

# Research and Practice of the Hybrid Teaching Mode of Operations and Supply Chain Management Course Based on Rain Classroom

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**Abstract:** The proposed national strategy for a modern supply chain marks the increasing need and the utmost importance of modern supply chain management professionals in China. Therefore, to meet the needs of the national strategy, it is becoming more and more urgent for universities across the country to explore how to innovate the teaching mode to train more excellent professionals in supply chain management. In this study, we will take the Operations and Supply Chain Management course as an example and then tend to study how to reform and design the online and offline hybrid teaching mode based on Rain Classroom. Our goal is to improve the teaching quality of the Operations and Supply Chain Management course, so as to improve the quality of undergraduate talent cultivation and train modern supply chain management professionals who meet the needs of a modern supply chain national strategy.

**Keywords:** Logistics management; Rain classroom; Hybrid teaching; Operations and supply chain

## 1. Introduction

The report of the 19th National Congress of the Communist Party of China has proposed to “cultivate new growth points and form new dynamics in the fields of medium and high-end consumption, innovation-led, green and low-carbon, sharing economy, modern supply chain, and human capital services.” This is the first time the Party Central Committee puts forward the concept of the modern supply chain, signaling that the development of “the modern supply chain” has been formally upgraded to a national strategy. Subsequently, in 2020, the Party Central Committee proposed to upgrade the modernization level of the industry chain and supply chain again and regarded it as a key objective-task to promote industrial transformation and upgrading, economic structure optimization, and high-quality development. In recent years, with the booming development of the Internet and supply chain in China, the integration and innovation of e-commerce, logistics, procurement, express delivery, and other industries are evolving and upgrading from industrial supply chain to platform supply chain and supply chain ecosystem. Modern information technology is constantly evolving and therefore the concept, model and method of the supply chain is constantly changing and innovating. At the same time, the supply chain circulation service system driven by big data is taking form, for which the representative firms can be seen among Alibaba Group, Jingdong, Suning, and so on. However, in the overall view, the development of the supply chain in China is still at an initial stage and many industries are still at the middle and low-end of the global value chain and supply chain in the global competition. For example, the industrial chain and supply chain in China still have a series of deep-seated problems and challenges, such as a backward theoretical system, high handling cost, low service efficiency, weak value-added services, and slow construction in information standardization. We can see that one of the most significant reasons for the problems mentioned above is the lack and insufficiency of professional talent in the field of supply chain management. The lack of talent will further exacerbate these problems, hampering supply reform and the optimal allocation of resources, and hindering China's economic transformation and valuation, as well as high-quality development. This suggests that it is more important to speed up the

development of qualified talent in modern supply chain management.

In 2020, as the global outbreak of the COVID-19 epidemic, universities across the country have generally adopted online teaching tools, such as Rain Classroom and QQ Classroom, in place of offline traditional teaching. In parallel, some educational platforms, such as the MOOC and Love Classroom, offer rich online educational resources for the convenience of online education. However, online and offline hybrid teaching will become a new normal in the post-epidemic era, bringing challenges to university faculty that are accustomed to the traditional mode of teaching. In the context of the new normal, only by innovating the curriculum system, the teaching content, and the teaching mode of the Operations and Supply Chain Management course, synthesizing the advantages of online and offline teaching, and actively exploring a new online and offline hybrid teaching mode, can we successfully create a golden course of Operations and Supply Chain Management, thereby improving the quality of undergraduate teaching and talent training, and cultivating high-quality supply chain management professionals for the needs of the modern supply chain national strategy.

