

# Safety Quality: Research on the "Double-qualified Teacher" College-Enterprise Co-Education Mode——Taking Jiangsu College of Safety Technology and Shanghai Mitsubishi Corporation as an Example

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**Abstract:** Safety quality education is an indispensable part of higher vocational education. Safety quality is also one of the necessary qualities of double-qualified teacher and an important part of the teacher quality structure. At present, the cultivation of higher vocational teachers in China mainly focuses on the professional qualities of teachers and ignores safety quality education, which will lead to some problems such as insufficient attention, weak pertinence, and poor integration. Make use of Dai Minghuan theory to build a college-enterprise co-education mode, and form the four modules, which can integrate safety qualities into the training of different professional teachers to participate in enterprise practice. By learning in research and realizing in practice, achieve the goal that I will be safe and I can be safe, and then achieve the unity of professional ability cultivation and safety quality improvement.

**Keywords:** Safety Qualities; "Double-qualified" Teachers; College-enterprise Co-education

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## 1. Safety quality education is a practical requirement for "double-qualified" teachers

### 1.1 Safety quality is an indispensable component of the educational content of vocational students

Higher vocational colleges are an important part of China's higher education, which bear the vital task of cultivating billions of high-quality skilled talents. Vocational education is closely connected with economic development. After graduation, most students directly enter the production line. The production line is the source of safety accidents, and the production line employees bear a high rate of production accidents<sup>[1]</sup>. Quality education is an important component of the overall growth of vocational students, among which safety quality is the basis for ensuring their career development. To train high-skilled talents with safety qualities in higher vocational colleges, the primary task is to cultivate a "double-qualified" teacher team with safety qualities. Some scholars found that the phenomenon of ignoring the training of safety qualities is common, which leads to the generally low vocational safety qualities of students, weak occupational safety consciousness, occupational safety psychology and emergency ability, etc.<sup>[2]</sup> This shows that over the years, higher vocational colleges have attached importance to the training of teachers' professional skills, but neglected safety quality education, and lacked systematic planning for the development of teachers' safety quality education. No effective

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paradigm has been formed, resulting in low safety quality of vocational students. It is closely related to the structural shortage of the "double-qualified" teachers' quality. Safety quality education is an indispensable and important component of the comprehensive quality training of vocational students. It is related to family happiness, college reputation, enterprise development and social stability, and is the basis and prerequisite for all educational work carried out by the college.

### **1.2 Safety quality is a necessity for "double-qualified" teachers**

Safety quality means that people have a relatively deep, full-scale and scientific understanding of the safety and health of themselves and others, and make their behavior always meet the requirements of safety regulations<sup>[3]</sup>. Higher vocational colleges are aimed at cultivating front-line technical talents for enterprises. Safety quality is crucial for vocational students to go to the workplace. "Double-qualified" teachers are the main force for cultivating high-quality skilled personnel. They need to meet the special requirements of "career pertinence". In theory, they should have the specialized theoretical knowledge required by the professional posts, and in practice, they need to have the specialized skills, especially required by the professional posts and other practical activities.<sup>[4]</sup> Safety quality is an indispensable educational component of the "double-qualified" teachers' quality structure. However, some higher vocational colleges lack the safety quality education which is for teachers, and required by teachers, and they only content with the learning of general safety systems, the training of safety regulations, and the acceptance of superior safety inspections. These are far from enough. In fact, safety education is not equivalent to safety quality education. Safety education is the basis of safety quality education, and safety quality is the purpose of safety education. Safety quality education has strong practicality. It needs to be strengthened in production practice, cultivated in life practice, and implement cultivation on purpose. Once it is formed, it will be internalized in the heart and externalized in the practice, so that teachers will benefit from it the whole life. Educational practice shows that there is a positive correlation between the safety qualities of teachers and that of students. The level of teachers' safety qualities is directly related to the level and effect of the stable development of teaching-centered work in higher vocational colleges.

