# Requirements Analysis and Designing an Examination Repository System Based on Cloud Computing Technology to Measure English and Information Technology Standards before Graduating from Higher Education

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*Abstract*—The objective of this study is to (1) study problems and requirement of stakeholder in examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education (2) design an examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education and (3) assessment the suitability of the design of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education. There are two steps of this study, in first step study problem and requirement of stakeholder and design in examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education by system development life cycle waterfall six step and second step is assessment the suitability of designing examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education. The sample consisted of 63 persons stakeholders that a knowledge about information technology of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education by stratified random sampling. The tool used in close-ended questionnaire with five-point rating scale. Statistics used to analyze data were mean and standard deviation. The results showed that: (1) the problems of traditional operations from the three groups of stakeholders survey, there are four factors are Person, Budget, Technology (2) Operation and analyzed to define design guidelines of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education consists of three diagrams are 1.fishbone chart 2.use case diagram and 3.architecture diagram (3) suitability of system design of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education at a high level ($\overline{X}$=4.06, S.D.=0.67)

***Keywords - Examination Repository System; Cloud Computing Technology; Measure English and Information Technology Standards***

## I. INTRODUCTION

Sustainable national development requires high-potential personnel because human resources are an important tool for the organization. Capable persons, when employed in any capacity, will develop the organization and cause a far-reaching ripple in the overall image of national development [1]. Furthermore, as technology has an increasingly larger role in the people's lives, as a major assistant and support in various jobs, everyday life becomes easier than ever [2]. Therefore, to improve quality of the people along the line of national development, technology is a major multiplier, especially in conjunction with personnel development through education, which will improve academic and professional wisdom of the people.

Education is a major foundation in national advancement, as education is a clear process that can develop people [3]. In the past decade, the trend of globalization led to social, cultural and economic changes in Thailand [4]. Thus, all sectors need more consciousness about human development. In such a case, learning management in educational institutes is a focal point of human development, to foster a foundation of knowledge in the learner. Still, learning management varies from one institute to another, a standard is needed, such as curriculum that needs to be systematically built, and reviewed by a central organization.

Educational assessment is needed because the teacher might not know whether there is any improvement

in the learner's knowledge [5]. Such assessment is especially important if the assessment reflects the overall knowledge base of the learner. Various educational institutes host examinations to measure english and information technology skills prior to graduation as required by the Announcement of the Higher Education Commission B.E. 2559 (2016). While the announcement allows some leeway in terms of assessment, most institutes include professional and information technology skill assessment, using their own forms, or standard forms from the professional agencies. Self-built forms might have problems such as inexperienced staff or insufficient staff for work, expenses, or lack of technological or paperwork management tools.

The researcher therefore developed a cloud-based examination system to facilitate the assessment of english and information technology skills of the undergraduates prior to their graduation in terms of speed, correctness and standardization for pre-graduation English and information technology skills assessment. Result from this study could be used as a guideline and model for other higher education institutes, and could be a contribution to the government policy pertaining to introduction of information technology in learning management, dubbed "Education 4.0" [7].

