

A Study on Amalgamation Insufficiency and Countermeasures in the Research Teaching Practice

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Abstract—Research teaching is one of the important teaching methods to cultivate innovative talents in colleges and universities. It has already achieved initial results in teaching practice. But it also shows amalgamation insufficiency problems in the research teaching practice, such as specialty cultivation plan is difficult to match with research teaching, teaching subject is difficult to adapt to research teaching, teaching content is difficult to consistent to research teaching, teaching methods are difficult to coincide with research teaching, teaching time arrangement is difficult to meet with the research teaching. Through the further practice and thinking, put up some effective ways to solve a series of amalgamation insufficient problems, as follows: enhancing the ability of research teaching subject, emphasizing the integrity design of research teaching content, controlling and interlocking multivariate research teaching methods, exploring the seamless convergence of research teaching process, strengthening the support from research teaching management system.

Keywords—research teaching; teaching practice; amalgamation; path design

I. INTRODUCTION

The characteristics of research teaching, such as inquiry, process, openness and autonomy, are highly consistent with the humanistic educational goal of cultivating innovative talents [1]. It is an effective practical tool in the process of higher education reform in China. However, through the teaching practice shows several amalgamation problems in the setting of specialty cultivation plan, the design of teaching process and the teaching participant subject. Therefore, in the further implementation of research teaching, it is necessary to seek an effective integrated path and take teaching efficiency improvement, thinking training and cultivation of problem solving ability as the result orientation to conduct reasonable and appropriate teaching exploration.

II. THE ANALYSIS OF THE AMALGAMATION INSUFFICIENCY OF RESEARCH TEACHING PRACTICE PHENOMENON

A. The Lack of Coordination of Teaching Subjects that Adapts to Research Teaching

The main subject of research teaching is the three parties of teachers, students and teaching managers. The integration system, effective interaction and synergy of the internal and mutual systems are the basis for the good effect of research teaching [2]. However, in teaching practice, there is an incongruity both within and between the subjects.

Firstly, teachers' teaching behaviors are not coordinated. To improve the students participation of teaching, teacher's teaching behavior excessively cater to students' interest which causes the separation of the teaching behavior and the intellectual property, excessive pursuit of form diversification. This causes the lack of necessary logical relation between teaching behavior and knowledge, and within different teaching behaviors, and presenting a discrete state in which there is no knowledge point attachment and no logical system bonding in teaching behavior. Secondly, students cope with learning activities in a perfunctory manner. Based on "relation distance", it is easy to form a gap between the knowledge and ability of members among the discussion group, and cause polarization in students' learning effectiveness [3]. The team members undertake the task after internal division, which leads to the lack of system learning process based on effective communication. Thirdly, the management behavior of managers lacks robustness. The difference between "research" and "teaching" in research teaching leads to the lack of necessary sustainability and stability in the implementation process of research teaching, and it is difficult to give full play to the due role or effect of research teaching. Lastly, teachers, students and managers are alienated and even in conflict with each other. In the research teaching practice, teachers often promote according to their own way, students often participate according to their own ideas, managers often manage according to their own concept. These three parties lack consistency both in thought and action.

B. The Lack of Conformity of Teaching Content Design that Consistent with Research Teaching

From the perspective of knowledge level, teaching content mainly includes unit knowledge points, chapter knowledge lines and course knowledge system. However, knowledge inside and between different levels is often scattered in research teaching practice [4].

Firstly, the decentralized unit knowledge points have not been reintegrated. In order to highlight student's main body status, in research teaching practice, the teaching design for a lesson generally contains knowledge points of one or more units. The unit knowledge points contained in the next lesson are designed after the last lesson is finished. This process only pay attention to the logical relation between the unit knowledge points within a lesson, and ignored the the mutual relations between multiple unit knowledge points in multiple lessons. Secondly, the knowledge line of chapters is fractured.

