On IT-Based Academic Credit System in Higher Education in Vietnam

Trinh Thi Thu*

Center of Foreign Languages and Computer Science, Hoa Binh University, No 8, Bui Xuan Phai Street, My Dinh 2 Ward, South Tu Liem District, Ha Noi, Vietnam

*Corresponding author: trinhthuth@gmail.com

Received February 28, 2021; Revised April 23, 2021; Accepted April 27, 2021

Abstract Higher education in Vietnam has applied credit system since 2007. Universities have been developing academic credit system for many years. In fact, along with the change in academic policy, changing the management environment driven by IT is currently a great concern of universities in Vietnam. This paper is conducting a brief review on issues and problems related to academic credit in the higher education in Vietnam, and in term of solving these issues and problems, is proposing the most common model for IT system for academic credit system at universities in Vietnam.

Keywords: academic credit system, IT in higher education, IT platform, Academic credit system in higher education, IT approach for credit system in higher education


1. Introduction

Credit system in higher education was first applied by Harvard University, USA (1872). By the early twentieth century, the credit system was widely applied in most universities in America. This system was then adopted by the United States, Canada, Japan, Taiwan, Korea, China, Thailand, Malaysia, Indonesia, India and many other countries. In 1999, 29 countries in the European Union signed the Bologna Declaration to form the “European Higher Education Space” and apply the credit system in the entire system of countries in the European Union. The power of IT is greatly enhanced thanks to communication technology (TT). This means connectivity (either wireless, cell phone technology or over cable) is a key feature that enables access to the Internet and the World Wide Web. These shared platforms have fueled the explosion of social networks and cloud services that turn the Internet into a highly interactive medium and create a new dynamic in the use of computers. As computing power and communication improve, mobile devices play an increasingly important role. An overview of higher education with an ICT approach [1]. Information and communication technology (ICT) application in higher education has been deployed and applied in many countries around the world. For Vietnam, along with the policy of promoting the application of ICT in all socio-economic activities. In the field of education and training, ICT is considered as an effective supportive tool for the process of teaching and learning innovation, education management reform, contributing to improving the quality and efficiency of education. ICT enables the creation of digital resources such as digital libraries and digital learning, where students, teachers and professionals can access materials for study and research and course materials. Learn from anywhere at any time [2].

Credit training with many advantages is being implemented in the education system of universities in Vietnam. The most important feature of credit-based training is: focus on learners, continuity; the initiative; Science; practicality, flexibility and flexibility. Credit training with many advantages is being deployed in the education system of universities in Vietnam. The most important features of the credit-based training form are: focus on learners, continuity; the initiative; Science; practicality, flexibility and flexibility. IT plays an important role in supporting learning, teaching and research in university in Vietnam, now is changing to “pure” academic credit system; In perspectives of students, they are increasingly looking forward to having information and materials about their courses credit. Students increasingly want to be able to work on and off campus and have constant access to materials to support their learning support to course credit; In perspectives of a university, a university needs to have IT infrastructure and applications in a clear and well designed system for supporting academic credit system. A university needs to ensure that on-campus learning spaces are enabled with technology, for example, for simple things like wireless access. A university should have a strategy for all aspects of IT delivery and clear policies for service level agreements on their IT systems. Cloud computing is increasingly used by both educators and students, and university needs to have a clear policy on the relationship between IT systems and the use of cloud...
computing; Both educatos and students need to develop a new set of digital literacies to harness the potential of technologies to support learning, teaching and research. Therefore a university needs to provide central support in terms of educational technology. Senior managers need to have an awareness of what technologies can offer in terms of learning, teaching and research and be aware of emergent trends in technology developments. However, Senior managers need to be aware of what technology can offer in terms of learning, teaching and research, and be aware of emerging technology development trends.

The article gives some situation information on the application of information technology in credit training in Vietnam universities as a scientific basis to propose management solutions.