## II. OBJECTIVE

2.1 Study problems and requirement of stakeholder in examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

2.2 Define design of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

2.3 Assessment the suitability of the design of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

## III. EXPECTED BENEFITS

3.1 Learn about problems and needs of relevant parties in examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

3.2 Acquire a model and guideline for designing the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

3.3 Expand the assessment system into a full examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

## IV. FRAMWORK

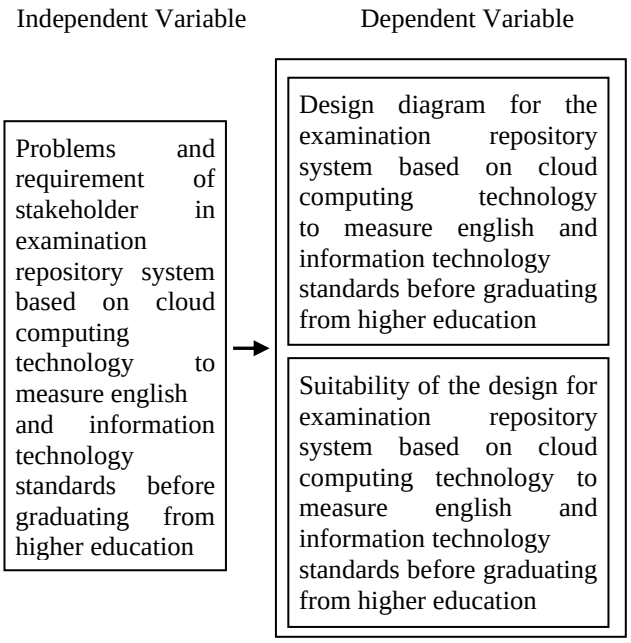


Figure. 1 Research Framework

## V. RESEARCH METHOD

The research was divided into two phases, Phase 1: Examine of problems and needs. Using a concept of 6 level waterfall model for IT system development was used [6] as follows:

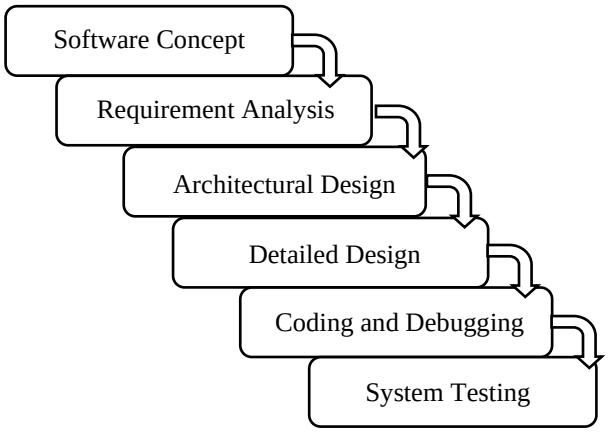


Figure. 2 Sashimi waterfall model [6]

Phase 2 : Assessment fishbone diagram and UML obtain from system analysis and design.

5.1 Examine problems and needs of relevant parties in examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

1) Examine problems and guideline through document and paper research.

2) Analyze and present the data using the fishbone diagram.

3) Specify system requirements through document research.

4) Interview experts on applied computer and examination repository system based on cloud computing technology to measure english & information technology standards before graduating from higher education.

5) Design the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education to explain the overall picture using the use case diagram shown in Figure 4.

6) Design details of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education using the Unified Modeling Language :UML (for example this paper is architecture diagram) in Figure 5.

5.2 Assessed the design for examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

1) Create a survey form with four aspects of assessment [8].

2) Collect information from the sample group, comprising 63 stakeholder and sampled by stratified random sampling.

3) Analyze and assessment suitability of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

## VI. RESEARCH RESUALT

Result of this study could be presented in accordance with the research purposes as follows:

6.1 Study of problems through documents, and research works pertaining to the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, using the fishbone diagram, revealed that there were four problems in the pre-graduation English and IT skills assessment. The first was staff problem with three issues such as lack of skills, slow working, and insufficient staff number compared to the service. The second issue was the budget, as there was a limited budget, and high expense on office supplies. The third problem was technology: facilitating technology was lacking, and the technology already in use was obsolete. The fourth problem was operation with three issues: disorderly archiving, loss of documents due to excessive number of documents, and slow queue checking as shown in Figure 3.

Analysis of the needs of the applied computer experts and relevant parties in the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education is shown in Figure 3.

