

# Research on the Construction of ‘X’ Occupational Skill Certificates for Vocational Education in China

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Vocational education in China has issues, compared with developed countries. They include inadequate occupational standards, insufficient motivation for industries to participate in running schools, and uneven quality levels for running schools and personnel training. In 2019, the Chinese government promulgated the National Implementation Plan of Vocational Education Reform. It places vocational education on an equal footing with normal education, and highlights its important role in both educational reform and innovation, and economic and social development. Based on Basil Bernstein's pedagogy, in this paper we analyze the mechanism of ‘X’ occupational skill certificates. Major findings include: (1) In the knowledge production field, China updates its old occupational classifications, and formulates skills standards. (2) It does so through strictly selecting intense needs majors and vocational training, through evaluation organisation launch pilot programs, and through establishing 1,988 pilot colleges with communication and confirmation by provincial education administrative departments. (3) A hypothesised ‘Credit Bank’ is used in training, to achieve the conversion between academic education and short-term training.

**Key words:** *Basil Bernstein's pedagogy, X occupational skill certificates, vocational education, Credit Bank.*

## Introduction

The ‘1+X’ certification system is a combination of academic certification and several occupational skill certificates. It is mainly targeted at vocational colleges and application-oriented undergraduate universities, and pilot work will be launched in 2019 (State Council, 2019). Actually, there is a policy of A Resolution on Several Issues About the Construction of a Socialist Market Economy System adopted by the Chinese Communist Party (CCP). It was formally proposed to implement two certification systems. The first is the ‘1+1’

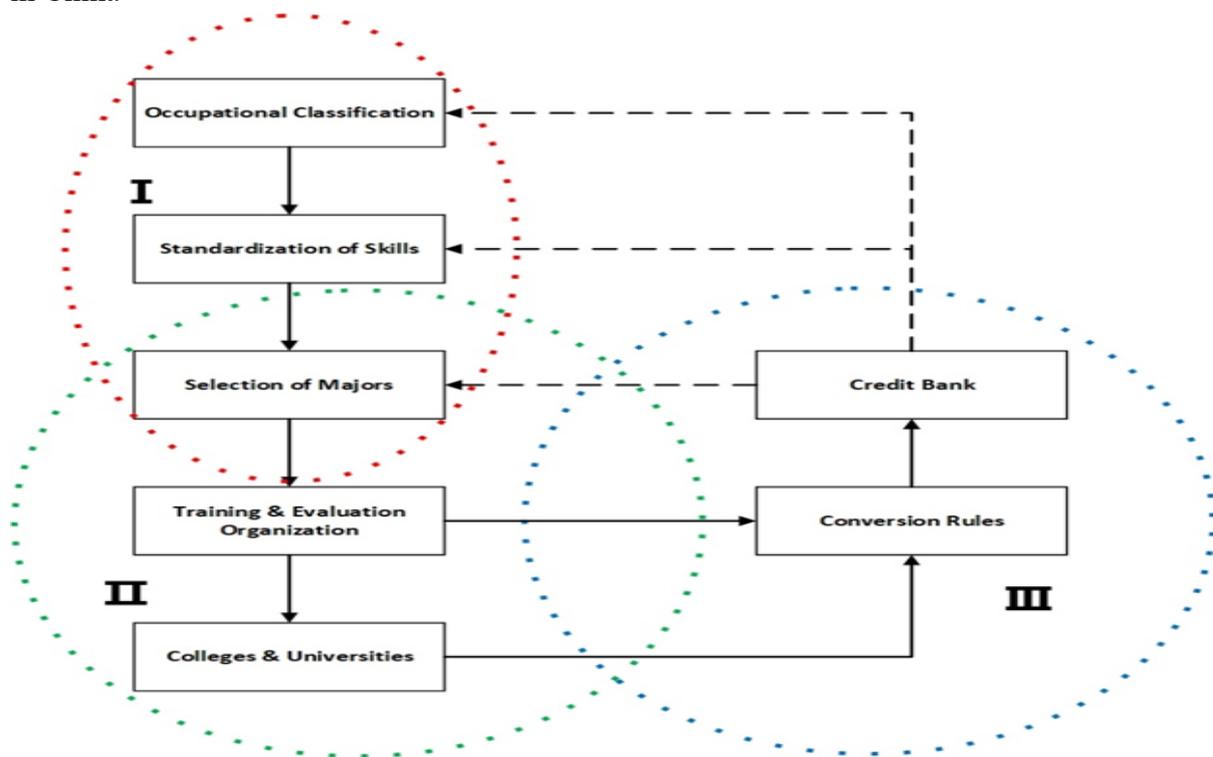
certification system, as early as 1993. It combines academic certification and one occupational qualification certification. In the following 25 years, vocational colleges and universities carried out and strongly promoted two certification systems. However, with the development of science and technology, there are some new issues in implementing the double certification system (Sun, 2019).

