

Construction of Virtual Teaching and Research Centers in Colleges and Universities

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Abstract— *The construction of teaching and research centers in colleges and universities is a complex systematic project, which is one of the hot issues that the Ministry of Education pays great attention to and deepens the reform of education and teaching. At present, there are some problems in the construction of teaching and research centers in colleges and universities, such as lax organization and management, single organizational structure and teaching and research activities, low participation of young teachers in teaching and research, and lack of in-depth communication between teachers and students. It is necessary to innovate the reform ideas and actively explore the construction scheme of the operation mechanism of the virtual teaching and research centers. The virtual teaching and research centers takes the Internet technology as the means to transform and upgrade the traditional teaching and research centers of colleges and universities through the cloud. Build a virtual teaching team, take online as the main method, flexible combination of online and offline, cooperate to realize interdisciplinary integration and resource sharing, promote the extension, implementation and guidance of more advanced teaching concepts and methods, and promote the high-quality development of higher education.*

Keywords— *University; Teaching reform; Virtual teaching and research center; Basic teaching organization.*

I. INTRODUCTION

Basic teaching organization is the most basic teaching unit in colleges and universities. At present, most colleges and universities in China take departments and teaching and research centers as the organizational system [1]. The in-depth promotion of the teaching reform in colleges and universities cannot be separated from the strong support of the teaching organization. As the basic teaching organization in colleges and universities, the teaching and research center plays an important role in guaranteeing the quality of undergraduate teaching and realizing the objectives of the quality of high-level university talent cultivation [2]. However, the reality is that under the influence of various factors such as insufficient attention to relevant policies, colleges and universities at present pay too much attention to the improvement of hardware facilities, discipline construction and talent introduction, and lack of organization, construction and management of the teaching and research centers, which to some extent leads to increasingly prominent problems in the operation of the teaching and research centers. The construction of virtual teaching and research center project is just an innovative exploration and reform practice in view of the current situation of basic teaching organizations, which has

attracted the high attention of the government, education departments and academic circles.

From a theoretical perspective, a comprehensive and detailed study on the exploration of the construction path of virtual teaching and research centers in colleges and universities can be seen in literature [3] in 2020. This paper takes the construction of virtual teaching and research center as the research subject, combs the construction of virtual teaching and research center from the construction origin, construction connotation, function orientation and construction path, and provides reference for serving the overall situation of school teaching reform and promoting the continuous progress of disciplines and school teaching quality. Other existing research results are mostly found in the case study conducted by provinces or schools, such as literature [4] "Improving the quality of course teaching by relying on virtual teaching and research center -- A Case study of Beijing Jiaotong University's 'Double Training Plan'". Literature [5] "Construction of virtual teaching and research platform of multi-school alliance". These literatures play a certain reference role in the construction of virtual teaching and research rooms in regional colleges and universities, but do not combine the problems faced by the construction of virtual teaching and research rooms in colleges and universities to make relevant countermeasures.

From the practical level, the construction of virtual teaching and research centers in colleges and universities has been concerned by the education authorities and relevant actions have been taken. The work points of the Higher Education Department of the Ministry of Education in 2021 point out that the opinions on strengthening the construction of basic teaching organizations in colleges and universities should be developed to achieve full coverage of basic teaching organizations and explore and promote the construction of virtual teaching and research centers. On July 20, 2021, the Department of Higher Education of the Ministry of Education issued the notice on the pilot construction of virtual teaching and research centers, which plans to recommend about 400 virtual teaching and research centers for pilot construction in the first batch and explore the construction standard, construction path and operation mode of new basic teaching organizations in the era of "smart +". According to the Ministry of Education document "blueprint" must draw a good college "construction map". To construct a set of operational mechanism construction ideas of the virtual teaching and research centers, which is suitable for the development of the

university and reflects the characteristics of the university itself, it is necessary to carefully clarify the current situation of the operation of the teaching and research centers in colleges and universities, fully explore the connotation of the virtual teaching and research centers, especially with the possible difficulties in the construction of the virtual teaching and research centers. It is an urgent responsibility to deepen the comprehensive reform in the field of teaching, improve the quality of teaching and realize the connotative development of higher education in the new era.

