

Interface Design for Credit Bank System and Level-Cross Curriculum system

Zhao Yang

Xuefu Rd. 113, Yunnan Open University, Kunming, Yunnan, China

zhaoyangcc@gmail.com

Keywords: credits accumulation and exchange, level-cross curriculum system, course depreciation, Upgrade credit cognizance rules, smart reminder for exchange

Abstract. Author designs credits accumulation and exchange model, the corresponding curriculum system, and the interface for them. This 3 parts form a credit bank system serving for lifelong learning. The innovation points are courses supermarket structure, level-cross curriculum system, course depreciation, and smart reminder for exchange.

Introduction

Credit bank provides learning account for all learners, and builds up a lifelong learning overpass. Learners can accumulate credits and exchange outcomes with the account. Credit bank in China is still in a start stage. And there are no uniformed standard, model, management system, and curriculum system serve for it. Base on lifelong learning idea, author designs a credits accumulation and exchange model, a corresponding curriculum system and test pattern, and an interface for both above.

1. Frame and Characteristics of Credit Bank Accumulation and Exchange System

Credit bank admits, accumulates and exchanges credits for learners. This is frame of credit bank:

1.1 Create an account for every learner.

The account is lifelong valid, with the learner's credits, scores, and outcomes in it. Learners can withdraw credits to exchange diplomas according to graduation rules. Scores of used courses still stored in the account.

1.2 Choose learning target.

At every beginning of study, learner should determine which course and level to learn, then, accomplish learning procedure according the uniformed course standard and pass the corresponding level test. By this step, learner can win the credits of the course. There are several levels such as vocational high school, college, undergraduate, postgraduate, and so on. Different levels of one course have different requirements of contents and test.

1.3 Credits are stored in the bank account.

If a learner accomplishes learning procedure and pass the corresponding level test of a course, the credits and score were stored in the bank. And his credits will grow up. There is a progressive relationship between different levels of a course, and learners can upgrade the level of one course by learning. So, the grow up including 2 sides: amount and grade.

1.4 Learner can exchange diploma (or professional certificate) by credits.

When the credits in one account growing up to a certain amount and degree, a diploma (or professional certificate) can be exchanged. At the same time, the diploma (or professional

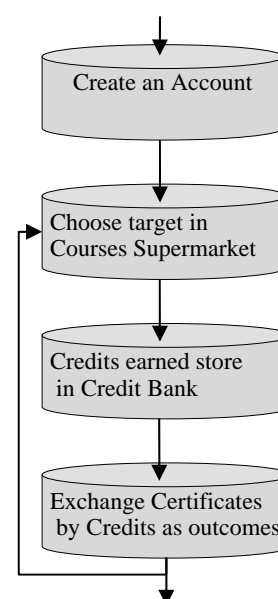


Fig.1 Credit bank framework

certificate) was stored into the account, and all of the credits still keep in the account to exchange for other diploma (or professional certificate).

Credit bank has characteristics that lifelong credits accumulation, flexible outcomes exchanging, and outcomes lifelong validity. It is convenient for learners choose appropriate courses and levels to learn, and upgrade levels at anytime according actual situation, cause the credit bank. The lifelong climbing learning pattern was come into being that can serve time and energy for learners by avoiding repeated learning. This is a convenient knowledge and skill promotion channels for all people.

2. Some Problems with Currently Situation for Credit Bank

Credit bank is a huge system. Some educational institutions in China start to build the system. And some of them have built up the embryo. But it is still a long distance way from perfect yet. The course system, test pattern, and manage system should be adjusted to achieve the credit bank system.

2.1 There is no uniformed course standard.

Every university has his own course requirement, management system and credit rules, and course naming and course ID are different. This is difficult for courses stored into credit bank and level link authenticated. To solve this, uniform courses standard and course ID rules should be set down.

2.2 There are 2 contradictions. One is between the lifelong learning idea and learner's name on roll term of validity. The other is between knowledge renew and lifelong learning outcomes validity.

Normally, it is incomplete credits system in most university in China. They set a limit to the validity of student's name in roll, 4-8years. If student haven't obtained all credits required in the limited years, they will get associate degree or be winded up passively. This is contradict with the rule in credit bank that learning account is lifelong valid.

