Original Research Article

Research on the Construction of Virtual Simulation Laboratory of Economics and Management

Qiang Xu

Sichuan University of Media and Communications, Chengdu Sichuan, China

Abstract: As an important place for college teaching, scientific research and social service, laboratory plays an important role in training high-quality talents. The construction of virtual simulation laboratory of economics and management is an important change in the teaching of economics and management. Through the application of new technology, new means and new methods, students can have immersive experience, overcome the lack of pure theoretical teaching, and truly perceive the running state of economic phenomena so as to better grasp the theoretical knowledge. By sorting out the development path of the construction of the virtual simulation laboratory of economics and management, the general law of the development of the virtual simulation laboratory of economics and management is explored, so as to provide countermeasures and suggestions for the construction of the laboratory of economics and management.

Keywords: Virtual simulation laboratory of economic management; Development path; Countermeasures and suggestions

As a subject lacking concrete image, the major of Economics and Management has always been based on the teaching mode of "theory teaching, supplemented by experiment teaching". It is difficult for students to combine specific and real situations in the learning process, resulting in insufficient knowledge transfer ability, weak consciousness, low knowledge conversion rate and poor transformation effect. Therefore, through the establishment of virtual simulation experiment teaching platform and the use of VR technology to construct specific teaching scenarios, the multi-dimensional learning can be expanded, the limitation of space and time can be broken, the learning interest of students can be stimulated, and the excellent management innovative talents with the systematic thinking of "people, finance, materials, production, supply and marketing" can be cultivated. In this paper, combined with the construction of virtual simulation experiment of economics and management major in Sichuan University of Media and Communication, the general law of construction of virtual simulation laboratory of economics and management is explored, so as to improve the training quality of economic and management talents.

1. Development history of the virtual simulation laboratory of economics and management

Reviewing the development history of the virtual simulation laboratory of economic management, it is a continuous exploration, continuous improvement, and continuous enrichment of the final formation of the current experimental system with more complete professional coverage, wider project development, more reasonable structure and more complete equipment. In general, it can be divided into three stages:

1.1. The first stage: 1997 -- 2010 -- start and explore

With China's accession to WTO, China's economy has entered the high-speed development track, the

information technology in economic business and economic management activities has become more and more prominent, and the information technology requirements of employers for talents have become increasingly obvious. Under this background, the drawbacks of the single teaching mode of pure theory of economics and management are increasingly severe, so how to integrate information technology into the teaching process of economics and management has become a new topic. To this end, in June 2000, Liu Fengtai, deputy director of the Department of Higher Education of the Ministry of Education, stressed that "the construction of economic management laboratories and other liberal arts laboratories should be paid attention to and strengthened, and the relatively backward situation of experimental teaching of economic management majors and other liberal arts majors in China's universities should be changed as soon as possible" at the "National Seminar on the construction of economic management laboratories". [1]Since then, colleges and universities around the country began an in-depth study of the construction of economic management professional laboratories, through the purchase of test equipment, the initial establishment of professional background as the support of professional laboratories, such as accounting computerization laboratory, financial investment laboratory and tax computerization laboratory.

The characteristics of the laboratory construction at this stage are as follows: (1) The construction is carried out on the background of the profession, and the crossover of the profession is low. Each laboratory is built in strict accordance with the actual needs of a certain profession (research direction), so each laboratory fully reflects its professionalism. [2](2) Heavy construction, not heavy use. Due to the influence of traditional teaching thinking, experimental teaching has always been regarded as the supplement of theoretical teaching but not paid attention to, which makes it difficult to effectively connect the teaching content and curriculum system of economic management practice courses. [3](3) The experiment is mainly verification, lack of comprehensive and innovative experiment. Although there are many problems in the laboratory construction at this stage due to various limitations, the experimental teaching of economics and management major is pioneered, which makes up for the vacuum of economic and management experimental teaching, develops teaching methods, enriches classroom content, strengthens professional understanding, and stimulates learning interest. It also laid a solid foundation for the further development of the subsequent construction of the virtual simulation laboratory of economics and management, and explored a new way for the training of applied and composite talents.