2. Content

2.1. Academic Credit System in Higher Education in Vietnam

In Vietnam, since 1987, academic credit system has been partially applied in the form of course credit for some academic learning modules or topics only. It has a formal implementation since 2001 when the Prime Minister emphasized credit system as a solution to renovate higher education. It is confirmed in the Education Law (2005), which states that education programme shall be implemented based either on school year or on credit accumulation for professional education and higher education. Decision 43/2007/QĐ-BGD DT on August 15, 2007 "On promulgation of regulation on formal undergraduate education using academic credit system" officially put the credit system into operating in higher education. Thus, in terms of policy, academic programs in universities in Vietnam are now implicitly understandable credit systems.

In term of implementation of the credit system, there are problems and issues raised by academic credit systems. In order to clarify the problem domain for IT as a solution to credit learning, we conduct research on the problems of implementing credit in practice in universities in Vietnam. Problem domain analysis allows to propose an IT model to meet management needs and solve problems related to credit processing.

The issues of credit institutions are presented in groups as follows:
- Organization and activities of teaching and learning;
- Management of students;
- Facilities and materials for credit system;
- Collective activities of students.

The method of investigating is reviewing opinions of the credit system in universities over a country, one in mountainous northern area (Tay Bac University), ones are bigger universities in Hanoi (Vietnam National University, Hanoi and Academy of Journalism and Communication) and HCMC (HCMC University of Technology), one in central Vietnam (Hue University) and one in southern province (Cantho University). There are articles at various timing of credit systems of universities in Vietnam, from 2006 to 2020.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name of University</th>
<th>Organization and activities of teaching and learning</th>
<th>Management of students</th>
<th>Facilities and materials for credit system</th>
<th>Collective activities of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tay Bac University (2020) [3]</td>
<td>The registration and selection of credits suitable for students are still difficult. -The time for self-study that requires credit learning is not effective (1 hour in class equivalent to 2 hours of self-study). -Many teachers are confused in choosing appropriate teaching methods. -Credit requirements is sometimes inadequate.</td>
<td>Academic mentors/ supervisors are not for course credit, just like in K12.</td>
<td>Lacks in facilities, classroom and teaching conditions</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hue Science University (2020) [4]</td>
<td>- There is ineffectively organizing students to register for the subjects according to their choice according to the timetables arranged by faculties. -Still conducting by normal classes (majors), not credit classes. Courses still are discret, not yet combine to majors blocks for students to choose from. -The problem is occured that often canceled groups because of not enough students to register (too many or too few classes) due to lack of information of academic register. -Many disciplines are short of teachers due to mandatory requirements of course credit.</td>
<td>Academic mentors/ supervisors are changing from single to multi-classes.</td>
<td>The facilities in classrooms like sound, projectors... have not yet met demands.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HCMC University of Technology (2006) [5]</td>
<td>-The mindset of education managers/teachers/students is confused to change, inactive in changing, has not yet adapted to the form of credit system.</td>
<td>Students are still inactive or not responsible to follow requirements of course credit.</td>
<td>Limited resources have not yet met the most students' aspirations to register for their learning options</td>
<td>It is difficult for the appropriate forms of organization and activities of the Youth Union and Associations of students.</td>
</tr>
</tbody>
</table>
Based on the above mentioned review of issues and problems of implementation of academic credit in universities over the country, (Table 1) there are summarizations as follow:

- Inadequacies in subject registration, class arrangement, credit schedule.
- The problem of teaching methods in the form of credit.
- Proactive and self-study of learners, self-study time management.
- Inadequacies in academic mentors/supervisors in notification and student management.
- Difficulties in facilities for teaching by credit system: classrooms, equipments and learning materials.
- Inadequacies in collective activities of students.
- Calculate the number of hours, fees related to credit learning.
- The continuity and consistency of academic credit programs and timetable by credit system.

The problem-solving approach in credit learning by IT is to build a unified IT environment throughout the school, including IT tools, applications and hardwares to support the operation of credit system, in order towards solving those problems and issues, that mentioned above.

### 2.2. IT Approach for Credit System in Higher Education

Currently, most universities in the world and in Vietnam have been being transforming to academic credit system. With the characteristics of the credit system, it requires a comprehensive change in educational management, pedagogical methods and administration in universities. Universities have applied IT tools and systems to enhance teaching and learning management, innovating teaching methods, student management, and school administration.