Right now, Rain Classroom is one of the online teaching tools widely used by teachers in colleges and universities across China for online or online/offline hybrid teaching. As a new teaching interactive tool linking PowerPoint and WeChat via modern information technology, Rain Classroom breaks the time and space limitations of online and offline teaching, allowing teachers and students to effectively interact with each other in all scenes, at all times, and in all links. Some researchers have also explored how to design the online and offline hybrid teaching mode via Rain Classroom and the impact of the hybrid teaching on the teaching quality for different courses. For example, Sun et al. (2020) designed a hybrid teaching based on Rain Classroom to solve the existing teaching dilemma, considering the problems of poor mastery of theoretical knowledge and weak practical ability confronted by students during security service middleware technology course<sup>[1]</sup>. Liu et al. (2021) considered the students' self-directed learning ability as the main evaluation criterion in the designing of a hybrid teaching model based on the Rain Classroom, implemented this new design idea, and examined its effect through an organic chemistry course<sup>[2]</sup>. Ding and Sun (2022) designed a hybrid flipped classroom for a computer programming course based on Rain Classroom, and the results of student questionnaires also verified the effectiveness of the hybrid flipped classroom<sup>[3]</sup>. Wang et al. (2021) introduced the Rain Classroom platform into the design of architectural structure course and pointed out that the new design hybrid teaching can effectively integrate the three stages of pre-class, in-class, and post-class organically, thereby improving the activity and participation of students and the corresponding teaching quality of the course<sup>[4]</sup>. Ning et al. (2022) considered an online and offline hybrid teaching mode combining Rain Classroom and traditional classroom for the linear algebra course, and found that the new teaching mode and evaluation system promoted the transformation of teaching from teacher-centered to student-centered, and the new teaching content incorporating ideological and political elements helps students understand Chinese traditional culture and Chinese science and technology better<sup>[5]</sup>. Yin and Cao (2021) studied the use of Rain Classroom in the hybrid teaching of physical education training<sup>[6]</sup>. They showed that teachers could objectively and quantitatively evaluate students' learning status and learning effects in the physical education course by establishing data collection points that can acquire and record students' physical education learning data in the whole process through Rain Classroom. The aforementioned studies have designed hybrid teaching modes for different subject courses based on Rain Classroom and pointed out the important role of Rain Classroom in improving teaching effectiveness and quality. In this paper, based on the realistic demand of modern supply chain national strategy for logistics and supply chain management professionals, we will take the Operations and Supply Chain Management course as the object and explore its reform of hybrid teaching mode through Rain Classroom.

## **2. Course characteristics and teaching status of Operations and Supply Chain Management**

The Operations and Supply Chain Management course is one of the basic professional courses for logistics management majors, which systematically introduces the latest theories, tools, and methods of supply chain and logistics management, including the basic theory of supply chain management, production planning and control, information technology, inventory control strategies, vendor selection problem, supply chain enterprise performance evaluation, etc. As a course with a close link between theory and practice, Operations and Supply Chain Management highlights the practical application of supply chain management principles and methods in practical issues. Especially with the development and application of modern information technology in the supply chain, such as big data, cloud computing, the Internet of things, block chain, and artificial intelligence, the new changes, trends, and characteristics of modern supply chain management are emerging from the aspects of theories, methods, modes, and applications. The teaching effect of Operations and Supply Chain Management course directly

determines whether the cultivated students have the ability and literacy to adapt to the new changes in the development of supply chain management. Especially under the background that the country attaches great importance to the safety and stability of the industrial chain and supply chain and elevates the modern supply chain to the national strategy, the Operations and Supply Chain Management course is becoming more and more important.

In summary, the problems derived from the traditional teaching of Operations and Supply Chain Management are as follows.

Firstly, fewer teaching hours and unreasonable course structures. As an abundant content contained in the Operations and Supply Chain Management course and some of which are very difficult, teachers tend to reduce the interaction with students to save time in the teaching process. As a result, students usually have the impression that the course is annoying and difficult to link theory with practical problems. In addition, as the feature that practice plays an important role in this course, the practical time allocated is not sufficient to exercise the practical capacity of students. At the same time, teachers generally tend to emphasize theory rather than practice in the teaching process, leading the practical teaching sessions to be taken in theoretical courses.

Secondly, old and annoying content of teaching. The Operations and Supply Chain Management course usually adopts classical textbooks and its traditional course teaching content is mostly limited to textbooks, lacking frontier and science, and many applications of theory and technology in various fields cannot be fed back into the textbooks in time. For example, the development and application of modern information technology in logistics and supply chains, such as big data, cloud computing, Internet of Things, blockchain, and artificial intelligence, are less introduced in the textbooks of Operations and Supply Chain Management. The teaching content lacks to advance with the times and is out of touch with modern supply chain management and industrial development, making students lack a comprehensive understanding of the new development of modern logistics and supply chain management. Consequently, student capacity and literacy are difficult to meet the requirements of the modern national supply chain strategy for logistics and supply chain management professionals.

