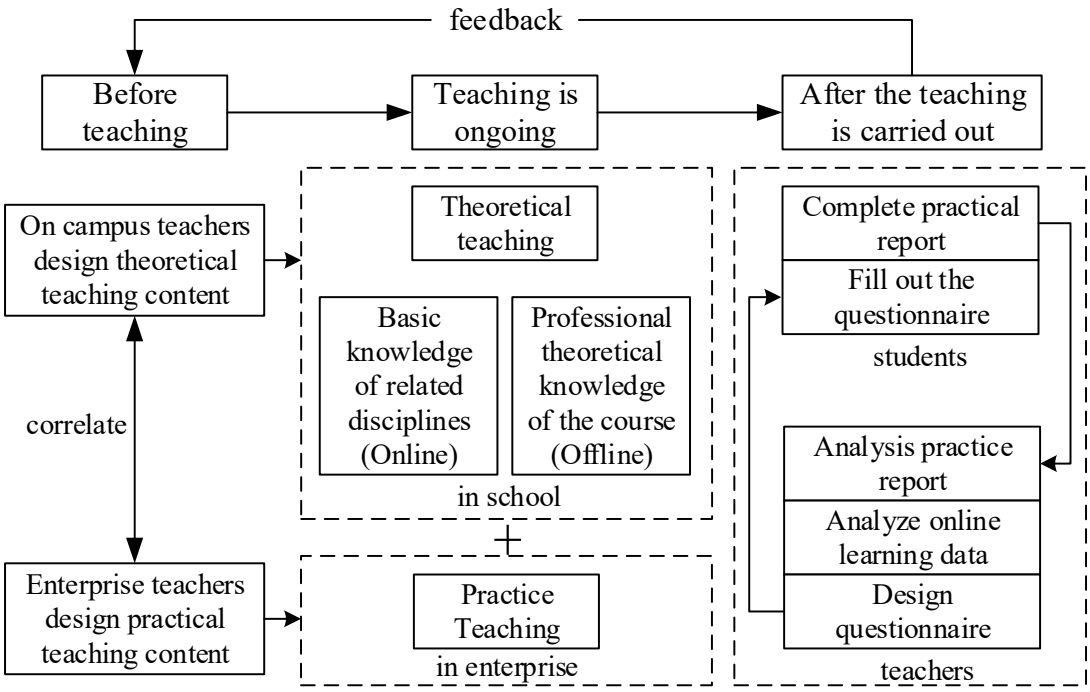

Figure 1. Curriculum Reform Concept Map

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

2.1. Before Teaching - Identifying the Ability Needs of Industry Talents and Developing Teaching Content

In response to the issue that the teaching content in school classrooms cannot effectively meet the needs of the logistics industry, before the teaching is carried out, teachers on campus conduct interviews and research with relevant logistics enterprises to determine the talents and abilities required by the logistics industry. Then, they analyze the abilities that logistics technology and applications should cultivate for students, and work with industry teachers to develop practical teaching content that can be practically operated, And the theoretical teaching content will be developed based on the abilities required for the course. Finally, the theories learned by students will be applied to practical teaching and practical assignments need to be completed.

2.2. Teaching in progress - arranging teaching through a combination of online and offline methods

Develop a teaching plan based on the teaching content set before the teaching is carried out. Conduct theoretical teaching first, and organize practical teaching after the completion of theoretical teaching. In theoretical teaching, rain classroom management is used for teaching, and a combination of online and offline teaching methods is adopted. Before class, teachers should prepare teaching design and prepare relevant subject basic knowledge and course theoretical knowledge. Push basic knowledge to students for preview in the form of MOOC, online teaching videos or lecture notes, and monitor the effectiveness of student preview. During class, explain professional theoretical knowledge that needs to apply basic knowledge, assign homework after class, monitor student learning effectiveness, and respond on the Rain Classroom platform or focus on answering questions in the next class based on feedback from students who do not understand the knowledge points.