The current feature of IT is digital transformation, changing from single IT applications or tools and specialized data for building separate business domains, into a unified digital platform from it automatically executes academic functional activities and connects the whole education. Concepts such as technical infrastructure, data integration, shared and automated information processing systems, smart and real-time human-computer interaction systems, allow conducting higher education everytime and everywhere.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name of University</th>
<th>Organization and activities of teaching and learning</th>
<th>Management of students</th>
<th>Facilities and materials for credit system</th>
<th>Collective activities of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Cantho University (2010) [6]</td>
<td>-Teachers have to adapt to the new training system. -Register the subject at the beginning of each semester is delayed. -The assessment in the credit system is formative, not only final. -The electives are too few. For the academic majors with few students, there is not enough to open classes.</td>
<td>-The academic units at all levels have not had measures to test and assess self-study. -The mentor’s plan is too formal. -Many academic measures such as subject registration, schedule adjustment, managing classes and specialized classes cause many issues, contrary to the credit-based learning.</td>
<td>Textbooks and learning materials are not meet requirements. Difficulty in facilities, classroom conditions; equipment for teaching by new methods is not effective.</td>
<td>Collective organization, class organization is broken when students are organized into “credit groups” and are self-managed in learning as well as learning time.</td>
</tr>
<tr>
<td>5</td>
<td>Academy of Journalism and Communication (2015) [7]</td>
<td>-The registration and selection of credits units for students is not easy. In fact, the learner has very little choice for electives. -The annual-based teaching method has been &quot;deeply rooted&quot;.</td>
<td>There is a lack of information for students. Regarding the tuition collection: Tuition fees are collected according to the number of modules registered by students, the price of each module is calculated depending on the number of theoretical hours, exercises and practice. The number of study mentors is relatively small.</td>
<td>-New teaching and learning methods for students' active learning and utilizing new technologies are used only in a small part of teachers, has not yet become popular where applied credit systems.</td>
<td>Collective activities in the students community: This is a problem that many people are concerned, because it is related to a disadvantage of credit system.</td>
</tr>
<tr>
<td>6</td>
<td>VNU and others institutes (2006) [8]</td>
<td>Distributed training management system: Due to the current organizational structure of VNU, each member is considered as an independent training institutions, and the training systems of member are little cohesive together, and it is difficult to design common curricula for the entire VNU. Since then, it is difficult to exploit the same resources of faculties and design teaching infrastructure of the entire VNU. -Distributed location: With the current dispersed location, deploying a common teaching year for all disciplines, all members are hardly feasible. It is difficult for students to travel from very distant locations to study on a common schedule. - There are not enough resources to satisfy all expectations of students but need to repeatedly adjust the class parts.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lina María Castro Benavides and others their review paper [2] note dimensions of a digital transformation (DT) in higher education as follow:

Teaching dimension: The DT seen from the teaching dimension has several fronts

- Digital platforms and contents for teaching and learning considered that it was important to use the tools which satisfy contemporary educational standards and methods, first of all, the tools based on digital technology.
- Innovate pedagogical methodologies in digital teaching are not just technical innovations, but rather academic, curricular, organizational and structural innovations [10].
- Teaching administration process has been leveraged the use of technology to provide flexibility in learning and just-in-time training for learners in the efforts to improve both the internal processes of course delivery and enhance the provisions of education quality.
- Software infrastructure is contemplated an agile platform and flexible architecture that could handle adaptive and emergent processes (administrative, teaching, and researching)

Curriculum dimension: This dimension has several views depending on the DT process that has been performed.

- Modernize the curricula which satisfy contemporary educational standards and methods, developing international curricula, finding new ways of delivering content through digital learning and the widening use of ICT technologies [10].
- Flexible curriculum is flexible responding to the needs of labor market is the main goal of updating the educational program.
- Digital curriculum means that students are increasingly demanding an improvement in the "basics" of their experience, with features such as digitization of administrative processes, unrestricted 24-hour access to all information, and services using multiple platforms or digital curriculum.