There are some problems in China's vocational education. They include inadequate systems, imperfect vocational skills training bases, inadequate system standards, insufficient motivation for enterprises to participate in running schools, insufficient supporting policies conducive to the growth of technical and technical talents, and an uneven quality of education and training (State Council, 2019). Since 2014, China has cancelled more than 70 percent of its vocational qualifications, including 154 vocational qualifications for professional and technical personnel and 280 vocational qualifications for skilled personnel (Ministry of Human Resource and Social Security, 2017). The previous certificates are too multifarious, cross-related and lowly recognised in industry. They can no longer match the needs of industrial development (Ministry of Human Resource and Social Security, 2017; Li, 2019). Many occupational qualification certificates were originally formulated by vocational colleges and universities. They have been cancelled. This policy leaves students without certificates, to apply for and take exams. It is necessary to reconceive and reconstruct the occupational qualification certification system, if the double certification system continues to be implemented (Liang, & Zhang, 2018).

There is not much research on the certification of occupational qualifications in China. Liang and Zhang proposed six measures for certification: (1) build a system that can meet the multidimensional requirements of students' development; (2) build suitable job groups for students; (3) establish diversified certification authorities; (4) build high value and authoritative certification; (5) be multilateral; (6) update rapidly. Nonetheless, in '1+X' certification, 'X' refers to the occupational level of certification. That is different from the occupational qualification certification. This indicates that in fields where there is a shortage of technical skills, the state has not set occupational qualification access requirements. This system encourages vocational colleges to vigorously carry out occupational skill certificate training, to alleviate the structural employment contradiction. In the National Implementation Plan of Vocational Education Reform, the state council come up with four measures, to construct national standards: (1) improve the standards related to education and teaching; (2) launch the pilot '1+X' certification system; (3) carry out high-quality vocational training; and (4) realize the recognition, accumulation and transformation of learning achievements. The new certification system must connect with industry needs and the content of teaching courses, to bridge industry and the academy, and so broaden the channel for the continuous growth of technical talents.

In Basil Bernstein's pedagogy there are three fields: knowledge production (I), recontextualization (II), and remanufacturing (III). In the field of knowledge production, different groups try to turn their knowledge into thinkable knowledge. In the recontextualization field, different groups transform thinkable knowledge into educational discourse, and construct a legitimate educational practice. In the remanufacturing field, different groups compete to identify and realize the educational code type embodied in the legal education practice, to facilitate the remanufacturing (Ma, Shang, & Wu, 2019). We try to build the mechanism of X occupational skill certification from six aspects: occupational classification, standardization of skills, selection of majors, training and evaluation organization, colleges and universities, and credit banks.

**Figure 1.** The current mechanism of X occupational skill certificates of vocational education in China



### Knowledge Production Field

Occupational standards lead the national occupational qualification system. They guide vocational education, vocational training, appraisal, skill competition and so on. From a global perspective, the standard-oriented reform has become a common goal of the world trend toward vocational education reform. However, for our country of China, it is dramatic that it is the standard itself, as the direction of reform, that is most unsuitable to meet the requirements of this reform.



