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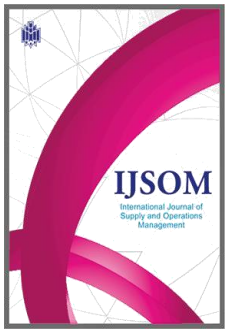

Supply Chain Management Information System for Curriculum Management Based on The National Qualifications Framework for Higher Education

Artaphon Chansamut [a,*] and Pallop Piriyasurawong [a]

[a] *Faculty of Technical Education, King Mongkut's University of Technology, North Bangkok, Thailand*

Abstract
The purposes of this research were to develop a supply chain management information system (SCM-IS) for curriculum management based on the National Qualifications Framework for Higher Education in Thailand and to study the efficiency development of the system based on the framework. In this study, the system was designed by the PHP script and MySQL database. The research methodology was according to the concept of System Development Life Cycle. The system was separated into 4 groups including the administrator main menu, student home menu, lectures home menu, and entrepreneurs' home menu. The Black Box Testing evaluation which included four tests of 1) System Requirement Test, 2) Functional Test, 3) Usability Test, and 4) Security Test, shows the average score was 8.63 out of 10, suggesting that, Supply Chain Management-Information System (SCM-IS) for Curriculum Management based on the National Qualifications Framework for Higher Education may be applied to support the tasks.

Keywords: Information system; Supply chain management; Curriculum management based on national qualifications framework; Higher education.

1. Introduction

Nowadays, the education system is very significant, and the Thai government has realized the importance of improving the country to increase its capability to compete with other countries in every aspect. Especially, in educational development that leads to the development of quality products , the government has formulated the following policy: "To develop quality of people, as the people are human resources of the country and the key component in all aspects of development, to reform the whole system of education, to expand education and modify educational structure, to decentralize educational administration to the provinces so that educational management becomes more thorough and responsive to the local needs" (Office of the National Economic and Social Development Board,2006). This policy also includes the establishment of private and public higher education institutions to meet the needs for national development and development of individuals who want to further their studies. One of the strategies is the application of the supply chain management system to educational development in order to increase competitive ability. As Thailand is a part of world community, it needs to urgently develop its research systems for the development of the country and enhance academic excellence. As such, the government has formulated an important policy that "The creation of a stable knowledge-based economy and environmental factors must support Thailand to be a center of goods and service production in the region based on creative thinking, creation of innovations, and extension of the body of knowledge in order to support the adjustment of the structure of production and service sector in every stage of supply chain. This is to enable the creative economy to be a new mobilizing power that leads toward a balanced and sustainable economy in the long run, together with the creation of the assurance system and the supply chain system, the management of economic risks, and the creation of the free and just atmosphere to facilitate the production, commerce and investment

Corresponding author email address: artaphon.c@mail.rmutk.ac.th
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inclusive of the development of new entrepreneurs, the creation of infrastructure and internal logistics networks that connect with other countries in the region." Based on this policy, the 11th National Plan for Social and Economic Development was formulated (Office of the National Economic and Social Development Board, 2012).

The researchers have realized the importance of curriculum development in order to cope with economic, social and political changes. In the business and industrial sector, the changes have included the movement toward more and more application of the concept of SCM-IS. This is because the business and industrial sector needs to be highly competitive due to increasingly high competitions from both within and outside the country. In order to be highly competitive, organizations in the sector need to have personnel with knowledge, ability and skills who can work efficiently to increase output and products. The organizations, therefore, must have sufficient information and resources to increase their values and respond to the demand of their clients. Thus, the supply chain management process is a key process in supporting the organization's whole activities system from upstream to downstream. It enables the organization to promptly check the information system to ensure that the organization operates smoothly and effectively based on the determined strategies. Based on this realization, the researchers have decided to develop a SCM-IS for curriculum management based on the National Qualifications Framework for Higher Education and then study the efficiency development of SCM-IS for curriculum management based on the framework.

2. Methodology

The research methodology comprised six following steps.

