

Practice of Scientific Research Feedback Teaching in the Course of "Valve Testing Technology" in Higher Vocational Education

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Abstract: Teaching and research complement each other in the process of talent cultivation in universities. Conducting research feedback teaching for the core course of valve design and manufacturing, "Valve Testing Technology," integrates the research content and achievements of new weld non-destructive testing technology into the teaching of this course, which is beneficial for students to understand the forefront of the profession and master the course content. It can not only enhance students' engineering practice ability, but also cultivate their professional innovation and team awareness.

Keywords: Teaching Reform; Research Feedback Teaching; Valve Testing Technology.

1. Introduction

"Valve Testing Technology" is the core course of valve design and manufacturing in vocational colleges. Through the study of this course, students can master the theoretical knowledge and operational skills related to valve testing and inspection, cultivate good engineering values, and enhance their job competence in valve quality testing, valve production management, and other positions. Valve non-destructive testing is one of the important teaching contents of this course. More and more advanced non-destructive testing technologies (such as magnetic leakage testing, eddy current testing, and AC electromagnetic field testing) are being applied to the detection of valve weld cracks. Therefore, integrating the research content and achievements of new weld non-destructive testing technologies into the teaching of "Valve Testing Technology" course can not only guide students to pay attention to the forefront of their profession, expand professional knowledge, and improve professional skills, it is also beneficial for improving teachers' ability to provide scientific research feedback and teaching, truly achieving mutual benefit between teaching and scientific research.

2. The Connotation of Research Feedback Teaching

The relationship between teaching and scientific research in universities is complementary, and teaching is the foundation of scientific research, providing original accumulation and reserve strength for scientific research. Scientific research relies on the effective utilization of teaching resources in teaching work, transforming research advantages into teaching advantages, and forming a situation of positive interaction and collaborative development between teaching and research[1]. Research feedback teaching is the application of scientific research methods and achievements in teaching practice to cultivate students' innovation ability and cutting-edge knowledge mastery ability. The author believes that it specifically includes two key points for vocational colleges.

2.1. Research Method Feedback Teaching

Under the modern education mode, students have changed from passive learning audience to participatory learning, and teachers have changed from knowledge disseminators to learning leaders and classroom organizers. Interaction and role transformation between teachers and students have become the new normal of college education. In this context, vocational college teachers should fully utilize scientific research methods to guide classroom teaching and promote teaching reform. Firstly, teachers set up an introduction link to ask questions during the teaching process, guiding students to actively think and promoting the cultivation of divergent thinking, thereby further strengthening students' dominant position and teacher-student interaction. Secondly, teachers should attach importance to cultivating the cooperative ability and awareness of student teams, guiding students to complete learning tasks through division of labor while promoting the improvement of team collaboration ability. In addition, teachers can also introduce scientific research methods into teaching research, continuously summarize teaching experience, reform and innovate traditional teaching models, and study how to better serve classroom teaching with scientific research results, so as to revitalize teaching models [2].

2.2. Research Results Feedback Teaching

The progress of science and technology is conducive to the development of the social economy. In order to enable university students to have timely access to cutting-edge scientific research achievements, teachers should attach importance to summarizing and categorizing scientific research achievements into classroom teaching content that students can accept, systematizing and standardizing scientific technology and theoretical knowledge, and introducing them into textbook dissemination and classroom teaching. This process is the process of theorizing scientific research achievements and audience recognition, and it is also an unshirkable responsibility of university teachers. There is a significant gap between the textbook knowledge that students are exposed to and the cutting-edge scientific research achievements. In order to bridge this gap, university

teachers should first master the knowledge related to scientific research achievements and transform them into typical classroom teaching cases, in order to deepen students' understanding of the latest knowledge in their undergraduate majors and enable them to connect with the cutting-edge scientific research in the classroom [3].

3. The Significance of Research Feedback Teaching Practice

By studying new non-destructive testing technologies and their applications in the field of valve weld inspection, combined with the application of research results in actual enterprise testing, a teaching case for the course "Valve Testing Technology" is written, and corresponding training projects are designed to improve students' professional skills and professional abilities, while also enhancing teachers' ability to provide technical services for enterprises.

