

# Exploration of “Course Certificate Integration” for Software Technology Majors Based on the “1+X” Certificate System

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**Abstract:** With the continuous development of information technology, software technology has become one of the most promising majors in today’s society. However, the rapid development of software technology majors has also brought many problems, one of which is the employment problem of students. The “1+X” certificate system is proposed by China’s education department to promote vocational education reform. It refers to students obtaining multiple vocational skill level certificates while obtaining academic qualifications. The “1+X” certificate system points out the direction for software technology majors to expand their employment and entrepreneurship skills, and alleviate structural employment conflicts. This article explores the construction strategy of “course certificate integration” for software technology majors under the “1+X” certificate system, hoping to provide valuable reference for colleagues.

**Keywords:** “1+X”; Certificate system; Software technology; Course certificate integration

Among many majors, software technology is a rapidly updated field of knowledge and technology, which can be understood from the development trends of artificial intelligence, big data technology, etc. In the talent cultivation work of vocational colleges, combined with the “1+X” certificate system, a course certificate integration model is constructed for the software technology major, which meets the teaching reform and course construction needs of the major. The integration of course certification and job positions has integrated the curriculum system, creating a new curriculum system that can cultivate more practical talents in the software field. However, from the actual situation, there are still many problems that affect the teaching quality of software technology majors. Therefore, in the context of the rapid development of software technology and the strong promotion of the “1+X” certificate system by the country, it is necessary to explore the methods of constructing “course certificate integration”.

## 1. The Important Significance of “Course Certificate Integration” in Software Technology Majors

With the rapid development of information technology, the demand for talent in the software technology industry is becoming increasingly strong, and software technology talents with professional knowledge and practical operation skills have become the focus of competition among enterprises. However, the traditional academic education model often emphasizes theoretical teaching and lacks practical teaching, resulting in students lacking practical work ability after graduation and being unable to meet the job requirements of enterprises. Based on the “1+X” certificate system, the “course certificate integration” model can combine the teaching work of vocational colleges with the actual needs of society, allowing students to master more professional related skills.

Course certification integration “refers to integrating the training and examination content of vocational skill level certificates into the curriculum system, enabling students to not only master professional knowledge but also improve practical operational skills during the learning process, achieving an organic combination of academic certificates and vocational skill level certificates. The significance of integrating courses and certificates in software technology majors is mainly reflected in the following aspects: firstly, improving students’ employment competitiveness. Through the integration of course certification, students can gain a certain level of practical operation experience and skills during their school years, meeting the needs of enterprises for skilled talents. Secondly, meet the personalized development needs of students. Through the integration of courses and certificates, students can choose to obtain vocational skill level certificates that are suitable for themselves based on their interests and development direction, providing more choices for their future career. Finally, promote educational and teaching reform. Integrating vocational skill level certificates into the curriculum system can encourage education departments and vocational colleges to pay more attention to practical teaching, promote educational reform, and improve the quality of talent cultivation.

## 2. The Problems in the Integration of Course Certificates in Software Technology Majors Based on the “1+X” Certificate System

2.1 Insufficient teaching resources related to the “1+X” certificate. At present, vocational colleges have implemented information-based teaching, and various online courses are emerging one after another, providing students with rich extracurricular learning resources. However, there is a lag in online courses targeting the “1+X” certificate system. In addition, there is a relatively lack of books and electronic materials related to the “1+X” certificate in the library collection resources. These issues affect the smooth promotion of the construction of “course certification integration” in software technology majors.

2.2 There are limitations in the curriculum of software technology majors. The software technology major has strong practicality, requiring students to have the ability to engage in software development, software testing, software technical support, database design and management, and become high-quality technical skills talents through learning. However, there are many certificates related to software technology that cannot be fully integrated into the curriculum. In this way, vocational colleges can only choose several relatively common

certificates as pilot projects for course certificate integration construction, lacking scalability and difficulty in meeting the personalized needs of different students.

