Systems Analysis to Design Information System for Cooperative Education Process Management on Cloud Computing Environments for Thai Higher Education Institutions

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บทคัดย่อ—งานวิจัยเรื่อง "การวิเคราะห์ระบบเพื่อออกแบบระบบสารสนเทศเพื่อจัดการกระบวนการศึกษาแบบสหกิจศึกษาบนสภาพแวดล้อมของการประมวลผลแบบกลุ่มเมฆสำหรับสถาบันอุดมศึกษาไทย" โดยมีวัตถุประสงค์เพื่อ (1) วิเคราะห์ระบบเพื่อออกแบบระบบสารสนเทศเพื่อจัดการกระบวนการศึกษาแบบสหกิจศึกษาบนสภาพแวดล้อมของการประมวลผลแบบกลุ่มเมฆสำหรับสถาบันอุดมศึกษาไทย (2) ประเมินแผนภาพการออกแบบระบบสารสนเทศเพื่อจัดการกระบวนการศึกษาแบบสหกิจศึกษาบนสภาพแวดล้อมของการประมวลผลแบบกลุ่มเมฆสำหรับสถาบันอุดมศึกษาไทย โดยงานวิจัยนี้แบ่งออกเป็น 2 ระยะ โดยระยะที่ 1 เป็นการรวบรวมความต้องการของผู้ใช้ระบบสารสนเทศ โดยการศึกษาเอกสารและสัมภาษณ์เชิงลึกกับผู้ที่มีส่วนเกี่ยวข้อง ระยะที่ 2 เป็นการออกแบบระบบสารสนเทศจากความต้องการของผู้มีส่วนเกี่ยวข้องด้วยแผนภาพแบบ ยูเอ็มแอล แล้วนำไปประเมินความถูกต้องของแนวคิดและความถูกต้องของการออกแบบ โดยกลุ่มตัวอย่างเป็นผู้เชี่ยวชาญด้านการจัดการศึกษาแบบสหกิจศึกษาที่มีความรู้ด้านระบบสารสนเทศและการประมวลผลแบบกลุ่มเมฆ จำนวน 20 ท่าน โดยใช้การสุ่มตัวอย่างแบบเจาะจง ทั้งนี้เครื่องมือที่ใช้ เป็นแบบสอบถามประมาณค่า 5 ระดับ และสถิติที่ใช้ในการวิเคราะห์ข้อมูล คือ ค่าเฉลี่ยเลขคณิต และค่าเบี่ยงเบนมาตรฐาน ซึ่งผลการวิจัยพบว่า (1) มีผู้มีส่วนเกี่ยวข้องกับระบบสารสนเทศเพื่อจัดการการศึกษาแบบสหกิจศึกษาบนสภาพแวดล้อมของการประมวลผลแบบกลุ่มเมฆ มีจำนวน 4 กลุ่ม คือ นักศึกษา อาจารย์ที่ปรึกษาสหกิจศึกษา เจ้าหน้าที่สหกิจศึกษา และผู้แทนสถานประกอบการ (2) แผนภาพการออกแบบระบบประกอบด้วย ยูเคส ไดอะแกรม และดีพรอยเม้นท์ ไดอะแกรม ที่มีความถูกต้องและเหมาะสมอยู่ในระดับมาก

คำสำคัญ :ระบบสารสนเทศ , สหกิจศึกษา, การประมวลผลแบบกลุ่มเมฆ

Abstract —The study of "Systems analysis to design information system for cooperative education process management on cloud computing environments for thai higher education institutions" with the objectives as follows (1) to systems analysis to design information system for cooperative education process management on cloud computing environments for thai higher education institutions and (2) to evaluate the design diagram of the information system for cooperative education process management on cloud computing environments for thai higher education institutions. The study separated into two stages. The first stage, gather the requirement of information system user by document analyses and depth interview with stakeholder. Second stage, design information system from requirement of stakeholder by UML and then to evaluate the validity of the concept and accuracy of the design. The samples used in this study are experts in cooperative education with information and communication technology amount 20 persons by purposive sampling. The tools used in this study are closed-ended questionnaire with five-point rating scale. Statistics used to analyze data are mean and standard deviation. The results revealed as follows: (1) A stakeholder with information system for cooperative

education process management on cloud computing environments consist four group are (1) Students (2) Co-op advisors (3) Co-op officers and (4) Entrepreneur and had three module were (1) Pre Operation (2) Operation and (3) Post Operation

