

# Thinking of taking teaching resource library to solve part of problems of the ternary system in higher vocational education

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**Abstract.** Swiss ternary system for vocational education system is the most advanced vocational education system currently. How to effectively integrate the school education resources with occupation training in work site to establish a talents training system with abundant resources, theory, practice and the objective evaluation and stable supervision is the core in the implementation of ternary system. The reference and implementation of ternary system in China encountered difficulties and the construction effect of teaching resource library is also a just passable result. The paper discussed the combination of teaching resource library that government invested heavily and ternary system to build a new stable education system which can meet and coordinate the interests of all parties so as to promote the long-term healthy development of occupation education.

**Keywords:** vocational education; teaching resources; ternary system.

## 1. Introduction

Switzerland is a small island country in Europe with few natural resources, but first place in the global competitiveness rankings and the world famous brands share. The secret of the Swiss advanced economy is the good vocational education mechanism, thus the vocational education and training system have made an important contribution to its comprehensive competitiveness and economic prosperity [1]. Although compared with Switzerland, China has different traditional culture, industrial development process and industrial background. But on the basis of Swiss experience and compared with Chinese current industrial development status, construction conditions and market demand, it will be able to establish a first-class vocational education system with reasonable structure, various forms and Chinese characteristics by taking the cyber source curriculum, school enterprise cooperation and work study combination mode.

The construction of higher vocational teaching resources library is a great event in the development of vocational education in China. In order to further play a leading role of Model Higher Vocational and Technical College, promote the teaching reform and their advanced teaching achievements of higher vocational education, improve the quality of personnel training and social service ability, the Ministry of Education started the construction of vocational education teaching library so as to promote students' active and collaborative research and autonomous learning [2].

Swiss ternary system of modern apprenticeship vocational education model cannot be directly migrated in China. In addition, with the further construction and development of resources library, some contradictions and problems have gradually emerged and it encountered a bottleneck problem to restrict the comprehensive development, so the construction of resource library also meets the crisis of a flash in the pan [3]. Ternary system and the construction of teaching resources are both the important driving force for the development of vocational education. If combining the two to achieve complementary advantages, it will give the two stronger vitality. The mutual integration of the ternary system and the professional teaching resources library is urgent to study and explore.

## 2. Difficulties encountered in the implementation of ternary system in China

Ternary system is a stable vocational "iron triangle" structure with schools, enterprises and industry associations, which needs to mobilize the enthusiasm of the three. In the vocational education system, there are five major difficulties [4]: first one is to mobilize the enthusiasm of the

enterprises and schools especially the enthusiasm of students and parents when constructing a personnel training mode; second one is to solve the identity problem with "students and employees" double identity; third one is to build a three-dimensional course structure to correspond with ternary system; the fourth one is to create a "school teachers and enterprise engineers double tutors" full-time and part-time teachers group; the fifth is to establish a knowledge and skills double assessment standard and establish an objective and practical evaluation system. These five difficulties are very difficult to cross. In addition, China's industrial association is a very loose organization, which generally has no ability to manage and deal with the affairs related to vocational education. The industry association's status cannot be equal to schools and enterprises in the iron triangle bodies of ternary system. So the stability cannot be guaranteed with the lack of industry association.

The benefit dispute is also very complex related to ternary system, and even cannot be reconciled. In order to improve the level of vocational education and the quality of school running, the education authorities and schools are often with high enthusiasm. But the other two major parties in the three are extremely cold. Enterprise's cold is because the benefits. From the angle of production efficiency and production quality assurance, the new apprentice without technical and practical experience not only don't have the product value creation ability, but also need to spend manpower and material resources to train, and is likely to affect the stability of product quality. If it has to pay compensation for the apprentice, enterprises are even more reluctant. In addition, the apprentice is with no enterprise loyalty. The staffs they cultivated may change the job when they graduate. So the enterprises cannot obtain benefits in the implementation process of ternary system, so they show cold. Students' cold is because of self-interest demands. Students cannot show as solid attitude as the enterprise's staffs when change to business apprentice. Enterprises have a lot of jobs which are repetitive. When they pass through the fresh period, they will lose interest in learning.

