

Reflections on the Synergistic Effect of "Teaching and Scientific Research" in Higher Education

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Abstract

Colleges and universities are the forefront of talent training, the improvement of teaching quality and the promotion of scientific research is an important way to realize the comprehensive development of students, but also an important index to measure the comprehensive development ability of a school. Emphasize the important position of scientific research in the teaching process, promote teaching by scientific research, and drive the development of scientific research by teaching. Through the synergistic effect of "teaching and scientific research", it will bring substantial changes to the classroom of colleges and universities, and realize the transformation from cultivating "specialized talents" needed by the society to "high-quality talents of socialism with Chinese characteristics in the new era".

Keywords

Teaching Principles; Teaching; Scientific Research; Synergistic Effect.

1. Introduction

In ancient China, the Confucian school regarded the teaching process as a unified process in which students acquire knowledge and improve ideological consciousness and morality under the teacher's inspiration and guidance. The teacher, the student and the education intermediary are the main factors that constitute the teaching process. The teaching process is a bidirectional educational activity that consists of the teacher's teaching and the student's learning.[1] The teaching process of colleges and universities is to guide students to know the world and transform the world. Therefore, it is particularly important to introduce scientific research into the teaching process of colleges and universities.

With the improvement of the popularization of higher education, colleges and universities are shouldering more and more heavy responsibilities in national construction, and improving the quality of higher education has become an important task of current colleges and universities. One of these tasks is to improve the scientific research ability of teachers and students. [2] In such an era, the burden of entrepreneurship and innovation will undoubtedly fall on the university body.

2. Why Should the Synergy of "Teaching and Scientific Research" be Brought into Play?

The principle of "the unification of teaching and scientific research" was first put forward by the German educator Humboldt in 1809, aiming to form a unified whole that can play a synergistic role between teaching and scientific research. [3] This principle makes the University of Berlin a model for German universities and a model for many countries in the world to imitate. The University of Berlin is also known as "the first university of modern significance". It has realized the transformation from a purely teaching university to one that pays equal attention to teaching and research.

In June 1988, Comrade Deng Xiaoping, the second generation leader of our country, put forward the important development slogan of "science and technology is the first productive force" according to the current situation and future development trend of science and technology at that time. [4] This slogan has been used up to now, enough to explain the importance of science and technology to productivity and life.

Moreover, in May 1995, Comrade Jiang Zemin, the third-generation leader, also proposed the strategy of rejuvenating the country through science and education in his speech at the National Science and Technology Conference, making clear that science and technology and education are important means of national prosperity.

University is in the forefront of science and technology development, to shoulder the burden of the education and scientific research, how to the steady development of higher education, further development and guide social forces to run schools, it became the site of the Ministry of Education to discuss topics, especially in the proposed to implement the comprehensive quality education is an important move, how to improve the quality of higher education so as to adapt to society's need for all kinds of talents, has become an important work of the Ministry of Education.

Then in 1997, the Ministry of Education made it clear that it would carry out the pilot work of industry-university-research cooperative education in 28 universities across the country. It is pointed out that the task of colleges and universities is not only teaching, but also training the scientific and technical talents needed by the society.

It is proposed that "scientific and technological achievements should be combined with the actual development and needs of the country, and should be developed step by step from scientific research, experimental development, promotion and application, and finally truly realize the value of innovation and realize innovation-driven development." [5] Young people are the hope of a country and a nation. They should contribute to the prosperity of the country and the happiness of the people.[6] Countries and the whole society are advocating "public entrepreneurship, peoples innovation", especially the largest domestic mobile phone brand Huawei in chip problems, let every Chinese heart, is deep awareness to the importance of master the core technology, the "core" in hand, have a voice, is the development path, there is no "core", disciplined by others, it is difficult to develop and expand.

