

Research on Teaching and Research Universities Collaborative Enabling of Teaching, Research and Resources

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Abstract: Modern colleges and universities are basically facing a prominent problem, how to combine teaching, scientific research and resources to cultivate high-quality talents. In order to solve this phenomenon, this paper takes a university in Sichuan as the research object, and discusses the rational combination of teaching and scientific research from a small paper. At the same time, this paper puts forward the model of 'demand assistance-collaboration drive-collaboration sharing', which focuses on cultivating students' ability to master professional knowledge and solve problems in the field of science. The results show that: First, it is difficult for students to access topics related to scientific research, so they cannot improve their research ability. Secondly, the school's research institutions lack cooperation within and outside the profession. Third, scientific research projects not only lack professional ability, but also lack scientific research resource reserves and auxiliary support. Fourth, compared with the average situation, the proportion of time available for scientific research is 7.44 %; the utilization efficiency of soft resources is 0.23 less than the utilization efficiency of comprehensive resources 0.27, and the utilization rate of comprehensive resources is less than the utilization rate of hard resources 0.28. Finally, some suggestions for improvement are put forward, including five aspects of teaching and scientific research, learning assessment and assessment incentive. This virtuous circle will certainly drive application-oriented universities to better empower students and teachers in teaching, scientific research and resources.

Keywords: Teaching Research; Research Collaboration; Balanced Configuration; Evaluation Incentive; Time Cutting

1. Introduction

1.1 Research Background

In the stage of Science and Education Collaboration 1.0, a small paper "Behavioral Research on the Influence of Consumers' mental Perception based on Cold chain Prepared Dishes" was started, which on the one hand is the core competence of our institute of cooking or food, on the other hand is the core research of consumer behavior, and on the other hand is the analysis and exploration of management and marketing [1,2]. From the perspective of product research, prepared dishes are only one kind of food, and product perception may include national key elements such as platform system, terminal equipment, sensory perception, and even medical products, with a wider range. From the perspective of economic theory, manufacturer theory and consumer theory are two important theories of neoclassical economics, and how to achieve the best match between cold chain prepared dishes and consumers needs to be further extended. From the perspective of management theory, resource elements, technological innovation, management and control mode, and behavior mechanism are all systematic studies from top to bottom, from whole to part, and from outside to inside, and the depth of this study is not sufficient [3]. Therefore, we focus on the following: how to coordinate teaching, scientific research and resources to better empower the trinity of student and teacher resources in research-oriented colleges and universities.

1.2 Literature Review

1.2.1 Domestic Research Review

In the late 1970s, the transformation of university research results began in China, although after decades of practice, our country has made corresponding achievements in this

aspect, but the transformation of university research results into teaching resources is not much, most of the university research results into productive forces. Through the search of the key words "universities, teaching, resources, research", we found a total of 124 academic journals and 7 academic papers. Relevant scholars' views are as follows.

From the perspective of the current situation of the transformation of scientific research achievements into teaching resources, focused on the applicability and conditionality of scientific research achievements, so as to provide information reference for finding the transformation channels[4]. Zhao Xingcun and Zhao Zhen, based on the basic characteristics of scientific and technological achievements, analyzed the teaching value of scientific and technological achievements in colleges and universities, expounded the main obstacles existing in the transformation of scientific research achievements into teaching resources, and proposed the main ways for the transformation of scientific research achievements into teaching resources [5].

1.2.2 Review of Foreign Research

As western countries have always adhered to the open teaching mode, there are not many articles on the conversion of scientific research results into undergraduate teaching resources in foreign universities. The reason is that students have been able to carry out scientific research independently during their university years, so to a certain extent, this has also diluted the research on teachers actively transforming scientific research results into undergraduate teaching resources. Relevant scholars' views are as follows:

Teachers and students in foreign research universities coexist in a symbiotic system, They are both students and researchers, and their interaction contributes to a healthy and strong academic atmosphere [6]. Attention should be paid to the radiating effect of scientific research on teaching, that scientific research and teaching are dialectically unified, that scientific research should be used to educate teaching, and that teaching reacts on scientific research, so as to achieve the mutual unity of scientific research and teaching, and ultimately achieve positive interaction [7].

