ISSN:2790-167X DOI: 10.56028/aehssr.4.1.223.2023

Research on the Construction of Core System of Credit Bank in Vocational Education

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Abstract. Lifelong education and lifelong learning are increasingly implemented all over the world. The reform and development of education system and training mode are facing new opportunities and challenges. Based on the concept of lifelong education, we must establish the core system of credit bank as soon as possible so as to achieve the orderly operation of the credit certification, conversion, accumulation and exchange process of vocational education. Only in this way can we gradually establish an effective credit bank for vocational education, and achieve the vocational education goal of attracting social members to the lifelong learning system.

Keywords: vocational education, credit bank, credit, lifelong learning.

1. Introduction

The "credit bank" system is a visualized expression that identifies, accumulates and transforms different types of learning achievements in the way of credit by simulating some functions of banks or drawing on some characteristics of bank credit management system[1]. Credit Bank is an important initiative of educational system in the lifelong education society[2]. In the credit bank, credit is cash. This system can not only enable students to break through the limit of learning period and accumulate credits for their achievements, but also break through the traditional professional limit and combine the learning achievements obtained through different learning approaches with relevant educational experiences. The highlight of the credit bank is that the system can realize the mutual conversion of credits between different types of education based on expert evaluation, so that it can Form a complete set of learning achievement management and service system, which is learner-centered, and focusing on credit certification, conversion, accumulation and exchange. This system can reflect learners' dominant position in the learning process, and realize mutual recognition, cohesion, accumulation and transformation of different types of learning achievements. The system construction is very important for the education credit bank. We must focus on establishing and perfecting the "credit bank" to support the talent selection system[3]. We must focus on the construction of the certification, conversion, accumulation and exchange system of vocational education credits based on objective analysis, so that we can gradually promote the construction of the vocational education credit bank.

2. Credit certification system

Credit certification refers to that the students who have completed the registration in the credit bank of vocational education can be granted equivalent credits by the credit bank after each course. The credit bank can automatically grant credits to students according to their course learning achievements after the scientific credit certification system is established. Students can check their credits through their credit bank accounts through open channels.

The credit certification of vocational education can be achieved through two channels: course credit certification and vocational skill credit certification.

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2.1 Course credit certification

Course credit certification refers to the process in which the credit bank grants corresponding credits to vocational education students after they participate in the course learning and meet the learning requirements. It mainly includes two types. One is to give students all credits for the course after passing the course assessment, which is aimed at the learning courses that need to be examined. The second is to gain credits by accumulating learning time, which is mainly an online course for knowledge expansion and updating. For this type of course, the credit bank should comprehensively assess students' online learning time, exercise assignments and interactive questions, and then give reasonable credits to students. For the same learners who repeat the same course or courses of the same type and level, the credit bank will not give credits repeatedly.

2.2 Professional skill credit certification

The trainees participating in vocational education may have many years of work experience, some of them have also obtained professional qualification certificates recognized by authoritative institutions, which proving their learning achievements in the industry. The credit bank should also convert the vocational skills acquired by the trainees into corresponding credits according to the established rules with the support of the expert system, reflecting the characteristics of vocational education. This system can reflect the characteristics of vocational education.

3. Credit Transfer System

Credit bank is a service provided by authorized education organization so that customers can save, manage and exchange education credits[4]. Credits The credits of a bank must reflect the exchange value just like the cash of a bank., Vocational education credit banks need to classify various credits and establish reasonable rules for conversion due to the complexity of various credit sources.

The credits of vocational education that need to be converted can be divided into four types. One is general credits, that is, the original credits obtained by vocational education students through all learning channels of vocational education. The second is post credits, which can also be called compulsory credits, that is, credits obtained by completing post compulsory courses in the credit banking system of vocational education; The third is extension credits, which can also be called elective credits, that is, credits obtained from completing knowledge expansion and updating courses in the credit banking system of vocational education; The fourth is qualification credits, that is, credits obtained by completing qualification courses can be exchanged for corresponding qualification certificates after meeting the qualification certification standards. The post change, post adjustment and major change of vocational education students are relatively frequent, and the credit transfer standard should also change accordingly. Although the credit bank account is unique and lifelong, it does not mean that students' post credits can be transferred directly, but must be transferred from general credits to post credits in the credit account according to certain rules. Due to the complexity of professional fields and post settings, credit conversion is extremely complicated.

3.1 Correlation analysis of credits

Credit is the abstract expression of effective learning knowledge and skills. The correlation of credits corresponding to different knowledge and skills can be divided into three situations. First, if different knowledge and skills are not intrinsically related, their credits are completely independent; Second, two different knowledge and skills are inclusive, so their corresponding credits should also be inclusive; Third, two different knowledge and skills are cross related, so their corresponding credits should also be cross related. As shown in Fig. 1.