In order to use the research teaching method, some teachers break the logic system between chapters to implement the research teaching practice of "easy first then difficult". Although this method conforms to the progressive rule of the learning of knowledge [5], but it also disturbs the inherent logic of knowledge, especially abandons some chapters and leads to the breakage of knowledge line and further affect the cultivation of student's understanding ability. Thirdly, there is a lack of necessary integration and evolution of curriculum knowledge systems. In research teaching practice, the teaching content is basically divided according to the course boundaries, which is lack of internal connection whether in portrait or landscape orientation, teachers are only responsible for their own courses. The lack of appropriate continuity and extension of learned and subsequent knowledge at the beginning and the end of the course leads to the isolation of curriculum knowledge. In addition, it also shows the separation of theoretical teaching content and practical teaching content. In research teaching practice, most of the practical teaching content of a course is arranged after the theoretical teaching content, rather than contained in the whole teaching process.

C. The Lack of Diversity in Teaching Methods that Coincides with Research Teaching

At present, research teaching methods are increasingly abundant, including traditional teaching, more vivid flipped classroom, case teaching, problem teaching, double-teacher teaching, group discussion, etc. With modern information technology embedded in the teaching process, it also includes the recently emerging SPOC teaching, MOOC teaching, rain classroom, etc. However, these teaching methods not only stimulate teaching efficiency, but also expose various problems in teaching practice.

Firstly, a variety of teaching methods are pieced together in a class. Too much time is spent on the switching between teaching methods [6] when teachers utilize various teaching methods in one lesson, in addition to the lack of necessary internal connection, which leads to two kinds of adverse consequences, on one hand classroom time is more fragmented, on the other hand knowledge is cut too fragmented. Secondly, teaching methods are excessively diversified in the teaching of certain courses. As a result, the focus of students' attention in the classroom is shifted from learning knowledge to acquiring the freshness of new teaching methods. However, after a period of time, students' enthusiasm may decrease significantly and the level of classroom dissociation increases. At this time, teachers often switch to another new teaching method to arouse students' enthusiasm again.

D. The Teaching Schedule Lacks Continuity that Corresponds to Research Teaching

Compared with traditional teaching methods, research teaching has the advantage of breaking through the limitation of time and space and extending the teaching process beyond the classroom. But in practice, we find that it is difficult to extend the teaching time from classroom to after-class. Firstly, the time integration inside and outside the research teaching classroom is insufficient. A large number of research teaching

content has extended to extra-curricular space, and needs enough Extracurricular time that keeps a good distance from class time to support. However, there are two following difficulties in the teaching practice: First, students can't grasp the best timing of preparation before class which makes the preparation before class time and class time is difficult to fully cohesion, and causes inadequate and scattered preparation before class leading to the perfunctory characteristics of the class which based on the preview results of students. Second, the uncertainty of after-class time extension leads to the disconnection between after-class time and class time. As a result, it takes a lot of time to review the knowledge in application. Secondly, the monitoring of students' learning activities after class is insufficient. When students are given tasks in groups or individually, groups or individuals usually prepare in different space. Therefore, it's difficult to monitor the learning which leads to "formal learning" and "hitch hiking" phenomenon [7] and deviates from the original intention of training students' collaborative learning of research teaching.

E. The Lack of Coordination between Specialty Cultivation Plan and Research Teaching

Specialty cultivation plan is a specific program of implementing activities of talent training formulated by colleges and universities according to different levels, different professional training objectives and training specifications. It is the basic document for schools to guide, organize and manage the teaching work. However, in the process of the revision of specialty plan, the main measurement basis often focused on the integration and scientificity of knowledge, and research teaching methods are often neglected.

In the teaching practice, once the standard of specialty cultivation plan is established, it is not open in a certain period of time and is difficult to change at any time, but the implementation of the research teaching process need a open specialty cultivation plan. This mismatching situation directly led to the dilemma of teaching design in which teachers not only want to successfully complete the teaching requirements of specialty cultivation plan, but also want to embed research teaching into teaching process. However, it is difficult to change the original course assessment method and evaluation system and it's also difficult to extend the course teaching to outside. At present, the common practice of domestic universities is to try to implement research teaching method under the framework of the existing traditional teaching mode of specialty cultivation plan, which makes research teaching become a compromise, and it is difficult to promote the implementation of research teaching, and guarantee the teaching effect.