Administration dimension: DT strategies is using to improve existing work, to apply changes in value creation, while building new digital models in parallel, or fully digitizing current considering the new demands of the labor market and the growing expectations of students to innovate their experiences regarding learning, teaching, research and management [11].

Business process dimension: DT promotes the re-invention of the institution the transition from related operational procedures to the use of digital technologies to improve, enhance, or replace traditional services with digital ones, to simplify the processes involved in educational service delivery and operational complexity.

The IT architecture in universities includes six main areas of operation, aka payroll and financial accounting, administration of student data, inventory management, personnel records maintenance, library systems and learning management systems. These systems provide following core IT services in an university [12].

(1) The student journey, from an initial enquiry through to graduation. This includes managing of a student’s initial enquiry about courses, application, module selection, monitoring and support for the delivery of a course, assignment handling, examinations and graduation. For on campus students systems are in place for room booking and timetabling. This is usually done through a central IT system, but there may also be local systems for some departments. Courses are delivered and support through an Virtual Learning Environment (VLE) or Learning Management System (LMS). The library provides access to learning resources (both paper-based and digital), these can include learning materials and set texts for course, research journals and multimedia resources.

(2) The research activities are supported through systems for managing and monitoring research applications, research grants and contracts, research finance, publications recording and patents and intellectual property recording.

(3) Financial services include: asset management, accounts payable, accounts receivable, financial reporting, management accounting, management information, payroll, pensions, purchase ordering, goods receipt and invoice processing, tax treasury.

(4) Human resources IT systems cover: recruitment, recording of staff employment activity and history and recording of staff training history.

(5) Residential and commercial services include: application, allocation, control and financial management of student accommodation and, where appropriate, provision of conference services and the delivered catered service.

## 2.3. IT Platform for Credit System at a University in Vietnam

IT in higher education, in general, including infrastructure (i.e. hardware equipments and networks such as presenting equipment, video conferencing, computer systems and interconnecting networks and Internet connections), and software systems (i.e. management and learning tools and information systems with various databases), that support functions in academic credit system in universities.

Based on analysis in points 1 and 2 above, we are trying to propose components of IT model to support credit-based mechanisms for universities in Vietnam. This proposal, in fact, is the most common IT model for operating the credit system. When deployed, it will adapt depending on the specific conditions of each school with the relevant characteristics and detailed requirements.

### 2.3.1. Learning Management System

A learning management system (LMS) can be defined as a set of computer software tools specifically designed to manage the teaching and learning process. This system allows organizing, managing, monitoring, assigning, evaluating, reporting all the education contents and resources, towards the overall management of the activities of academic credit program. The value of the LMS system is its abilities to create an online environment, apply various rich applications through online tools (i.e. Web 2.0) to serve teaching and learning purposes of the university. This system is usually deployed on a computer network that allows many participants to use it at the same time without the barriers of geography and time.

A LMS basically has the following features:

- Registration/Enrollment: Students register and enroll through the LMS. The management of students is also through the web environment of LMS.
- Timetabling: Create and schedule courses and academic program to meet institution’s and individual requirements of the credit system.
- Distribution: Distributing online learning content, assignments, and other learning resources by credit modules.
- Tracking: Track students’ learning progress and create result reports.
- Information exchange: Exchange information by communication and collaboration tools such as chat, forum, e-mail, e-portfolio.
- Assessment: Provides the ability to test and evaluate students’ learning outcomes.

In practice, there are typical softwares for LMS such as Moodle [12], EDX [13], Blackboard [14] allows management and deployment of teaching and credit-based activities effectively:
- Manage learning content with diverse learning resources.
- Manage students for credit-based learning classes in both online and offline forms.
- Create and manage various learning assessment forms such as exam banks, quiz or multi-choice questions (MCQ).
- Create and manage forums for information sharing between students and educators (mentors, supervisors).
- In conjunction with other social and collaboration softwares (i.e. Facebook and Zalo), create and manage activities of students.

2.3.2. Technology-enhanced Learning Tools

If the LMS is the core system in providing academic activities, then there are a variety of tools to support teaching and learning. There are increasingly academics are also incorporating other cloud-based services, such as the dropbox tool for sharing files (Figure 1).