2.3 The practical ability of students has not been significantly improved. At present, the construction of "course certification integration" for software technology majors in most vocational colleges is still in the exploratory stage, and the methods and experience mastered are relatively limited. In addition, some vocational colleges have only responded to the "1+X" certificate system and have not fundamentally combined course teaching with skill level certificates. Affected by this, compared to before, the current talent cultivation work has not significantly improved students' practical abilities.

### **3. The Construction Strategy of “Course Certificate Integration” for Software Technology Majors Based on the “1+X” Certificate System**

Vocational colleges, as an important component of higher education in China, are of great significance in achieving “integration of courses and certificates” in software technology majors. Vocational colleges have the characteristics of independent education, enrollment, teaching, and management, which can better adapt to the needs of social development and meet the learning needs of students. In response, this section proposes four strategies for building a “course certificate integration” for software technology majors, including establishing a course system that integrates course certificates, enriching professional teaching resources, implementing certificate incentive mechanisms, and establishing a teaching model that integrates course certificates, based on the current problems in teaching.

#### **3.1 Establish a curriculum system that integrates course certification**

Establishing a curriculum system that integrates course certification is the foundation for achieving “course certification integration”. In software technology majors, the curriculum system for integrating courses and certificates should include professional core courses, professional elective courses, and certificate courses. Among them, professional core courses are courses that students must take, professional elective courses are courses that students can choose based on their interests and career plans, and certificate courses are professional certificates that students can obtain. When establishing a curriculum system that integrates courses and certificates, full consideration should be given to the needs of enterprises, so that the content learned by students can be close to the actual situation of enterprises and enhance their employment competitiveness.

For example, in the skill level certificates published by the Ministry of Education, certificates related to software technology include: Java Web application development vocational skill level certificates, WeChat mini program development vocational skill level certificates, big data application development (Python) vocational skill level certificates, etc. In the process of constructing the “integration of courses and certificates” system, vocational colleges can combine the level classification of various vocational skill certificates, making initial and intermediate certificates as core and compulsory courses, and advanced certificates as elective courses. Taking the Java Web Application Development Vocational Skills Level Certificate as an example, the core courses of the major include Java Programming, Fundamentals of Web Design, Dynamic Web Page Development, MySQL Database, Java Web Programming, and SSM Framework Technology. Elective courses include MySQL Database Management, Spring Boot Architecture, Spring Cloud Microservice Architecture, Java Design Patterns, and Java Project Container Deployment. These courses include the knowledge and skills assessed by the corresponding level certificates, achieving the goal of building a “course certificate integration”.

#### **3.2 Enrich professional teaching resources**

Under the “integration of course certificates” model, teachers majoring in software technology need to integrate course teaching resources with the “X” certificate, providing resource support for their own teaching on the one hand, and providing materials for students’ personalized development on the other hand. In this process, the school needs to make efforts in library and information platform construction, focusing on the “X” certificate of software technology major, enriching and improving the book resources of the school library, and establishing resource sharing relationships with other universities to provide practical and high-quality online resources for teachers in this major. In teaching, teachers majoring in software technology should be “student-centered”, provide online learning channels for them, and encourage students to utilize the school’s book and digital resources; Integrate daily teaching information and establish an “X” certificate case library for software technology majors, such as cases that are close to social reality, excellent graduation design works, and participating projects. In managing teaching resources, teachers can use the “X” certificate examination system to integrate the courses involved in different certificates, and differentiate different course packages according to the certificate level; By combining the rapid updating of software technology and the iterative updating of skill level certificates, timely organize teaching resources to ensure that the content learned by students is in line with the development of the times, accurate and practical.

#### **3.3 Implement certificate incentive mechanism**

The implementation of certificate incentive mechanism is the key to achieving “integration of courses and certificates”. In software technology majors, certificate incentive mechanisms should include certificate exam rewards, certificate passing rewards, and certificate holding rewards. Among them, certificate exam rewards refer to the rewards that students can obtain by participating in certificate exams, certificate passing rewards refer to the rewards that students can obtain by passing certificate exams, and certificate holding rewards refer to the rewards that students can obtain by holding certificates. By implementing a certificate incentive mechanism, students can be motivated to participate in certificate exams and improve their competitiveness in employment.