III. THE PATH DESIGN OF ENHANCING THE AMALGAMATION OF RESEARCH TEACHING PRACTICE

Based on our 3-year experience in research teaching practice and the combination of the research results of research teaching, we can realize the amalgamation of research teaching practice to enhance the efficiency of research teaching effect through enhancing the ability of research teaching subject, emphasizing the integrity design of

research teaching content, controlling and interlocking multivariate research teaching methods, exploring the seamless convergence of research teaching process and strengthening the support from research teaching management system.

A. Enhancing the Ability of Research Teaching Subject

According to constructivism theory and experiential learning theory, we can draw lessons from the concepts of "discussion", "participation", "reflection", "cooperation" and "experience" [8] to improve the ability of the teaching subjects in the research teaching.

Firstly, teachers should reverse the teaching concept and improve the quality required for research teaching. For example, the rigorous spirit of teaching, they should be a teacher who can guide students rather than cater to them. Solid scientific research ability, they should supplement the research knowledge into teaching, and help students learn cutting-edge knowledge as much as possible; Active innovative thinking, they should constantly innovate teaching means, methods and ideas in teaching practice to impart knowledge and train students in the most effective mode; Profound teaching ability, they should accumulate, reference and reflect teaching skills in teaching practice, and use the most infectious teaching way to attract students into the classroom. Secondly, students should actively change the traditional learning habits, establish and develop new ideas and abilities of independent learning. Students should not only learn in class by listening, but also learn in class by asking and thinking, and more importantly, they should go out of class to learn through watching and doing, and transform themselves from passive receivers into active explorers and researchers. Thirdly, teaching managers should gradually change their roles from research teaching managers to service providers. Managers should take the initiative to go deep into the research teaching line, summarize successful experience, sort out problems and shortcomings, and formulate targeted solutions based on feedback from teachers and students. In addition, they should actively do research work on research teaching based on the school's positioning, objectives, levels and other attributes, so as to provide ideas and schemes for realizing the operationalization and maximization of the effectiveness of research teaching. Lastly, achieve orderly interaction among teachers, students and administrators and strengthen the equal status of the three parties. All kinds of problems, opinions and experiences existing in the research teaching process should be timely conveyed to all parties, and consensus should be reached on the basis of mutual consultation, so as to effectively promote the realization of tripartite cooperation and co-governance of research teaching.

B. Emphasizing the Integrity Design of Research Teaching Content

Through the integrated design of research teaching contents on the stratum of micro, medium and macro, the professional teaching contents with horizontal coordination, longitudinal coherence, distinct hierarchy and interconnected structure are formed to realize the integration of research teaching contents.

Firstly, the modular design of knowledge point of

microcosmic stratum. Based on the careful carding of internal connection of micro knowledge points, the design can effectively carry the modules of each subdivided knowledge point, and carry out the teaching of knowledge points and avoid the scattered state of isolation of knowledge points to realize the modular acquisition of knowledge points. Secondly, the orderly connection of knowledge line of medium measure. Teachers should reflect on the traditional "easy first then difficult" research teaching approach, break the section line, design the teaching content of medium stratum knowledge line based on inherent evolution of knowledge and pay attention to the progressive deduction of whole logical process. Both the easy and difficult knowledge should be reflected in the whole knowledge context, at the same time, research teaching should be carried out by fully considering the inherent logic of knowledge, let knowledge difficulties appear in intervals to maintain the students' learning interest. Thirdly, the systematic construction of macro knowledge is carried out from two aspects [9]. On the one hand, design courses in academic year group, and consider the knowledge logic relationship among these courses and avoid the isolated setting of courses as much as possible. On the other hand, design courses in major, and classify the knowledge that should be possessed by the major and conduct systematic design of the teaching course of the whole professional knowledge system.

