

Talk about the relationship between teaching and scientific research

Yun Li

College of Mathematics and Statistics, Taishan University, 271000, Tai'an, ShanDong, China
Email: guigongliyun@126.com

Abstract—This paper expounds the relationship between teaching and scientific research from three aspects, and explains that teaching and scientific research are two aspects that are both opposite and unified, interdependent, complementary and inseparable from their own personal experience. And in my own teaching process, summed up a research teaching method, and achieved good results.

Index Terms—Teaching; Scientific research; Unity of opposites

I. INTRODUCTION

Most teachers in colleges and universities are engaged in both teaching and scientific research. They are different from middle school teachers who only engage in teaching and researchers in scientific research institutions. Teachers not only have heavy teaching tasks, but also write papers and carry out other work related to teaching. At the same time, they also undertake heavy scientific research tasks to guide some students who have just entered the laboratory [1-3]. The dual tasks of teaching and scientific research bring great pressure to teachers. The most important thing is to deal with the contradiction between teaching and scientific research, and turn the opposition into two aspects that are interrelated and unified.

II. BOOK KNOWLEDGE IN TEACHING COMES FROM SCIENCE AND TECHNOLOGY AND SOCIAL ACTIVITIES

Many theorems, laws and equations in science and engineering textbooks come from scientific research and practice. In ancient times, because human understanding of society and nature was still in the primary stage, it was impossible to form a system and become a system. Most of them were scattered experience descriptions. Ancient science and technology determined the teaching content at that time, such as the "Seven Arts" (grammar, rhetoric, logic, arithmetic, geometry, music and astronomy) in ancient China and the teaching in Western Europe in the middle ages, which were highly religious and hierarchical. In the 12th century, the germination of universities appeared, and the teaching content of many universities was mainly theology. The rapid development of modern science has strengthened their influence on teaching. The two technological revolutions have greatly promoted the practice and development of teaching theory. Generally speaking, the development of

science has generally experienced three stages: synthesis, analysis and re-synthesis. Since the second half of the 20th century, while continuing to differentiate, science has been developing towards high integration, integration and socialization. Now thousands of discipline branches and their theories are the result of the development of scientific research. When we explain these knowledge, if we integrate the research and discovery process of the theorem at that time with knowledge, interest and vividness, it will be easier to master and remember when we teach it to students. For students, teachers engaged in both scientific research and teaching are particularly welcome, which has been proved by many years of teaching effect investigation. For teachers, we can also get enlightenment from the understanding of the process of previous scientific discoveries and scientific practice.

III. CLASSROOM TEACHING CONTENT IS THE THEORETICAL BASIS OF SCIENTIFIC RESEARCH ACTIVITIES

After countless times of practice, scientific research activities have produced theorems and laws, namely theories. These theories have been incorporated into university textbooks and become our teaching content. The knowledge is the theoretical basis for our deeper scientific practice. However, textbook knowledge is dead and scientific research is alive. How to explain textbook knowledge thoroughly in class is the goal of our teaching. Therefore, teachers should be supported by scientific research and practical knowledge to avoid making some wrong mistakes when they first enter the laboratory.

IV. WAYS TO IMPROVE COLLEGE STUDENTS' SCIENTIFIC RESEARCH LEVEL

A. Turn the teacher's monologue classroom into a discussion and research forum for teachers and students

In the traditional teaching mode, students' classroom teaching is centered on imparting knowledge. Teachers pay attention to imparting classroom knowledge, and students simply accept it passively. This is not conducive to the improvement of students' scientific research consciousness and scientific research ability. Therefore, to change this situation, the combination of teaching and scientific research plays a prominent role. This teaching mode requires teachers



to summarize their teaching contents into some enlightening and academically valuable problems based on the conditions of scientific research and teaching, so that students can independently consult materials after class, prepare by themselves, and then discuss in class. Combining teaching and scientific research, it emphasizes the penetration of scientific research in teaching and the teaching with scientific research as the background. In the whole link, students turn from passive learning to positive thinking and active exploration. On the one hand, it stimulates students' thinking, improves their interest in learning and learns scientific research methods, and on the other hand, it enhances students' ability to practice research.