1.2. The second stage: 2010 -- 2017 -- comprehensive development

Compared with the first stage, the second stage of laboratory construction has a faster development speed, wider scope and more profound impact. As the laboratory in the first stage is mainly based on the construction of professional laboratories, the lack of interdisciplinary integration, in the construction process, due to one-sided emphasis on the "personality" of each major, ignoring the "commonality" of each major, resulting in less interaction between majors, poor communication, lack of effective linkage mechanism, which has certain limitations on the improvement of students' comprehensive quality. In addition, the relatively single confirmatory experiment no longer meets the teaching needs, so the laboratory construction at this stage focuses on solving the two major problems of interdisciplinary and unidirectional experiment under the premise of insisting on consolidating theoretical knowledge, taking social needs as guidance and information technology as support. Based on this, a group of "common basic knowledge and skills laboratory", its "teaching test equipment in the hardware requirements are not very high, but also has its commonality"[4] interdisciplinary, cross-professional comprehensive laboratory came into being, of which ERP sand table simulation is the most typical. Sichuan

University of Media and Communication Economics and Management Experiment (practical training) Room was established in 2014, in order to meet the teaching needs of financial management, accounting, international economy and trade and marketing and other economic and management majors, it has four experimental and practical training places, namely enterprise operation and planning training room, finance and accounting training studio, marketing simulation studio and international trade comprehensive studio. Each laboratory site not only meets the experimental needs of related majors, but also sets up experiments for other majors. For example, the Enterprise Operation and Planning training room can meet the experimental needs of students of all majors in enterprise operation. The ERP sandtable confrontation of the finance and accounting training studio enables students to practice and learn related knowledge such as strategic planning, procurement and production, financing and loan, and marketing planning.

To be specific, the characteristics of the laboratory construction at this stage are: (1) obvious interdisciplinary and high degree of professional integration. The construction and teaching organization of comprehensive experiment course for economics and management major has its own particularity. Comprehensive experiment is an interdisciplinary and interdisciplinary course, so its construction can no longer be completed by one discipline, one profession or one course. Teachers of different disciplines, different majors and different courses must be coordinated to participate in and coordinate the teaching task. [5](2) The types of experiments are diversified. With the continuous development of science and technology and the change of teachers' concept of experimental teaching, the laboratory built at this stage not only has the function of verification, but also develops comprehensiveness, design and innovation, which effectively cultivates students' innovative consciousness and creative ability, and improves their self-learning ability and the ability to acquire knowledge independently. [6](3) Lack of students' sense of experience. Due to the limitation of technological development, the laboratories constructed at this stage are still at the level of filling in the form of teaching and lack of immersive experience.

1.3. The third stage: 2017 -- now -- the system is mature

With the continuous development of information technology and the demand of talent training under the new economic form, the construction of the laboratory of economics and management has been changed to cultivate students' innovation and entrepreneurship ability as the guidance, constantly strengthen the connotation construction of the laboratory, and enhance the experience of experimental teaching. In 2017, the Ministry of Education issued the “Notice on the Construction of Demonstrative Virtual simulation experimental teaching Projects from 2017 to 2020”, which clearly proposed that about 1,000 demonstrative virtual simulation experimental teaching projects should be identified by 2020, thus opening new requirements for the high-quality construction of virtual imitation laboratories. Under this opportunity, Sichuan University of Communication introduced the ARE comprehensive simulation platform in 2019, and set up platform experiment courses that are common to all majors of economics and management. The virtual simulation experiment teaching system enables students to understand the real work of enterprises and feel the real business of enterprises in a real dynamic scenario, fully understand the law of production supply chain activities in the manufacturing industry and the process of financial business operation and management, master the decision-making tools and methods of enterprise operation and management, and comprehensively apply professional knowledge related to economic management. Improve decision-making and analysis ability, post and team cooperation ability, independent learning ability, stimulate students' innovative spirit, and cultivate innovative talents of economic

management and management with information management and control consciousness.

The characteristics of laboratory construction at this stage are: (1) the virtual scene is more prominent and the sense of experience is stronger. Virtual simulation teaching platform can quickly create a simulation work scene combining virtual and reality through AR technology and intelligent perception equipment. Taking the simulation of the commercial social environment as the starting point, students from different majors can simulate the business operation and management process in the form of role play, so as to exercise students' vocational ability in different positions and comprehensively train students' practical and innovative ability. [7](2) Pay attention to the construction and development of experimental projects. The quality of experimental projects is an important index to measure the success of laboratory construction, so each management laboratory actively develops high-quality experimental projects under the guidance of talent training program. (3) Rapid development of cloud desktop technology. With the development of computer cloud technology, it provides a broader space for the construction of virtual simulation laboratory of economics and management. It not only breaks the limitation of experiment time and space to a certain extent, but also releases[8] the experimental personnel from the traditional training room mode, and is of great significance for cultivating high-quality economic and management personnel.