C. Controlling and Interlocking Multivariate Research Teaching Methods

The amalgamation insufficiency of multiple research teaching methods is mainly due to the deviation of teachers in using these methods. Therefore, to solve the problem of amalgamation insufficient, teaching means can be innovated from the following aspects:

Firstly, the diversity of research teaching methods must be controlled. In the teaching process of a knowledge point, it's not appropriate to use too much research teaching methods, otherwise it will waste teaching time, and easy to consume students' energy. In addition, in the research teaching process of the whole course, the most matching research teaching means can be selected according to the different knowledge points of the knowledge context, and avoid the problem of activating classroom atmosphere by "stacking" teaching means without the teaching content [10]. Secondly, the mixed use of multiple research teaching means must be based on interlock. For example, integrate the knowledge into the case and gradually guide students to think actively and analyze dependently in the process of case analysis to acquire knowledge. In this process, case teaching means and teaching means are used mutually rather than simply pieced together to ensure the final acquisition of the synergy between the two kinds of research teaching methods. Thirdly, design the interlock utilize of multiply research teaching methods according to the knowledge points. In preparation process, the purpose and content of research teaching should be clarified, the matching methods should be selected according to the specific knowledge, and the transfer relation and coordination mode of the teaching method should be designed to ensure the interlock utilize of multiple teaching methods.

D. Exploring the Seamless Convergence of Research Teaching Process

No matter the subject, content or methods of research teaching are attached to the tightly knit teaching process, the whole teaching process should be seamless as far as possible.

Firstly, achieving students' exercises, teachers' lectures and practical applications of small knowledge points in the same space and time as far as possible when redesigning single lesson. After three years' research teaching practice, it is found that three sections in a row can achieve this goal. In this process, students did not suffer from learning burnout due to too long time. On the contrary, their learning autonomy, enthusiasm and interactivity were maintained at a high level. It is worth noting that in the process of the research teaching, we did not adopt diversified research teaching means, but only attach the research teaching content to three research teaching processes including teachers teaching, students acquisition and application practice, and unified the three processes in a period of time, a classroom and a research teaching method. Secondly, modern information technology supports the seamless connection of research teaching process. Practice found that the smaller knowledge points can realize the seamless connection of the three processes of research teaching by using the method of three sections in a row, but for larger or harder knowledge, it doesn't work. We can use WeChat, QQ and other modern means of communication and modern education tools to realize it inside and outside the classroom. Thirdly, realizing the seamless connection of the research teaching process by adapting the research teaching method based on scientific research. Taking scientific research projects as the carrier, and integrating students' exercises, teachers' teaching and practical application into the process of scientific research projects. In practice, it is found that this method not only realizes the seamless integration of research teaching process, but also realizes students' independent learning, and teachers do not have to spend a lot of energy to supervise students.

E. Strengthening the Support from Research Teaching Management System

The amalgamation of research teaching practice must rely on the stable support of relevant systems, which can be strengthened through the following ways:

Firstly, reforming the existing research teaching evaluation system. The concrete measures include: Paying attention to the effect evaluation of research teaching and systematic and integral evaluation of research teaching process and introducing diversified research teaching evaluation indexes. Secondly, improving teacher performance appraisal system and multi-party communication system as soon as possible. On the basis of the improvement of the teacher's teaching performance evaluation system, which mainly takes teaching quantity and student evaluation as the reference standard, the research teaching overall evaluation system is designed independently, which takes the college, department and discipline as the unit. At the same time, the communication mechanism has been gradually constructed to provide institutional support for multi-party participation, appeal

expression and barrier-free flow of information in the research teaching process. Thirdly, paying attention to the strong support of senior managers. The implementation of research teaching is a systematic process, which requires close cooperation at all levels and continuous attention and overall coordination of top-level leaders, and more importantly, macro-guidance and specification of top-level system. Therefore, a top-level management system, which is in charge of major leaders and supported by relevant important systems, should be established in practice. Lastly, refining the experience that is beneficial to the integration of college, department and discipline in the practice of research teaching and integrating it into the institutionalized procedure to gradually construct a complete system of research teaching management system.

IV. CONCLUSION

Overall, our study investigated the current situation of research teaching practice, analyzed the amalgamation difficulties and made the path design. In the process of research teaching practice, we can find that it is difficult to integrate the existing teaching links with the concept of research teaching. These amalgamation insufficient mainly reflected in the design of specialty cultivation plan, teaching subject, teaching content, teaching methods and teaching time arrangement. Therefore, more attention should be paid on the amalgamation insufficient.

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