(2) The design of information system for cooperative education process management on cloud computing environments for thai higher education institutions consists a Use Case Diagram and Deployment Diagram , The design of the system is evaluate by 20 a stakeholder specializing in information technology as most appropriate.

Keywords—information system; coorperation education cloud computing environment;

I. INTRODUCTION

Education is considered an important part of self-development [1] which will lead to development of organization and nation to be stable, well-off, and sustainable. Unfortunately, it is well known that Thailand's educational system has been struggling in various aspects which results in the country's education not being as successful as expected [2]. For this reason, education administration in Thailand should be improved by taking educational formats that have been proven to be successful in other countries and adapting into Thailand scenarios [3]. Administration of cooperative education has been reckoned as one of the most effective educational formats in many countries; it involves practical experiences and in-class learning [4].

Because experience in working is also another important reinforcement that helped combines skills and knowledge of a person in order to improve her or his organization. The Order skills preferred by the business organization are knowledge implementation, problem solving etc. These skills could not be learned from any textbooks or papers. They were learned from practicing in real life, especially in a working context [5]. But the management of the course cooperative education is more different than the management of general course.

Therefore, the cooperative education format should be seen as important and administered appropriately to help enhancing Thai education in order to meet with the 21st Century's learning concept [6]. Information technologies can be assisting cooperative education administration to ensure the most effective results if applied appropriately taking into consideration the administration of cooperative education in the form that is most suitable for the country's background and situation[7].

Cloud computing is a new technology that allows users to access information system in an easy, convenient, and mobile manner which flexibly meets the demand of users [8]. Thus, developing information system to support cooperative education administration using cloud computing is a direct and effective solution to one of Thailand's educational issues.

II. PURPOSE OF STUDY

(1) to systems analysis to design information system for cooperative education process management on cloud computing environments for thai higher education institutions.

(2) to evaluate the design diagram of the information system for cooperative education process management on cloud computing environments for thai higher education institutions.

III. RESEARCH FRAMEWORK

Conceptual framework of A systems analysis to design information system for cooperative education process management on cloud computing environments for thai higher education institutions was shown in *Figure 1*.

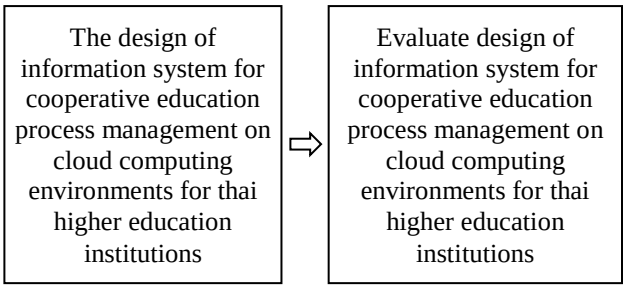

Figure 1. Conceptual framework

IV. METHOLOGY

A systems analysis to design information system for cooperative education process management on cloud computing environments for thai higher education institutions consisted of two phases as follows:

Phase 1: Surveys and gather requirement information system from reviewed papers and synthesized relevant literature to scope the area of studied and depth interview with stakeholder.

Phase 2: Design and evaluate the diagram of the information system for cooperative education process management on cloud computing environments for thai higher education institutions.

Population and Sample

Population who were stakeholder and experts about cooperative education with information and communication technology in higher education institutions.

Sample who were stakeholder experts in cooperative education with information and communication technology in higher education institutions amount 20 persons by purposive sampling.

Tools

The tools used in this study were:

(1) a semi-structured interview.

(2) closed-ended question of a questionnaire with a five-point rating scale.