II. THE PROBLEMS OF CURRENT TEACHING AND RESEARCH CENTER OPERATION

At present, there is a big gap between the construction level of teaching and research centers in many colleges and universities in China and the development needs of schools. In summary, the problems in the operation of teaching and research centers in colleges and universities in China present the following four characteristics.

A. *The organization and management work is relatively lax*

Most domestic colleges and universities adopt the organizational structure of "university-college-department-teaching and research center", and colleges and departments have mature management systems and reward and punishment mechanisms. In contrast, the management of the teaching and research centers of universities is relatively loose. First, the composition of its members is mostly determined by departments, and there are few voluntary groups. Secondly, there is no hard and fast requirement for teaching task objectives, and there is also lack of certain incentive measures. Finally, the lack of binding force and cohesion allows teachers to conduct unified discussion and planning of teaching content, which may lead to the difficulty in ensuring teaching quality.

B. *Single organizational structure and teaching and research activities*

Although the organizational structure of "faculty-department-teaching and research center" has a certain control and help in the teaching process and quality, its disadvantages are becoming increasingly obvious: it not only hinders teachers' interdisciplinary and department-teaching discussion and exchange, but also hinders the cultivation of interdisciplinary talents and affects the interdisciplinary, integrated and innovative development of disciplines. In addition, most of the teaching and research activities organized by the teaching and research centers of colleges and universities are mainly teaching seminars, which are of a single form, low level and have little effect.

C. *Young teachers' participation in teaching and research is low*

Under the guidance of the evaluation mechanism such as the promotion of teachers' professional title and the assessment of the employment period, the phenomenon of valuing scientific research over teaching is widespread in colleges and universities, which affects the innovation and

enthusiasm of teachers' teaching reform to a certain extent. For the newly introduced young teachers, most of them are not active in teaching because of the pressure of scientific research. The low degree of teaching discussion and communication between new and old teachers makes it difficult to give full play to the role of old teachers in spreading, helping and leading. The shortage of teaching teams and the inability to optimize the allocation of teaching resources are not conducive to the growth of young teachers.

D. *Lack of depth of communication between teachers and students*

In addition to teaching activities, the teaching and research centers of colleges and universities shoulder the heavy burden of cultivating talents for the society. At present, the communication between the teaching and research centers of colleges and universities and students mainly involves soliciting suggestions on teaching improvement, guiding student associations and social practice, but the communication involving disciplines, curriculum construction and talent cultivation is very scarce, and the construction of teaching and research centers lacks vitality and reform power.

Therefore, in order to solve the problems existing in the teaching and research centers of traditional universities, it is far from enough to perfect the function of the original teaching and research centers. In other words, on the basis of not changing the structure of the original teaching and research centers, the construction of virtual teaching and research centers is explored to supplement, expand and innovate the traditional basic teaching and research centers.

III. CONNOTATION ANALYSIS OF THE CONSTRUCTION OF VIRTUAL TEACHING AND RESEARCH CENTERS IN COLLEGES AND UNIVERSITIES

Virtual teaching and research centers is a new basic teaching organization that combines online and offline teaching and research activities and classroom teaching practice by using information and intelligent teaching means under the background of "smart+" era. To fully grasp the connotation of virtual teaching and research centers, it is necessary to go beyond traditional thinking to understand the subject and specialty belonging, personnel and resources of teaching and research centers.

A. *Break through traditional cognition and innovate teaching and research forms*

Virtual teaching and research centers with the help of digital information technology, the guide of modern education technology and teaching depth fusion, the use of "flat type management, democratic discussion, equality and sharing", and other forms of innovation research promote the teaching innovation and systemic change, cultivating teaching ability, teaching activity and value growth fertile soil at the same time, Accelerate the fermentation of more basic teaching organization reform and innovation.

B. Focusing on teaching reform to meet future challenges

Under the traditional teaching and research centers, the teachers in colleges and universities generally lack the use of new teaching ideas, new technology, new methods to actively practice and in-depth research. The virtual teaching and research centers enables teachers with common research interests or directions to voluntarily gather and connect through the cloud, focusing on the commonness and predictability of higher education teaching, aiming at improving teaching academic level, shaping high-quality teaching culture and forming a special teaching academic community. The virtual teaching and research centers focuses on the needs of teaching and carries out pioneering research on teaching contents and methods, teaching evaluation and subject construction with the help of sharing and communication. Teachers can learn the latest information of teaching reform in time, focus on and solve the cutting-edge issues of teaching reform together, and actively respond to the changes in education in the future.

