

# Research on the construction and practice of online and offline hybrid courses: Taking Urban Logistics as an example

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## Abstract

**Aiming at the goal of cultivating professional capabilities in the discipline of finance and management, and adhering to the concept of student-centered education management, a hybrid teaching implementation method including digital platforms and physical classrooms was proposed. Besides, the specific reform content was demonstrated using "Urban Logistics" as an example. The proposed hybrid teaching makes university teaching activities more vivid and comprehensive, which is of great significance to the improvement of teachers' teaching ability and discipline construction.**

## Keywords

**Digital platform, physical classroom, hybrid course, urban logistics.**

## 1. Introduction

In the first batch of national first-class majors in 2019, the logistics management major in our college was selected as a typical site for undergraduate major construction. Taking the construction of national first-class undergraduate majors as an opportunity, the college has carried out research and reform of teaching models, development of curriculum and teaching resources, construction of experimental practice projects, and student innovation and entrepreneurship education, which continuously improved the connotation and construction level of the majors. Based on the exploration of teaching practice, this article proposes a hybrid teaching concept based on online and offline modes, and uses "Urban Logistics" as an example to illustrate the teaching practice content.

The most direct and core source of knowledge for college students is discipline courses. How teachers teach their courses will determine the quality of talent training in various universities. In the process of building a national first-class undergraduate major, teachers should not only focus on innovation in academic research, but also do a good job in the reform of undergraduate education and teaching [1]. Focusing on the comprehensive development of students, creating high-level courses, and using course construction as an important carrier for cultivating first-class talents are the keys to revitalizing undergraduate education.

With the rapid development of science, technology and the Internet, teachers have more and more teaching tools and methods, and the teaching form and content of the classroom are becoming more personalized and targeted. Wu Yan, Vice Minister of the Ministry of Education, emphasizes that in order to cultivate students' comprehensive ability to solve complex problems with advanced thinking, and to organically integrate knowledge, ability and quality, teachers should strive to achieve high-level, innovative and challenging curriculum standards in teaching, and create "golden courses" and "golden teachers" [2]. To this end, a comprehensive teaching model and theoretical support system, with online and offline hybrid classes as the main feature, to meet the needs of modern logistics talent training should be constructed.

## 2. Overall framework

Online courses refer to the use of modern information technology and network platforms to transfer teaching content and teaching processes to the Internet, allowing students to directly participate in the classroom through the Internet, thus realizing a remote synchronous learning model. Online courses include video courses, live webcast courses, online lectures, webinars and other forms. Currently, online cloud classrooms include Chinese MOOC, XuetangOnline, Ulearning, National library open courses and so on [3].

Offline courses are one of the traditional teaching modes. Students usually go to school to participate in teaching activities at a designated location and time. Offline courses are usually taught by teachers in classrooms or other teaching places, and students can interact, practice and discuss directly. Whether it is an online course or an offline course, it needs to be systematically designed, especially the online and offline hybrid courses, which need to be comprehensively planned from the perspective of holistic complementarity.

Inspired by the concept of full life cycle management in manufacturing enterprises, research institutions such as the Massachusetts Institute of Technology in the United States have proposed a teaching model of Conceiving, Designing, Implementing, and Operation (i.e., CDIO) [4]. This model incorporates the perspective of engineering management into the design, implementation, and evaluation of courses, and forms a new teaching method through an integrated curriculum setting. This method takes students as the main body and teachers as the guide, and cultivates students' comprehensive abilities by completing specific projects.

This study incorporates CDIO teaching concepts into online and offline hybrid courses, organically combines teaching methods with feedback effects, and incorporates the concept of continuous reform throughout the entire teaching practice, so as to be applicable to the teaching of finance and management courses. By emphasizing students' active participation and teachers' guidance, students are driven to systematically learn in case projects, while improving their practical operation capabilities. Furthermore, the relevant course resources of this major are coordinated to design a teaching framework for online and offline teachers and students to participate together, and the multi-step cycle optimization process including conception and design is integrated into the framework, as shown in Fig. 1.

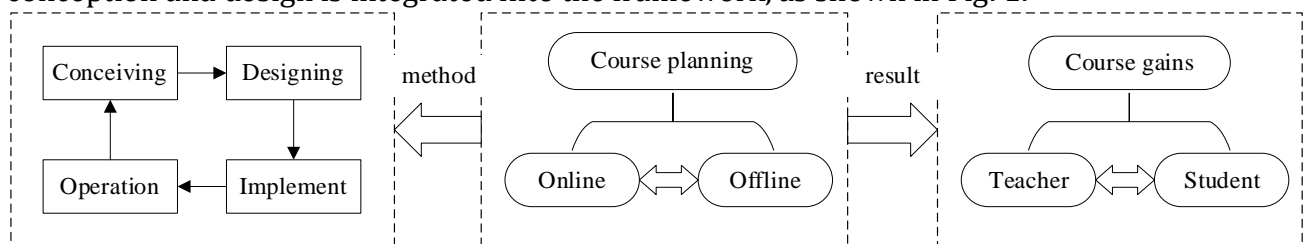


Fig. 1 Online and offline hybrid teaching framework

## 3. Hybrid Course Program

In traditional courses, students passively accept knowledge and lack in-depth discussions and interactions. Teachers are limited by class time and focus only on explaining basic concepts and theories, which leads to unsatisfactory teaching results [5]. Incorporating CDIO teaching methods into online and offline hybrid courses can effectively solve this problem.