There are many scholars expecting government departments to issue the relevant regulations and laws in an attempt to solve these conflicts of interest with strong measures, but this is not the fundamental solution and it is futile. In addition, trying to take financial subsidies to guide is also futile. Government cannot have that big subsidies and it also cannot make a relatively objective and fair subsidy standard. Therefore, it is needed to think about the solution from other angles.

### **3. Existing problems of the construction of resources library**

Resource library construction forms an open and efficient new teaching model in accordance with the overall idea of "fragmentation of resources, structured curriculum and systematic design". Construction process forms the resource management and user learning platform taking a set of distributed storage, knowledge management, learning evaluation as one through massive teaching resources processing. Platform in functional maintenance can realize the shared and open mode which can be updated at any time with participation of multi-schools and enterprises.

Nowadays, the construction of professional teaching resource library between vocational college and cooperative enterprise exists the following problems:

(1) Architecture settings of the platform are not reasonable.

Some resource platform's architecture settings show a vague positioning on the main functions and blindly seek perfection causing a resource stack and ignorance of the main role of the learners. In content, there are many useless columns with the learning so it weakens the basic goal of the teaching resource library which is built for providing convenience for learners so as to influence the use and the promotion of resources.

(2) Low quality of resource construction.

The construction of the resource library base should be high, and it should base on the industry's most advanced knowledge and skills. Materials of resource library are mainly obtained by the building of higher vocational colleges and co-building with enterprises as well as purchasing, optimization and integration. It may guarantee the amount but it often has low quality and has less

advancement and the promotion value is also not high. Those truly reflects the modern teaching like 2D and 3D animation and simulation of the operation are less.

(3) Lack of implementation and low utilization rate.

After the completion of the resource library, the promotion capacity of the building school may be limited. In the absence of the promotion mechanism, it is generally with low utilization rate. Apart from the schools which participated the building, teaching resources are not incorporated into the teaching process and teaching system. The existing resources courses in the network are neither required courses nor elective courses for other colleges. Depending on the students' self-study, the amount of browsing and usage is very low, which has become an important factor restricting the construction and application of the current teaching resources.

(4) Late-stage management is inconvenient

Late-stage management and maintenance of part of the teaching resource library is not convenient leading to the slow update rate of the resources for the builders, confusing setting of the resource management authority, so there also exists the problem of false operation. A part of the discussion group function because of the outside attack may release some boring content causing the great system maintenance workload, which is seriously influence the efficiency of the use of resources.

(5) Problem of construction concept.

Pay attention to the construction of hardware resources, ignore the construction of software resources. Pay attention to the results of the review and the funds, neglect the quality of construction and the promotion and influence of the courses.

#### 4. How the construction of resource library makes up for the rift in the implementation of ternary system in China

Apprenticeship system is the best and also the worst way in the vocational education. Enterprises and masters, based on the immediate benefits, are possible to see the apprentice as a cheap labor force limiting the learning of the apprentice as well as the opportunity to participate in school education. Therefore, how to effectively integrate the school education and occupation training in work site to establish a stable personnel training system with abundant resources, theory, practice and the objective evaluation and supervision is the key problem for the implementation of ternary system.

Swiss ternary system is a form of modern apprenticeship. Ternary means: first element refers to the higher vocational colleges, second refers to enterprises, third one is the industry association and its training center. Three education subjects alternately participate in the whole training process according to the proportion and the period of time and its training mode is shown in Figure1 [6, 7]. Enterprises put forward job requirements and the corresponding training or teaching content, then school and industry association develop standards and then schools and enterprises jointly implement teaching and industry association plays as a third party to supervise the teaching quality. In terms of time allocation, students spend 1-2 days in vocational colleges to learn culture and professional basic theory, and take 3-4 days' internship in enterprise. Each semester, they take 1-2 weeks to learn professional development course in industry training center to supplement the lack of enterprise practice and learning contents in vocational colleges.

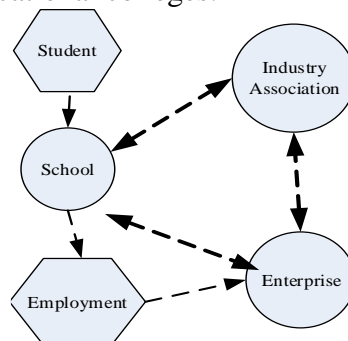


Figure 1 Swiss ternary vocational teaching system

The Figure 2 can be obtained by refining and optimizing the structure of Figure 1. Compared with Chinese vocational education system, it is mainly different in the second and third element. Second element is enterprises directly involved in the whole teaching process from enrollment, teaching planning, teaching process and internship until employment. As a third element, industry training center is an independent accounting institution. Besides an even more advanced training conditions than the enterprise, it also has leading industry experts and enterprises engineering and technical personnel, who can give the students objective evaluation and assessment on the training quality in school and enterprise.

