Research on the Training Mode and Countermeasures of Interdisciplinary Postgraduates

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Keywords: Interdisciplinary, Postgraduate, Training mode.

Abstract. With the increasing demand of the society for high-level interdisciplinary talents, it has become an irresistible trend to cultivate interdisciplinary talents. Meanwhile, a large number of major interdisciplinary subjects need to be solved urgently and there is a sharp shortage of high-level talents with interdisciplinary knowledge structure. Therefore, it is urgent to promote the cultivation of interdisciplinary graduate students. This study focuses on the analysis of the cultivation of interdisciplinary graduate students, finds out the possible problems and current situation in the cultivation mode of interdisciplinary graduate students, and finally puts forward countermeasures and suggestions to improve the cultivation status of interdisciplinary graduate students.

1. Introduction

In 2017, The State Council issued the 13th Five-Year Plan for The Development of National Education. The plan points out that attention should be paid to the development of interdisciplinary education, in deepening the reform of undergraduate education and teaching, a talent training mode combining general education and professional education should be explored, and modular general education should be carried out to promote the integration of arts and sciences\textsuperscript{[1]}. In 2017, General Secretary Xi Jinping mentioned in his report to the 19th CPC National Congress that we should "accelerate the construction of first-class universities and disciplines, and realize the concurred development of higher education". Strengthen discipline collaborative innovation, forming a cross between a group and to further build "interdisciplinary engineering", the major national strategic needs and the main battlefield, the frontier science and technology, economic and social surrounding and advantages of traditional subjects, subjects, the intersection of the implementation, so as to promote the college talent training, scientific research and technological innovation\textsuperscript{[1]}.

Modern scientific research is becoming more and more complex, which is difficult to be solved only by a single discipline or experts in a certain discipline. It needs to be examined from multiple disciplines and perspectives. Therefore, it is urgent to cultivate high-level talents with complex knowledge and use interdisciplinary knowledge and methods to deal with complex problems. As an important part of higher level talents and higher education research, nowadays many countries regard interdisciplinary talent training as an important breakthrough point to deepen graduate education reform and comprehensively improve the quality of graduate education. Therefore, there is an urgent need for interdisciplinary training of graduate students.
2. Interdisciplinary Graduate Student Motivation of Talents Cultivation

2.1. The Urgent Needs of the Development of Science and Technology

Contemporary social objective process to retype it science and technology, economy, social development and environmental problems such as the height of comprehensive and responsible for sex, not only involves the knowledge and method between different disciplines, and requires the science, technology and humanities and social science knowledge combine to become a creative synthesis[2]. Especially in high-tech areas, interdisciplinary research is closely, mutual penetration. In its report to the 19th National Congress, the Party pointed out that innovation is the primary driving force for development and the strategic support for building a modern economic system. Interdisciplinary innovation become the main way of major original innovation, stimulate interdisciplinary innovation needs to be a multidisciplinary perspective and interdisciplinary thinking. Therefore, actively explore and establish reasonable interdisciplinary graduate cultivation model, prepare the way for interdisciplinary talents for the future.

2.2. The Needs of the High-level Interdisciplinary Talents

With the continuous development of human society and the rapid change of society, the knowledge structure of a single subject and the narrow scope of knowledge have become vulnerable. To solve these problems, it is urgent to improve the level of education and improve the quality of talent cultivation. It is also necessary to break the traditional mode of training postgraduates of a single subject and promote the cultivation and integration among disciplines. The national medium and long-term education reform and development plan outline (2010-2020), "pointed out:" promote the colleges and universities, research institutes, enterprises of science and technology education resource sharing, promoting college innovation organization pattern, cultivate interdisciplinary, interdisciplinary research and teaching with the combination of team."[3] At the National Conference on Graduate Education held in Beijing in 2020, it made important instructions on graduate work, adhered to the principle of "optimizing the layout of disciplines guided by national needs", insisted on closely combining talent training and discipline construction with national strategic needs, promoted the reform of postgraduate training system and mechanism in the face of a new round of scientific and technological revolution and industrial reform, and strengthened the overall planning of the layout of disciplines and the adjustment and optimization of specialty Settings.