1.2.3 Research Review

The ability to transform scientific research ability into teaching resources is the key step

to train and build innovative talents. In our country, there are many scholars researching, exploring how to realize the creative transformation of both. However, due to the wide range of research, it failed to take root. Therefore, this paper takes Sichuan Tourism Institute as the research object, discusses how to actively transform the scientific research ability and teaching resources into each other, and realizes the dialectical unity of the two.

1.3 Research Methods

The research methods adopted in this paper include the method of unifying logic and history, literature research analysis, case analysis and quantitative analysis.

2 Correlation Analysis of Scientific Research Achievements and Teaching Resources in a University in Sichuan

2.1 Collaborative Analysis of Teaching and Research

2.1.1 Teaching and Research Status

(1) The School of Economics and Management has three majors and six classes in one grade, with an average of 40 students in each class and a total of 240 students [Sichuan Tourism University - School of Economics and Management (sctu.edu.cn)]. The college focuses on cultivating students' solid theoretical foundation of disciplines and improving their professional quality and ability, so that students' theoretical knowledge of disciplines is rich but their scientific research practice ability is poor.

(2) If there are five students in a class doing scientific research, there will be 30 students in a grade doing scientific research. The students in the whole grade can not only focus on the knowledge in the textbook, but also have the research ability in a certain professional direction. In this way, students' learning ability and professional knowledge can be greatly improved.

2.1.2 Direction of Teaching and Research

(1) In the previous learning process, it is difficult for middle school students to get access to topics related to scientific research. Usually, students focus on learning the courses of their own major, and teachers rarely take the initiative to let students participate in the topics, which makes it difficult for students to

combine learning with scientific research and improve their research ability.

(2) Regardless of whether students will pursue further postgraduate study or work in the future, such learning and research ability will lay a good foundation for their graduation thesis, future study or work in advance [8].

2.2 Collaborative Analysis of Faculty Research

Sichuan Tourism University has 12 secondary schools, each of which has three to four majors, and each school has different research centers, laboratories, research platforms and experimental bases, among which there is intra-professional collaboration, cross-professional collaboration and cross-school collaboration. How to avoid individual combat, how to improve the academic output ability of individual teachers, it is necessary to carry out team cooperation or collaboration, it is necessary to form an industry-university-research alliance, breakthrough and enlarge the ratio of scientific research input and output.

2.2.1 Current Situation and Direction of Intra-Professional Collaboration

(1) At present, teachers in the major are mainly engaged in individual combat, basically focusing on their own major or the direction of the professor, and there is little cooperation between teachers in the college of their own major.

(2) Teachers in the professional field or professional cluster shall carry out in-depth cooperation in their own major and explore deeper directions or topic projects within the major. This cooperation includes both horizontal and vertical projects [9].

2.2.2 Status and Direction of Cross-Professional Collaboration

(1) The current scientific research and topics cannot be solved by a single professional direction. Whether it is horizontal or vertical topics, especially national and provincial fund projects, they all need multi-disciplinary cooperation in order to have in-depth research and solutions. Our school is also lacking in this aspect at present.

(2) Through majors in different directions, further explore the scientific research points between cross-majors, realize the integrated research between different majors, and improve the scientific research and expansion ability of cross-professional teachers [10].

2.2.3 Status and Direction of Cross-School Collaboration

(1) Different schools and majors have their own characteristics. No matter comprehensive university or professional university, each has its own core professional group or professional direction, but no school can cover all professional fields, resulting in poor comprehensive academic output ability. The current academic development is no longer an era in which a single major or development direction can produce results. Only the professional collaboration of different schools or the collaboration of teachers can promote the output of greater scientific research results in a certain direction [11].

(2) College teachers should go out and cooperate with more teachers with core professional abilities for comprehensive or large-scale topics in cross-disciplinary or cross-disciplinary fields, so as to form comprehensive cross-disciplinary competence. At the same time, cross-disciplinary teachers from other schools will be introduced to form greater synergy and innovation ability with related majors in our school.

2.3 Collaborative Analysis of Scientific Research Resources

Under normal circumstances, if teachers and students want to conduct research on scientific research topics, they need not only professional ability, but also the auxiliary support of scientific research resources, including hardware resources and soft resources.

2.3.1 Status and Direction of Hardware Resources

(1) Hardware resources refer to laboratories or research centers with professional facilities and equipment for teachers and students to carry out scientific research and have a strong learning atmosphere. At present, there are still insufficient hardware resources and academic environment in the laboratory, which prevents teachers, students and other relevant researchers from incubating results together and reduces their enthusiasm for scientific research.