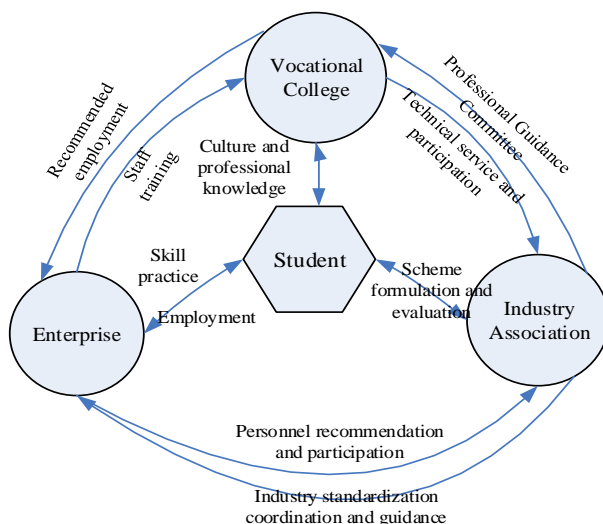


Figure2 Functional refining of ternary system

The software construction of the resource library can construct the virtual workshop to build the simulation experiment and the training environment according to the production situation of the enterprise. Virtual workshop can be combined with the situations of more than one enterprise of the industry so that students can get repeated, not bound skills training not causing significant quality accidents and economic losses.

The hardware construction of the teaching resource library can be learnt from the experience of Nanyang Polytechnic in Singapore and construction of all levels of key laboratory in colleges. It can construct a joint training center with advanced equipment combined with the experimental conditions and resource library construction funds of the construction unit. The leading colleges for the construction of the teaching resource library generally has a very good training conditions. But limited by the size of a single school enrollment, the idle rate of equipment is generally very high, resulting in waste. Resource library construction investment funds can be used to establish several reasonably distributed joint training centers providing for the use of several schools in the national scope, which solve the problem of low use rate of advanced equipment and achieve the sharing of resources.

The supervision function of the industry association can also be realized by the evaluation module of the teaching resource library to achieve the fair evaluation of related profession students objectively. Personnel and management of teaching resources joint training center can be directly under the Education Department or it can also be managed by the library construction colleges entrusted by Education Department modelling on the way of the construction of the State Key Laboratory.

The diagram of optimized teaching resource ternary system is shown in Figure 3. It not only has learning and teaching resources and it also has training conditions, objective evaluation, the third party supervision mechanism and the leadership to make up for irreconcilable benefit deficiencies in the implementation of ternary system and solve the random investment in the construction of teaching resources, which is a practical, standardized and scientific development mode of vocational education. It make possible for the state unified standard of teaching standards or training standards through the ternary system structure of basic teaching resource library. Plus the additional special content of enterprise or industry around, it can form effective interactive mechanism for the enterprise and the

school to complete the teaching task together. The knowledge and skills are updated and increased year by year through the library. This will be able to form an organic convergence of the teaching standards for nation, local government and enterprises so as to achieve a more advanced personnel training mechanism than German dual system personnel training standard.