### ***Occupational Classification***

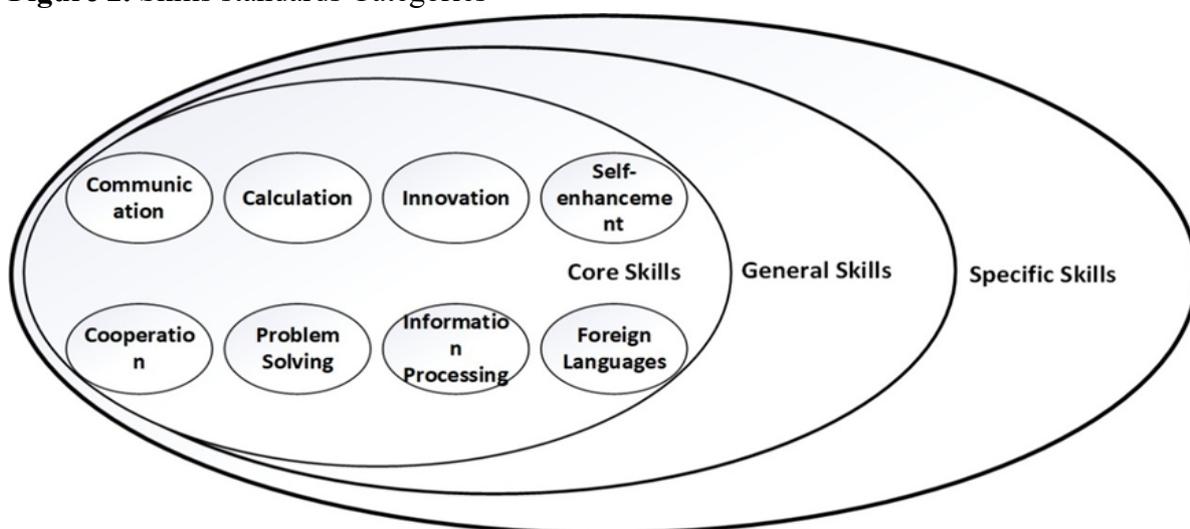
China's occupational standards are derived from the standard of workers' skill levels, formulated under the planned economy system. At its original formulation, it was deeply influenced by the highly centralized system of the Soviet Union (Shi, 1996; Chen, 2004). The first Dictionary of Occupational Classification was published in 1999. From the perspective of dynamism, it cannot respond quickly to the development of productivity and the progress of technology. In terms of structure, it has more of the framework and characteristics of the educational discipline system, which does not meet the requirements of an occupational system. In methodology, it usually adopts the knowledge analysis method, to pursue epistemological integrity, rather than realising occupational functions and advancing the application of technical skills (Ministry of Civil Affairs, 2010).

The revised 2015 Dictionary of Occupational Classification provides new occupational classifications. It includes eight major categories, 75 middle categories, 434 minor categories and 1481 occupations. Compared with the 1999 edition, there are nine more middle categories, 21 more minor categories, and 547 fewer occupations (Committee on Revision of National Occupational Classification, 2015). This new classification gets rid of the traditional subject-oriented model of 'basic knowledge-professional basic knowledge-professional knowledge-related knowledge', but adopts the structure of professional function modules under the guidance of functional job analysis (FJA) (Shi, 1997). According to the FJA, the basic theoretical framework of the new occupational standard can be designated thus: (1) Occupational title: the definition and social characteristics of a job; (2) Occupational function module: the basic functional unit that constitutes occupational activities, which in many cases can be separated and have relatively independent significance. The occupational function module is divided into two categories: basic module and optional module. When necessary, the occupational function module can be assessed separately and awarded with a relatively independent certification. (3) Occupational skill module: the minimum skill category element required to realize the above functions, which is also the actual working step when completing a functional module unit. (4) Operation specification: specific requirements for completing the operation of the skill module. (5) Activity area: complete the main work scope of the skill module, including the requirements for specific conditions and situations. (6) Knowledge content: complete the basic knowledge requirements of the skill operation, which is characterized by matching with the skill requirements in the operation specification. (7) Assessment guidance: the basic requirements of skill module assessment (Ministry of Civil Affairs, 2010).