(2) Hardware resources mainly refer to the laboratory that feels like home, when you need to do experiments or need to go to the computer room, you will go to the experiment site. When learning, projects, academics,

research, internships, etc., need to have discussions, meetings, or teacher-student discussions, you will return to the atmosphere of the experimental place [12-13].

2.3.2 Status and Direction of Soft Resources

(1) When I was in school, whether I was looking for learning materials or academic solutions, I needed a strong library of teaching and research resources. At the present stage, the resources in the resource database are not comprehensive or the threshold for finding resources is too high. Through the research, it is found that no matter teachers or students, the lack of research operation data, the lack of projects or research methodologies, the lack of advanced model algorithms, and the lack of bright spot mining of project topics are common problems.

(2) On the one hand, the resource bank includes offline resources, which are conducive to generating sparks of academic and scientific research and promoting the further completion of scientific research projects; On the other hand, better online resources, both on and off campus, at home and abroad, can give you a new understanding or insight into the subject or project, which is a valuable asset for both teachers and students [14]. These resources also help students from school to society [15].

2.4 Discussion and Analysis of Collaborative Enabling

2.4.1 Collaborative Discussion on Teaching and Research

Lorenz curve and Gini coefficient can be used to analyze and compare the degree of educational balance between different regions. The education Gini coefficient is developed on the basis of the income Gini coefficient, which is the most commonly used tool to analyze income gap [16]. Because Gini coefficient of income can be used as a common statistical analysis method, Gini coefficient is not only used for the study of income distribution, but also for the analysis of all distribution problems and the degree of equilibrium. Therefore, this paper uses this method for the balanced distribution mechanism of students' teaching and research.

It is generally believed that when the Gini coefficient is less than 0.2, it indicates that the income distribution of residents is too average; when it is between 0.2-0.3, it is more average;

when it is between 0.3-0.4, it is more reasonable; when it is between 0.4-0.5, the gap is too large; when it is greater than 0.5, the gap is wide.

For better measurement and evaluation, we use time as a scale. At present, the average discretionary time of students in our school is 24.6 hours, the average time available for scientific research is 3.06 hours, and the proportion coefficient of scientific research is 12.23%. Similarly, with reference to the survey data of target development institutions, it is calculated that the average discretionary time of students in target institutions is 24.3 hours, the average available time for scientific research is 4.72 hours, and the proportion coefficient of scientific research is 19.67%. The gap between the two is 7.44%. Therefore, in order to achieve the balanced and coordinated development of teaching and research, it is necessary to further strengthen the time investment and efficiency investment in scientific research.

2.4.2 Collaborative Discussion of Faculty Research

Teachers still need to increase the cooperative mode of mutual cooperation in scientific research. At present, the more common cooperative mode of scientific research is: 1. Co-school Co-school cooperation (SI) refers to the cooperation between teachers and members of the school and the college, which can be divided into two categories: cooperation with the college staff and cooperation with the college students. 2. Inter-school Cooperation (SS): refers to the cooperation between teachers and non-members of the school, which is divided into two categories: cooperation with faculty and cooperation with students. 3. Collaboration with the District (SR): refers to the cooperation between teachers and members of other institutions in the city. 4. Inter-regional Cooperation (DR): refers to the cooperation between teachers and members of other provinces or regions in China outside the city. 5. Transnational Cooperation (DC): refers to the cooperation between teachers and members of other countries.

Based on the analysis of the regression model of the impact of research cooperation mode on research performance [17], based on the purpose of this paper, the final model and coefficient of the same major, cross-major and

cross-university are obtained by the sum calculation of regional cooperation, cross-regional cooperation and cross-border cooperation, that is, $Y=a+34.59X_1+18.31X_2+47.11X_3$.

For better measurement and evaluation, we use the number of times in one year as the scale. At present, the research results of the references are as follows: the average number of professional cooperation of teachers in class A universities is 20.74 times, the average number of cross-professional cooperation is 4.11 times, and the average number of cross-school cooperation is 9.44 times. Similarly, the average number of professional cooperation among teachers in our school is 15 times, the average number of cross-professional cooperation is 2.73 times and the average number of cross-school cooperation is 1.07 times. The gap between the two is on the one hand, the number of cross-professional and cross-school cooperation is relatively low, and on the other hand, the proportion of cross-professional and cross-school in our university is completely opposite to that of A-class universities. Therefore, in order to achieve the collaborative development of scientific research between schools and classrooms, it is necessary to further strengthen cross-professional and cross-school cooperation on the one hand, and at the same time, to increase the frequency of cross-school cooperation to a greater extent.