### **1.3 Safety quality education is a compulsory course for all staff in vocational colleges**

The purpose of developing safety education in higher vocational colleges is to improve the safety quality of teachers and students. In recent years, different types of schools have different safety problems, which requires all teachers and students to actively learn safety knowledge, follow operating procedures, understand safety laws and regulations, master safety skills, establish safety consciousness, and avoid unnecessary injuries. The best way to carry out "double-qualified" teachers' safety quality education is to integrate safety knowledge, skills and consciousness into the college-enterprise practice training, which is to improve teachers' professional quality. Some colleges attach importance to safety education, but do not integrate into education and teaching practice, which is easy for teachers to produce a single, boring, abstract cognition, and it will restrict the formation of "double-qualified" teacher safety behavior habits. The developing process of the "double-qualified" teacher is not a simple technical process, but a practical one<sup>[5]</sup>, which cannot be separated from the development of professional practice. Higher vocational colleges should not regard safety education as "test-based education" for examinations, let alone safety education as an "optional course", but a "required course" to improve the safety quality of all teachers and students, and carry out the "quality education" that is internalized in the heart and externalized in the practice.

## **2. College-enterprise co-education mode cultivates safety quality constructing ideas**

### **2.1 Basic principles followed by mode construction**

The college-enterprise co-education "double-qualified" teacher safety quality mode is constructed, following the Dai Ming PDCA cycle principle to build four major modules, which are education target module, education content module, implementation path module, and effect monitoring module. The implementation of the educational target module needs to be determined according to the study of the training goals of teachers of different specialties. The educational content module needs to be determined based on the security quality education content (security awareness, security knowledge, security skills) required by different professional groups. The implementation path module is promoted through two paths, one is the way to improve the safety quality in the college; the second is the way to improve the practice of the enterprise. The promotion path in the college is not only suitable for theory

class teachers, but also can meet the needs of enterprise personnel to improve their teaching ability in the college. It is implemented through five methods. The practice path of an enterprise revolves around the ability of the enterprise, the needs of the college, and the demands of teachers, and is implemented by six methods. The effect monitoring module compares the monitoring results with the initial target plan setting, and implements continuous improvement, and forms a complete closed loop.

## 2.2 The internal logical relationship of mode operation

The so-called college-enterprise co-education means that the college and the enterprise organically combine for a common training goal, so that the college and the enterprise can realize the complementary advantages and resource sharing of talents, equipment and technology, and effectively improve the pertinence and effectiveness of educating people, and it is a new educational concept of improving technical talents training quality<sup>[6]</sup>. Constructing a college-enterprise co-education mode is to improve the operating system of "double-qualified" teachers' safety qualities, and mainly to realize the organic connection between modules, so that the education target module, the education content module, the implementation path module and the effect monitoring module are integrated, connected with each other and inseparable. To achieve goal guidance, content embedding, path implementation, effect monitoring, feedback adjustment, construct a "double-qualified" teacher safety quality education paradigm, as shown below:

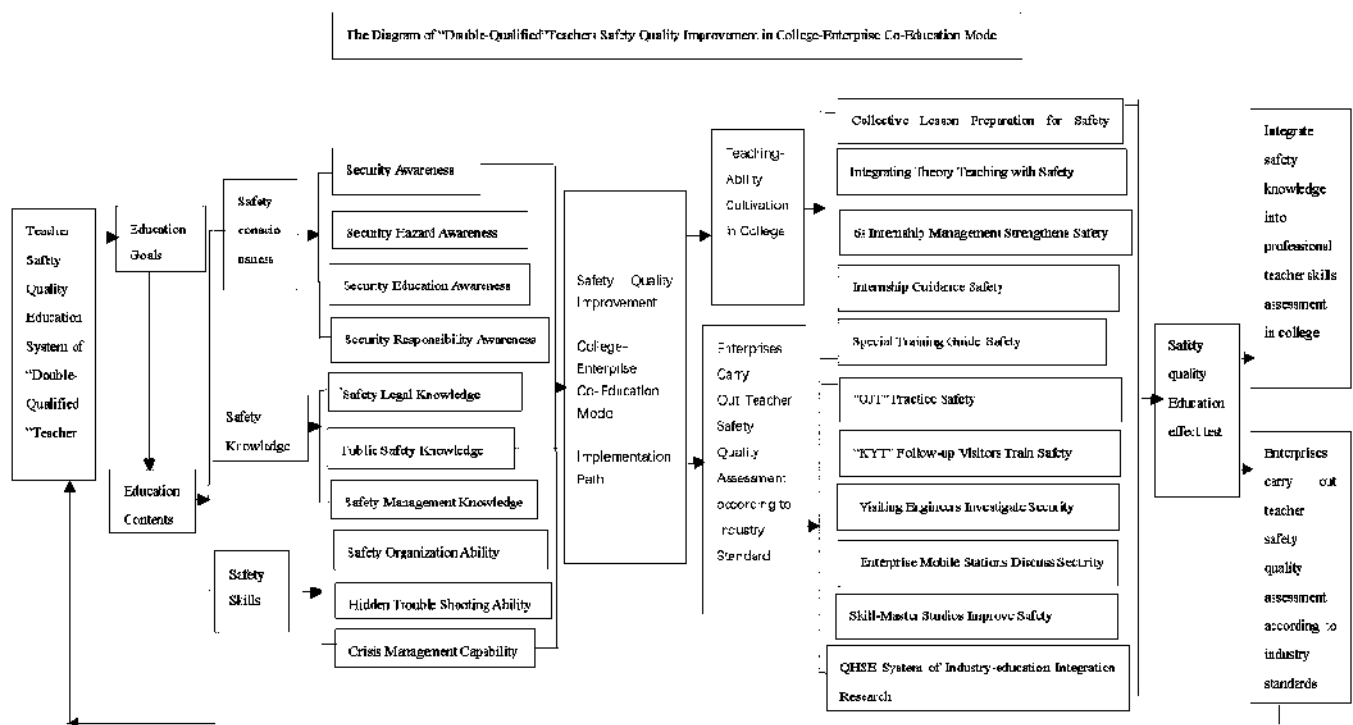


Figure 1. Teacher safety quality education paradigm.

## 3. Safety quality mode construction and practice of college-enterprise co-education "double-qualified" teachers

### 3.1 Taking college-enterprise co-cultivation mode of elevator engineering professional teachers as an example

Jiangsu College of Safety Technology (Su'an College for short) has established lasting college-enterprise cooperation with Shanghai Mitsubishi corporation (SMEC for short) since several years ago. There is a Mitsubishi elevator training base on our campus. As for the training of elevator professionals' cultivation, we implement "order education", promote "new apprenticeship", deepen college-enterprise cooperation and cultivate the teachers together. Over the years, Su'an College has been featured by "profession +safety" and "safety quality" education including the teachers and students. In accordance with the co-education mode of the elevator engineering technology major and SMEC, four major modules have been implemented, they are explained as followings: the college and enterprise should reach consensus on college-enterprise mode, take "co-consultant" for operating mechanism, and have "co-research" for the cultivation for the content. All of the above can ensure the education mode operated well and education

effect realized greatly.

(1) Reaching "consensus" on the mode construction by college and enterprises, and attaching great emphasis on this mode. On the basis of consensus, both of the parties optimize the mode operation mechanism further, implement dynamic management, connect the four modules of goal determination, content integration, implementation path, and effect monitoring effectively, then we can reach consensus on the long-term effect of the education mode. For example, the cultivation target setting highlights the teacher-based education principle, and the college and enterprise formulate different cultivation targets according to various levels of "double-qualified" teachers cultivation requirements. For example, teachers in enterprise mainly aim at the abilities and qualities of elevator engineers or web masters in SMEC. The cultivation goal of "double-qualified" teacher of the internship is to achieve reach professional level and have safety literacy of the first-line A-level operation technical workers in "SMEC". This degree is equal to the highest level of the elevator maintenance work or the level of "quasi-engineer".

(2) College and enterprise take co-consult on the mode of the operation mechanism so as to improve the effectiveness of education. That is to say, both of the parties participate in the education together so as to ensure the effective operation of the mode, implement the plan normally, resolve the problems in a timely manner, and evaluate the operational mechanisms from the beginning to the end. For example, according to the needs of teacher cultivation, Su'an College and SMEC make clear the responsible persons in charge of the connection between the two parties, discuss and clarify their the responsibilities and obligations fulfilled during the implementation of the training plan respectively, and communicate with each other about the potential problems to ensure the mechanism of the mode operation goes smoothly.

(3) Both college and enterprise conduct "co-research" on the content of the mode so as to improve the pertinence of education and enhance integration. The educational content constructed by this mode includes safety awareness, safety knowledge, and safety skills. In order to meet the various needs of different industries, enterprises, professions, and job occupation groups, college and enterprise joint the research together. For example, Su'an College should combine the laws and regulations in the "Law of the People's Republic of China on Special Equipment Safety", laws and regulations of the elevator industry and enterprise operating procedures, and all of the these should be integrated into ten educational contents as well as three knowledge modes. In this way can we cultivate the teachers' safety quality in pertinence.