3. The Origin of the Combination of Teaching and Scientific Research in Higher Education

Humboldt, the great German educationist, put forward many ideas about the modern university during the reform of Berlin University. It is pointed out that the study of college students is a kind of creative activity, students should actively participate in scientific research activities, in the activities to understand science and explore the unknown world. He also pointed out that the purpose of teaching is to help and guide students in independent learning and research. Research and teaching are unified, they are not separate and go their own way. Universities not only have the function of teaching and educating people, but also have the function of scientific research. Universities are not only schools but also scientific research institutions. Teachers should first be researchers when they undertake the teaching task. Teaching is not only teaching the existing indirect experience, but also imparting the methods of scientific research. Cai Yuanpei is an important educationist in modern China. During the development of modern Chinese society, he put forward many original opinions on the development of Chinese higher education. In particular, the science education proposed by him advocates freedom of thought and inclusiveness. The purpose of science education is to strengthen academic research and explore advanced knowledge. [7] It was very important to advocate the study of scientific knowledge in China at that time. Cai Yuanpei also vigorously advocated academic research and

proposed to cultivate students' spirit of scientific research. His thoughts on scientific education were rich in connotation and dealt a heavy blow to the feudal autocratic culture of China at that time, which enhanced the academic atmosphere, promoted the prosperity of ideology and culture, and provided conditions for the emergence and development of new things. He attached great importance to the establishment of the Academia Sinica and the support of the Chinese Science Society, which laid the foundation for the development of modern Chinese science, accelerated the process of China's modernization, and made indelible contributions to the rapid development of modern science. Humboldt in Germany and Cai Yuanpei in China have both made outstanding contributions to higher education in the world.

4. Main Factors Affecting the Synergistic Effect of "Teaching and Scientific Research"

4.1. Schools and Teachers have an Incomplete Understanding of Scientific Research

"Reinvigorating the school through scientific research" has become a fashion, which has been recognized by schools at all levels and received varying degrees of attention. However, in the case of high enthusiasm of teachers and students, we also found that there are still some problems or defects in school scientific research. The first is that we do not have a deep understanding of "research methods" and blindly conduct qualitative research while ignoring quantitative research. Second, the quality of academic research is not high, only quantitative accumulation, not qualitative improvement.

Teaching and research are not only the work of teachers, but also of schools. Schools delegate teaching tasks and scientific research workload to teachers, and do not assume their due responsibilities. School leaders also fail to take the lead in scientific research, ignoring the importance of leaders doing research.

4.2. Lack of Practical Training in Scientific Research Courses

<Methods of Scientific Research>, <Fundamentals of Educational Research>, <Educational Measurement>, <Evaluation are all degree courses>. However, according to the author's observation and analysis, the teachers who teach a series of research methods are still mainly lecturing, purely teaching theoretical knowledge, with almost no practical training. In particular, some data analysis systems are only taught in pure theory. In this way, research methods lacking practical training will be abandoned by students after a period of time, and students do not really master them. If most of the courses are still carried out in a cramming way, just blindly indoctrinating students, then there is no essential difference with the education model of middle school, and it is still in the stage of secondary education rather than higher education. If students are still in the process of passively receiving knowledge, it is useless to carry out many scientific research projects. Moreover, if these scientific research projects are not included in the professional teaching and training program, and there is no corresponding evaluation mechanism, they are all useless. The study of theoretical knowledge is ultimately to take to use, do not practice, the value of knowledge can not be reflected.

4.3. Students Themselves do not have a High Understanding of Scientific Research and Lack the Ability of Independent Research

Students understanding of scientific research is not comprehensive, and their understanding of scientific research is not high enough. They do not realize that the true significance of scientific research is to explore unknown knowledge. Such biased understanding leads to the insufficient investment of most students in scientific research projects, and they just regard scientific research as a task and finish it. As a result, their real scientific research quality and exploration

ability cannot be exercised and improved. The topic selection of scientific research projects is not reasonable, and the topics selected by students generally come from the interests of students. Often because of the unreasonable title, it is difficult to apply for funds and difficult to grasp the time to complete the project, and also lose interest in scientific research; Overly dependent on teachers, most students place their hopes on teachers for the difficult problem of topic selection, hoping that teachers will directly give them a topic to study. Whether it is the topic selection or the research process, they expect teachers to provide themselves, and expect too much of teachers; Focus only on the result not on the process. Some college students apply for research projects just to earn extra points at the end of the semester, as a tool for students to earn scholarships and grants, or just to get a research certificate that will help them build up a resume for jobs after graduation.

4.4. The Imbalance between Teaching and Scientific Research by University Teachers

To become a researcher of education and teaching is an important concept of teacher professional development. [8] On the one hand, college teachers generally lack conscious awareness of their own research on education and teaching, and devote themselves to teaching while ignoring teachers is also necessary for scientific research. Even if we do scientific research, we are also forced to appraise professional titles and other reasons, and lack of initiative and enthusiasm in scientific research. On the other hand, some teachers blindly do scientific research, put scientific research above teaching, regardless of the quality of teaching, ignoring the teaching is a teacher's job.