Education technologies (Edutech) include hardware (i.e. interactive boards, tablets, handheld devices) and softwares such as MatLab [15], GeoGebra [16], Crorodile, simulation tools, educational games, interactive social applications and 3D Virtual Reality (VR and Augmented Reality (AR) tools)

Using tools of video communication based on Internet connection to conducting online classes. This is situation that has been appeared due to 2019-Covid epidemic. Software like Zoom, MS Teams, Google Meets or Jitsi Meet all are an easy, reliable cloud platform for video/web conferencing, chat and webinars. With video meetings, phone calls, whiteboarding, and annotation on personal collaboration device, these tools support the requirements of credit-based courses effectively (Figure 2).
Using technology for student assessment. The examples are HotPotatoes [17] for test questionnaires, BrainBench [18] and Gmetrix [19] for online test tools, profile tools (ePortfolio) for student records.

2.3.3. Shared Learning Material Repository

This is indicated by MoET’s plan for IT application for period 2012-2025, that guides to establish shared learning and teaching databases (i.e. databases for educators, teachers, students, facilities, electronic lectures, online question banks, electronic data for management activities), including the following:

- Open Education Resource (OER), including textbooks, electronic lectures, presentations, researches, videos and images, shared for public use. OER repository, which provides free access to learning materials or research data management systems, which allow the users to store information on publications, professional activities and working relationships.

- Multimedia lecture stores, digital learning, virtual experiments for students, teachers, and scientific researchers.

2.3.4. Timetabling and Resource Allocation

There are three main areas of activity supporting the academic planning and resource allocation: requirements identification (identifying all requirements for teaching and learning activities), scheduling (identifying date and time of activities) and location allocation (allocation of rooms and other resources to activities).

The softwares of training management that implicated in most universities have met these areas of activities. The examples of in-house or commercial these software in Vietnam universities could listed like as UniSoft-Thien An, UI-CMC, EduSoft.

2.3.5. Student Records System

This is the student management system and is at the core of the credit learning management functions, with the following features:

- Handling requests from students
- Handling the admissions process
- Enrolling new students and storing academic option choices
- Automatically creating class and teacher schedules
- Handling records of examinations, assessments, marks, grades and academic progression
- Maintaining records of absences and attendance
- Recording communications with students
- Maintaining discipline records
- Providing statistical reports
- Maintenance student’s dorm details
- Communicating student details to parents
- Special Education / Individual Education Plan services
- Human resources services
- Accounting and budgeting services related to students
- Student health records

This system is closely linked to the learning management systems and the school's financial system.

2.3.6. Library System

Library systems cover all aspects of the management of library materials both physical and digital. This includes the following areas:

- Acquisitions (ordering, receiving, and invoicing materials)
- Cataloguing (classifying and indexing materials)
- Circulation (lending materials to patrons and receiving them back)
- Serials (tracking magazine and newspaper holdings)
- The public interface for users.

Some typical library software today: commercial systems such as ExLibris [20], Innovative [21]; open source or free to use such as Koha [22].

2.3.7. Financial and Accounting System

The core of university’s administration, the financial and accounting system contains a wide range of functions such as purchase and sale administration, fixed assets, ledger, financial statements, revenue, debt. Current popular accounting and financial management such as MISA, F@st Accounting.

3. Conclusion

The paper has presented contents related to the IT-based approach for a academic credit university in Vietnam. Starting from problems and issues of academic credit implementation in universities in Vietnam, the paper goes through an analysis of how IT factors play important role to support the all activities in universities, including teaching, learning, researching and administration. Based on the analysis, the paper is proposing one general structure of IT system in an typical university in Vietnam, that supports academic credit system.

References


[12] https://moodle.com/


[16] https://www.geogebra.org/

[17] https://hotpot.uvic.ca/

[18] https://www.brainbench.com/

[19] https://www.gmetrix.net/


[21] https://www.iii.com/

[22] https://koha-community.org/.

© The Author(s) 2021. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).