3. Interdisciplinary Graduate Research Present Situation and Existing Problems of Training Mode

3.1. Curriculum System, Training Scheme is not Perfect

Our academic graduate cultivation time for three years, time is relatively abundant in terms of a single discipline. However, for graduate students in the interdisciplinary training mode, it is difficult to carry out in-depth research on basic theories within the three-year academic system. Compared with graduate students in a single discipline, interdisciplinary graduate students are involved in a wider range of basic knowledge. They not only need to master the basic theoretical knowledge of their major, but also need to make up for the knowledge of interdisciplinary majors. The biggest characteristic of the interdisciplinary curriculum structure is the boundary between disciplines, to strengthen the connection between disciplines and interdisciplinarity. But in the existing literature research interdisciplinary curriculum system analysis, interdisciplinary curriculum is still insufficient.
3.2. Lack of Interdisciplinary Faculty

In recent years, the scale expansion of graduate student recruit students behind the students and the corresponding is the lack of teachers, especially for lack of teachers in the field of interdisciplinary graduate students, and even can be said to be rare. Teacher individual factors that affect the quality of graduate student training in particular, for interdisciplinary graduate students, however, it is fatal. Most college teacher research direction is relatively concentrated in a subject area, relatively fixed, achievements or to undertake the project basic it is within the scope of this major, therefore, for interdisciplinary graduate, most teachers are overwhelmed, teacher to student's interdisciplinary understanding degree is not high, it is difficult to in the interdisciplinary field of graduate instructional Suggestions, mastery of other kinds of discipline knowledge and development of the master is not enough, different disciplines have unique knowledge structure and ability request and the way of thinking brought by the interlaced like the hills of objective reality.

3.3. Scientific Research and Practical Training Reflect Lack of Discipline

Graduate education in social practice and scientific research training is the important content. Among them, the social practice is the combination of theoretical knowledge and social practice way, help to improve the comprehensive quality of graduate students; Research and training to help graduate students understand the knowledge of subject frontier, cultivating the graduate student's innovative thinking, innovative ability and the ability to solve the problem[4]. Single subject graduate student scientific research activities in China has formed a relatively perfect system, based on the subject of scientific research training, but is not doing the experiment class of graduate students to participate in scientific research is still on the low side, most of the graduate student scientific research concentrated reflection to help mentor relevant papers, research and writing subject and dissertation as a condition of a degree, is a hard and fast rules. The degree of integration of cross-discipline research training is very limited, and there is no perfect scientific research teaching system, which leads to the scattered teaching and research practice, and it is seldom possible to give different training and guidance based on students' respective disciplinary backgrounds. And many colleges and universities of interdisciplinary training mechanism is not perfect, lead to scientific research and teaching activities of the corresponding mechanism imperfect, the clear, will not be able to implement effective guidance, also can't keep up with the corresponding hardware facilities, interdisciplinary research and training also only stay in the knowledge level of incremental learning, lack of knowledge integration and application ability training, unable to form the thinking and method of interdisciplinary research, from quantitative change to qualitative change in the sublimation and the lack of effective means and measures[5].