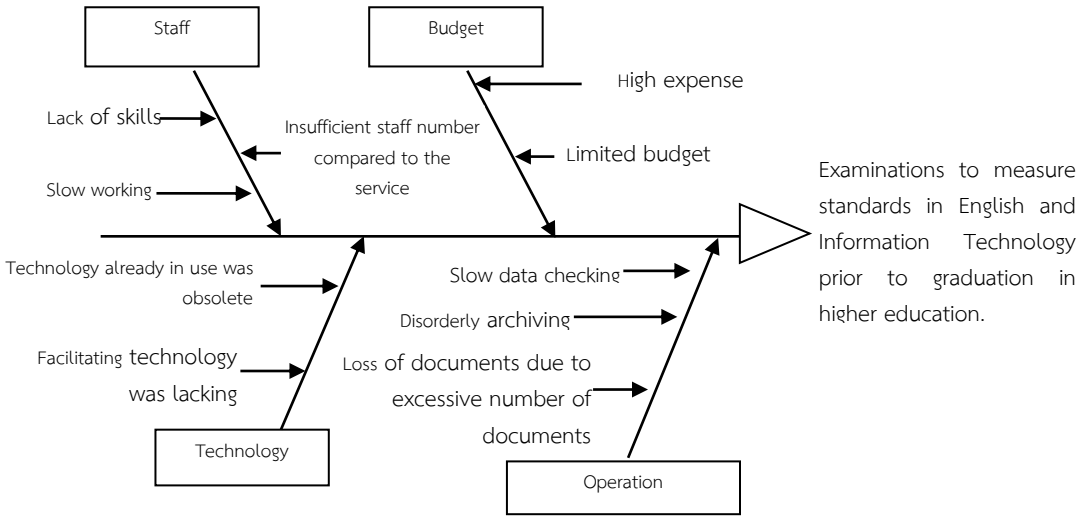


Figure. 3 Fishbone Chart

6.2 Analysis of use case diagram showed that the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education had the officer part, with five sub-parts: (1) login (2) manage user (3) manage exam (4) webboard and (5) report. The second part was for the teacher with three sub-parts: (1) login, (2) create exam and (3) webboard. The last part is for the students with three sub-parts: (1) login (2) test and (3) webboard, and all detailwas shown in Figure 4 and the system architecture is shown in Figure 5 as follow.