2.1. Problem Study and feasibility

Problem study from the original system or part involves understanding and analyzing data.

2.2. System analysis and design

The program was designed in a way that could be separated into 4 groups as follows:

1. The first group was administrator who can manage users, faculty, major, course title, candidates, students, lecturers, grades, list of graduates, list of students, full time equivalent students, and curriculum management results.
2. The second group was lecturers who can check the test score of candidates, record grades, profile oneself, and fill data into database.
3. The third group was the students who can enrol course titles, assess satisfaction with teaching, and satisfaction with curriculum, record career of the graduates, and profile oneself and fill data into database.
4. The last group was entrepreneurs who can fill the data about employing graduated students with desirable characteristics including good virtues and morality, good knowledge and intellectual skills, good human relationship skills, good responsibility, good numerical analysis skill, good communication skill, and good information technology usage skills, and can print reports in Html format.

In the picture of data flow diagram, the administrator can manage Users, Faculty, Major, Course title, Candidates, Student, Lectures, Grades, List of graduate, list of students, Full time equivalent students, curriculum management result etc. The lecturers can enter candidates on a score, record grade and curriculum management result. The student can enter enrol course title, graduation, students' satisfaction with teaching, students' satisfaction with curriculum, and record career of the graduates. The entrepreneurs will record the employer's satisfaction with graduates and evaluate questionnaires with five main components: good virtues and morality, good knowledge and intellectual skills, good human relationship skills, good responsibility, good numerical analysis skill, good communication skill, and good information technology usage skills etc., as depicted in Figure 1. The Data Relationships is shown in Figure 2.

2.3. Development

The program used Appserv-win32-2.5.10 program, PHP script and MySQL database.

2.4. Testing the program

The function of the program was tested by the Back-Box Testing technique.

2.5. Evaluation

The program tested the Back-Box Testing technique. The efficiency evaluation product by the experts consisted of five experts on supply chain management and three experts in information and technology.

2.6. Research Tool

The Evaluation form for experts to assess the appropriateness of the program. (Thammasa, 2015)
The Defining criteria for the interpretation of the scores are as follows: (Chansamut & Piriyasurawong, 2014; Zavvar Sabegh, Ozturkoglu, and Kim, 2016)

The rating ranging from 9.00 – 10.00 means appropriate at the highest level.
The rating ranging from 7.00 – 8.99 means appropriate at the high level.
The rating ranging from 5.00 – 6.99 means appropriate at the moderate level.
The rating ranging from 3.00 – 4.99 means appropriate at the low level.
The rating ranging from 1.00 – 2.99 means appropriate at the lowest level.