C. Break identity boundaries and optimize organizational structure

Virtual teaching and research centers is based on the product of Internet information technology. With the help of network teaching platform, digital learning platform, live broadcast platform and other means, teachers can achieve cross-professional, cross-disciplinary, cross-school, cross-regional teaching and academic exchanges, and break through the barriers of belonging to disciplines, personnel and resources of traditional teaching and research centers of universities. To provide greater autonomy, flexibility and autonomy for teaching and academic research and practice. In order to further improve teachers' participation in teaching, create a good atmosphere of teachers' hot teaching, enhance the cohesion of teaching and research center and improve the teaching organization structure.

D. Sharing teaching achievements and serving teaching practice

Under the traditional teaching and research centers, it is difficult for college teachers to spread the latest teaching reform and practice achievements in a large area. The virtual teaching and research center platform aims to serve education and teaching practice, systematically integrate teachers' latest teaching ideas and research results, and form replicable and extendable demonstration experience. With the cloud as the starting point, it explores the realization of interdisciplinary integration, the sharing and construction of teaching resources among colleges and universities, and builds a training demonstration platform for improving teaching ability. It provides teaching reference for more universities and teachers, and drives the extension and implementation of more new ideas and technologies in curriculum construction and teaching methods into teaching practice, so as to achieve high-quality teaching results.

IV. CHALLENGES FACED BY THE CONSTRUCTION OF VIRTUAL TEACHING AND RESEARCH CENTERS IN COLLEGES AND UNIVERSITIES

The challenges facing global virtual team construction can be divided into four aspects: communication, culture, technology and team management. Colleges and universities can improve the comprehensive ability of all aspects in the pilot construction of undergraduate virtual teaching and research centers.

A. Communication level

The success of virtual teamwork depends on effective communication. Virtual team trust building involves members' perceptions of each other's abilities, honesty and kindness. Practice shows that rich face-to-face communication helps foster and build team trust, but face-to-face communication is often extremely scarce in virtual environments.

B. Cultural level

There are countless examples of cultural misunderstandings between team members. Cultural differences due to factors such as race, gender, language, nationality and religion can breed prejudice and misunderstanding among team members. For example, research by M. R. Lind [6] in 1999 showed that gender differences affect interactions between virtual team members. In virtual teams, women had better group perception and satisfaction experiences than men.

C. Technical level

Long-term or permanent virtual teams need to gather geographically to establish or restore personal trust. Virtual teams often use a combination of technologies, such as video conferencing and email, to communicate, exchange data and engage in social interactions, which may not be as effective as face-to-face meetings in conveying the reality of social existence.

D. Team management

L. Chidambaram [7] believes that leadership is crucial in a virtual team, and it may take longer for team members to develop intimate relationships in a virtual environment than in face-to-face cooperation. Therefore, team leaders must find ways to build team cohesion from the start, such as building more open information sharing mechanisms.

V. EXPLORATION ON THE CONSTRUCTION OF OPERATION MECHANISM OF VIRTUAL TEACHING AND RESEARCH CENTER IN COLLEGES AND UNIVERSITIES

Under the background of "smart+" and education informationization, after comprehensively defining the symptoms of chronic diseases in the teaching and research centers of colleges and universities, we should speed up the construction of the operation mechanism of the virtual teaching and research centers in line with the characteristics of colleges and universities.

A. Facing communication and cultural challenges: classification and diversity

Colleges and universities can explore the project establishment and construction of virtual teaching and research center by relying on the teaching and research center of each college, and form an operation mechanism construction scheme based on the four categories of projects with classification and pluralism as the starting point. The first type is to use Internet technology to translate the physical teaching and research center into the virtual space operation, such virtual teaching and research center functions, organizational structure, member composition and so on are no different from the traditional teaching and research center. The second type is based on the development of discipline and specialty, aiming at the common problems of specialty or discipline, the virtual teaching and research center is used as the carrier to realize the interdisciplinary integration, the collision of teachers' ideas, and the co-construction and sharing of resources among universities. The third type is to establish a multi-school joint virtual teaching and research center for student training, bringing together many professional teachers from colleges and universities to participate in the cooperative training programs and curriculum plans for compound and innovative talents. The fourth class is the key construction and promotion of virtual teaching and research centers of the nature of the academic community, with special teaching its function not only contains collaborative and talent training mechanism, teaching outline, teaching video, practice and achievements in teaching research, teaching and research into high-quality teaching resources, such as and covers the normalized teaching demonstration and teacher training, promote the development of teacher's teaching.