2. Typical characteristics of the virtual simulation laboratory

Compared with traditional teaching, the characteristics of virtual simulation experiment teaching are mainly reflected in the “four combinations”, which are as follows:

2.1. Combination of theory and practice

The essence of experimental teaching is to show theoretical knowledge through practical means. Therefore, the most important feature of the virtual simulation experiment teaching of economics and management is the combination of theory and practice. In the development of economic and management personnel training program, we mainly consider the combination of theory and practice from the horizontal and vertical aspects: from the vertical point of view, according to the progress of knowledge learning to make a reasonable arrangement of experimental teaching. Under normal circumstances, experimental courses are usually set up in different semesters starting from the second semester of freshman year, so as to ensure that students can master certain theories on the basis of effective experimental learning, so as to deepen the understanding of theoretical knowledge. For example, the “ERP sandtable Simulation” of financial management major is opened in the second semester of freshman year, because in the first semester of freshman year, students have learned the “basic accounting” course and mastered the basic knowledge of the company's financial processing. From the horizontal point of view, it is mainly reflected in the distribution of the proportion of theory and practice hours of a course. Through multiple references and scientific demonstration, we carefully consider the theory and practice hours of each course and strive to achieve an effective combination of theory and practice.

2.2. Combination of virtuality and reality

In the teaching process of economic and management virtual simulation experiment, through the introduction of virtual simulation experiment software system, the use of virtual simulation technology can move the real environment to the classroom, so as to realize the combination of virtual and real, to prevent the drawbacks of experimental teaching and reality separation, which is particularly important for economic and management experiment teaching. For example, the dynamic simulation of marketing highly realistic imitation

of the real market environment, it provides a number of industries, each industry has three to five companies, each company has three to five members, by their senior marketing management team fully responsible for the operation of the company. The company sells three kinds of products in three regions. The popularity of these products varies according to the product and the market, because a successful marketing plan designed for one product or market may not be suitable for other products or markets. Because the decisions of competitors are variable, a successful marketing strategy at one time may not be as effective in the competition later on. In this case, students can truly feel the fierce and cruel market competition.

2.3. Combine knowledge with interest

Knowledge and interest can be said to be the soul of virtual simulation experiment teaching. Without these two characteristics, all virtual simulation experiment teaching will be meaningless. For the teaching of economics and management major, because most of the class hours are pure theory teaching, students can't help but feel boring in the learning process. In addition, theoretical teaching is divorced from specific real situations, resulting in students' lack of knowledge transfer ability, low migration rate and weak migration consciousness. Therefore, through virtual simulation practice, immersive teaching and experiential teaching methods are adopted to participate in the production and operation of enterprises in the form of role. Through the implementation of daily business, dealing with emergencies and other gamified practical tasks, students are trained in the response ability and analysis and decision-making ability in enterprise operation and management, which can greatly enhance the interest of learning. For example, if students want to understand the internal organizational structure and operation of a company, they can access the ARE integrated simulation platform and master the relationship between various functional departments by completing the built-in customs clearance tasks. Therefore, through the study of virtual simulation experiment, you can not only experience the fun of actual operation, but more importantly, gain knowledge in the fun.

2.4. Combine “competition” with “teaching”

In order to further stimulate students' interest in learning, improve students' practical ability, and thoroughly implement the teaching idea of “promoting competition by teaching and promoting teaching by competition”, the experiment instructor often uses the form of group competition to teach in the virtual simulation experiment teaching. Not only that, in order to enhance the students' vision and strengthen the contact with the outside world, the college often organizes students to participate in a variety of professional competitions inside and outside the school, such as organizing economic management students to participate in the provincial ERP business competition, marketing competition and other events. Through the way of “combining competition and teaching”, not only can improve students' practical ability, but also can deepen students' theoretical cognition and stimulate students' innovative consciousness.