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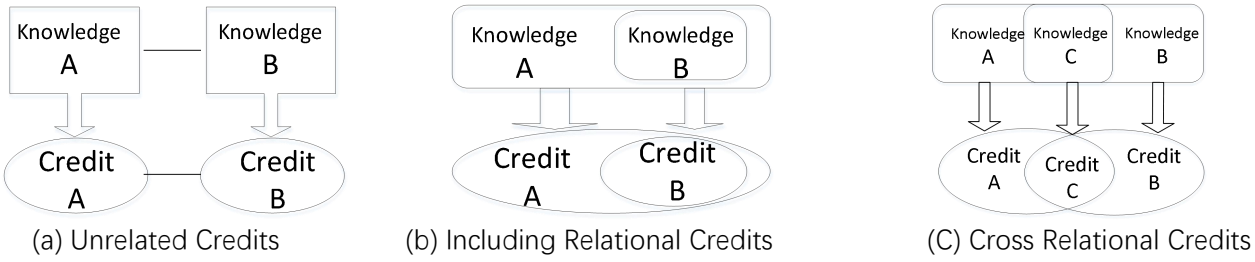

Fig. 1 Credit Relationship

In the first two cases above, the relationship between credit conversion is relatively clear, and the operation of credit conversion is relatively simple in practice. In the third case, there is a cross relationship between courses, and the rules of credit transfer are relatively complex, which is a difficult point in the construction of the credit banking system. Course credit conversion is a regular work in the operation of credit banks. The selection of conversion methods must rely on computer systems to reduce the burden on operators. In this paper, the principle of similarity calculation is introduced and a credit calculation method based on curriculum similarity is proposed. This paper proposes a credit calculation method based on curriculum similarity, which uses the value of curriculum similarity as the basis to judge the component of convertible learning.

3.2 Credit calculation method based on curriculum similarity

Vocational education curriculum is a modular curriculum closely related to posts and majors, which can be reflected through knowledge point collection, knowledge point cognitive level and knowledge learning methods. Courses similarity refers to the similarity between the two courses in terms of knowledge content, cognitive level and learning methods. Its value range is [0, 1]. The larger the value, the higher the similarity between the two courses. Convert the description features of modular courses into feature vectors, which are knowledge point feature vectors, learning requirements feature vectors, and training methods feature vectors.

①knowledge point eigenvectors. First, build a knowledge module comparison knowledge point set. For example, the knowledge modules of the two courses to be compared are S1 and S2, with Xi representing different knowledge points. The two knowledge modules are represented by the set of knowledge points as S1: { X1，X2，X3，X4}, S2: { X1，X2，X5，X6}. Define the knowledge modules of the two courses as S, S=S1 ∪ S2, that is, the knowledge module comparison knowledge point set S: { X1，X2，X3，X4，X5，X6}. The second is to construct the feature vector of the comparative knowledge module. The feature vector of the knowledge module is used to describe the difference between the knowledge modules to be compared (such as S1 and S2 above) and the knowledge module comparison knowledge point set (such as S above). Each specific value in the knowledge point feature vector is represented by "0" or "1". If a knowledge module contains the content of a common set, it is assigned a value of "1"; if it does not, it is assigned a value of "0". According to this rule, the eigenvectors of the two knowledge point sets (S1, S2) in the above example can be represented by vectors, where the eigenvector L1 corresponding to S1={1, 1, 1, 1, 0, 0}; The eigenvector L2 corresponding to S2={1, 1, 0, 0, 1, 1}.

② Learning requires eigenvectors. Using Bloom's new goal classification, namely memory, understanding, application, analysis, evaluation, and creation, learning requirements are represented by preset values, namely {memory, understanding, application, analysis, evaluation, and creation} are represented by numerical values as {1, 2, 3, 4, 5, 6}. If the learning requirements of the four knowledge points corresponding to S1 above are memory, application, evaluation and understanding, then the vector description is {1, 3, 5, 2}.