However, if the system set down a rule that the credits obtained by learner are everlasting, it brings another problem. Science and knowledge are developing, and the course content and requirement are changing accordingly. The learner with everlasting credits will not match the need of science and knowledge development at one day.

2.3 Isolated curriculum system could not satisfy the lifelong level link up education mode

Credit bank provides link up pattern between all levels of higher education. At present time, universities in China have their own curriculum system and rules of graduation, one curriculum system for one level, without link up channel. In this pattern, if student want elevate his degree level, he have to do a lot of useless repeated study.

3. Solutions: Level-cross Curriculum System and Credits Accumulate and Exchange System

To building up a perfect credit bank system, a reasonable credit accumulation and exchange system and logical link up curriculum system are necessary. The demand of social and knowledge development and the learner's learning experience and outcomes should be taken into consideration at the same time. In this part, author proposes solution for problems mentioned above.

3.1 Level-cross curriculum system model

3.1.1 Courses supermarket and course ID

Course is single element. Courses supermarket is the total collection of courses, with all credit bank's courses contained in it. Courses supermarket is the foundation of credit bank. Base on course, learners choose learning target, credit bank refine credits, the account accumulate and exchange credits. Course ID is the unique tag (major key) of a course in the supermarket.

For accessing into the credit bank, the MOE (ministry of education) should set down a set of course ID for universities. And universities must use this set of ID for their course management. Setting the efficient course ID rule is the data structure

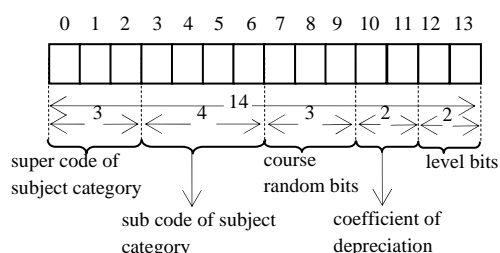


Fig.2 Course code compile rule

foundation of the curriculum system mode and credit system model. Author design an ID rule with 14 bits. As shown in Fig.2, the ID structure is:

- (1) Bit0-6: subject category code set by MOE. In this part, bit0-bit2 are super-code of subject category, and bit3-6 are sub-code of subject category;
- (2) Bit7-9: course name. It is produced by system randomly according to different course name. 3 bits are enough for this part, cause of it is mostly impossible that over 1000 courses in a same subject;
- (3) Bit10-11: coefficient of depreciation, using 'year' as unit. For example, bit10-11 is 06 denotes that this course credits will invalid 6 years later after the credits were obtained by learner;
- (4) Bit12-13: course level. Set the rule uniformly that 01 is vocational high school level, 02 is college level, 03 is undergraduate level, 04 is postgraduate level, and so on....

In this course ID, information of this course will be easily recognized that which subjects it belongs to, which level it belongs to, and how many years it will be invalid after learning. This will lay a foundation for course supermarket management, level-cross curriculum system, different level course credits link up, and different professional level link up.

3.1.2 Modularized course and upgrade test pattern

Modularized course here extremely refers to different level with different modules. One course is divided into several parts by different level requirements, such as vocational high school level, college level, undergraduate level, postgraduate level, and so on...Different level module has separate teaching program, contents requirements, and test requirements. In the level-link module course program, a higher level course consists of the lower level course and upgrade modules.

Corresponding with the modularized course, the test pattern should be adjusted. Every level course (besides the lowest level) has 2 sets of test program. They are full-test and upgrade-test. The former one is full course knowledge test of the level, and the latter one is the upgrade part test for the part comparing with the lower level. Learner can choose the different pattern with his situation. For example, if a learner with college level credit of a course wants to win the undergraduate level of this course, he can choose the full-test or upgrade test freely. And if a learner without any background of this course, he should choose the full-test. He will win the undergraduate course credits after accomplishing the learn process and pass the test. (The Fig.3 demonstrate the modularized course and upgrading test pattern)