5. How to Better Play the Synergistic Effect of "Teaching and Scientific Research"

5.1. Cultivate Students' Innovative Spirit and Scientific Spirit

As a modern and contemporary college students, the society requires us not only to have sufficient basic knowledge and professional knowledge, but also to have the spirit of innovation and creative ability, to do a comprehensive development of the new era of the new youth. It is necessary to publicize scientific research in the school and the society, guide students to establish scientific spirit, teach students to use scientific research methods, encourage innovation and creation, improve the innovation incentive mechanism, and form a strong scientific research atmosphere in the whole campus. Colleges and universities should let students try not to miss every scientific research academic report, so that students can cultivate their scientific spirit in academic research, so that students know the importance of scientific research.

5.2. Improve the Proportion of Practical Training in the Course of Scientific Research Methods

The study of theoretical knowledge will eventually return to practice. Of course, grasping theoretical knowledge is the primary task, and then using the learned theoretical knowledge to conduct practical training. This way of learning can enable students to truly grasp the essentials of scientific research. For example, in the course of "Research Methods", the final examination can be concluded by submitting a small paper. It must be noted that it is necessary for students to submit a report on the repetition rate of the small paper. In addition, the study of data analysis system can be arranged in the computer classroom. In this way, students' grasp of scientific research methods can be greatly improved, and it is convenient for them to conduct academic research activities later.

5.3. The University Organizes and Establishes a Scientific Research Community

The organization of scientific research community is beneficial to the cultivation of students' social practice ability. From enrollment to graduation, students have learned a lot of theoretical knowledge from books, but one weakness is that they seldom carry out scientific research and social practice. Through the development and study of scientific research activities, as well as the organization of innovative activities, we can overcome the exam-oriented education of our country's emphasis on indoctrination and rote memorization, promote the students to develop the courage to explore, face difficulties, constantly improving quality, and gradually cultivate students rigorous scientific attitude and innovative ability.

5.4. Promote Classroom Teaching Reform and Innovation

When teachers give lectures, they combine their own research results and cutting-edge achievements with teaching-related contents organically, which can stimulate students' learning motivation and interest, broaden students' horizons, and thus improve the teaching effect in class. For teaching, the combination of teaching and scientific research can break the old teaching model and help teachers to have a deeper understanding of the textbook, so as to expand the depth and breadth of teaching. This also means that teachers are required to pay close attention to the development of the subject, pay attention to improve their own scientific research level, and promote the integrated development of teaching through scientific research. [9]

What should be established finally is that the student is the master of learning and the teacher adopts the corresponding new teaching organization form according to different contents. Teachers should adopt a variety of teaching methods, such as heuristic, inquiry and so on to build a combination of online and offline teaching mode. Teachers should also master the modern teaching methods, especially the use of cutting-edge technology for teaching.

5.5. Actively Elucidate the Role of Teachers as Research Leaders, and Promote Scientific Research through Teaching

It is well known that teachers lead students to do scientific research. Through the communication and cooperation with teachers, students can improve their scientific research ability and also learn some knowledge outside scientific research, [10] such as the ability to communicate with others.[11] This is not only conducive to the improvement of teaching methods, but also conducive to the enrichment of teaching content, and is also an important measure to deepen the teaching reform.

5.6. Strictly Verify Students' Graduation Thesis Design and Give Students a Reasonable Increase in Burden

Instructor and defense team to strengthen their responsibilities, strict examination and approval of the whole process of graduation project. [12] First, strengthen supervision and inspection to improve the quality of students' graduation design. In the process of defense, the inspectors sent by the school carried out irregular supervision and inspection, which effectively reduced the occurrence of the phenomenon of graduation design not conforming to the norms, not strict requirements, and fuddling through. Second, the topic has more research value, the paper quality requirements, strict examination. The third is to strictly implement the paper review and sampling inspection system, strict requirements of the paper repetition rate, sampling inspection of the paper is also strictly in accordance with the procedures to avoid academic fraud. Through the high requirements of graduation thesis, improve students' attention to scientific research, appropriate to increase the pressure on students. Finally, submit a satisfactory graduation project.

We should give full play to the synergy between teaching and scientific research, promote the development of scientific research by teaching, drive teaching by the development of scientific research, and realize the reform and innovation of teaching content and teaching methods. Finally realize the development of teachers and improve the comprehensive development of students, and contribute to the development of the country and society.

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