Data Analysis

Data gained from the stakeholder and experts evaluation on the design of the information system for cooperative education process management on cloud computing environments for thai higher education institutions were collected. Statistics used to analyze data were mean and standard deviation.

V. RESEARCH RESULT

The results revealed as follows:

(1) Gather requirement from stakeholder with information system for cooperative education process management on cloud computing environments consist four group were (1) Students (2) Co-op advisors (3) Co-op officers and (4) Entrepreneur, and the information system had three module were (1) Pre Operation (2) Operation and (3) Post Operation

(2) For a design of the information system for cooperative education process management on cloud computing environments for thai higher education institutions. Authors designs the system with two diagrams including use case diagram and deployment diagram [9]. And two diagrams had details and shown on Figure 2, 3, 4 and 5.

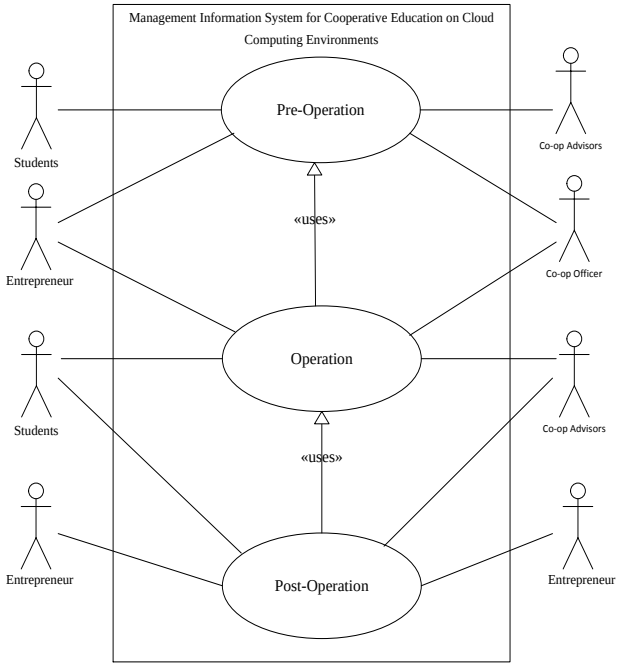

Figure 2 Use Case Diagram of information system for cooperative education process management on cloud computing environments