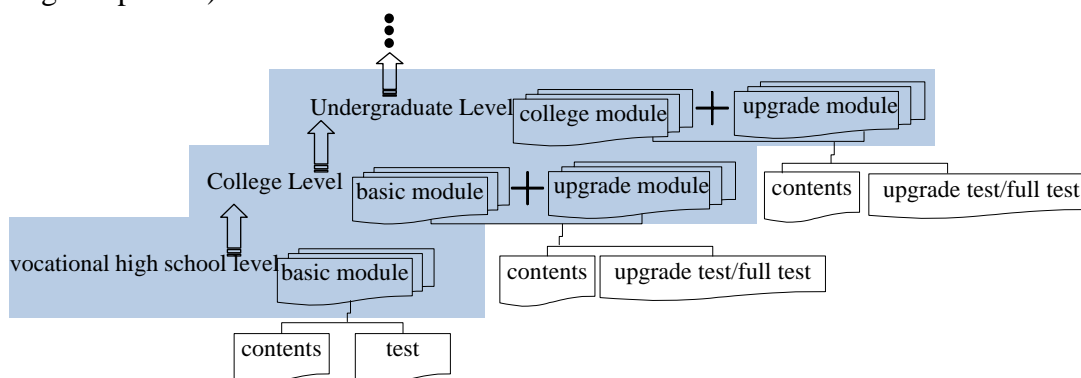


Fig.3 modularization courses and upgrading test mode

The relationship between course modules and their test is progressive but isolated. The modularized course and upgrade test pattern provide opportunity for learners that they can learn a course step by step, module by module, instead of learning the whole course one time. If he has already obtained certain level of a course, he can choose the upgrade course module and upgrade-test instead of learning the whole course. Repeat learning was avoided.

3.1.3 Upgrade credit cognizance rules

When learner want to win higher course credits, the system obey the upgrade credits cognizance rules. If a learner has already obtained a certain level course credits, and he accomplished the upgrade part of higher level, the credits of higher course ID will store into his account, and the credits of lower level course ID will be move out of his account. That is, only the credits of highest level course ID were stored in the account, and the old credits of lower level course will move to the trail file.

When learner want to exchange diploma, only the credits of highest level of a course should be taken consideration. And the exchange obeys the downward compatibility rule: higher course replace the lower one automatically.

3.1.4 Level-cross curriculum system design

In this paper, curriculum system was defined as a set of courses collection that demand learner must accomplish to meet the qualification of professional personnel training, and rules of assembling the courses collection. The curriculum system is also the learning outcomes exchange rules. All courses in the system are from the course supermarket.

To achieve the different level personnel training, and satisfy different learners choosing courses freely, a flexible and efficiency curriculum system should be built up in the credit bank.

On the one hand, the course system should like a bridge link mode, linking all level of profession by course upgrade, crossing all levels that begin with vocational high school level, end with the highest level the credit bank have.

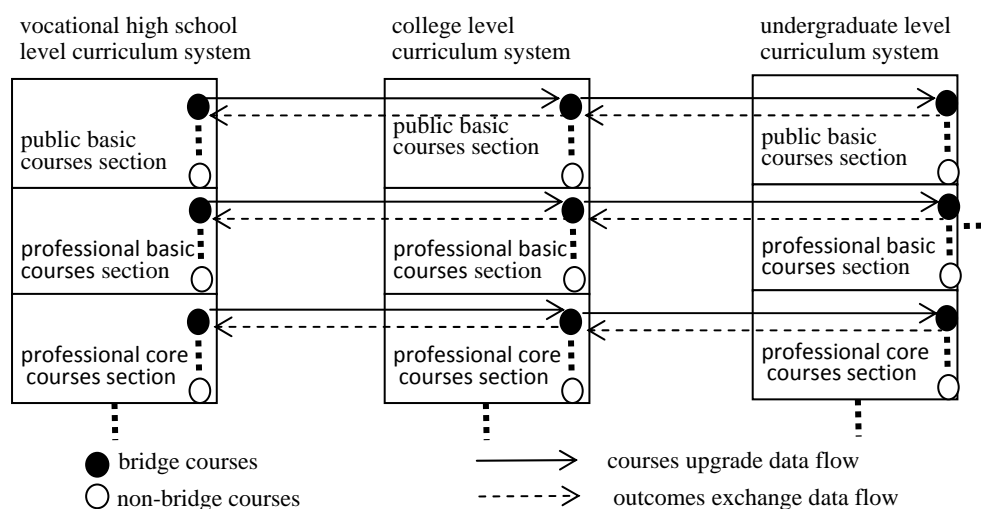


Fig.4 Courses upgrade and outcomes exchange base on the level-cross curriculum system

On the other hand, every level curriculum system should set more courses than the least courses learner should finish. The idea can be elaborate as that:

- (1) One curriculum system has several sections;
- (2) In each section, the least credits was defined, and more courses credits should be set than the least demands;
- (3) The totally graduation credits demands should be defined more than the sum of each section.