### **3.2 Safety quality improvement in enterprises practice focus on the use of six methods.**

The "double-qualified" teachers cultivation plan for college-enterprise co-education is made by Department of Electrical Engineering of Su'an College and Training department of Mitsubishi. In the process of formulating the plan, we combine with the actual situation of the enterprise, the training objectives, training time, training content, training methods and effects monitoring are refined to promote the co-cultivation mode to be taken into practice. The safety quality of "double-qualified" teachers cultivation can be achieved by the following six methods: Method one, the teacher docks with the enterprise engineer to sign the apprenticeship agreement, and carry out the "first-line engineer" elevator maintenance work practice through the "OJT" on-the-job training. Method two: the teachers cultivation in enterprise can improve their safety literacy through "KYT" safety training. Method three: to investigate safety through "visiting engineers". The teacher should understand how to combine the safety knowledge of professional teaching with the occupation responsibilities in teaching. Then we can form a research plan to participate in the curriculum reform. Method four: Set up an "enterprise mobile station" to discuss safety. Professional teachers go to each site of the company to communicate with and guide students to work with the workstation engineers, then organize the rules into a book based on the characteristics of the position and promote curriculum reform. Method five: Teachers connect with the enterprise skill master studio to improve safety. By participating in enterprise research and development, the teachers study the elevators' installation, commissioning, maintenance methods and operating procedures according to the classification and different models research. In this way can we develop teaching materials combining with professional development. Method six: the teachers participate in enterprise QHSE management system practice research and development through in-depth integration of industry and education, and the revision of the talents cultivation program. the development of student internship plan, the research of elevator industry 1 + X certificate and etc. will be done by college and enterprise together.

As for the "double-qualified" teachers safety education approach in college, five methods can be used: teaching-preparation

together, theoretical teaching, 6S internship teaching, special training, and guidance for students during the internship period, in this article all of the above will not be explained in details.

### 3.3 Analysis of the effect of testing on the operation of the college-enterprise mutual education model

When the teachers complete the training tasks of one stage by the college-enterprise co-education model, they should accept the elevator industry and enterprise safety work standards and operating procedures. Meanwhile, the quality, efficiency, attitude and etc. involved in the task completion should also be evaluated. After each training, the college will conduct the following specific interviews. The advantages of safety quality cultivation model for the college-enterprise co-education "double-qualified" teacher confirmed by most of the teachers, which is to put the safety quality into the teachers practical ability cultivation in enterprise training. Teachers combine with professional practice under the guidance of enterprise technical personnel, in addition to strengthen professional technical ability learning, they can also feel the necessity of complying with industry and enterprise safety operation regulations deeply, and transform passive safety awareness into active safety awareness, namely from I'm safe to I can be safe. In this way can the teachers professional ability cultivation and safety qualities improvement be improved both.

The engineers selected by Mitsubishi participate in the education practice in Su'an college, and they believe that the college-enterprise co-education mode is conducive to deep cooperation between college and enterprise in deepening the implementation of the Ministry of Education to strengthen the "double qualified" teachers training, to a platform building for the mutual-growth for teachers and the staff in Mitsubishi, such as to be a trainer in enterprise and to enhance the industry-education integration. Meanwhile, the technicians in the enterprise also have the opportunity to work as teachers in vocational college, and the mode characterized by mutual talents-flows from college to enterprise. In this way can we enhance the mutual development between college and enterprise, so does the overall improvement of teachers and students safety and quality education.

In addition, from 2016 to the present, the research team has tracked and dispatched 9 professional teachers to SMEC company for training in 3 years, and compared the ratio of selected professional teachers with non-selected professional teachers to guide students' awareness internships in school. The tracking found that the students who were sent by professional teachers to guide their cognitive internship had a safety accident rate of almost zero in one semester. In addition, the student evaluation of teachers selected by the student supervision room scored 96.5, and the student satisfaction was 98.7%; while the professional teachers who did not participate in this mode of training guided student safety accident rate 2‰ (retroactive elevator maintenance and safety bumps are included in the statistics). The student's teaching evaluation score is 87.5, and the student satisfaction is 86.3%. Regardless of the safety accident rate, student evaluation scores and satisfaction, teachers using this model to participate in the cultivation of safety qualities have higher scores than untrained teachers.

In summary, since the implementation of this model, the Department of Electrical Engineering of Su'an college has taken the lead in formulating national standards for elevators, working with SMEC to revise elevator professional training programs, formulating theoretical and practical teaching plans, and forming the characteristics of safety quality education + professional education. Remarkable achievements have been made in teaching and education.

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