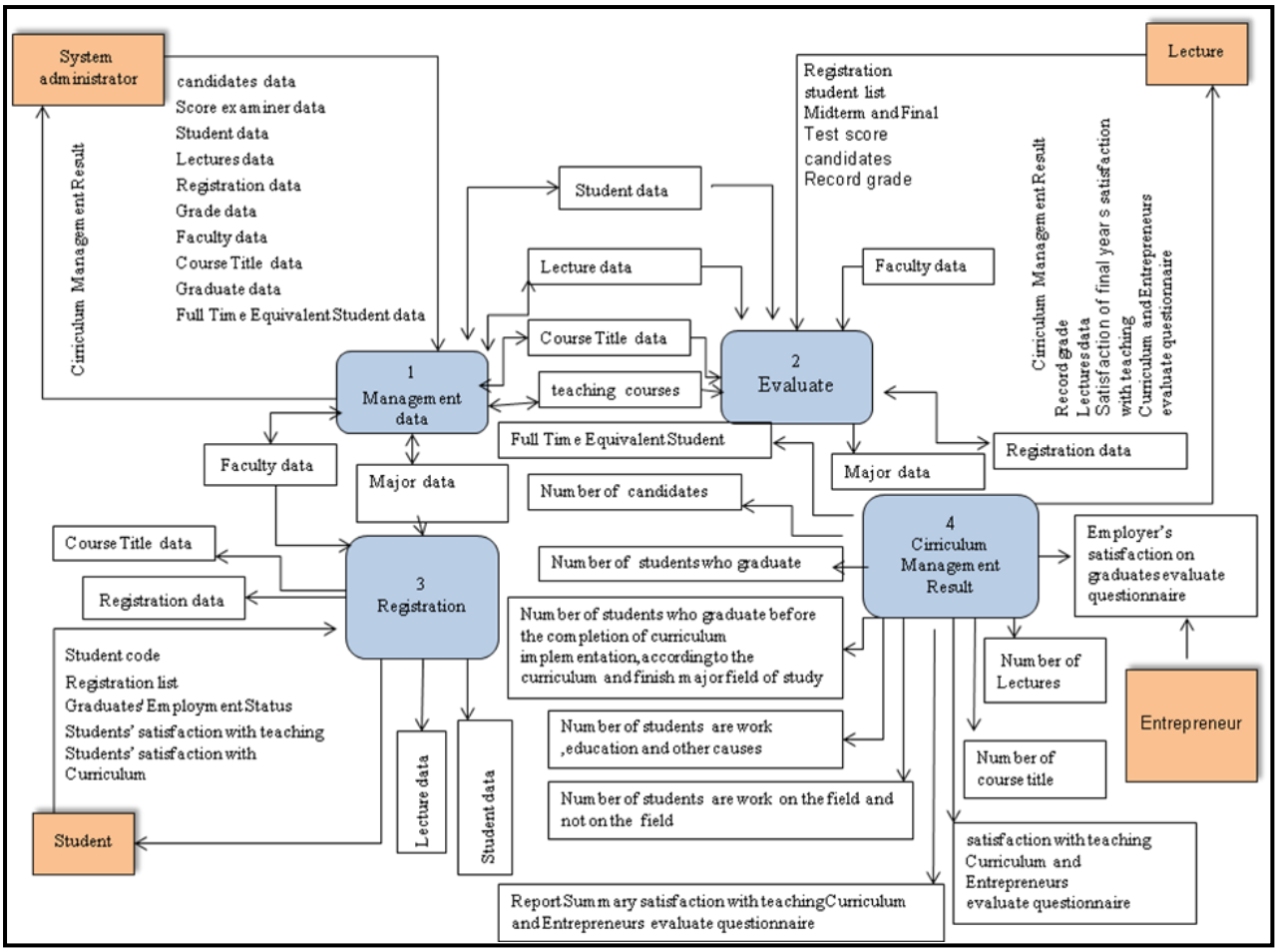

Figure 1. Data flow Diagram

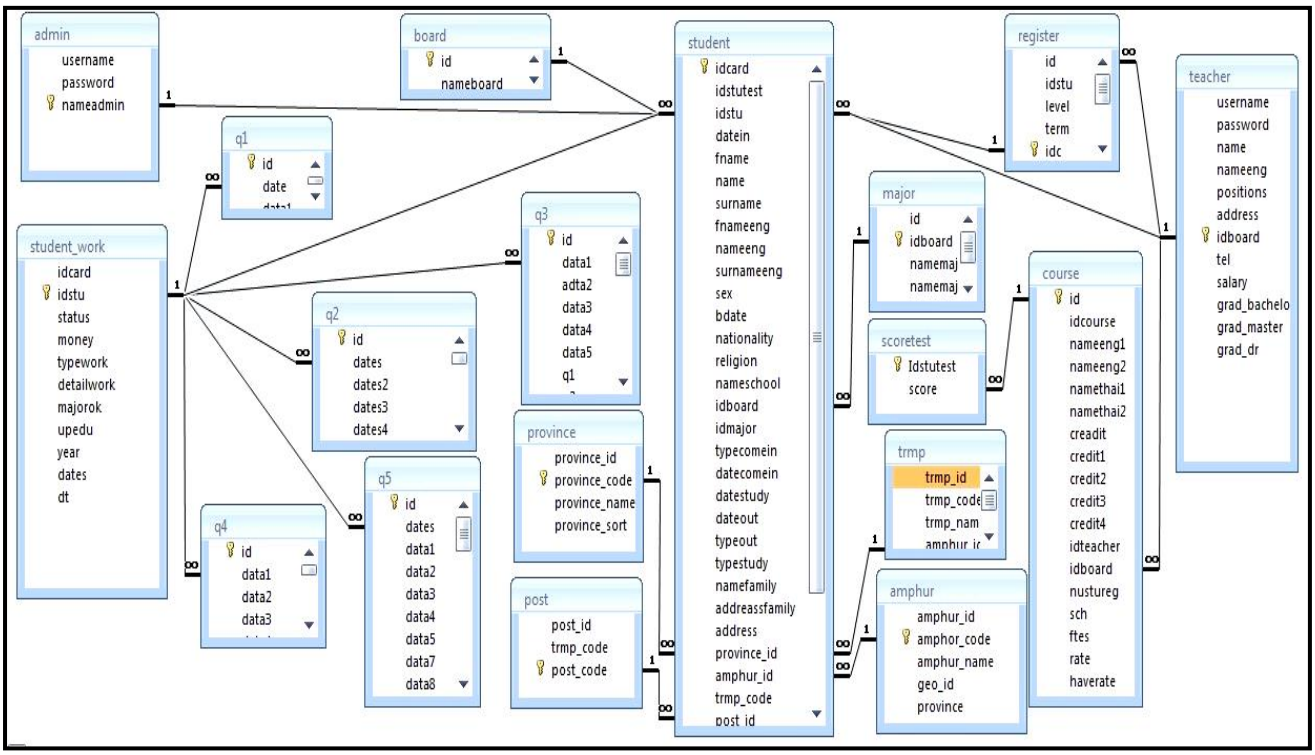

Figure 2. Entity Relationship Diagram

3. Research Findings

3.1. Results

Results are shown in Figure 3-7:

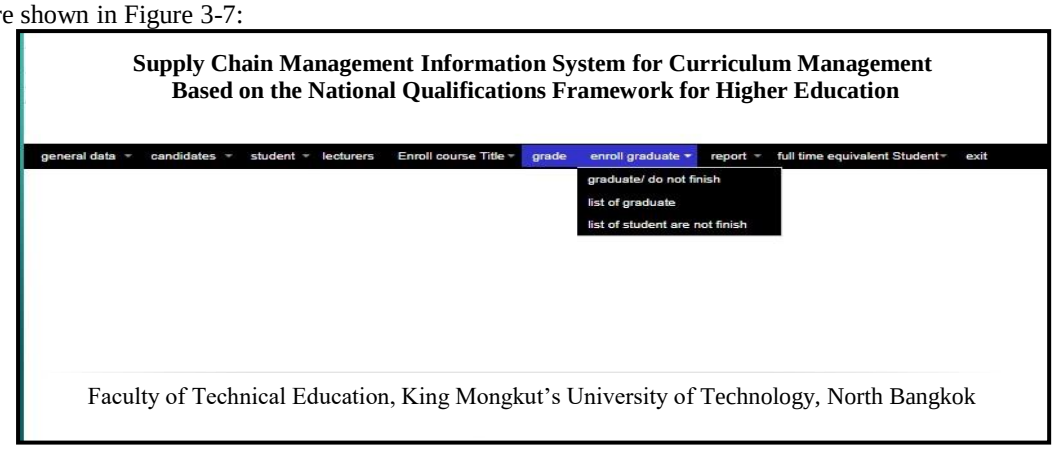

Figure 3. Administrator main menu

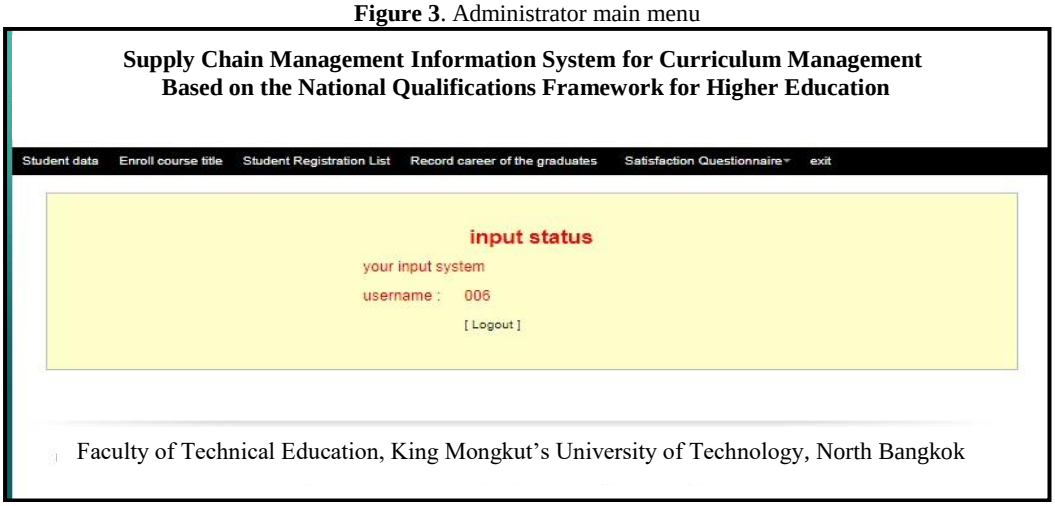

Figure 4. Student home menu

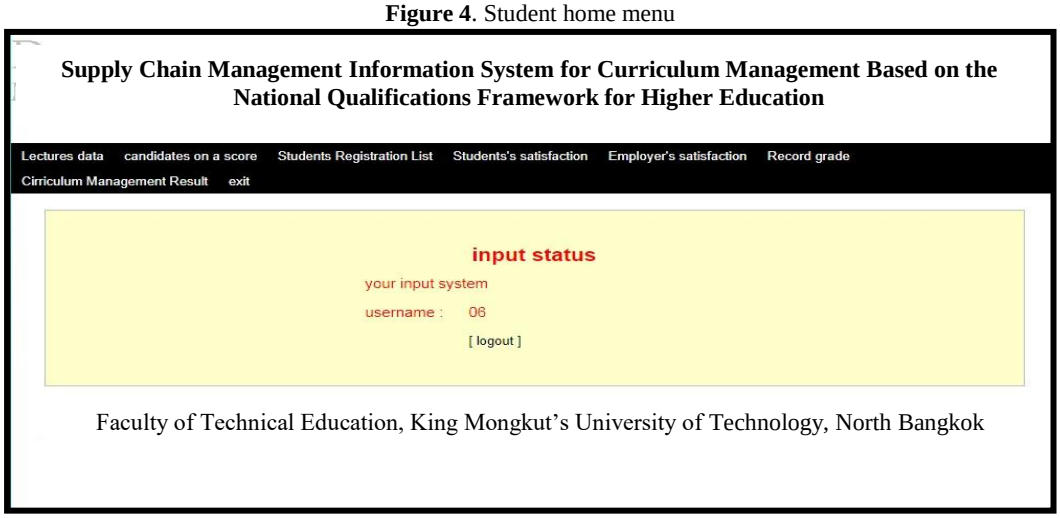

Figure 5. Lecturers' home menu

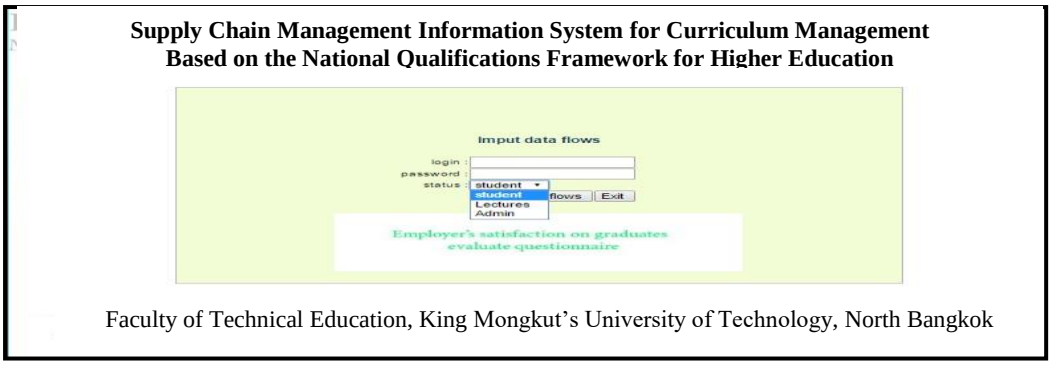

Figure 6 .Entrepreneurs home menu.

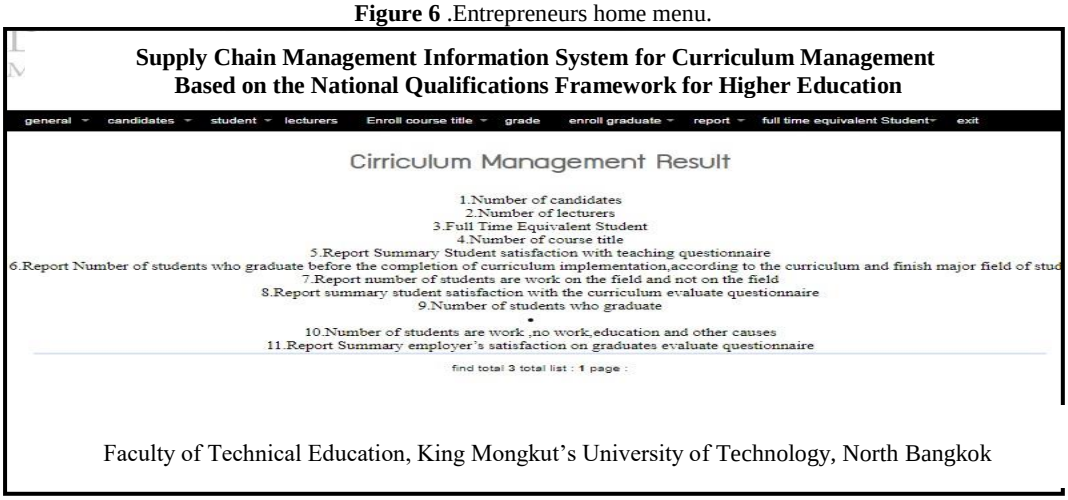

Figure 7. Curriculum Management Result home menu.(Office of the Higher Education Commission, 2009; Saffarian, Barzinpour, and Ali Eghbali, 2015; Efiok Jhon, Joseph Etim, and Uduak Ime, 2015; Pavlis, Moschuris, and Laios, 2018; Bureau of Higher Education Standards and Evaluation, 2006)

3.2. Conclusion

The overall results for the evaluation of the program by eight experts are shown in Table 1.

No	List of Evaluated Items	$\overline{X}$	S.D.	Appropriate Level
1	System Requirement Test	8.83	0.84	high
2	Functional Test	8.90	0.68	high
3	Usability Test	8.94	0.69	high
4	Security Test	8.37	0.63	high
	Summary	8.63	0.71	high

From Table 1, it can be concluded that the program is highly appropriate with the total rating mean of 8.63, Also, its main efficiency evaluation criteria -- usability test, functional test, system requirement test, and security test -- are highly appropriate, with rating means of 8.94, 8.90, 8.83 and 8.37, respectively.

4. Discussion

Based on the results of this research, the researchers present the following discussion:

4.1. The program is considered to be highly appropriate and the system design was according to the review of documents and relevant literature from both within and outside the country on developing an information system)Pant & Mahapatra, 2018.

4.2. The efficiency evaluation program was in accord with the related literature from outside the country on SCM-IS)Phumcharoen, 2017; Thammasa, 2015; Njualem & Smith, 2018; United States Agency for International Development, 2018; Rokonuzzaman, 2018; Erraoui, Charkaoui, and Echchatbi, 2019.

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