Thirdly, the single teaching method. In the traditional teaching process of Operations and Supply Chain Management course, teachers usually use the indoctrination method to explain the PowerPoint contents in the whole teaching process following the content arrangement in the syllabus. Therefore, students often have less opportunity to participate in the active learning of classroom content, and in turn, the interactivity in the classroom will be very weak, seriously affecting the students' active learning enthusiasm and the training of students' self-learning ability, communication ability, and teamwork ability.

Fourthly, lack of practical teaching. Operations and Supply Chain Management is a course which places emphasis on both supply chain management theory and its application in practice. In traditional teaching, because of a low proportion of practical teaching, students usually have no more chance to effectively apply the theoretical knowledge they have learned even though their understanding of theoretical knowledge is not deep enough. In recent years, with the increasing need for modern supply chain management talents in China, an excellent supply chain management talent must have not only good theoretical knowledge reserve but also sufficient and complete practical operation ability. However, because of the lack of practical education, students cultivated by major logistics management usually cannot effectively meet the demand for excellent talent in the national strategy of the modern supply chain. From a micro-economic perspective, it will have an impact on the future growth and development of students, and from a macro-economic perspective, it will have an impact on the future construction and development of this country.

Fifthly, unreasonable evaluation system. At present, the final examination is the core of the evaluation of students' learning outcomes in the traditional teaching of the Operations and Supply Chain Management course, and its results usually occupy about 60% of the score. Such a monotonous evaluation system is mainly to examine students' memory and control of theoretical knowledge. It is difficult to help students to form a deep understanding of practical knowledge content and to help students effectively apply the knowledge they have learned into practice by relying only on the evaluation system of final examinations. Consequently, the irrationality of such a traditional evaluation system hinders the overall growth of students and even the improvement of modern educational norms.

### **3. Reform of the hybrid teaching of Operations and Supply Chain Management course**

Based on the various problems in the traditional teaching of Operations and Supply Chain Management course, we will explore and reform the course structure, teaching content, teaching mode, and evaluation system of the course.

Firstly, optimizing the structure of course hours. Operations and Supply Chain Management is a professional course for a major in logistics management which places importance on practice. In the new course structure, the proportion of the practical course is increased, and some small experiments of virtual simulation developed by the company Suitanglian are introduced into the teaching of Operations and Supply Chain Management course, and students are arranged to participate in the simulation of site selection for logistics distribution centers, the planning simulation for logistics center facilities and equipment, the planning simulation for manufacturing facilities and equipment, etc., to strengthen the practicality of course teaching by using practical simulation exercises. This kind of teaching, on one hand, makes students have pressure to take the initiative to preview and discuss underclass, exercising their comprehensive ability to ask questions, analyze problems, and solve them. Teachers are also able to understand exactly how well students understand theoretical knowledge. This interactive mode of teaching can benefit both teachers and students, allowing them to influence each other and obtaining a resonance of thought.

Secondly, reconstructing and integrating teaching contents. In the process of reconstructing and integrating the teaching contents of the Operations and Supply Chain Management course, we should pay attention to the fundamentality and systematisms of the theories of the course, as well as the frontier and innovation of the subject theories. Teachers should adjust the syllabus in time and supplement new teaching content based on the basic theoretical framework of the course. For example, the teaching content of Operations and Supply Chain Management should follow the trend of development of modern information technology, focusing on the application of big data, cloud computing, Internet of Things, blockchain, artificial intelligence, and other information technology in logistics and supply chain management. At the same time, teachers should supplement the latest and hottest management examples about the development of logistics enterprises, so that students can perceive the hot spots and difficult problems in the management of Chinese logistics enterprises, and give problem-solving ideas by asking questions, arranging students to investigate and research, discussing in groups, and summarizing and generalizing.

Thirdly, innovating the teaching mode. Compared with the traditional teaching mode of Operations and Supply Chain Management course, the new online and offline hybrid teaching mode will fully use the Rain Classroom teaching platform, require teachers to sort out the course contents that need to be taught and differentiate which kind of contents that students need to learn and practice in advance online and the contents that teachers need to teach offline. In the meantime, teachers should organize discussions across the reverse classroom. Furthermore, the Rain Classroom platform can record students' learning dynamics anytime and anywhere, fully mobilize students' learning enthusiasm, initiative, and participation, and change the leading actor of the course from teachers to students.