### **Standardization of Skills**

When formulating the national occupational standards system, Ministry of Human Resource and Social Security should determine and formulate core skills standards, industry general skills standards and specific occupational skill certificates standards at different levels, so as to meet the different needs of vocational education, training and assessment and improve the applicability and openness of occupational standards. The core skills include eight categories: communication, calculation, innovation, self-enhancement, cooperation, problem solving, information processing, and foreign language (Chen, 1999).

**Figure 2.** Skills standards Categories



### **Selection of Majors**

Selection of majors belong to both knowledge production field and recontextualization field. According to the new occupational classification and the needs of industries, the Department of Vocational and Adult Education in the Ministry of Education organizes government, colleges and industries to discuss. Finally, these different groups try to turn their knowledge into thinkable knowledge and form a consensus to create intense need majors. Meanwhile, Only after confirming majors can training & evaluation organizations and colleges & universities develop training curriculums, then transform thinkable knowledge into educational discourse and construct a legitimate educational practice (Jabarullah et al., 2019).

With the initial establishment of national occupational standards, China has decided to promote vocational colleges training in about 10 intense need fields since 2019, including modern agriculture, advanced manufacturing, modern service and other strategic emerging industries. At the beginning of the year, Department of Vocational and Adult Education in Ministry of Education launched six majors, such as building information model (BIM), Web front-end development, logistics management, elderly care, automobile application and maintenance,

and intelligent new energy vehicle. In August, the second list of majors selected includes E-commerce data analysis, online store operation, industrial robot operation, industrial robot application programming, special welding technology, intelligent accounting, maternal and child care, sensor network application development, dementia elderly care, and cloud computing platform operation & development.

### **Recontextualization Field**

Vocational education includes vocational college education and vocational training. Vocational colleges and applied undergraduate universities complete teaching tasks and vocational skills training in accordance with national teaching standards and prescribed duties. At the same time, social forces must be mobilized to supplement the shortage of colleges and to enhance the connection between colleges and industries (State Council, 2019). Vocational colleges and training & evaluation organizations will work more closely together than ever before. After more social organizations participate, these two groups will transform more thinkable knowledge into educational discourse and construct a legitimate educational practice.

### ***Training & Evaluation Organizations***

Through broader market access and stricter supervision, the government try to support and cultivate the excellent and the strong organizations, which is good to ensure the quality of training and the ability of students. It follows three principles: (1) selecting a group of established brands. (2) cultivating a group of growing brands. (3) planning a group of areas where there is a need but no established project. Priority should be given to those organizations that have formulated national occupational standards and completed the compilation of standard teaching materials, have experts and trainers team, have financial strength and excellent training achievements of more than 5 years. By September, the Department of Vocational and Adult Education in the Ministry of Education had selected and released two lists of training and evaluation organizations.

In table 1, the initial list of training & evaluation organizations was published by the Department of Vocational and Adult Education. We find that these organizations are all subordinate to the state organs, which not only have strong social credibility, but also have been closely linked with the industry. It can really prevent vocational education from being separated from the actual needs of the industry. Take China Federation of Logistics & Purchasing (CFLP) for example, founded in 1980, it's the only integrated logistics and purchasing association in China approved by the State Council. And, it's the president of International Federation of Purchasing and Supply Management (IFPSM). There are more than 9000 group members in CFLP. In addition to organizations with brand influence, in some emerging industries, the Ministry of Education has consciously cultivated a number of growing

or start-up organizations to meet challenges such as digital economy, artificial intelligence and aging population. In table 2, most of the organizations are small and medium-sized enterprises in Beijing, indicating that the government has consciously relaxed access.

