

## Exploration of the Difficulties and Countermeasures of Numerical Control Integrated Teaching in Technical Schools

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**Abstract:** Technical Schools are cradles for the country to provide high-end talents with production technology. With the continuous progress of society and the continuous development of production technology, effective changes have been made in teaching methods. The traditional sectional teaching mode and system have been changed, and the tradition has been thoroughly broken. Through the test of time, scientific teaching mode has also achieved certain results. However, there are still some problems and difficulties in the integrated teaching of Numerical Control (NC) specialty in technical schools. How to effectively solve these problems and difficulties has become an important issue for technical schools to study urgently. This article will give a brief analysis of some problems and difficulties in NC integrated teaching in technical schools, and put forward some countermeasures and suggestions to solve them, so as to promote the teaching effect.

### 1. Introduction

At present, with the progress and rapid development of market economy in our country, the demand for production technology talents is also growing continuously. According to the development situation of the times, the Ministry of Human Resources and Social Security issued the *Pilot Program of Teaching Reform of Integrated Courses in Technical Schools* in 2009, from which the integrated teaching reform of technical schools began to be implemented and practiced. Many places in the country have carried out the reform of the integrated curriculum system of numerical control specialty, and carried out a series of integrated teaching mode research and learning for teachers of technical schools. In the long period of study and research, some problems and difficulties of reform have gradually emerged, which has produced some resistance to the reform of integrated teaching mode.

### 2. Specific Definition of Integrated Teaching Mode

The definition of integrated teaching mode is to combine professional theoretical knowledge with practical training and teaching organically to realize the integration of professional teaching, integration of teaching fields, integration of teaching theory and practice, and integration of teachers. Students can apply the theoretical knowledge they have learned to practice, accumulate experience in practical training, and verify the theoretical knowledge in practical operation, so as to form their own professional skills and operational concepts. At the same time, the integrated teaching mode will turn the traditional teacher-centered into student-centered, transform the dominant position from teachers to students, make students change from passive acceptance to active learning and achieve the effect of learning. The scientific and reasonable teaching mode is combined to form a systematic system, and a set of teaching management system, teaching evaluation standards and effective incentive system should be established accordingly, teachers will be trained to become a team of high-quality, high-level teachers. According to the teaching content, teaching mode and teaching objectives, the integrated teaching process and teaching plan are formulated, and the theoretical knowledge is re-compiled, a new integrated teaching syllabus is formed.

### **3. Problems and Difficulties Occurred in the Nc Integrated Teaching Mode of Technical Schools**

#### **3.1 Construction Problems of Hardware Facilities in Nc Integrated Teaching Mode of Technical Schools**

At present, in the application and construction of NC integrated teaching mode in technical schools, the hardware facilities of NC teaching mainly refers to NC equipment. The construction of integrated teaching mode needs a large number of NC equipment to support, and namely requires a large amount of capital investment. The main requirements of integrated teaching mode for NC hardware facilities include: adequate equipment and advanced technology for hardware facilities. In order to meet these requirements, a large amount of money is needed to purchase hardware equipment; meanwhile, the maintenance of equipment also needs more money. Moreover, the current teaching methods in technical schools also need a series of hardware facilities such as computers, printers, multimedia equipment and NC equipment, as well as various measuring tools, practical tools and various types of cutters. It is far from enough to rely solely on students' training costs.

#### **3.2 Software Problems in Nc Integrated Teaching Mode of Technical Schools**

The first problem of the software aspect of the integrated teaching mode of NC specialty is the teaching material of integration of specialty. Integrated specialty textbooks need to be compiled, and at the same time, the establishment of textbooks should maintain their professionalism and advancement of technology, which should be combined with the advanced technology and advanced concepts of the current era. The teaching aim of NC specialty in technical schools is to cultivate students' NC operation ability and programming ability. At the same time, students should acquire NC intermediate and advanced vocational qualification certificates through mastering knowledge, and become high-end technical talents with great career development potential and advanced NC professional skills. The compilation of mature teaching materials for integrated specialty needs to be supported by sufficient theoretical knowledge, long-term theoretical practice and practical operation verification. Whether it is the verification of theoretical knowledge or the supplement of teaching cases, a lot of practical verification is needed. In the process of building a professional skilled talent base, besides strict requirements for hardware facilities, the textbooks used in specialty integration teaching need to be examined and accepted. In order to pass the acceptance of the skilled talent base, many technical schools fabricate the contents of the textbooks, and compile some theories and operational experience that have not been practiced into the textbooks. These unqualified knowledge and unproven teaching content have a great impact on students' learning effect, and some actual case analysis often appear the phenomenon that the NC knowledge, the actual operation process and operation effect cannot match, which seriously hinders the improvement of students' technical level.