3.1. Integrating the New Non-Destructive Testing Technology for Valve Parts into Practical Teaching on and Off Campus to Improve Teaching Effectiveness

Through the task driven approach of non-destructive testing projects, guide students to independently learn the theoretical knowledge of new types of non-destructive testing, explore a practical teaching model that combines on-site training and enterprise practice, consider individual differences of students, and arrange training tasks reasonably both in and out of class. Through on-site training weeks and students' off campus practice (such as summer professional practice), adopt a dual guidance approach of on-site and off campus guidance teachers to optimize the effectiveness of practical teaching.

3.2. Improve the Professional and Technical Service Abilities of Teaching Teachers

The feasibility and application level of the research results of teachers in advanced non-destructive testing technology need to be verified in actual testing projects of valve enterprises, and the research results should be continuously optimized based on this. The extracurricular training projects of students are taken from real testing cases of enterprises, and the use of research results is integrated into the extracurricular training of students, which is conducive to urging teachers to constantly pay attention to the development of new technologies in the industry and enterprises, continuously research new technologies in valve testing, and thus improve teachers' business and technical service capabilities.

3.3. Improve Students' Professional Skills and Learning Awareness, and Cultivate Their Teamwork Spirit

Teachers guide students to make full use of their spare time and explore the theoretical knowledge of non-destructive testing research results for valve welds based on real valve product testing cases in enterprises. Teachers led students and enterprise technicians to deeply explore the technical points of testing, which is beneficial for improving students' comprehensive application ability of professional knowledge and skills such as valve design, manufacturing, and testing, and also for cultivating students' team spirit.

4. Implementation Measures for Research Feedback Teaching

The author takes the detection of valve weld cracks as an actual case, and introduces a teaching mode driven by project tasks in the course of "Valve Testing Technology", which combines theoretical teaching and practical operation, as well as school practical training and enterprise practice, effectively integrating "research and development" and "course teaching". The specific implementation content is as follows.

4.1. Leading New Curriculum Knowledge Based on the Integration of Research and Education

Based on the teaching objectives of the course, the core theoretical knowledge and key technologies involved in valve weld crack detection are integrated into the teaching content of Valve Detection Technology to build a resource mapping path from the research and development of valve weld crack detection technology to the teaching content of valve nondestructive detection technology. Emphasis is placed on the application of new technologies such as AC electromagnetic field detection technology in valve weld crack detection, so as to realize the training of new technology and new application for students, Breaking through the limitations of existing non-destructive testing teaching content in the field of valve weld crack detection technology.

4.2. Strengthening Skill Development based on the Integration of Theory and Practice

On the basis of students' learning of ordinary non-destructive testing technology, combined with the principles and characteristics of AC electromagnetic field-testing technology for valve weld seam cracks, with the goal of cultivating practical skills, the focus is on exploring the setting of course practice plans to achieve the teaching goal of students mastering valve weld seam crack detection skills.

4.3. Deepening Talent Cultivation based on the Integration of Industry and Education

Taking the actual testing cases of enterprises as the source of teaching cases, and the testing equipment of enterprises as an effective supplement to practical teaching conditions, this study explores the integration points of school enterprise dual elements in valve crack detection from multiple perspectives such as teaching cases and enterprise practice, in response to the differences in the form, process, and objectives of school teaching and enterprise production, Develop a set of case compilation and practical methods for valve crack detection technology that can be used jointly by students and enterprise employees in school.

5. Conclusion

Through the teaching of the research feedback course, combined with the scientific research work of teachers, some research content on non-destructive testing technology and application has been integrated into the teaching process of the "Valve Testing Technology" course. Some beneficial explorations have been made in improving the teaching quality and talent cultivation quality methods, achieving good results and achieving the expected goals, it is of great significance to cultivate the engineering practical application ability and innovative awareness of students majoring in

valve design and manufacturing.

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References

- [1] Tang Pingping, Hu Yiyuan. The Practice Dilemma and Improvement Countermeasures of Research Feedback Teaching [J]. Journal of Shaanxi University of Technology (Social Science Edition), 2020,38 (04): 66-70.
- [2] Chen Baiman, Lin Yousheng, He Qing, Li Chao, Yang Xun, Lin Ziyuan, Xu Yongjun. Exploration and Analysis of the Path of Research Feedback Teaching in Universities [J]. Research and Practice of Innovation and Entrepreneurship Theory, 2021,4 (3): 114-117.
- [3] Song Lei. Practical Exploration and Research on the Teaching of Scientific Research Feedback in Universities under the Background of New Engineering Construction [J]. East China Paper Industry. 2021,51 (06): 47-49.