The design can make the free courses choose in the system possible. This is an aspect of individualization personnel training.

This bridge link level-cross curriculum system can deal with the multi-level personnel training in link up mode by upgrading levels through low to high. The cross-level curriculum system was realized by the bridge course, and the bridge courses were realized by modularized courses idea and upgrade test pattern. And course with same name should have same credit in different level of one curriculum system. Bridge courses should come into the body parts of the curriculum. And they distribute in every section of the curriculum system but not one section isolated, such as public courses section, professional basic courses section, and professional core courses section etc. Then, the bridge link curriculum system was formed, and it can link up the multi-level personnel training.

Modularized course, upgrade test pattern and credits cognizance lay the foundation for level-cross curriculum system. The system provides opportunity for learners choose courses and levels freely, and channel for upgrading courses level. Then, learners can exchange diploma by finish all require credits in the certain level curriculum system.

3.2 Credits accumulation and exchange model

3.2.1 Credits accumulation.

Credits accumulation includes 2 sides, course amount increase and course level upgrade. Learners increase the course amount, then the credits growing up. Learners upgrade high level course replacing the lower one. If credits of a course should be stored into the bank after the learner accomplishes the course, system should check the course ID bit0-9. If the bit0-9 of 2 courses is the same, they are different level of one course. If the answer is yes, replace the lower one with higher one, by changing the level bits. (Fig.4 describe the credits accumulation procedure) This idea can keep the account data stay in minimum, and it is profit for the management system by reduce redundant data.

3.2.2 Learning outcomes exchange rules.

The exchange mainly accord to the curriculum system. It matches credits learner won to the certain level of a curriculum system. If the matching is fulfilled, the learner can obtain the corresponding diploma.

Determined by the level-cross curriculum system designed above, the exchange rule is also level crossing. For example, if a learner wants to obtain undergraduate diploma, and he has won the college level diploma in same profession before, he should finish 2 tasks:

- (1) Accomplish the full undergraduate courses that the college level don't have in the curriculum system;
- (2) Upgrade the courses' upgrade modules that the college level have in the curriculum system.

The exchange obeys the downward compatibility rule. A learner has obtained a course's undergraduate level credits. And the course will be used when he want to exchange vocational high school level or college level. Under that circumstances, the system that he has already obtain the lower level of the course default.

3.2.3 Course depreciation

Name in roll forever and outcomes everlasting are the trend of lifelong learning. The course supermarket contains lots of courses. Some of them renew rapidly, and some slowly. If all courses were set valid forever, when exchanges happen, maybe some of courses' knowledge was already overdue. Overdue here means the knowledge is too old for the development.

Setting a coefficient of depreciation is reasonable way to resolve this problem. Before the course was put into the supermarket, the coefficient bit should be filled by subject experts committee according to the characteristic. They should set high coefficient for traditional courses with steady contents, and low coefficient for courses that renew rapidly.

When exchange happens, the system should checks weather the learner has already finished all credits the curriculum system requires. At the same time, the all course's coefficient should be