2.3. After teaching implementation - collect teaching effectiveness data, evaluate the effectiveness of teaching reform, and continuously improve

After the teaching is carried out, students' practice reports are reviewed, questionnaires are designed and distributed to understand their attitudes towards the teaching reform of the course and whether the reform has improved their professional abilities. Based on the collected questionnaires, practical reports, and data recorded in Rain Classroom, analyze and summarize the effectiveness of educational reform, identify problems, and continuously improve.

3. Construction of STEAM Logistics Professional Course Integration Model

Due to the comprehensiveness of the logistics discipline itself, traditional teaching has fragmented the connections between different disciplines, disciplines, and real industries, resulting in significant deficiencies in cultivating students' ability to solve practical problems and find employment. And STEAM's development of curriculum integration is also gradually moving from singularity to diversification.

3.1. Different types of integration of STEAM logistics courses

When STEAM integrates logistics professional courses, it requires that the main issues of multiple related disciplines in the course development and implementation process must be closely related. Through an integrated teaching method, it focuses on the fundamental components of students' STEAM literacy and solves practical problems to carry out integration. This course integration model aims to reduce the repetition of course content and strengthen the systematization of knowledge.

The logistics major belongs to an interdisciplinary discipline, where the knowledge, skills, and concepts within it intersect with each other. This requires the integration of courses around

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

relatively identical knowledge content within the disciplinary framework. This type of integrated curriculum has begun to use a holistic thinking approach to develop corresponding content and design implementation methods. The mode of curriculum integration is mainly divided into two types: one is to develop corresponding courses around certain themes of multiple related disciplines, and carry out teaching at relatively the same time, such as combining mathematics and science in STEAM courses into science courses, and combining technology and engineering into technical engineering courses. The correlation between the two parallel disciplines depends on students' own mastery. The second is to adjust relevant disciplines to a single curriculum unit or course around a common theme, while each discipline remains independent and the integrated content belongs to different learning areas. The characteristics of the discipline affect the teaching and evaluation of the integrated discipline. The curriculum integration model refers to the organization centered around themes, problems, concepts, basic learning content, skills, etc., consciously integrating all disciplines in the school curriculum to form a teaching unit. The course content integrated using this model is interrelated, but the subject it belongs to can still be identified. The purpose is to enable students to use corresponding exploration activities through curriculum development and implementation to learn how to handle information and viewpoints related to learning tasks from multiple perspectives, in order to have a more comprehensive and objective understanding of knowledge and solve various problems in life.

3.2. Characteristics of interdisciplinary integration mode in logistics major

As an interdisciplinary discipline, the various disciplines included in the logistics major are no longer the organizational center of the curriculum. Instead, the core content is practical problems in social life. Disciplinary knowledge is integrated into teaching units, cultivating students' ability to solve practical problems. Through learning the knowledge, skills, attitudes, and corresponding high-level thinking required to solve problems, it has become a focus of the curriculum. The process of integrating courses places great emphasis on the development of students' subjectivity and the connection between courses and real situations and the world. The relevant curriculum model refers to the integration of two or more subjects of the same quality using interrelated themes and viewpoints, strengthening the overall and coherent arrangement of subject teaching content, and finally jointly constructing a teaching curriculum for logistics majors. Relatively speaking, the curriculum model design based on the STEAM concept breaks the boundaries between disciplines through comprehensive theme development and instructional design, allowing logistics students to learn knowledge from various disciplines in real situations. However, how to balance the knowledge content between disciplines and reconstruct a new curriculum structure poses new requirements and challenges for schools and teachers.

3.3. The diversified construction mechanism of STEAM logistics discipline integration model

The interdisciplinary integration of STEAM courses is to eliminate barriers to different disciplines through various mechanisms, enable students to adapt to the development of the logistics industry, achieve the intersection and integration of logistics disciplines, and promote the formation of interdisciplinary majors. The diverse mechanisms of integrating interdisciplinary courses include:

(1) The multi element mechanism, that is, the integration of interdisciplinary courses must occur between diverse and heterogeneous disciplinary elements. There are significant differences in the fields, main problems, corresponding methods, and processes involved in the independent professional disciplines of STEAM interdisciplinary courses.