### 3.1. Online Program

The CDIO method adopts the concept of constructivist education, believing that "conceptualization" means setting system goals and requirements, defining system form, function and structure, and conducting overall project positioning management under the condition of technical level [6]. With the development of computer technology and network

technology, many online learning platforms have been maturely operated, including MOOC, XuetangX, Ulearning, etc. The teaching resources in each platform cover multiple disciplines, and there are more and more courses by famous teachers from famous schools. Some double first-class universities even establish their own exclusive online platforms and interconnect them with the academic affairs system. Our university is a financial university, not good at information technology, so we use MOOC, which runs smoothly and has a large user base, as the online teaching platform for this major.

The CDIO method believes that "design" is a further embodiment of the concept. It is a series of activities for teaching design through the design of classroom content, duration or form, covering design goals and methods, application knowledge in design, cross-disciplinary design and other contents [6]. Most online courses on the MOOC platform are centered around textbooks. Teachers can provide students with learning and use according to the degree of proximity to the content of the textbooks they use. Considering the different positioning and student levels of different schools, it is more appropriate to design and formulate MOOC online classes that are suitable for the school's learning situation. Teachers make professional MOOCs for their colleges by extensively referring to and learning the teaching styles and contents of famous teachers from famous schools on various platforms. The course content includes theoretical knowledge points, extension introductions and demonstration animations of each chapter. The page settings include student's check-in area, discussion area, homework area, question-and-answer area, suggestion area and other sections.

CDIO requires students to master solid theoretical knowledge through course learning, and to be able to analyze practical problems and plan solutions to problems, so as to achieve comprehensive cognitive management of theories, methods and systems [6]. The online platform and offline classroom is a complementary entity. In the process of teaching, teachers should make overall arrangements for class hours, content and grading. A university semester generally lasts 14 to 18 weeks. A course is calculated as 2 class-hours per week, with a total of 28 to 36 class-hours. 40% of the total class hours are arranged in the online platform classroom to learn the theoretical knowledge points of the course, watch videos, complete homework and participate in discussions. Teachers need to record compact and concise teaching videos to teach the terminology concepts, principle definitions, process methods, etc. of the course. For knowledge points with strong practicality, process operation animations need to be edited into the teaching videos. Teachers assign relevant exercises in the homework area of the online platform to test students' mastery of the knowledge. Students can ask questions in the Q&A area if they have questions or exercises they don't know how to do. If they have opinions about the teacher's explanation method, rhythm, expression, content, and tone, they can also leave anonymous or named messages in the suggestion area.

The operation stage of CDIO focuses on the evaluation and optimization of operation, improvement and evolution, abandonment and operation management [6]. Online platform classrooms make it possible to quantitatively evaluate student performance and grades. Teachers count the number of student check-ins, inspect the hot topics in the discussion area, check the homework accuracy, and verify the video viewing time, etc. in the background. They further use curve charts to analyze historical data and summarize what students really think, which time periods are preferred by students, which topics students are keen to discuss, and which knowledge points are difficult to understand and master. Based on the quantitative analysis of big data, teachers improve the teaching content and teaching methods of online classes, forming a targeted closed-loop, i.e. learning-teaching-learning-teaching-..., for improving the teaching process.

### 3.2. Offline program

In terms of the conception, the format of offline classroom must also be adjusted and changed. It can no longer be dominated by teachers lecturing and students' passively participating. Instead, it must be coordinated with the content of the online platform to strengthen the understanding and application of theoretical knowledge through situational interaction, topic discussion, group cooperation, and divergent thinking. In this process, the teacher only plays the role of guiding, answering, prompting, and summarizing, allowing students to explore, draw conclusions, and expand their reading by themselves, making the classroom lively and active, and knowledge subtly entering the students' minds and hearts.

In terms of the design, the offline class is designed by the teacher to summarize the knowledge framework of each chapter on the online platform. And by asking the students simple questions, the teacher can understand their mastery of theoretical knowledge. Furthermore, the teacher designs appropriate cases around specific knowledge points, and students discuss and express their opinions in groups on the case content. The mastery of knowledge points, expression level, and cooperation ability of each group of students are comprehensively evaluated by the teacher. At the same time, teachers design exploratory questions based on their latest scientific research topics and the theme of this class, with scientific research applications as the background, to further stimulate students' interest in learning new knowledge and solving difficult problems, and expand students' knowledge and learning enthusiasm.