3.4. Training Evaluation Mechanism Evaluation System is not yet Mature

At present, the current teaching evaluation system in China's colleges and universities ignores the consideration of knowledge system, innovation ability and discipline vision of graduate students. The main evaluation criteria for graduate students' degree requirements are to assess different stages of graduate students in the form of opening report, mid-term examination and graduation thesis. As long as the graduation requirements stipulated by the school are met, the degree can be awarded. To some extent, this evaluation system is unfavorable for interdisciplinary graduate students. Scientific and effective evaluation mechanism for interdisciplinary students have a positive active function, it can not only help students play subjective active to learn, but also for their own learning achievement test, power direction for later efforts[6].
Interdisciplinary graduate cultivation model and the traditional graduate training model, there is a big difference between interdisciplinary graduate is geared to the needs of the social demand as the guidance of academic and applied and inter-disciplinary talent, training evaluation system of standard compared with the traditional education mode is more complex. The cultivation of interdisciplinary graduate students involves many disciplines, and it is difficult to clearly divide the disciplines involved. The researchers are concentrated in interdisciplinary fields, and the disciplines do not understand each other, and the evaluation standards of different disciplines also lead to differences among non-peer experts. The imperfect assessment mechanism of postgraduates in colleges and universities is not conducive to the initiative of interdisciplinary postgraduate study and the improvement of scientific research ability. In general, the immature assessment mechanism directly affects the training quality of postgraduates.

4. Countermeasures and Suggestions to Improve Interdisciplinary Graduate Cultivation Model

4.1. Optimize the Curriculum System and Training Program

Interdisciplinary belongs to a high level of graduate student training compound talent training teaching activity, study is the way of it’s into the subject, the important way to promote professionalism, therefore, should be inclusive and comprehensive interdisciplinary, emphasize the interdisciplinary graduate education in order to adapt to the diversification of social and economic development needs the inter-disciplinary talent. Therefore, in terms of curriculum setting, it is necessary to make accurate positioning around the characteristics of different disciplines and cross-disciplines, follow the principle of gradual progress, pay attention to the differences of interdisciplinary students according to the background of students, follow the general and special principles, pay attention to the comprehensiveness and completeness of curriculum system, pay attention to the relevance and integration of interdisciplinary curriculum design, promote the complementarity and integration of different disciplines, and improve the quality of interdisciplinary training mode. To improve the condition of the elective courses can be evaded, enlarge the autonomy of students' course selection, stimulate students' interest in study of interdisciplinary knowledge, such ability of knowledge integration, cross to their advantage. Set up reasonable curriculum system can not only help build interdisciplinary graduate complete knowledge system framework, also to a certain extent, make up for the part of students' professional knowledge is weak.

The training plan for interdisciplinary graduate students should follow the current training objectives and meet the diversified demands of today's social development for interdisciplinary and interdisciplinary talents. The training plan should also keep pace with The Times, provide diversified choices, and keep flexible adjustment space according to the social demand. Due to the different professional backgrounds of interdisciplinary graduate students and the different characteristics of cross-disciplinary students, different training methods should be implemented when the training plan is designated. The word "different" here does not mean different, but broad-caliber training plans should be made for different types of interdisciplinary students.

4.2. Strengthen the Mentoring System

High-level and high-quality teaching staff is the guarantee to cultivate high-quality research institutes and the key to improve the quality of graduate students. For graduate students with interdisciplinary backgrounds, the role of supervisors is more prominent. At present, our country
shall practice a system of a single mentor, tutor to play a leading role in the graduate student's learning and scientific research, for interdisciplinary graduate student, teacher must have a cross subject research background and the interdisciplinary research direction, have the insight to the development of interdisciplinary, therefore, in order to ensure the quality of the cultivation of interdisciplinary graduate students, we must strengthen the construction of tutors.

First, interdisciplinary graduate tutor cannot confined to this professional, can choose according to different disciplines are teachers. Second, for the cultivation of interdisciplinary graduate students, the joint cultivation of multi-disciplinary tutors can be advocated. As the single tutor will limit the limitation and narrowness of thinking of interdisciplinary graduate students, the joint cultivation of tutors is more conducive to solving interdisciplinary problems, breaking the boundary of interdisciplinary, promoting the integration of different disciplines, and promoting the development of science and technology to some extent.