(2) The integration mechanism refers to the coordination and integration function of curriculum integration models through the establishment of common discourse among diverse

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

and heterogeneous disciplinary elements. The development of STEAM interdisciplinary integrated curriculum mainly relies on the concept of interdisciplinary integration to integrate these heterogeneous disciplines together.

(3) Complementary mechanism refers to the cross integration of multiple disciplines. Due to the differences in knowledge bases and categories of different disciplines, they should learn from each other and complement each other in talent cultivation, forming an optimized curriculum integration mechanism. There are significant differences in the subjects included in STEAM interdisciplinary courses in terms of training objectives.

(4) Open mechanism refers to promoting the integration of various disciplines by searching for common or similar deep roots between disciplines, while applying the essence of the condensed interdisciplinary integration to the outside world and continuously absorbing feedback from the external environment, truly achieving interdisciplinary integration. The development and designers of STEAM interdisciplinary courses continuously absorb new knowledge based on social development, student needs, and subject development needs, promote the exchange of various elements between related disciplines, and use various channels to promote active interaction between interdisciplinary courses and external disciplines and environments, break through the barriers formed by single disciplines, and promote the continuous development of students' STEAM literacy.

(5) The essence of STEAM interdisciplinary curriculum is to solve real, complex, diverse, and difficult social problems through collaborative exploration between teachers and students, and to construct the meaning of knowledge. The practical foundation of STEAM interdisciplinary integration curriculum is social participation, and its organization and implementation are also diversified. It requires deep participation and cooperation from governments, educational institutions, non-profit organizations, consulting institutions, etc., to form a strong organizational guarantee. The STEAM integration strategy is a continuous implementation process that requires a complete system design. The corresponding curriculum development requires real scientific research data, research tools, and other resources, and is integrated with the STEAM curriculum in an appropriate way to form a collaborative force, thereby effectively supporting the implementation of the curriculum.

3.4. Strategy for Constructing the Integration Model of STEAM Logistics Cross disciplinary Courses

Practice has proven that the traditional single course teaching model is difficult to support the cultivation of STEAM literacy, especially the effective transformation of core competencies. Therefore, it is particularly important to construct a suitable curriculum integration model for the transformation of core competencies and adopt the correct practical operation strategies for curriculum integration.

(1) Theme selection

Under the STEAM concept, the selection criteria and principles for the integration of interdisciplinary courses can be examined by combining specific problem situations and taking into account the following three aspects: firstly, the universal applicability of the theme content, that is, the scope of the theme should ensure that it can be applied to different interdisciplinary subjects, and if the theme is too narrow, it is impossible to cover all interdisciplinary subjects; If the theme is too broad, it is not conducive to conducting in-depth learning. The second is that the value of theme selection is legitimate, which should reflect the knowledge, humanistic, and social attributes of STEAM interdisciplinary integrated curriculum. It should also be in line with mainstream value orientation and pay attention to the urgent social issues and cutting-edge educational concepts that need to be addressed. The third is the democratic and fair selection of themes, which should focus on strengthening the joint decision-making of schools, teachers,

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

students, and society, providing a wide range of diverse learning opportunities, and enhancing their participation awareness and ability by satisfying their interests and curiosity.

(2) Goal setting

In the process of building an interdisciplinary curriculum integration framework based on the STEAM concept, considering the hierarchical nature of curriculum integration, different goal orientations should be taken into account. As an integration of multiple disciplines, the training goal of logistics majors should also strengthen the cultivation of students' core competencies. At the social level, the ability to solve practical problems should be the main goal, and the curriculum objectives should be integrated and designed based on future employment needs. At the level of professional training in schools, the goal of curriculum integration is not only to achieve talent cultivation in logistics majors, but also to integrate and isolate interdisciplinary disciplines through curriculum integration, reduce the intersection between different disciplines, optimize the curriculum structure, and thus exert the overall effect of the curriculum system.