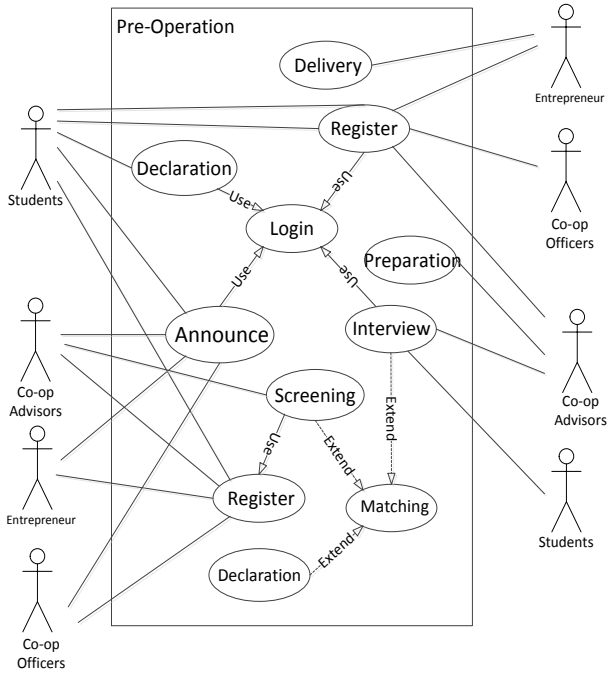

Figure 3. Use Case Diagram of pre-operation module

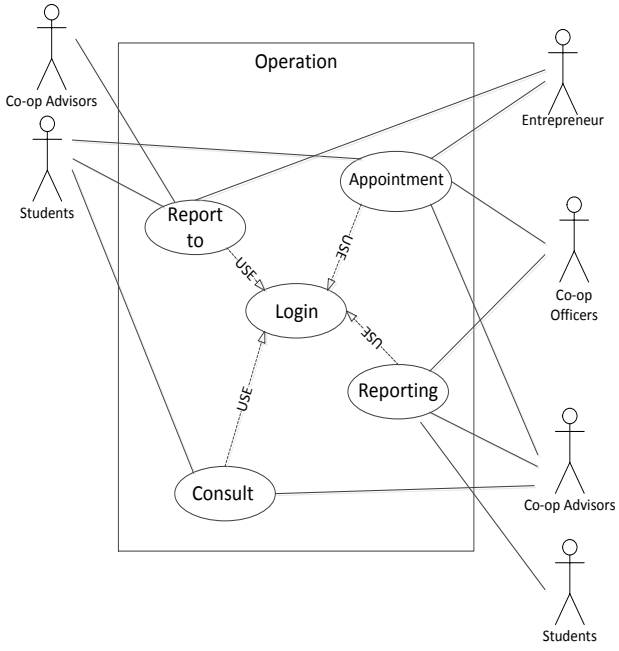

Figure 4 Use Case Diagram of operation module

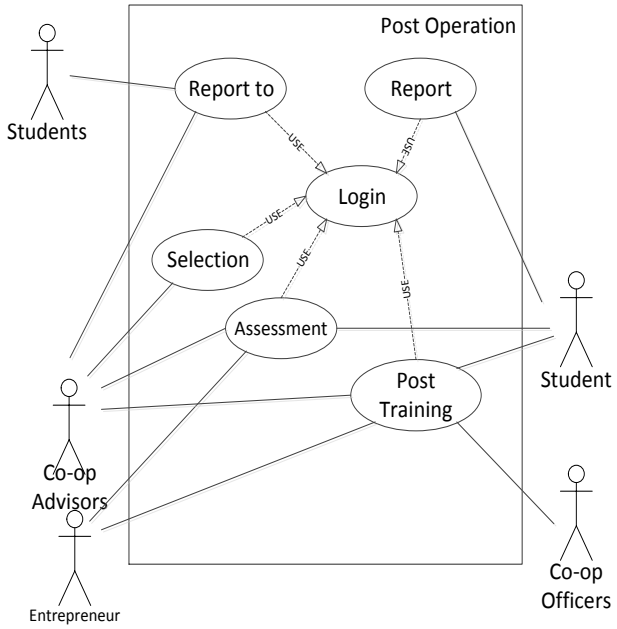

Figure 5 Use Case Diagram of post-operation module

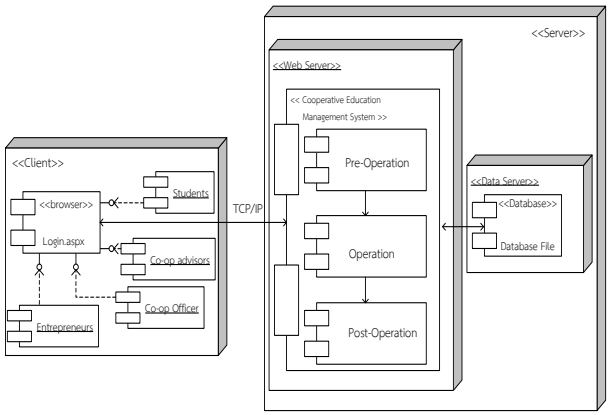

Figure 6 Deployment Diagram of information system for cooperative education process management on cloud computing environments

Use case Diagram in figure 2 to 5 explains a work of cooperative education systems on cloud computing environment. The three diagrams contain the same four users (Students, Co-op advisers, Co-op Officers and Entrepreneur). In Figure 4 is the Pre-operating system and consist nine subsystems as a following (1) Login (2) Register (3) Declaration (4) Preparation (5) Announce (6) Interview (7) Screening (8) Matching and (9) Delivery. In Figure 5 is the Operating system and consist four subsystems as a following (1) Login (2) Appointment (3) Consult (4) Report to and (5) Reporting. In Figure 6 is the Post-operating system and consist six subsystems as a following (1) Login (2) Report to (3) Report (4) Selection (5) Assessment and (6) Post-Training

Deployment Diagram in Figure 6 shown the functionality of the system has both client and server. Client consists of four users (Students, Co-op advisers, Co-op Officers and Entrepreneur). Client connecting to a server via the TCP/IP Protocol, and server (web server) consists of three modules (Pre-Operation, Operation and Post Operation) these three module works on the environment on the cloud computing.