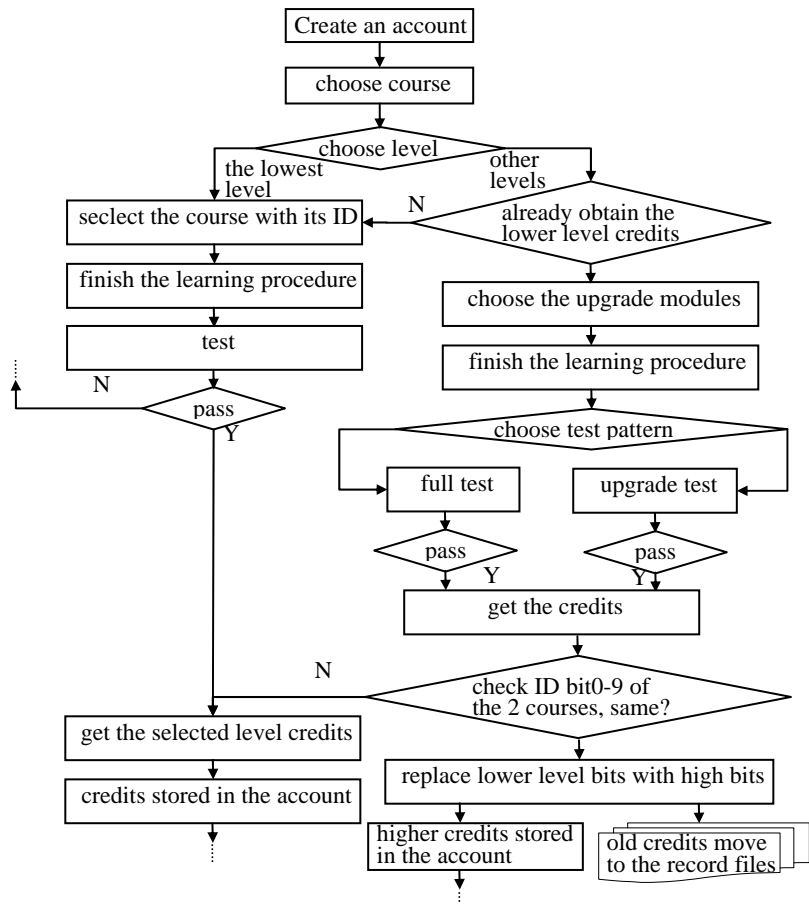


Fig.5 Credits accumulating model

checked. If the answer is yes, system allows him getting the diploma. Otherwise, he should make-up the overdue courses in order to catch up with the professional development.

The credits accumulation rules and learning outcomes exchange rules build up the credits accumulation and exchange system.

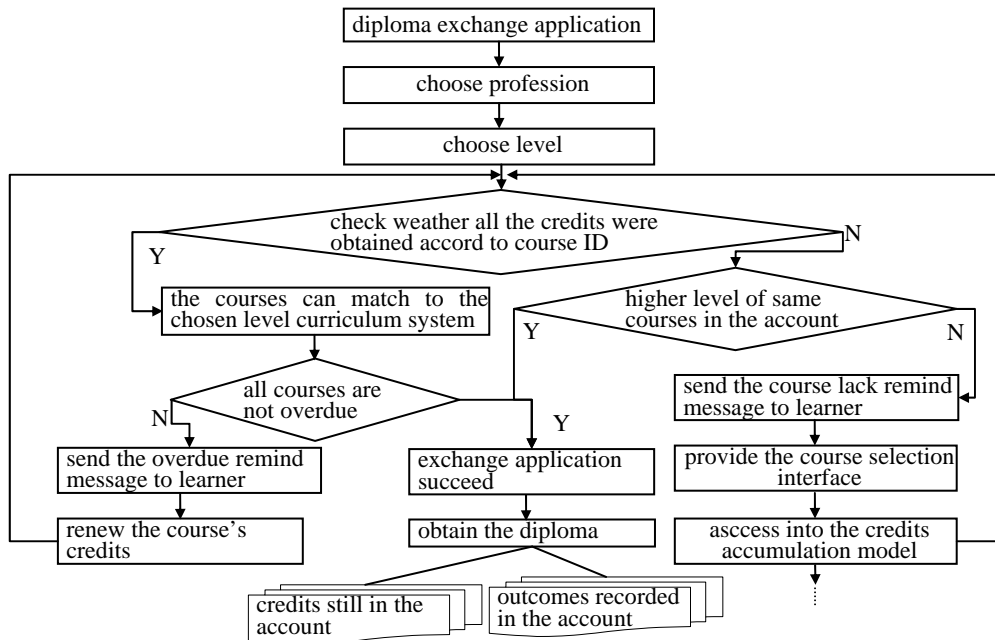


Fig.6 Learning outcomes exchange model

4. Interface Design

2 models designed above integrated by interface will consist the whole system.

4.1 Interface frame model

The interface model was designed for realizing the link and application of courses supermarket, curriculum system and the credit accumulating and exchange system. The Fig.7 demonstrates the frame of the interface.