**Table 1:** The initial list of training and evaluation organizations (April, 2019)

<b>Organization Name</b>	<b>Certificate Name</b>	<b>State Organs Attributed</b>
Zhongke Research Center of Building Industrialization Innovation	Building information model (BIM)	Ministry of Housing and Urban-Rural Development
China Electronic Information Application Education Center (CEIAEC)	Web front-end development	Ministry of Industry and Information Technology
China Association of Social Welfare and Senior Service (CASWSS)	Elderly care	Ministry of Civil Affairs
China Federation of Logistics & Purchasing (CFLP)	Logistics management	State Council
China Standard Certification (CSC)	Automobile application and maintenance	State Administration for Market Regulation
	Intelligent new energy vehicle	

**Source:** Retrieved from Ministry of Education

**Table 2:** The second list of training and evaluation organizations (August, 2019)

Organization Name	Certificate Name
Beijing Bodao Qiancheng Information Technology Co., Ltd	E-commerce data analysis
Beijing Hongke Jingwei Technology Co., Ltd	Online store operation
Beijing Xinao Shidai Technology Co., Ltd	Industrial robot operation
Beijing Saiyu Da Science and Education Co., Ltd	Industrial robot application programming
CSSC Naval Architect Maker Education Technology Co., Ltd	Special welding technology
Fujian Zhongliang Group Education Technology Co., Ltd	Intelligent accounting
Jinan YGDJ Service Co., Ltd	Maternal and child care
Beijing Newland Education Group	Sensor network application development
Beijing Zhongmin Fuzhi Education Technology Co., Ltd	Dementia elderly care
Nanjing 55 <sup>th</sup> Research Institute of China Electronic Technology Group Corporation	Cloud computing platform operation & development

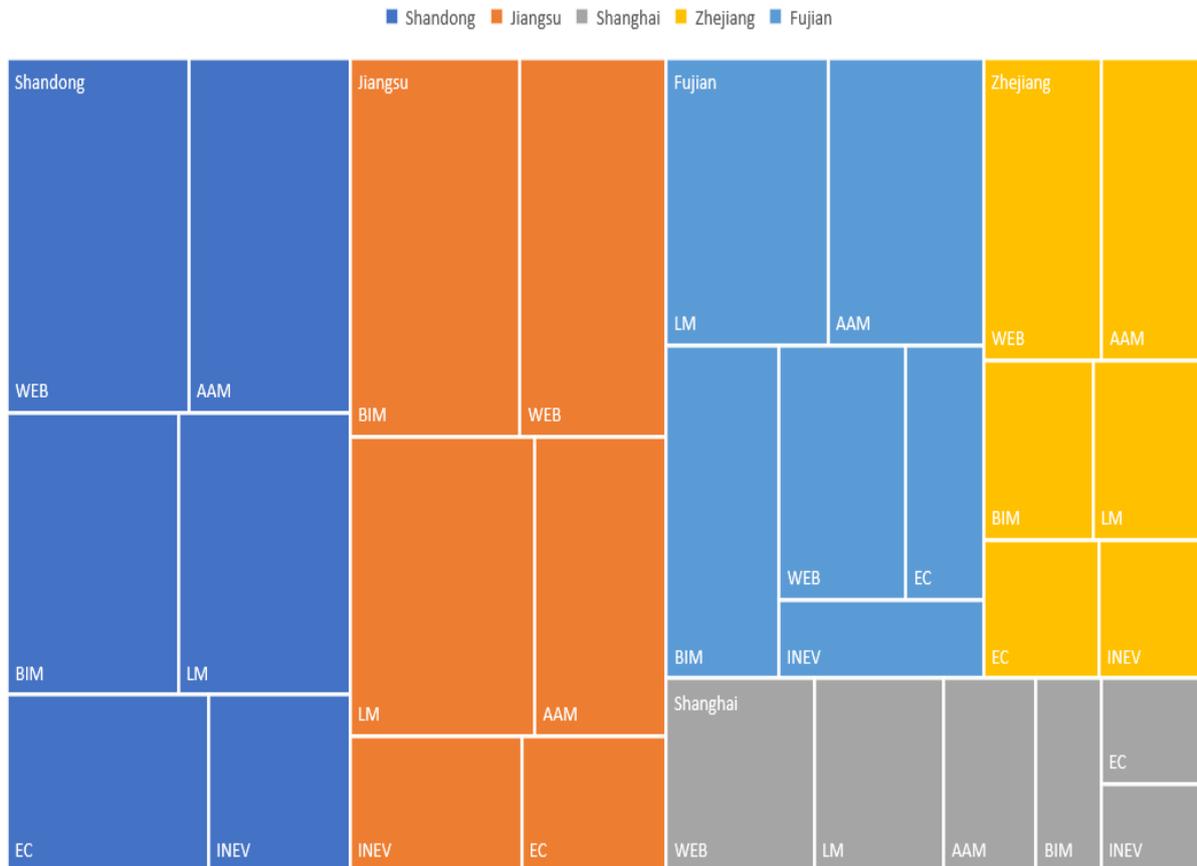
**Source:** Retrieved from Ministry of Education