B. Introducing cutting-edge topics into classroom teaching

When teachers ask students questions, they are not limited to the limited scope of handouts and textbooks, but consciously introduce some cutting-edge academic research topics into classroom teaching and guide students to carry out thematic discussion. It is undeniable that students' education should still pay attention to mastering solid and solid basic knowledge. Learning, accumulating and mastering knowledge is the premise and foundation of forming innovative practical ability. At the same time, we should pay enough attention to the dynamics of the discipline. The above measures have built a bridge between the learning of basic knowledge and the grasp of the frontier of disciplines, and created conditions for students to think independently and conduct independent scientific research. Under the active guidance of teachers, while mastering basic knowledge, students have conducted special discussions on many cutting-edge topics of undergraduate purposes, so that their learning and research can realize the natural transition from basic knowledge to topics.

C. Guide students to actively carry out scientific research practice

In the past classroom teaching, students only need cognition and understanding to achieve the purpose of learning. However, in the future social practice and higher-level research activities, the problems they face are not limited to the scope of cognition and understanding. Their difficulty and complexity are far from comparable to ordinary class and extracurricular reading. They must be collected, sorted, extracted, analyzed, judged Comprehensive and a series of specific practical activities and complex rational thinking, the processing process can achieve the goal. In view of this, our teachers should actively guide students to actively participate in various scientific research activities, so that students can feel and understand the process of knowledge generation and development in direct scientific research practice, and improve scientific literacy, scientific spirit, innovative spirit, innovative consciousness and ability. In addition, teachers can introduce problems related to scientific

research topics and teaching contents into teaching, so that students can have classroom discussion on the basis of consulting materials. On the one hand, it enriches the teaching content and broadens the students' vision. On the other hand, it makes full preparations for the students' scientific research practice. The full preparation after class and the active discussion in class have obviously strengthened the students' micro understanding and objective grasp ability of many problems. By participating in scientific research projects and carrying out scientific research, these students not only learn how to do scientific research, but also cultivate the scientific spirit of being rigorous and realistic and not afraid of difficulties.

V. MEASURES TO PROMOTE THE CULTIVATION OF INNOVATIVE TALENTS WITH SCIENTIFIC RESEARCH

A. Set up innovation credits

Actively encourage students to engage in scientific research activities. In order to encourage students to participate in scientific and technological activities, students can be allowed to replace some elective course credits with innovation credits during school. Actively encourage students to participate in the teacher's scientific research project team and complete the project under the guidance of teachers. This system can be implemented from the beginning of freshman enrollment. Students with excellent character and learning can be selected from them to enter the laboratory or the teacher's research group, and study while studying. In this way, after four years of university learning and research, they will have the conditions for innovative talents when they graduate.

B. Set up a special fund to encourage students to conduct scientific research independently

The school strongly supports students to guide students to conduct scientific research and carry out scientific research independently by applying for school funds. Encourage students to choose their own topics to carry out research, and improve students' ability of independent learning and scientific research.

C. Carry out various forms of scientific and technological innovation activities

The electronic design of college students, the National Mathematical Modeling Activity of college students and the "Challenge Cup" scientific and technological work competition carried out by our university every year belong to the category of scientific and technological innovation. This proves the innovative ability of our students from one side, and is the fruitful achievement that our school has always adhered to promoting teaching with scientific research. By participating in scientific research, students have activated their innovative thinking, exercised their innovative ability



and cultivated their team spirit.

REFERENCES

- [1] A.D. Zhu, X.M. Cui, "Research and practice of cultivating innovative physics talents based on scientific research," *Survey of Education*, vol. 41, pp. 97-100, Oct 2021.
- [2] X. M. Yang, "Relying on key laboratories to explore the cultivation path of graduate students' innovative ability," *Basic Medical Education*, vol. 23, pp. 670-672, Sep. 2021.

- [3] D. L. Di, W.F. Gao, "The Practice and Discussion of Medical Undergraduates Participating in Scientific Research Projects," *Education and Teaching Forum*, vol. 36, pp. 134-135, Sep 2020.



Yun Li is a lecturer. He obtained his first degree of Bachelor of Management at the Central South University and Master of Science Degree at GuiZhou University. His major fields of study are image processing and big data processing.