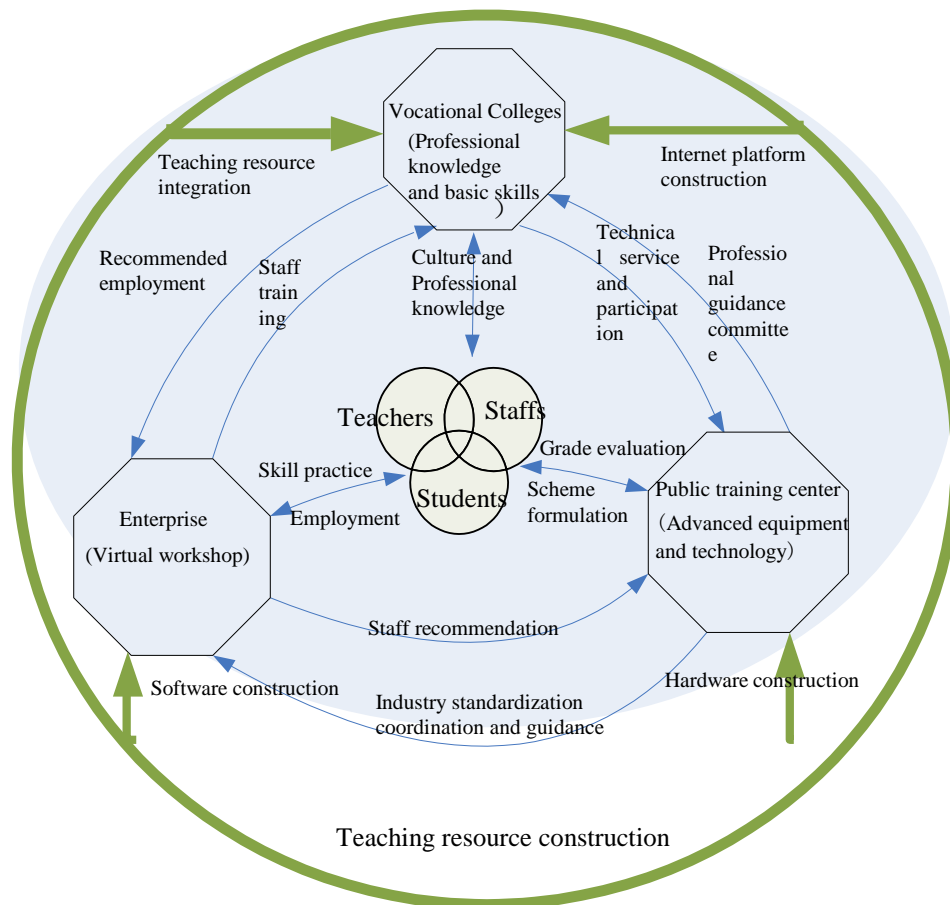


Figure3 Optimized structure diagram of ternary vocational education system in teaching resources library

## 5. Details needed to solve

### (1) Methods and positioning of implementation

The true meaning of the construction of teaching resources library is in the "use value". It will have vitality only combined into the courses which can be implemented. The current teaching resources library platform lacks the actual implementation of the environment and has low utilization in non-constructed institutions because of the teaching team and whether teaching resources library is elective or compulsory course and students study in the class or extracurricular. Similar to the Australian TAFE [8] training package, resource construction should be completely open and can be compulsorily used for a universal platform and teaching resources package for related profession so as to carry out the teaching process like ternary system.

### (2) Role position of resource construction

When those which should be browsed and shared by teachers are placed in front of the students, it will cause a lot of confusion and resentment such as guiding ideology, curriculum objectives, curriculum standards and the like, which have no relationship for the students' learning. So the construction of the resource library must conduct role differentiation. It should be sure to strictly distinguish the access, the interface, the teaching resources evaluation and the website maintenance content of student users, teachers and enterprise employee user.

### (3) Construction of public training center

Public training center has become the priority among priorities in similar ternary system, which need to invite experts, the government, enterprises, schools and research institutes to participate in the division of labor cooperation to build a diversified project team. It also need to be able to integrate industry good resources, continue to keep up with the advanced technology, ensure the correct direction, proper methods and quality of project construction to realize a win-win, collaborative development and keep pace with the times.

## 6. Summary

Vocational education is the "secret weapon" of economic development. The cultivated students directly go into the enterprise. The development of vocational education, to a large extent, determines the level of manufacturing and technology of enterprises. Vocational education is the engine of enterprise production and operation, and is directly related to the level of technology and production management of the enterprise.

At present, China carries out the modern apprenticeship system, the core of which is unable to coordinate the interests of all parties, cannot mobilize the enthusiasm of the enterprise and the industry and exists the problem of only school with the enthusiasm. The construction of teaching resources, because of the lack of specific implementation soil, no objective and the low utilization rate. The combination of teaching resources and modern apprenticeship system forms the similar ternary system with the advantages of learning and teaching resources, training conditions, objective evaluation, third party supervision, institutional leadership. Besides, it also don't lose the main role of school in the vocational education system, which is a scientific mode of vocational development education with implementation, standard.

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