Fourthly, optimizing the evaluation system. The hybrid teaching mode will abandon the single final exam form and adopt the process evaluation method, that is, fully consider all aspects of the theoretical classroom and practical classroom, online learning and offline learning, so as to comprehensively evaluate the students' learning effectiveness and teachers' teaching effectiveness. The content of the evaluation should include all aspects, such as student online pre-study time, on-line test results, participation in courses, individual participation in classroom activities and teamwork, the practice teaching, and final exams. The reasonability of the evaluation system reform is a guarantee to promote the implementation of the online and offline hybrid teaching mode, which stimulates students' learning enthusiasm in using the online platform, enhances their independent learning ability, and improves teachers' classroom teaching effectiveness.

### **4. Implementation of the hybrid teaching mode of Operations and Supply Chain Management course**

The teaching process of the hybrid teaching mode Of the Operations and Supply Chain Management course will be divided into four stages: pre-class preparation stage, class teaching stage, post-class review stage, and evaluation stage.

Pre-class preparation stage. The pre-class preparation stage is the prerequisite foundation of online

and offline hybrid teaching and is also the key to determining whether the hybrid teaching is successfully implemented. Before the class starts, teachers should upload all the related teaching materials of the Operations and Supply Chain Management course to the Rain Classroom platform, such as the teaching objectives, syllabus, weekly teaching calendar, selected teaching materials, teaching courseware, evaluation requirements, teaching cases, MOOC videos, and hybrid teaching programs, so that students can know well the course information and requirements in advance. As for the teaching contents in the classroom, teachers need to sort out and classify the knowledge points of the course contents, divide them into categories according to the key points, difficult points, and easy points of theories, make explanation videos, provide supporting materials, and set practice questions. In addition, teachers should provide the case study materials and MOOC videos related to the theoretical knowledge, and upload all the course teaching materials to the Rain Classroom for students to review in advance. For example, in the practical course of the virtual simulation experiment of logistics distribution center site selection, teachers should first sort out the knowledge points involved in the experiment, such as the principles of logistics center site selection, centroid method, dimensional analysis method, fuzzy synthetic evaluation model, etc. Then, according to these theoretical knowledge points, teachers make PowerPoint, knowledge point explanation videos, application problem analysis and explanation videos, practice problems, case study problems, etc., and upload these materials to the Rain Classroom platform. At the same time, teachers upload virtual simulation experiments to the Rain Classroom platform, and students can practice the experiments after learning the theoretical knowledge. The Rain Classroom can record the whole process of students' pre-study and practical operation, and score students according to their learning content, learning time, and test scores, which can be used as a reference for evaluation after the end of the class. Teachers can also summarize the difficult issues faced by students using the Rain Classroom platform for a detailed explanation during classroom teaching.

**Class teaching stage.** In class teaching, teachers should first further sort out, explain, and analyze the knowledge points involved in the content, so that students can then deepen their understanding of the knowledge points. Afterwards, teachers should judge the results of the pre-study of students summarized by the Rain Classroom platform and encourage students' excellent performance in order to boost their pride and motivation in learning. For the difficulties and doubts fed back from the pre-study, teachers should focus on solving students' doubts and test students' mastery degree of the knowledge by providing the relevant exercises prepared in advance. For knowledge points that are generally difficult for students to understand, teachers should explain them in detail several times until the students can fully grasp them. Teachers can also allow students to respond to each other in the form of a group discussion or classroom debrief. For example, for the virtual simulation experiment of logistics distribution center site selection, teachers can first comment on the students' test results fed back from the Rain Classroom platform. Afterward, according to reporting results of the virtual simulation experiment where students make more mistakes, teachers can organize students to discuss and review each other in groups so as to enhance students' understanding of knowledge points and teamwork ability. After the comment, answer, and discussion, students are organized to continue to operate the virtual simulation experiment so that they can complete the virtual simulation experiment in full, thus exercising their ability to apply theory to practice. Finally, the teachers can arrange some study cases in practice related to logistics distribution center site selection, and organize the presentation and discussion for students, thereby training their independent thinking and deep analysis ability. Meanwhile, the case teaching can further deepen students' understanding of supply chain management theory, and allow students to understand the actual problems faced by logistics and supply chain enterprises, thus improving students' ability to solve real-life problems. The Rain Classroom has a roll call function, which allows teachers to randomly roll calls in the middle of the class, master the information about students' class attendance, and roll call students to answer relevant questions. In addition, teachers can free up relevant discussion topics, which is helpful in improving students' learning interests and enthusiasm.