Another problem is the lack of teachers for professional integrated teaching in technical schools. Teachers' integrated teaching is the organic combination of professional theory and practical operation training, which is the unification of theoretical knowledge and practical training operation content in one teacher's teaching. Many teachers in technical schools are even the students who have just graduated and are without practical working experience, these young teachers do not have solid theoretical knowledge and rich practical experience at all, so it is difficult to achieve effective teaching effect in this case to go into the classroom to teach.

#### **3.3 Problems in Cooperation between Technical Schools and Enterprises**

To cooperate with enterprises is a good choice for technical schools, because it can not only improve the quality of students' employment, but also provide students with practical operation opportunities. Cooperation is an effective test of the integrated teaching as well, verifying whether the integrated teaching is applicable to the requirements of enterprises. If the technical level of students and the actual needs of enterprises cannot achieve unity and docking, it cannot form a good interaction and in-depth cooperation with industries and enterprises.

### **3.4 Top-Level Design Problem**

The integrated teaching of NC specialty belongs to an extremely complex system. It poses a great challenge to the management and system of the school's teaching mode, which especially involves many factors, such as the redesign of teaching plan, the formation and cultivation of professional teacher team of integrated teaching, the examination and evaluation of teaching results and the construction of professional training teaching base. At present, most of the technical schools are facing the difficulties of review and distribution of the school performance, it is unable to cultivate an integrated teaching team, and unable to effectively motivate the teachers of integrated teaching. The allocation of class hours is also extremely unreasonable, and the focus on the teachers of integrated teaching is still lacking.

### **3.5 Problems in Teaching Methods**

At present, most schools pay more attention to theory than practice in teaching methods. Teachers only pay attention to the consolidation of students' theoretical knowledge, but weaken the importance of practical operation ability, which results in the phenomenon that students' theoretical knowledge does not correspond to their actual operations, of whom the practical ability is weak. With the rapid development of economy, the market demand for technical talents is growing, especially for comprehensive talents. Most schools do not attach importance to practical teaching, teachers mainly use explanation and demonstration as the main means of teaching, students cannot get the opportunity to practice. In addition, the teaching in some schools is still the sectional teaching mode, equipped with the teaching method of interlacing a theory teacher with a practical teacher. In this way, the progress of students' learning NC professional knowledge cannot be effectively unified with the progress of practical operation training, and it will also cause a certain lag in the verification of students' knowledge, which seriously reduces the learning effect of students. However, the practical training teachers generally have the problem of poor theoretical knowledge foundation, and cannot make scientific theoretical guidance for students in practical training teaching; while, teachers of theoretical teaching lack practical operation experience, so they cannot make students compare and verify their professional knowledge in practical training courses. Moreover, this sectional teaching method can not enable students to combine theory with practice organically, and can not form their own learning system and theoretical operation system.

## **4. Analysis and Solution of Problems in Current Integrated Teaching Mode of Nc Specialty in Technical Schools**

### **4.1 Top-Level Design Should Be Done Well in Technical Schools**

The school should construct the training base of NC integrated teaching according to the actual situation, including the hardware construction of a series of integrated training rooms for NC specialty, such as NC lathe, CNC milling machine, fitter, lathe, mechanical drawing and NC simulation. In addition, schools should establish effective performance review mechanism and incentive mechanism in order to effectively motivate the professional teachers of integrated teaching, improve the enthusiasm of teachers' team, and then improve the teaching level of teachers and teaching effect. The actual economic benefits should be linked with the teaching work in order to promote enthusiasm with interests. Students should also strengthen cooperation and communication with enterprises and maintain close cooperation with enterprises, and the mode of school-enterprise cooperation should be truly realized <sup>[5]</sup>. High-level experts from enterprises can come to schools to provide support for students' learning and practical operation, and bring abundant practical experience to students.