B. Facing technical challenges: online + offline

First of all, the virtual teaching and research center takes online as the main means of implementation, and combines online and offline flexibly. Online teaching takes Internet technology as the means to build virtual teaching teams and choose online teaching platforms, such as MOOC and Dingding. Teachers can also choose or build their own teaching platforms to carry out course construction and case analysis, which can fully stimulate teachers' teaching vitality and enrich the fertile soil for teaching growth. Secondly, the virtual teaching and research centers can organize teachers' online and offline case sharing, teaching demonstration and lecture training, so as to realize the construction of teaching concept and content sharing mechanism of teachers across disciplines, universities and regions, and open a new channel for teachers to improve their teaching ability.

C. Facing team management challenges: supervision and assessment

The virtual teaching and research center is not a spontaneous organization that only serves teachers' personal growth, but is directly led by the school and supervised and managed by the educational administration department. First, the virtual teaching and research centers must be jointly signed

by the teachers who initiated the project and must go through the relevant approval procedures of the school before it is established. Second, educational administration departments, network centers and colleges shall provide corresponding teaching and research sites, facilities and equipment, network platforms, funds and other guarantees for the virtual teaching and research centers. Third, the virtual teaching and research centers should clarify the work standard system, be responsible and report to the department of educational affairs, accept its business guidance, supervision and annual assessment, and complete the obligations stipulated by the school to create open teaching resource sharing, build excellent cross-specialty courses, comprehensive general education courses and teacher teaching training demonstration. Finally, the educational administration department should set up the assessment incentive and elimination system, and reward or disband the virtual teaching and research center flexibly for passing or failing the assessment.

VI. DISCUSSION AND CONCLUSION

Virtual teaching and research center, as a cross-professional, cross-disciplinary, cross-university and cross-regional ideological collision field for teachers in the era of "smart+", undertakes the important function of training and breeding masters. At present, the undergraduate virtual teaching and research center has ushered in an important stage of experimental construction in colleges and universities. Colleges and universities must attach great importance to it and actively explore new ways of construction.

First of all, before the pilot construction, colleges and universities must make it clear that teachers are the real subjects of the construction of virtual undergraduate teaching and research centers. Without the active participation of teachers, the construction of virtual teaching and research centers will be meaningless. Many teachers are trapped in their professional background, knowledge structure, age limitation, fear of difficulties and other factors when facing the new teaching mode such as information teaching, curriculum thinking and politics, intelligent teaching, and it is difficult to cross the threshold of thinking, technology and methods. Therefore, it is necessary to organize teachers to conduct in-depth discussions on the construction of virtual teaching and research center in the early stage, so that teachers can fully understand the connotation and significance of the construction of virtual teaching and research center, participate in the design and implementation of the construction of virtual teaching and research center, gain teachers' understanding and support, and improve teachers' enthusiasm for participating in the construction of virtual teaching and research center.

Secondly, in the pilot construction, whether the operation mechanism of virtual teaching and research center can achieve the expected results lies in the top-level design and reasonable planning of the school. Combined with the four challenges of communication, culture, technology and team management, colleges and universities should construct a virtual teaching and research centers operation mechanism that conforms to national conditions, provincial conditions and university

conditions by taking classification and pluralism, "online + offline", supervision and assessment as the starting point.

Finally, after the pilot construction, the pilot university will test the expected goals through the construction of virtual teaching and research centers, summarize the experience and lessons, and form the experience that can be replicated and promoted, so as to provide reference for other domestic institutions of higher learning, play a leading role in demonstration, and inject a fresh stream for the construction of a long-term mechanism for the development of teachers' teaching ability in China.

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