3. Enlightenments from the construction of virtual simulation laboratory for economics and management

3.1. Pay attention to experiment teaching and optimize experiment structure

For a long time, the problem of attaching importance to theoretical teaching and neglecting experimental teaching has existed in the personnel training of economic management major. The teaching mode is relatively fixed and the teaching method is relatively simple. As a result, students' practical ability is poor, knowledge

transfer is weak, employment is difficult, adaptation is difficult and many other problems are caused by the imperfect personnel training model, especially the insufficient emphasis on experimental teaching, excessive reliance on theoretical knowledge in teaching, neglect of experimental teaching, the idea that experimental teaching only exists in natural science has always been rooted in the economic and management teachers. They are skeptical about the process, method and evaluation system of economic and management experiments. Therefore, we should continue to emancipate our minds and discard outdated concepts. Secondly, it is necessary to optimize the experimental structure, take social demand as the guidance, optimize the proportion of experimental and theoretical hours with the purpose of optimizing the talent training program, and constantly develop new experimental projects to improve the experimental teaching effect.

3.2. Develop a scientific evaluation system and put an end to the experiment being a mere formality

At present, the virtual imitated reality teaching platform has built-in evaluation indicators, and corresponding scores will be automatically generated after each experiment, which can reflect the experimental effects of students to a certain extent. However, this is only the evaluation of project execution on the basis of the confirmed experimental project, and the evaluation of the project itself is relatively rare. In experimental teaching, due to the particularity of economic and management experiments, qualitative evaluation is often adopted, and "qualitative evaluation is often described by experts on the quality of project construction, and the evaluation results cannot be quantified"[9]. In addition, individual teachers still have a strong elite education color in the concept of talent cultivation, overemphasize the importance of theoretical teaching and scientific research, and think that experimental teaching is only an extension of theoretical teaching, resulting in experimental teaching becoming a mere formality. Therefore, establish a sound scientific and reasonable evaluation system to prevent the phenomenon of going through the motions and put an end to the experiment becoming a mere form.

3.3. Strengthen top-level design and deepen professional integration

At present, the common phenomenon in the experimental teaching of economics and management is that "the experimental teaching is independent, and the specialty is complementary and poorly integrated". At present, in order to strengthen the training of applied compound talents for economic and management majors, colleges and universities are constantly optimizing the talent training program, increasing the proportion of class hours in experimental teaching, and increasing the investment in experimental facilities and equipment. However, due to the characteristics and barriers of each specialty, the laboratory construction is mainly based on the specialty or project, which is governed separately. As a result, there is a phenomenon of separation among the specialties or projects in terms of operating environment, hardware, software, evaluation criteria, data resources and functional modules, forming a series of "information islands". To a certain extent, this violates the goal and requirements of compound talent training. Therefore, it is necessary to design from the top level, coordinate the curriculum of various majors, deeply study the integration of knowledge points of various majors, and enhance the degree of resource sharing.

3.4. Strengthen multi-party linkage and pay close attention to the needs of economic and management talents

For the experimental teaching of economics and management major, the biggest dilemma is that the experimental teaching is often a lagging response to social demand, and the teaching content cannot follow up

the social demand in time, resulting in a low matching degree between supply and demand. The main reasons for this phenomenon lie in the high construction cost of the economic and management laboratory, the slow system update speed and the long update cycle, so there is a certain lag in the face of the rapid development of the economy and society and the complicated economic environment. Therefore, it is necessary to strengthen the communication with enterprises and other colleges and universities, optimize the project in time, actively explore online experimental teaching, reduce the cost of experiments, and enhance the flexibility of experimental teaching.

References

[1] Li Wenlong, Han Xingguo. [J]. Laboratory Research and Exploration, 2006 (4):529-531.
[2] Liu Fangle, Xu Hui. Exploration and Practice of the construction of economic and management laboratories in Colleges and Universities [J]. Proceedings of the 8th National Seminar on the Construction of Economic and Management Laboratories in Colleges and Universities, 2008(11):101-105.
[3] Liu Fang, Li Hua, He Zhongwei. [J]. Career and Education, 2008(7):163-164.
[4] Yang Mingna. [J]. Experimental Science and Technology, 2012(2):155-157.]
[5] Gong Li, Wu Dongli. [J]. Journal of Liaoning Institute of Education Administration, 2014(3):84-87.]
[6] Gong Li, Guo Qingyun. Construction and management Reform of economic and Management laboratories in Chinese universities -- A case study of School of Economics and Management, Shenyang Agricultural University [J]. Agricultural Science and Technology and Equipment, 2015(9):86-88.
[7] Zheng Haiying. Discussion on the construction of cross-professional financial management virtual simulation experiment platform [J]. Business Accounting, 2020(4):112-115.]
[8] Ling Hu Xinrong. The application of cloud desktop technology in the construction of economic and management laboratory [J]. Information Recording Materials, 2022(8):75-78.