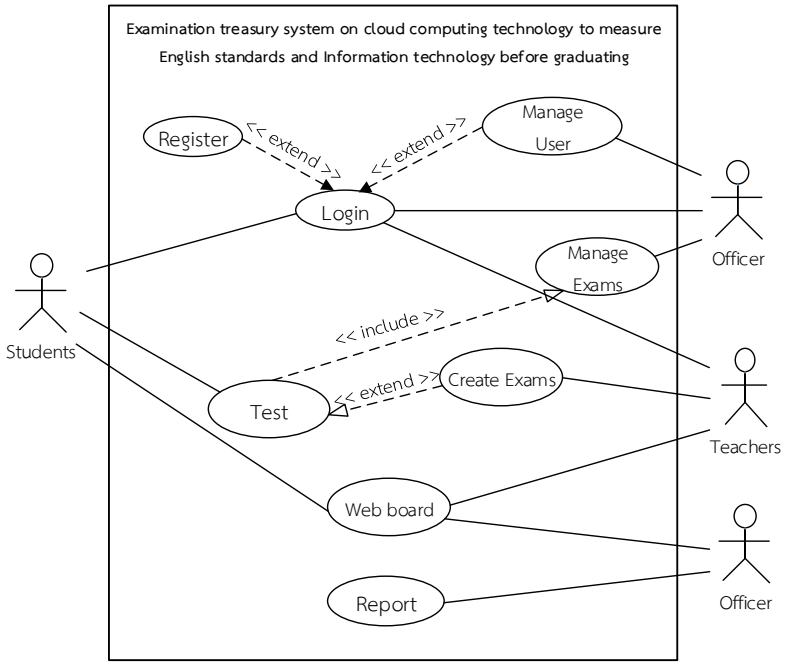


Figure. 4 Use case Diagram

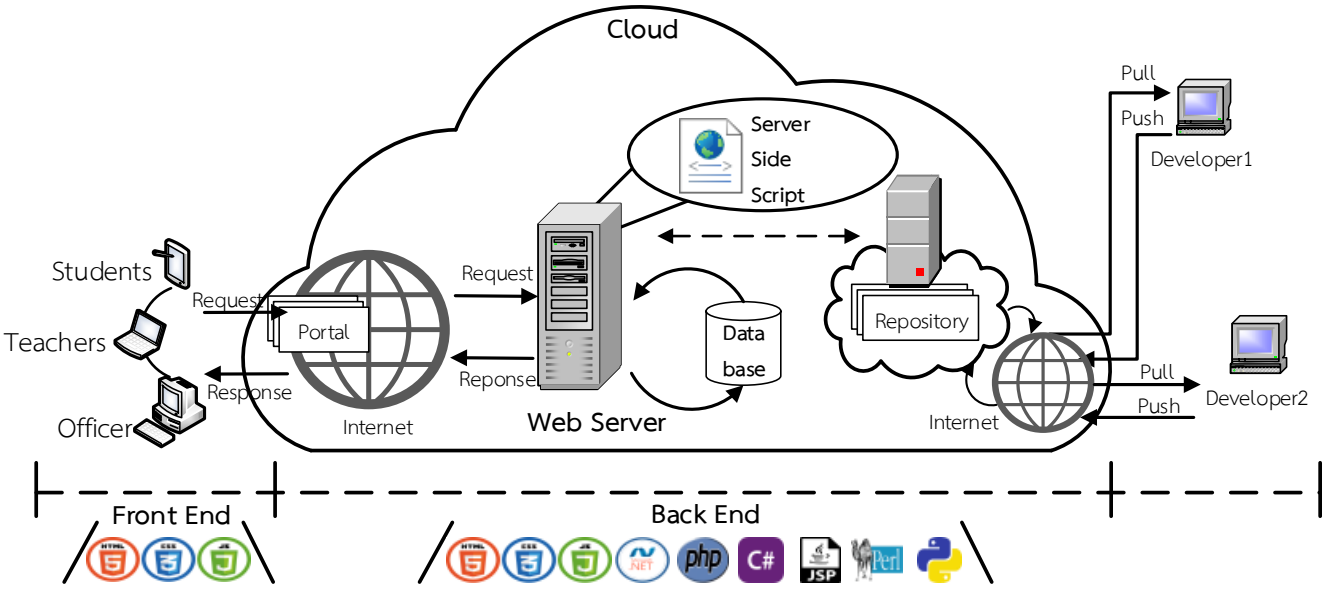


Figure. 5 Architecture Diagram

6.3 Assessment of suitability of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, through 63 sampled participants, revealed that the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education was given a high rating, with following details:

Table 1: Average, standard deviation and suitability of the design for the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education

| Items | Assessment result | | |
|---|---|---|---|
| | Mean | S.D. | Rating |
| 1. Utility Standards | | | |
| 1.1 The diagram can reflect the user problem. | 4.19 | 0.74 | High |
| 1.2 The diagram can clearly show the user needs. | 4.10 | 0.66 | High |
| **Total** | **4.15** | **0.70** | **High** |
| 2. Feasibility Standards | | | |
| 2.1 The diagram can clearly show the system process | 4.07 | 0.58 | High |
| 2.2 The diagram can be used as a programming guideline. | 4.17 | 0.66 | High |
| **Total** | **4.12** | **0.62** | **High** |
| 3. Accuracy Standards | | | |
| 3.1 The diagram uses the correct analysis and design symbols | 4.05 | 0.61 | High |
| 3.2 The diagram meets standards. | 4.02 | 0.79 | High |
| 3.3 The diagram can correctly explain the system process | 4.01 | 0.73 | High |
| **Total** | **4.02** | **0.71** | **High** |
| 4. Propriety Standards | | | |
| 4.1 Suitability of the diagram for system explanation | 3.92 | 0.53 | High |
| 4.2 Suitability of translation from idea to diagram. | 3.95 | 0.75 | High |
| **Total** | **3.94** | **0.64** | **High** |
| **Overall** | **4.06** | **0.67** | **High** |

According to Table 1, suitability assessment of the analysis and design for the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education revealed that utility was given a high rating ($\bar{X}$ = 4.15, S.D. = 0.70), feasibility ($\bar{X}$ = 4.12, S.D. = 0.62), accuracy ($\bar{X}$ = 4.02, S.D. = 0.71), and propriety ($\bar{X}$ = 3.94, S.D. = 0.64). Overall, suitability of the analysis and design for the the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education was given a high rating ($\bar{X}$ = 4.06, S.D. = 0.67)

## VII. CONCLUSION

7.1 Problems and needs of the relevant parties in the the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education could be grouped into four groups:

1) Staff (Lack of skills, slow working and insufficient staff for work.)