Evaluation result to check validity and accuracy to use Use Case diagram and Deployment diagram of the information system for cooperative education process management on cloud computing environments for thai higher education institutions. The authors using the 4-dimension standard evaluation form to evaluation of appropriateness and potentiality by 20 interested persons involved in cooperative education and information and communication technology [9]. The evaluation results were as validity and accuracy is in highly level ($\bar{x}$ = 4.33, S.D. = 0.57). details shown in table 1.

TABLE I
The results evaluated by the experts

Designing Criteria	$\bar{x}$	S.D.	Validity / Accuracy
1. Utility Standards	4.38	0.50	Highly
1.1 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand can lead to achievement of cooperative education objectives.	(3.99)	(0.28)	
1.2 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand can respond to the needs and benefit interested persons involved in cooperative education system.	(4.73)	(0.55)	
1.3 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand is beneficial to the quality of cooperative education management	(4.43)	(0.67)	
2. Accuracy Standards	4.32	0.62	Highly
2.1 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand can be adapted to practical.	(4.45)	(0.72)	
2.2 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand is in line with the country's cooperative education management.	(4.02)	(0.37)	

Designing Criteria	$\bar{x}$	S.D.	Validity / Accuracy
2.3 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand is not complicated and easy to understand.	(4.48)	(0.77)	
3. Feasibility Standards	4.29	0.58	Highly
3.1 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand conforms with the policies of the Office of the Higher Education Commission and its subordinated education institutions.	(4.38)	(0.64)	
3.2 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand conforms with standard criteria of the Office of the Higher Education Commission.	(4.23)	(0.53)	
3.3 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand causes the cooperative education management to be more reliable.	(4.27)	(0.58)	
4. Propriety Standards	4.31	0.59	Highly
4.1 Major components and minor details of the format of cooperative education administration for higher education institutions in Thailand are accurate, complete, and concise.	(4.08)	(0.45)	
4.2 The design of the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand contains a systematic procedure.	(4.50)	(0.81)	
Average	4.33	0.57	Highly

VI. CONCUSSION

(1) The study of document related research, including interview of the stakeholder and experts in co-operative education management and information technology issues helps the authors to be able to design Use Case diagram and Deployment diagram which shown both parts of people who were related to the system which were educational institution and entrepreneur. If looking at these three modules from Use Case diagram, it will consist of students, co-operative officer, co-operative advisors entrepreneur. However, these four groups of system user will perform action related to co-operative education through information system on cloud computing which will facilitate them to do anywhere, anytime and with any devices, but still had security, reliability, and energy efficiency [10].

(2) This design corresponds to concept of Anuchit Anupan, Prachyanun Nilsook and Panita Wanapirun [11] use UML to design an information system on cloud computing environment. Cloud computing technology is the new technology for education in Thailand emphasizing on flexible expansion. It can be adjusted its size by user satisfaction and resource allotment focusing on working from the remote area [12].

Result of possible validity and accuracy evaluation by using all 2 diagrams as ideas to develop the system is in a preset level (the preset criteria is in much level) the validity and accuracy is in much level ($\bar{x}$ = 4.33, S.D. = 0.5). This reflects the crucial possibility [13] to apply the diagram to develop to be the information system for cooperative education process management on cloud computing environments for higher education institutions in Thailand later. This study corresponds to concept and idea of Nipon Sookvilai and Panita Wanapirun [14] who applies cloud computing to develop the system to educational management effectiveness and efficiency. Therefore result of the research pointed out that the use of such the design will allow develop information system to be more flexible, effective and rebound the needs of system users.

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