## **4.2 Rational Application of Induction of Production into Teaching and Project-Based Teaching Methods in Integrated Teaching of Nc Specialty of Technical Schools**

The education and teaching of technical colleges should pay attention to the implementation progress of integrated professional teaching as well as the actual teaching effect, and the schools should carry out scientific improvement and positive innovation for the integrated teaching method of NC specialty, conduct scientific and reasonable research on the mechanical theory course and NC integrated training course, and reasonably introduce the project-based teaching method into the teaching of practical courses. It is necessary to introduce production into teaching so as to improve the teaching effect. Through the application of project-based teaching methods, students can get practical opportunities and accumulate practical experience without entering the workshop. In the course of classroom teaching, teachers bring real cases into theoretical knowledge teaching and organize students to study in groups. The teachers arrange the subject content of the project for the learning group, and guide the actual operation process of the project. They apply the knowledge content to the actual project, so that students can learn while producing and verify while practicing, so as to achieve the purpose of mastering the theoretical knowledge and operational skills skillfully<sup>[4]</sup>. The project-based teaching method of introducing production into teaching requires higher professional level and skills of teachers. Teachers in technical schools should actively improve their professional knowledge and skills, so as to fully play the function of project-based teaching method.

## **4.3 School -Enterprise Joint Help Technical Schools Form and Train Professional Teacher Team**

Technical schools should actively cultivate professional teachers and strive to improve the professional level of teachers of integrated teaching. Teachers of integrated teaching need not only abundant practical experience but also solid theoretical knowledge, and at the same time, they can combine theoretical knowledge with practice and verify it by practice. Especially in practical training courses, teachers should be able to give students some practical guidance. In this regard, schools should also strengthen the close cooperation with enterprises, which have a lot of high-end technical talents, who not only have rich practical experience, but also have profound theoretical knowledge, which can give students a certain degree of teaching guidance. Moreover, the school can also deliver students to enterprises for training by cooperation with enterprises, or even build an integrated teaching and training base within enterprises, with the help of powerful production workshops and advanced hardware equipment of enterprises for professional integrated teaching. Enterprises can also provide professional and technical talents for schools to form a teacher's team of integrated teaching. In addition, this is also an opportunity for enterprises to supplement high-end technical talents. The development of enterprises needs fresh blood. Technical schools are also the training base of high-end technical talents. The form of school-enterprise joint also helps to improve the teaching quality of schools and the long-term stable development of enterprises.

## **5. Summary**

The implementation of the integrated teaching mode of NC specialty and the improvement of teaching effect in technical schools need the support of top-level design and teaching departments as well as the cooperation of teachers and students. Relevant education departments should continue to study and discuss the integrated teaching mode, carefully analyze and timely solve the problems produced, improve and innovate the integrated teaching mode fundamentally, and support the hardware and software conditions. With the concerted efforts of all parties, the integrated teaching of NC specialty will be promoted to play a great role.

## **Acknowledgement**

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## References

- [1] Wen, Changxue. Difficulties and Countermeasures in NC Integrated Teaching in Technical Schools, *Occupation*, 2018(20):95-96.
- [2] Hu, Bo. Exploration and Research on the Teaching of NC Technology Education in Technical Schools, *Farmer's Staff*, 2018(07):158.
- [3] Liang, Yilong. Discussion on the Practice of Integrated Teaching of the Courses NC Machining Technology in Technical Schools, *Technology Wind*, 2017(12):29.
- [4] Tang, Xingjun. Exploration of Teaching Reform Path of NC Specialty in Technical Schools, *Occupation*, 2016(11):48.
- [5] Ye, Yun. Research on the Reform of NC Classroom Teaching Mode under the Background of Deepening Curriculum Reform, *Occupation*, 2015(30):36.