### *Colleges & Universities*

‘1+X’ pilot institutions are mainly higher vocational colleges and secondary vocational schools (excluding technical schools), like provincial and above demonstration (mainstay, high quality) higher vocational colleges, national secondary vocational education reform and development model schools, institutions with industry characteristics. And, the pilots of undergraduate vocational colleges, application-oriented universities and the Open University of China are voluntary to participate. After confirmation through provincial education administrative departments and training & evaluation organizations, the distribution of the first batch of ‘1+X’ pilot colleges & universities is as follows: building information modelling (BIM, 320), Web front-end development (WEB, 422), elderly care (EC, 231), logistics management (LM, 355), automobile application and maintenance (AAM, 465), intelligent new energy vehicle (INEV, 195). In this article, the data of pilot colleges & universities in five eastern coastal provinces of China are extracted. We use Treemaps to make simple visualization of hierarchy analysis. The blue and orange areas are the northern provinces, covering more than half of the map. It is not hard to see that more colleges & universities in northern provinces meet the requirements of the ‘1+X’ system than those in southern provinces. In the southern provinces on the right side, although there are many colleges & universities in economically developed provinces, the number of colleges & universities

actually participating in ‘1+X’ is the least. One possibility is that institutions in Zhejiang province or Shanghai do not know enough about ‘1+X’ to participate. Furthermore, the education administrative departments strictly control the quantity.