(3) Knowledge construction

The construction of knowledge system in the integration of interdisciplinary courses based on the STEAM concept should be based on social transformation, focusing on the significance of professional knowledge in social work, and exploring the re understanding and construction of knowledge is the foundation of the integration design of STEAM interdisciplinary courses. The knowledge of STEAM interdisciplinary curriculum integration should include three parts: subject knowledge, interdisciplinary knowledge, and interdisciplinary knowledge. For students, these three parts of knowledge acquisition are all aimed at improving STEAM literacy, thereby better serving their understanding of themselves and the world.

(4) Integrated design of teaching evaluation

The integration of interdisciplinary courses based on the STEAM concept requires horizontal and vertical coherence to achieve integrated design of teaching, learning, and evaluation. Therefore, STEAM course developers not only need to restructure and design the logistics subject content system according to the problems and tasks that need to be solved in real work, but also ensure that the designed problems and tasks comprehensively and evenly cover the basic knowledge of the interdisciplinary field, in order to cultivate problem-solving ability and high-level thinking to complete tasks. Under the STEAM concept, there is no fixed model for the teaching design of interdisciplinary course integration, let alone the distinction between advantages and disadvantages. Project based learning, collaborative teaching, thematic teaching, etc. can all be important choices for interdisciplinary course integration teaching under the STEAM concept. The evaluation of STEAM interdisciplinary integrated courses usually includes two aspects: course integration plan and implementation process evaluation. Among them, the evaluation of curriculum integration plans includes national planning plans for curriculum integration, curriculum integration plans at the school planning level, and unit integration design plans. The focus of evaluating the implementation process of curriculum integration is on monitoring the implementation of curriculum integration at the school and regional levels.

4. Conclusion

Course quality improvement is a requirement of the construction of the "Four New". The focus of course quality improvement is to expand the depth and breadth of the classroom, and pay attention to the combination of theory and practical application, arouse students' interest in learning, enable them to comprehensively grasp professional knowledge, and cultivate their ability to comprehensively apply knowledge. For professional courses that integrate multi-disciplinary knowledge, the STEAM teaching concept is used to decompose the various subject knowledge involved in the professional courses. Basic knowledge is used as online learning

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202401_7(1).0029

content, and students independently learn and complete online assignments. Professional knowledge is learned in offline classrooms, and finally theoretical knowledge is combined with practical applications according to industry requirements. Practical teaching is organized in enterprises to improve students' practical and innovative abilities.

Acknowledgments

The authors would like to express gratitude for the support from Undergraduate Teaching Engineering Project of Yibin University: Integrated Teaching Design for the Course "International Logistics and Freight Forwarding" under the STEAM Concept (No. 409-JGY202316)

References

[1] Yakman, G. STEAM Graphics[OL]. http://www.steamedu.com/wp-content /uploads/2014/12/. 2014-12.

[2] Vasquez, J., Sneider, C. Comer, M. STEAM Lesson Essentials, Grades: Integrating Science, Technology, Engineering and Mathematics[M]. Portsmouth, NC: Heinemann, 2013: 231-238.

[3] Tang Xiaowei, Wang Weizhen. Effective Path Analysis of Integrating STEM to Develop Basic Science Education in China[J]. Education Research, 2014 (9): 61-68.

[4] Herschbach, D. R. The STEAM Initiative: Constraints and Challenges[J]. Journal of STEAM Teacher Education, 2011(1) : 96-122.

[5] Morrison, J., Raymond, V. STEAM as Curriculum[J]. Education Week, 2009(23): 28-31.

[6] NGSS Lead States. Next Generation Science Standards: For States, By States[M]. Washington D. C.: National Academies Press, 2013: 210-220.

[7] Jin Weiyin. Research on interdisciplinary theory and interdisciplinary construction in universities [D]. Lanzhou: Lanzhou University, 2005: 14-22.

[8] Yuan Liping, Zhang Xinxin. On the Connection between STEAM Education and Core Literacy [J]. Journal of Shaanxi Normal University (Philosophy and Social Sciences Edition), 2017 (9): 164-169.

[9] Weng Cong'er. Training and Enlightenment of STEM Teachers in the United States [D]. Shanghai: East China Normal University, 2015: 65-79.