2.4.3 Discussion on Resource Allocation Collaboration

Scientific research resources focus on both hard resources and soft resources, in the case of limited or insufficient resources, how to balance the use of them is very important. To evaluate the rationality of the integration of experimental teaching resources and scientific research resources and the open laboratory system, the key lies in the utilization efficiency of experimental resources. Generally speaking, the utilization efficiency of experimental resources should consider the maximum benefit generated by the lowest input of experimental resources in the utilization process of experimental resource [18-19].

In order to better measure and estimate, this paper uses the cost of resource input in one year as the scale. Software resources are X_1 , hardware resources are X_2 , P is the number of scientific research outputs, and R is the

resource cost (in ten thousand yuan). The use efficiency of soft resources and hard resources of the university is calculated respectively, and the following results are obtained:

$$\eta X_1 = PX_1 / RX_1 = 29/103 = 0.28$$

$$\eta X_2 = PX_2 / RX_2 = 8/36 = 0.23$$

The comprehensive resource utilization rate is as follows:

$$\frac{HX_1 + X_2}{X_1 + P X_2 / R} = \frac{P}{X_1 + P X_2 / R} = \frac{37}{139} = 0.27$$

It can be seen that the utilization efficiency of soft resources is less than the utilization efficiency of comprehensive resources, and the utilization efficiency of comprehensive resources is less than the efficiency of hard resources. The main reason for this result lies in the current experimental resource allocation mode and resource management mode. Therefore, it is necessary to improve the utilization rate of soft resources, increase the investment and allocation of soft resources, and give full play to the maximum use efficiency of soft resources and hard resources.

2.5 Research Results

Through the above analysis, it is found that a university in Sichuan has a high level of professional quality of teachers and students, and has the ability to transform scientific research achievements with teaching ability. However, most teachers mainly take the courses of their own majors as their teaching goals, and do not fully combine scientific research with teaching, and students have less access to scientific research projects. In addition, the failure to achieve cross-professional, cross-school breakthrough, is still limited to the traditional concept. Through the Gini coefficient method, it is found that more time needs to be invested in scientific research. Through regression model analysis, it is found that cross-professional and cross-school cooperation and cooperation frequency need to be strengthened. In terms of resource allocation, resource utilization is not sufficient, including hardware and software resources. In short, a university in Sichuan needs to improve the frequency of professional collaboration, cross-discipline and cross-school, and improve the resource allocation rate, so that it is more likely to fully combine scientific research ability and teaching resources to cultivate high-quality talents.

3 Case Analysis

This section is based on the model of "demand help - collaborative drive - collaborative sharing" initially constructed in the early stage, and takes "Behavioral Research on the Influence of consumers' mental perception based on Cold chain Prepared Dishes" as a case study. During the research process, the operability and effectiveness of this model are verified by means of classroom operation, teacher guidance and reflection, after-class investigation, process data, etc. At the same time, some collaborative strategies and collaborative tools formed in the practice are analyzed and refined. In order to improve and enrich the practice of combining scientific research ability and teaching resources under the construction of the research institute.

3.1 Research Concept

"Behavioral Research on the Impact of Consumers' mental Perception Based on Cold chain Prepared Dishes" is mainly based on cold chain prepared dishes, so as to study the impact of consumers' mental perception. In this process, teachers use relevant teaching resources in the classroom, such as laboratories, databases, etc., to teach, and intersperse corresponding scientific research and teaching topics. In addition, teachers fully plan the time of scientific research and teaching to achieve the weighted proportion between the two; Fully improve the frequency of cross-professional and cross-school collaboration. For example, a teacher specializing in cold chain prepared dishes can cooperate with a teacher specializing in psychology to achieve interdisciplinary cooperation to achieve greater effectiveness; The cuisine major of a university in Sichuan can be coordinated with the consumer psychology major of other universities, so as to fully improve the ability of combining scientific research with teaching resources and transforming them.