On the one hand, vocational colleges should strengthen students’ promotion and education of certificate exams, make students fully

aware of the importance of certificate exams, and stimulate students' enthusiasm for preparing for certificate exams. On the basis of promotional activities, software technology teachers can provide students with exam preparation guidance to help them better prepare for exams. On the other hand, combining reward mechanisms with assessment and evaluation, such as using the skill certificates obtained by students as the final evaluation criteria, enriching the dimensions of student evaluation; It is also possible to combine the evaluation of rating certificate assessment units with the evaluation of teachers to build a diversified evaluation subject; Integrating with the credit system, the certification details of certificates are converted into students' learning outcomes, which are stored, recognized, and converted by credit banks. In this way, through the reform of the assessment and evaluation system, students are guided to change their learning methods and focus on improving their professional skills, thereby enhancing their self-awareness and effectively improving their comprehensive abilities.

#### 3.4 Establishing a teaching model of integrating course and certificate

Establishing a teaching model that integrates courses and certificates is an important guarantee for achieving the integration of courses and certificates. In software technology majors, the teaching model of integrating courses and certificates should include course learning, certificate learning, and practical learning. The relationship between the three is to learn the relevant content of the certificate through the course and master the skills required by the certificate through practical steps. For example, when teaching courses related to Java Web application development, teachers can adopt project-based teaching to ensure that the project content is close to the actual social project, allowing students to simulate actual job requirements, and gradually complete the entire project task through a sub project. Taking e-commerce platforms as an example, as an important component of the current popular field of e-commerce, they need to meet various needs of people. For this purpose, teachers can break down the entire project into several small projects, with "requirements" as the completion goal of sub projects, encouraging students to integrate knowledge points from courses such as Spring, SpringMVC, MyBatis, and Database Advanced to complete project tasks. This design of teaching plans is also beneficial for teachers to explain knowledge points and core technologies based on actual needs, and has a positive impact on improving the quality of talent cultivation. For example, product modules and order modules are popular elements of daily life for students, and they can even use on-site mobile phones to understand the information explained by teachers. In short, by establishing a teaching model that integrates courses and certificates, teachers can help students better grasp the course content and certificate content, improve their practical abilities, and enhance their employment competitiveness.

## Epilogue

In summary, in software technology majors based on the "1+X" certificate system, the integration of course certification combines course teaching with certificate exams, enabling students to not only master professional knowledge during the learning process, but also obtain industry-recognized skill certificates through certificate exams. This topic is derived from the educational science planning project of Yunnan Province, titled "Research and Practice on Constructing a Course Post Competition Certificate Integration Talent Training Model Based on 1+X Certificate Standards". The integration of courses and certificates is not only beneficial for students' personal development, but also for vocational colleges to improve the quality of talent cultivation. In practical work, vocational colleges and teachers in this field need to further improve the system design of course certificate integration, promote teaching reform based on "course certificate integration", seize the opportunities provided by the "1+X" certificate system for software technology majors, and cultivate more outstanding talents in the field of software technology in China.

## Reference:

- [1] Chen Hui. Research and Practice on the Reform of "Integration of Post Course Competition and Certification" in Higher Vocational Software Technology Major [J]. Journal of Higher Education, 2022, 8 (33): 144-147
- [2] Research on the Construction of Software Technology Professional Curriculum System under the Hu Jun 1+X Certificate System [J]. China New Communications, 2022-24 (02): 111-113
- [3] Lv Taizhi, Wei Wei, Zhang Jun Research on the Curriculum Reform of Software Majors under the "1+X" Certificate System for Document and Evidence Integration [J]. Computer Knowledge and Technology, 2021,17 (34): 161-163