In terms of the implementation, offline classes are arranged for 60% of the total class hours. Students can basically master the relevant knowledge points through independent learning and practice on the online platform. Offline classes are used to test students' ability to apply knowledge points, express themselves, and work in teams. Teachers will pre-publish the content such as the corporate cases to be discussed, the scientific research problems to be solved, or the design tasks to be completed on the online platform, and remind students to think about it and consult relevant materials before class. In offline classes, students can freely form groups and complete the given corporate cases, scientific research problems or design tasks under the guidance of teachers.

In the hybrid teaching mode, students' comprehensive abilities can be evaluated, and learning scores are no longer based solely on students' attendance and test scores. The total assessment score needs to be divided according to ability, with the learning consciousness, video viewing completion, exercise accuracy, topic participation enthusiasm on the online platform, and the oral expression level, material reading breadth, team member cooperation and coordination, and practical problem-solving ability in the offline classroom as assessment sub-items, and the final test score is weighted and summed to obtain the student's comprehensive ability score.

In terms of the operational planning, offline classes are places where teachers can closely observe students' performance. Teachers observe students' demeanor, enthusiasm for expression, logical reasoning, etc., and reflect on whether the given cases, topics, or tasks are suitable for students' current level, whether they are too simple or too complex, whether the online class knowledge is not well prepared, or whether students do not read related materials and are not motivated enough. Teachers revise the prepared courseware PPTs based on real-time feedback from students in offline classes, and match cases and scientific research background projects. This part lacks the support of quantitative data, and teachers need to adjust the content and organization of the class appropriately and timely based on their own teaching experience.

## 4. Practical case

The teaching based on online and offline hybrid courses must arrange the whole process from design to feedback so that the teaching links are organically combined. At present, the total

hours of the "Urban Logistics" course of our college is set to 34 class hours, a total of 2 academic credits, of which 12 class hours are practical ones. The course includes 6 chapters: Overview of Urban Logistics, Urban Logistics System, Urban Logistics System Planning, Urban Logistics Infrastructure Platform Planning, Urban Logistics Distribution Optimization Design, and Logistics Information Technology.

In the online and offline hybrid mode, the course is conceived and designed, and the teaching method and classroom content of "Urban Logistics" are determined. The online content is: 6 chapters with 15 sections of knowledge points, involving basic knowledge such as the basic definition, elements, characteristics, and theories of urban logistics, in the form of teacher's explanation videos and demonstration animations, and this part of the content is arranged for 12 class hours; offline content is: 4 cases with 6 exploration tasks, involving urban logistics system planning, urban logistics infrastructure platform planning, urban transportation demand forecasting, urban logistics distribution system design, TSP (i.e. Traveling Salesman Problem) & VRP (i.e. Vehicle Routing Problem) modeling and solving, and urban logistics distribution simulation scheduling system operation, of which part of the content is arranged for 22 hours. In addition to the clearly set hours, the extracurricular extended readings left in the online class are the prerequisite knowledge for the offline classroom discussion, which requires students to study on their own. There is no time limit, and the effect of self-study is determined by the comprehensive performance of students in the classroom after class.

During the implementation stage of the online and offline hybrid courses, according to the above-designed content, it can produce relevant online explanation videos, select demonstration animations, break down and refine offline case tasks, and set up theoretical knowledge application scenarios. According to the student's ability training goals, it needs to determine several aspects: a scientific and comprehensive assessment method, the proportion of student's ability and assessment, where the online part includes: learning autonomy, discussion enthusiasm, video viewing rate, after-class exercise score. This part of the assessment accounts for 40%; the offline part includes: expression ability, collaboration ability, acceptance ability, design ability, thinking activity, topic participation, task completion, and final examination score. This part of the assessment accounts for 60%. The specific proportion of each ability sub-item is given based on the subject positioning, the advice of college professors and experts, and the teacher's experience. The proportion of the sub-item can be optimized according to the semester as the teaching process is optimized.

The operation stage of online and offline hybrid courses is an important stage for teachers to reflect and improve courses. Based on the historical statistical data of the online platform, teachers need to further quantify the students' check-in rate, number of questions, discussion frequency, correctness of questions, etc., adjust the content of online course explanations, and change the ratio of teacher explanation videos and logistics operation process simulation animations. According to the student performance observed in the offline classroom case exploration tasks, adjust the classroom PPT content, classroom organization form and the difficulty of the exploration tasks. The online content includes: the difficult problems counted in the exercise area, the questions summarized in the question area, the opinions collected in the suggestion area, and the targeted explanation of the difficult points and homework; the completion of the exploration tasks in the four cases and the comprehensive performance of the students in the classroom, according to which the targeted adjustments to the courseware and cases should be made.

## 5. Conclusion

The hybrid course of online platform and offline classroom is knowledge- and ability-oriented. It improves the traditional teaching implementation and grading methods by reallocating

learning hours and effectively organizing the course knowledge structure. Meanwhile, CDIO is a new education model that emphasizes the importance of closed-loop management of the entire education cycle. Thus, teachers continuously optimize and improve classroom content and form to highlight the cultivation of students' innovative spirit and exploration ability. Incorporating CDIO management methods into online and offline hybrid courses will help clarify the positioning of the course and the goal of talent training, and explore a beneficial path for the innovation of the teaching model of financial management majors.

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