3.2 Research Conclusion

According to the current situation of the collaborative development of science and education in colleges and universities, combining the analysis of teaching and research, teacher collaboration and scientific research resources, the following suggestions are put forward.

3.2.1 Balanced Collaboration in Teaching and Research

In addition to learning knowledge from textbooks, students also need to learn more academic knowledge and practical ability. Schools should add research projects related to curriculum design and after-school practice; Teachers should develop students' scientific research ability to carry out corresponding classroom teaching.

In the ever-changing society in the future, analytical ability, thinking ability and summing up ability are all indispensable in government agencies, enterprises and institutions, and even in the career seeking stage of graduate students[20]. These things can not only help improve students' ability to solve problems in subsequent work, but also help them have solid basic scientific research skills in subsequent in-depth study[21].

3.2.2 Balanced Coordination of Learning and Assessment

In the course score setting suggestions, you can add the score of scientific research application ability or academic application ability; In the study of academic performance, add the students' scientific research ability assessment module; In the school graduation requirements, the score or proportion of scientific research application ability can be appropriately adjusted.

3.2.3 Teaching and Research Evaluation and Incentive

The collaboration among teachers depends entirely on assessment and incentive. Without assessment, the teaching and research objectives of the school or college cannot be completed, and without incentive, the motivation and innovation vitality of teachers cannot be activated. Especially for academic papers, it is suggested that the first author, the second author and the corresponding author of the paper should be given weight points respectively.

3.2.4 Balanced and Perfect Scientific Research Resources

Laboratory and resource place are the basic platform for teaching, scientific research and practice. Only by improving the allocation of such resources can we better promote the efficient use and efficient output of resource space. On the one hand, improve and optimize the configuration and equipment of the experimental environment of the production and education building; On the other hand,

accelerate the progress of government procurement or resource procurement.

3.2.5 Teachers' Time is Managed in Blocks

School teachers have both teaching and scientific research tasks, and they need to spend a lot of time on teaching and curriculum, as well as on scientific research and academic research. At the same time, in the inclusive society, teachers, as a member of the family, will also spend a lot of energy and time on various family education, daily trifles, and parental care[22]. Therefore, most teachers will find it difficult to spare time for scientific research and academic improvement, which will reduce teachers' enthusiasm for scientific research and greatly reduce their motivation for scientific development. In addition, academic research is not an overnight project, nor is it a short-term continuous battle, but a long-term continuous targeted investment. Therefore, it is suggested that teachers carry out segmented time management, taking one hour as the basic unit to divide the whole teaching, scientific research, work, life and other aspects, so as to ensure that work and life are not wrong.

4. Summary

Further cooperation and collaboration can be carried out with professional teachers according to the depth and breadth of the specialty. For example, teachers from different directions of the culinary school can cooperate on prepared dishes, including in-depth research on ready-to-eat, ready-to-cook, ready-to-mix.

Cross-professional teachers can find and explore the common points and differences in different professional fields and research directions. For example, teachers of cold chain prepared dishes can cooperate with teachers of consumer psychology, teachers of system platform in the School of Information Engineering, teachers of pre-dishes in the School of Cooking, and teachers of management behavior patterns in the School of Economics and Management. Cross-disciplinary collaboration is possible.

Cross-school teachers can carry out cooperation in different fields, including in the direction of different fields, or in the direction of different levels of the same field, or in different cross-links in different fields, such as the cooking and food direction of Sichuan Tourism University, the consumer behavior

direction of Sichuan University, and the cold chain logistics direction of Southwest Jiaotong University.

With the cooperation of the above different types of teachers and different resources, the small paper direction can be extended to "System optimization and Treatment Methods based on medical waste", the research has changed from cold chain prepared vegetables to medical waste, from consumer psychological perception to platform system performance, and behavioral research has changed to management and treatment methods. At the same time, the paper mentioned in the foreword, "Behavioral Research on the Influence of consumers' mental perception based on Cold chain Prepared Dishes", combines the vital interests of the industry with the needs of consumers themselves. From a certain point of view, this point coincides with the article, this article from the concept, the current situation, the problem one by one, how to combine scientific research teaching and learning research. Based on this, from small to large, from low to high, the national project "System Optimization and Treatment Methods based on medical waste" has a good foundation and groundwork, which also brings more projects, scientific research and learning opportunities for our school, college, teaching and research office, teachers and students.

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