**Post-class review stage.** The post-class review stage aims to consolidate students' learning outcomes and extend the outdoor training. First, the Rain Classroom platform provides space for students to discuss theoretical knowledge points, practical issues and other types of problems with each other. Teachers can understand what students don't understand in class instruction and provide more detailed answers online via the discussion platform. Teachers can also choose to again organise offline seminars to address common problems of students. Teachers can issue practical questions or discussion questions based on the teaching content so that students can consolidate and deepen their understanding of the theoretical knowledge they have learned. Rain Classroom can record the whole process of students' assignments after class, and teachers can also review them online. In addition, teachers can also issue extended exercises for students who are interested and capable to expand their learning. The students' performance in extended exercises can be used as a part of the evaluation results. The post-class review stage is also

an important part of practical training. For example, teachers can release a virtual simulation experiment of the coverage problem of fresh produce distribution site selection problem, which is an extended experiment of the logistics center site selection, then students can continue to complete the extended training based on the previous practical operation experience in order to further deepen the understanding of logistics site selection problem.

Evaluation stage. The evaluation process will move away from the single final exam format and comprehensively evaluate students' learning performance in an objective and reasonable manner. Evaluation of student performance will focus more attention on student performance in all aspects of the learning process. For example, in the pre-class stage, the length of pre-study, the type of pre-study content, and the test performance of exercises, all of these can be used as objects for evaluation. At the classroom teaching stage, student participation, classroom presentation, number of questions answered and correct rate, all can be used for evaluation. At the post-class stage, students may be assessed objectively based on the results of their post-class homework and extension training. As for the practical experiment, the evaluation can be based on different experiment types, the number of times students participate in the experiment, and the experiment results. In the final session, the final examination may be evaluated as a course document, etc. Teachers assign different weights to each link to examine students' learning effectiveness in an objective and comprehensive way. In addition, based on students' evaluation of teachers' teaching in the Rain Classroom platform, teachers can also change their teaching process and method to improve the effectiveness of online and offline hybrid teaching.

## 5. Conclusion

The modern supply chain national strategy has put forward higher standards and requirements for the quality of professional talents of supply chain management. As the logistics management major specialized in training logistics and supply chain management talents, whether it can successfully cultivate high-quality applied, compound, and innovative talents is directly related to whether it can provide sufficient talent reserve for modern supply chain national strategy. In this paper, taking the Operations and Supply Chain Management course as an example, according to its characteristics of combining theory and practice and based on the advantages of the teaching platform of Rain Classroom, the reform of online and offline hybrid teaching modes is carried out based on the traditional teaching. In the new hybrid teaching mode, the teacher as the main character of teaching is transferred to the students, which can effectively stimulate students' learning enthusiasm and initiative, improve the teachers' teaching effectiveness, and cultivate high-quality logistics and supply chain management talents. The results of the teaching mode innovation also show that the students' learning motivation is enhanced, their practical innovation ability and teamwork ability are significantly improved, and the learning effect is significantly improved compared with the traditional teaching mode.

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## References

- [1] Sun, J., Gao, L., Ma, B., Dou, R., Yan, S. (2020) Reform of "Rain Classroom" Based Blended Teaching Mode in "Internet plus" Background. *Computer Era*, (9):120-122.
- [2] Liu, Q., Dai, S., Ding, Y., Qian, G. (2021) Application of Online-offline Mixed Teaching Mode in the Teaching of Science Course Based on Rain Classroom: A Case Study in the Teaching of Organic Chemistry. *Journal of Chengdu Normal University*, 37(3):45-50.
- [3] Ding, J., Sun, Y. (2022) Practice of Online and Offline Mixed Teaching of C++Language Programming Based on Rain Classroom. *The Theory and Practice of Innovation and Entrepreneurship*, (9):49-51.
- [4] Wang, X., Jiang, L., Li, L. (2021) Mixed Teaching of Building Structure Course Based on Rain Classroom. *Kejifeng*, (36):124-126.

- [5] Ning, L. S., Li, C. Q., Li, Y. B. (2022) *Innovative Practice of Linear Algebra Teaching Based on Rain Classroom Platform. Education and Teaching Forum, (7):57-60.*
- [6] Yin, H., Cao, Y. (2021) *The Design and Application of Mixed Teaching Mode to Rain Class of Physical Education in School. Theory and Practice of Education, 41(36):61-64.*