**Figure 3.** Tree Maps of eastern coastal provinces of China

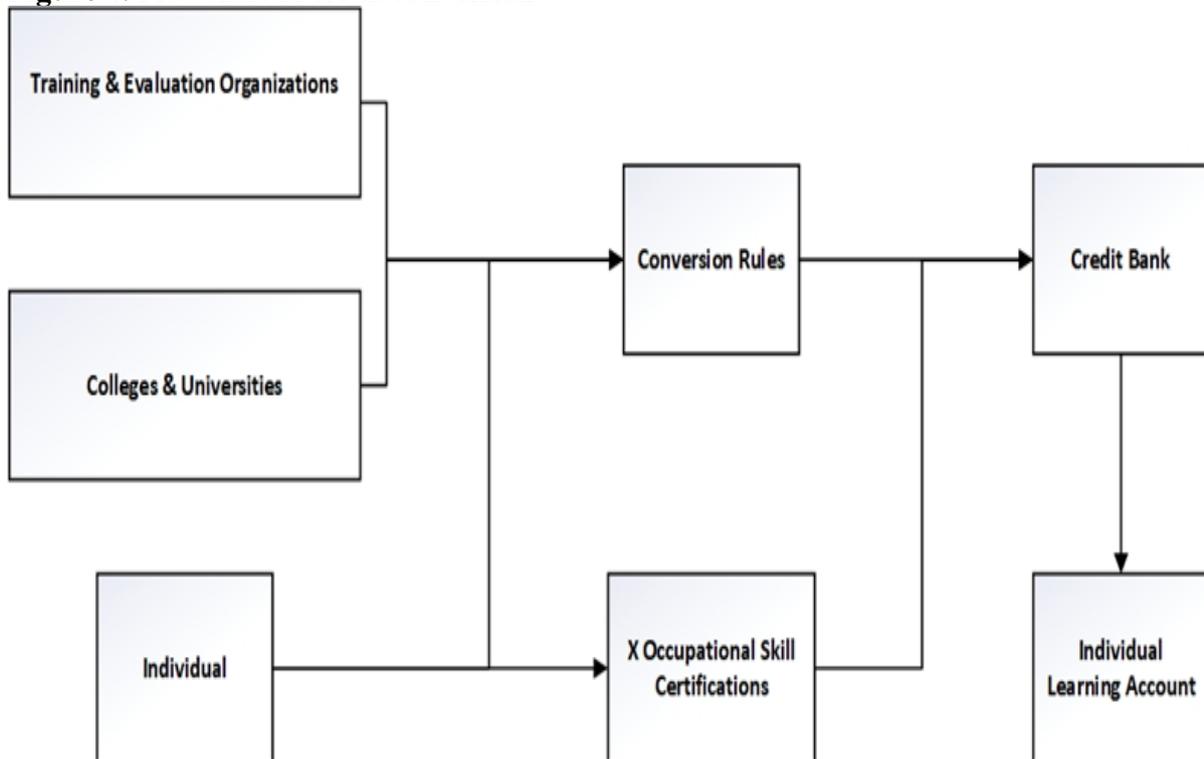


### Remanufacturing Field

Credit bank is a learning incentive system and educational management system that simulates some functions and characteristics of Banks, and measures learning results according to learning classification, and realizes the storage, certification, accumulation and conversion of learning achievements at all levels (Yan, 2015). At the beginning, in order to solve the problem of rural labour transfer training, the Ministry of Education established a Credit Bank system, which timely deposited the learning and training results into the Credit Bank and uniformly recorded them into learners' learning accounts in the bank (Ministry of Education, 2004). There is an urgent need to strengthen vocational education in rural regions (Shi, & Gao, 1995). Because most farmers finish their education in stages through part-time study, credit Banks effectively bridge the gap between academic education and short-term training.

In July 2016, the learning achievement recognition alliance was formed by six open universities and six training & evaluation organizations. Since then, fifteen more colleges & universities and five training & evaluation organizations have joined the alliance. After obtaining the X occupational skill certificates issued by the training & evaluation organizations, students can apply for credits. If the academic credits reach the required volume, the Open University of China will issue the corresponding academic certification. For example, China Federation of Logistics & Purchasing has developed the X occupational skill certificates of professional ability for logistics practitioners, which can replace the credits of the following courses offered by colleges and universities: Logistics Information Technology, Warehousing and Distribution Management, Marketing, Modern Logistics Equipment and Technology Practice, Logistics Transportation Management, Financial Management, and Logistics Cost Management.

**Figure 4.** Flowchart of credit conversion



In addition, in figure 1, we also find that the field ( I ) and field ( II ) overlap, and field ( II ) and field ( III ) overlap. However, in areas where the field ( I ) and field ( III ) do not overlap, we use dash lines to show where the two fields may be extended in the future. The Credit Bank should not be like the mythical beast PiXiu that is only-in-no-out in China. When the content of the field ( I ) needs to be updated and adjusted, the Credit Bank will analyze the learning data of each student and give real-time and dynamic feedback to the relevant organizations or government, so that X occupational skill certificates system can timely respond to the emerging industries.

## **Conclusions**

This paper comprehensively introduces and analyses the status quo of X occupational skill certificates in China. From the formulation of national occupational classification twice to the standardization of skills, China's vocational education has been reforming, seeking knowledge production fields that meet its own development needs. The Ministry of Education has vigorously promoted the construction of intense need majors related to emerging industries. Both training & evaluation organizations and colleges & universities have actively participated in the pilot work of 'X'. Finally, the credit bank will evaluate and transform the learning achievement of students.



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