2) Budget (Limited staff budget and High office supply expenditure)

3) Technology (Lack of facilitating technology and obsolete technology being used)

4) Operation (Slow data checking, Disordered archiving, Poor document tracing and slow queue checking)

7.2 The designing the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education used the use case diagram and architectural diagram to explain the overall process. The use case diagram was used to explain the process of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education. Three user groups were in the system (Teachers, students, and officer), Which had eight subsystems (1) login (2) manage user (3) register (4) creation exam (5) manage exam (6) test (7) webboard, and (8) report.

7.3 Suitability assessment of the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, as made by 63 persons related with the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, by stratified random sampling (first layer was divided 3 groups and second layer was snowball sampling), revealed that the average rating for the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education was 4.06, and standard deviation was 0.67

## VIII. DISSCUSSION

8.1 Interview of experts and relevant parties of the the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, in order to collect system requirements,

granted the researchers insight into system problems and requirements, which were then used to create the analysis and design framework for the the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education, using the fishbone diagram, context diagram, architectural diagram, Study of the problems and needs of the relevant parties concurred with the work by Pawanrant Deekasem et al. [9] about problems in storage of tools, technology and attendance/leave of the ambulance company in Ananda Mahidol Hospital. This work used the fishbone diagram to collect problems in equipment storage, data recording and attendance. After problems were discovered, the organization learned of the solutions and were able to minimize problems. This also concurred with the work by Thanchuda Pannikul, Duangporn Sangkhamanee and Preedaporn Ngamsanga [10] or Efficiency Improvement in Manufacturing Process by Industrial Engineering Tools Case Study: Bicycle Assembly Factory, which brought industrial engineering tools such as the fishbone diagram and Expense and Cost Recovery System (ECRS) to solve problems in the factory. This work found that after improvement, the wasted time was reduced from 509 seconds to only 43 seconds, and the bike assembly rate went from one every 837 seconds to only 595 seconds (a 28.91% increase in speed).

8.2 Once the problems were identified by the relevant parties, system analysis and design were carried out in accordance with the IT system design principle that reflected the user needs through the use case diagram and structure diagram. This was the Object-Oriented method for reflection of the system, in concurrence with the work of Chaiyaphon Putthamonsiri [11]. The research process was split into steps, and the Software Development Life Cycle (SDLC) approach was used for system analysis and design. This also concurred with Sairung Weangsima [12] that used the UML a guideline for development of the Electronic Payment System in Fisheries Single Window. After the design guideline was developed, it was tested for suitability by relevant parties using the UML, and received a high suitability rating. This could be used as a guideline for designing the the examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

8.3 The assessment method was consistent with the work by Khemmanit Preeprem [13] that used the four-aspect evaluation standard [8] for assessment of the Information Technology Competency and Management Information Systems of Administrator under the jurisdiction of Nakhon Pathom Primary Educational Service Area Office I, which received a high suitability rating. Wannaporn Jitsangworn [14] likewise used the four-aspect evaluation standard for assessment of the efficiency of recording studio rental systems and Internet music equipment by using the concept of electronic service quality, and likewise also got a high rating. Saeed Mohammed Almueed's A Meta evaluation of School Counseling Program Evaluations [15] likewise used JCSEE's four-aspect evaluation to compare with the meta evaluation approach on American school counseling program assessments. This work found that the meta evaluation was inferior to the JCSEE's approach in terms of suitability assessment and quality reflection. This work showed that the JCSEE was reputable and could be used for performance and quality assessment.

## IX. SUGGESTIONS

9.1 The next phase, should take the analysis and design guideline to develop an examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education.

9.2 There should be a guideline for analysis and design of examination repository system based on cloud computing technology to measure english and information technology standards before graduating from higher education that can handle cross-platform use or designed to work on mobile devices or may use technology block chain is used to ensure the reliability of information.

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