4.3. Establish Effective Training Quality Evaluation System

The key difference between the training of interdisciplinary graduate students and that of traditional graduate students lies in the fact that the key links, such as course learning, scientific research training and academic thesis, involve the interdisciplinary fields of different disciplines. Therefore, it is difficult to provide reasonable and objective evaluation results through the evaluation system of traditional postgraduate training methods\[10\]. Therefore, in order to reflect the real interdisciplinary graduate students in knowledge, ability and other aspects of change and ascension, and compared with that embodies the advantages of a single discipline. Interdisciplinary graduate training model should be focused on establishing effective quality evaluation system, the evaluation system should be throughout the whole process of training of graduate students and pay attention to the process and periodic evaluation, such as the semester courses, participate in the project situation and situation of academic papers published, etc., based on the characteristics of interdisciplinary graduate education evaluation system should be focused on graduate student achievement in the field of cross-disciplinary, establish a student-centered interdisciplinary education quality evaluation system. In addition, interdisciplinary graduate training can be considered into the assessment system of teachers to stimulate the enthusiasm of teachers for interdisciplinary graduate training. Only by establishing effective interdisciplinary graduate education quality evaluation system, to favor further perfect, interdisciplinary graduate cultivation model to objective and reasonable evaluation on the training quality of interdisciplinary graduate students.

4.4. Build Interdisciplinary Academic Exchange Platform

Optimize the curriculum system and training plan system can solve the problem of the nature of the interdisciplinary graduate cultivation model, build interdisciplinary academic exchange platform is optimized interdisciplinary graduate cultivation model on the basis of reality. The construction of interdisciplinary academic exchange platform is the support and guarantee for the training of interdisciplinary graduate students\[11\]. At present, universities and colleges in our country is given priority to with disciplines and departments set up, too much emphasis on academic independence and form the barriers between disciplines, unfavorable to the cultivation of interdisciplinary field, but also not conducive to the current society for the cultivation of the talents, build interdisciplinary academic exchange platform, forming interdisciplinary training organization, from set out actually change the interdisciplinary talents cultivation platform, platform to offer more for the interdisciplinary graduate research opportunities.
Due to the different professional backgrounds, research subjects, methods and ideas of interdisciplinary academic research, in order to enhance the innovative thinking of interdisciplinary graduate students in the interdisciplinary field, we can regularly hold a variety of academic exchange activities to stimulate academic inspiration, form the collision of thinking sparks, we learn from each other, regular academic exchange and discussion is conducive to active thinking and broad vision. Build interdisciplinary academic exchange platform, can solve single discipline thinking orientation and its limitations, through the academic exchange platform diffuse thinking, rich interdisciplinary graduate student aspect of knowledge, to seek new breakthroughs and innovation point.

5. Conclusion

Interdisciplinary education is an inevitable choice for cultivating innovative talents for postgraduates, which is conducive to optimizing knowledge structure, cultivating innovative ability and improving comprehensive quality of postgraduates. Interdisciplinary cultivating graduate students comply with the principle of top creative talents, is not only the innovation of science and technology and the urgent needs of the economic and social development, and has become an important trend of the graduate education reform in the world.

This study focuses on the analysis of the training mode of interdisciplinary graduate students, and analyzes the possible problems and current situation in the training mode of interdisciplinary graduate students, such as the immature training mechanism, the shortage of interdisciplinary faculty, and the immature assessment mechanism. How to break the disciplinary barriers and realize the integration of interdisciplinary, and puts forward corresponding countermeasures such as optimizing the training scheme and curriculum system of interdisciplinary graduate students, building academic exchange platform, strengthening the guidance role of tutors, and formulating reasonable quality evaluation mechanism, so as to improve the quality of the training of interdisciplinary graduate students. It also hopes to provide valuable reference for the training of interdisciplinary graduate students in universities in the future.

Acknowledgement

This article is in the Research Project of Degree and Postgraduate Education and Teaching Reform of Jiangxi Science and Technology University-“Research on the Training Mode of Interdisciplinary Postgraduates in Management Science and Engineering (Engineering)”.

References