③ Calculation method. The calculation method is designed according to the principle of from small to large, from sub item to global. The algorithm is implemented step by step in the order of

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calculating the similarity of knowledge points, then calculating the similarity of knowledge modules, and finally calculating the similarity of courses. The design calculation formula is as follows:

$$SimK_{ab} = \sum_{i=1}^{n} Q_i \times (Q_{X'} \times SimX_i^{'} + Q_{X''} \times SimX_i^{''} + Q_{X'''} \times SimX_i^{'''}) \quad (1)$$

Among them, $SimK_{ab}SimK_{ab}$ represents the similarity between course a and course b;

$X_i^{'}X_i^{'}$ is the eigenvector of the ith module knowledge point, $Q_{X'}$ $Q_{X'}$ represents the calculated weight of the knowledge point, $SimX_i^{'}$ $SimX_i^{'}$ indicates the similarity of feature vectors of the ith module knowledge point;

$X_i^{''}X_i^{''}$ is the learning requirement vector of the ith module knowledge point, $Q_{X''}Q_{X''}$ represents the calculated weight of the learning requirements of the knowledge point, $SimX_i^{''}SimX_i^{''}$ indicates the similarity of feature vectors required for learning the ith module knowledge point;

$X_i^{'''}$ $X_i^{'''}$ is the training method vector of the ith module knowledge point, $Q_{X'''}$ $Q_{X'''}$ represents the calculation weight of the training method of the knowledge point, $SimX_i^{'''}$ $SimX_i^{'''}$ indicates the similarity of training method eigenvectors of the ith module knowledge point; Q_iQ_i represents the calculation weight of the ith knowledge module.

The value range of each weight in the above formula is (0~1), and the specific assignment is scientifically determined after the investigation of the professor in charge of the course and relevant experts. Generally, curriculum similarity is not transitive. After calculating according to the course similarity rules, on the one hand, it can determine the value of the conversion from general credits to post credits for the newly adjusted post (specialty) personnel; on the other hand, it can determine the course content that the comrade needs to learn new according to the course similarity, and make a new course list for vocational education students to learn targeted in the new post.

4. Credit accumulation system

According to the learning achievements of vocational education students, the credit bank management center of vocational education automatically completes the credit entry, conversion and accumulation, which reflects the serviceability of the credit bank system. Students can log in to the credit bank system to query their learning progress and credits. When the credits are accumulated to the specified amount, students can log in their personal account to "withdraw credits" and exchange for corresponding qualification certificates. The credit accumulation process is similar to the bank's "zero deposit and lump sum withdrawal" rule. The main difference between them is that part of the credits have been set with a valid period. If the valid period is exceeded, this part of the credits will become invalid. As a result, relevant courses need to be re studied.

5. Credit exchange system

We can not only save money from the bank, but also withdraw money from the bank. Of course, the credits in the credit bank must also have the functions of "saving" and "withdrawing". The purpose of vocational education students to accumulate and store credits is to cash credits and obtain certificates. Therefore, the credit exchange system of vocational education credit bank is the basic system of credit bank operation.

The purpose for students to store and accumulate credits is to use, which is the embodiment of the value of credits and the source of motivation for vocational education students to participate in vocational education. There are two ways to exchange credits: one is to exchange credits for certificates, that is, to exchange certain credits for qualification certificates, education and degree certificates, and the other is to exchange certificates for awards and allowances. The credit exchange system should follow the principle of equivalent exchange. Whether the credit exchange can be realized depends on whether the conditions of the exchange parties are consistent. For

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vocational education students who participate in vocational education learning, the standard of credit exchange is whether the type and quantity of credits they have accumulated meet the credit standard required for exchanging certificates (awards, etc.). For the managers and organizers of vocational education, they should combine the characteristics of vocational education, improve the qualification, professional qualification certification system and reward system, so that students can learn more, gain more and use what they learn.

The process of credit exchange is as follows: After vocational education students have completed the required credits, they log in to the credit bank information system of vocational education and submit an application for exchanging qualification certificates, degree certificates or related awards; The Credit Bank Exchange Processing Center shall review the student's credits according to its responsibilities and authorities, and handle them in strict accordance with standards and relevant procedures; When the student has obtained the certificate or applied for the award successfully, the credit bank will lock the corresponding credits of the student and register the relevant information. Students cannot apply for similar certificates within the validity period repeatedly. The credit bank will reject it and inform the student of the reason why the request for credit exchange has not been approved if the application for credit exchange that does not meet the criteria.

6. Summary

This paper has deeply studied the construction of the core system of the credit bank for vocational education. The credit bank is designed to provide opportunities to earn academic qualifications at low cost and in collaboration with the traditional system[5]. It has deeply studied the credit certification system, the credit conversion system, the credit accumulation system, and the credit exchange system based on the characteristics and laws of vocational education. It has proposed a credit algorithm formula based on curriculum similarity with regard to the difficult problem of credit conversion, which has solved the key problem of the construction of the credit bank for vocational education. The research has carried on the forward-looking exploration for gradually constructing the credit bank of vocational education.

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