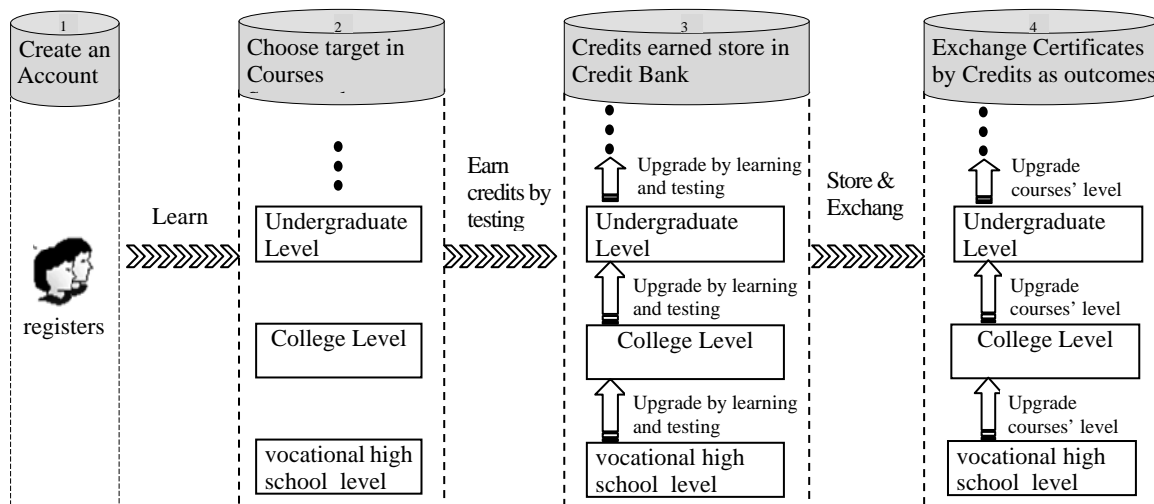


Fig.7 Interface model between credit bank and level cross system

4.2 Smart exchange reminder model

In the continuous procedure of learning, it is normal that the learner forgot how many credits he has obtained. And it is difficult for learners to match all professional course systems by all credits he has obtained. In order to maximize the outcomes by using credits obtained, the credit bank should

include a smart exchange reminder for learners. A reasonable threshold should be set down. When credits in an account was close to some curriculum system, the credit bank reminds learner some useful information humanized:

- (1) The credits in the account already can achieve which professional graduate demand. If the answer is yes, provide the exchange interface;
- (2) Which professional graduate demand are close to the credits collection, and provide the inquiry interface;
- (3) If the learner chooses one of the professional to continue his learning, which courses he should take. And the system provide the courses' ID and course selection interface;
- (4) After the learner choose one of the professional, checks his courses' depreciation coefficient. If there are courses nearly overdue, send a remind message to the learner.

5. Summary

This article analysis several problems of credit bank, and propose the solution. The credits accumulation model, outcomes exchange model and the corresponding level-cross curriculum system are sketch designed. And the interface model will connect them together. (Lack of space forbids, further design of those models will be discussed in another article.) This integrated information management system will be a reasonable running model serving for lifelong learning. The system can help learners to learn in climbing pattern instead of repeated stairs pattern by doing what he can with what he already have. And this will stimulate learners learning in lifelong time by flexible choose and outcomes maximization.

The *innovation of this article* is level-cross curriculum system, upgrade test pattern, course depreciation, downward compatibility exchange rule, and outcomes exchange smart reminder. The *core ideas* are level-cross curriculum system and upgrade test pattern.

References

- [1] Li Huikang, in: *The Establishment of the Credit Bank System for Shanghai's Lifelong Education*, [J]. Open Education Research. Vol.18, No. 1 Feb.2012: 46-49
- [2] He Juan, in: *Research on Higher Education Credit Accumulation and Transfer System in Britain*. [D]. Fujian: Fujian Normal University postgraduate thesis, 2007: 20-43
- [3] Chen Luyan, Xu Bin, in: *Yunnan Open University's Practice and Innovation*. [M]. Nanjing: Jiangsu Education Publishing Company
- [4] Yang Min, in: *Study on the Construction of Shanghai Lifelong Education Credit Bank Based on SWOT Analysis Method*. [J]. Modern Distance Education. Vol.134, No. 2 Feb.2011: 13-18
- [5] Zeng Fengjie, in: *The Study of the United Kingdom Mutual Recognition Mechanism of Credit in Adult Education*. [D]. Henan: Henan University postgraduate thesis, 2012: 29-36