Design of Ontology the Automatic Electronic Advisor Systems for Private Higher Education Institutions in Thailand

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Abstract —The study of "Design of Ontology the Automatic Electronic Advisor Systems for Private Higher Education Institutions in Thailand" with the objectives as follows (1) to design of ontology the automatic electronic advisor systems for private higher education institutions in Thailand and (2) to evaluate the design diagram of ontology the automatic electronic advisor systems for private higher education institutions in Thailand. The study separated into two stages. The first stage, gather the requirement of electronic advisor systems user by document analyses and depth interview with stakeholder. Second stage, design ontology 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 ontology and advisor in institution amount 13 persons by snowball 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 electronic advisor systems consist three group are (1) Students (2) advisors and (3) officers (2) The design of ontology the automatic electronic advisor systems for private higher education institutions in Thailand consists a Use Case Diagram and Architectures Diagram, The design of the system is evaluate by 13 expert in ontology and were advisor as most appropriate.

Keywords—ontology, advicing system, electronic system, automatic system

I. INTRODUCTION

Thailand has been developing and led itself to be a secured, prosperous and sustainable nation, this is considered as government's major strategy to develop the country. Thailand has a conceptual framework for national development planning, starting from 1932 by the People's Party and at the time, announcing six principles as guideline to lead the country in creating people's happiness. Later, the National Economic Council was established to conduct the analysis on economic research and acted as government's advisor in solving financial, fiscal and economic issues [1].

At present, Thailand is performing in accordance with the 11th National Economic and Social Development Plan ((2016-2012and is going to enter the 12th National Economic and Social Development Plan (20172-021), its directions are as follows: (1) the induction and application of King Rama IX's Sufficiency Economy Philosophy; (2) people are the center of participatory development; (3) supporting and promoting the concept of national reform; and) 4) the development to achieve security, prosperity, sustainability, happy society [2].

The present era is called as the Digital Age, economic and social surroundings are rapidly changing [3], many countries including Thailand need to adjust own strategies and tactics for national development, for example, the United States of America applies a strategy of 'A Nation of Makers', etc., [4]. In case of Thailand, a strategy to lead the country into the development which is called "Thailand "4.0 is established, it means a policy vision aiming to transform the country into security, prosperity and sustainability with the adjustment of economic structure to drive with innovations classified into 5 groups including (1) Biotech

Industrial Group; (2) Renewable Energy Industrial Group; (3) Engineering and Design Industrial Group; (4) Life Quality related Industrial Group; and (5) Creative Economy Industrial Group [5].

The education is considered as the essential foundation to develop country into securely, prosperously and sustainably progress because education is a process that helps to develop individuals in clear steps and evaluate its efficiency [6]. In the past decade, the globalization trend had caused Thailand's transition in economy, society and culture [7], resulting in the awareness of all related sectors to develop people and the quality of people for country's development for sustainable growth in the global society. This is in line with the 11th National Economic and Social Development Plan ((2016-2012 addressing the development of people into a sustainable lifelong learning society.[8]

Technologies are applied to enhance the potential of educational management for preparing teaching and learning in the Digital Age with full potential, effectiveness, supporting and strengthening the production of students who wisely grasp the change of the world to serve the society. However, the schooling in the institution of education is difficult to understand, some students may not be able to adapt themselves to this style of learning, as a result, they cannot pass the curriculum of that institution of education. Consequently, in order to solve such problem to enable students to adjust themselves in catching up their learning, they need to be advised, suggested and guided in a good manner. Institutions of education in both government sector and private sector have appointed teachers as advisors for students in giving advices, guidelines, whether they be educational rules and regulations, how to adapt themselves in learning and general life in the institution of education, under the objective to help those students to adjust themselves and not cause problems to themselves and to the institution of education where they belong.

Nevertheless, although many institutions of education already established an advisory teacher system, it may not be successful in helping students in a timely manner [9]. Therefore, in this advisory system, if the automated information system is applied, many operations that help consultancy providing and receiving will be more effective with better solutions.

II. PURPOSE OF STUDY

(1) to design of ontology the automatic electronic advisor systems for private higher education institutions in Thailand.

(2) to evaluate the design diagram of ontology the automatic electronic advisor systems for private higher education institutions in Thailand.

III. RESEARCH FRAMEWORK

Conceptual framework of A systems analysis to design of ontology the automatic electronic advisor systems for private higher education institutions in thailand was shown in *Figure 1*.

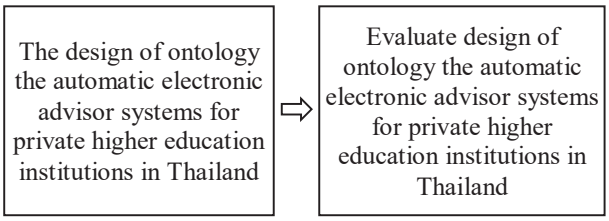

Figure 1. Conceptual framework

IV. METHOLOGY

A systems analysis to design diagram of ontology the automatic electronic advisor systems for private higher education institutions in Thailand consisted of two step as follows:

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

Step 2: Evaluate the diagram of ontology the automatic electronic advisor systems for private higher education institutions in Thailand.

Population and Sample

Population who were experts about advisor system with ontology technology in higher education institutions.

Sample who were experts in advisor system with ontology technology in higher education institutions amount 13 persons by snowball 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 expert's evaluation the design diagram for ontology the automatic electronic advisor systems for private higher education institutions in Thailand were collected. Statistics used to analyze data were mean and standard deviation. [10]

V. RESEARCH RESULT

The results revealed as follows:

(1) Gather requirement from stakeholder and the information system for ontology automatic electronic advisor systems consist three group [11] were (1) Students (2) Advisors and (3) Officers, and the ontology automatic electronic advisor had four class were (1) Stakeholder (2) Organization (3) Activities and (4) Rule, and shown on Figure 2

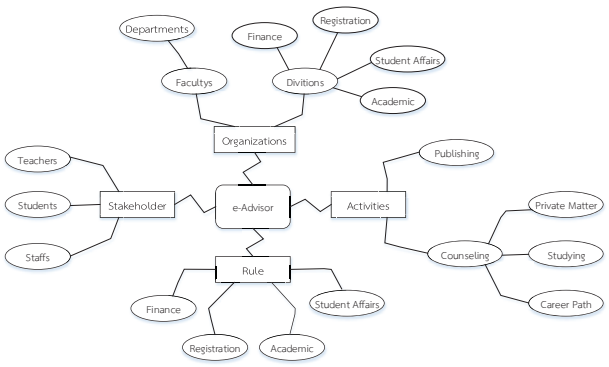

Figure 2. Concept of ontology automatic electronic advisor systems from stakeholder

(2) For a design of ontology automatic electronic advisor systems for private higher education institutions in Thailand. Authors designs the system with two diagrams including use case diagram and structure diagram [12]. And two diagrams had details and shown on Figure 3 and 4

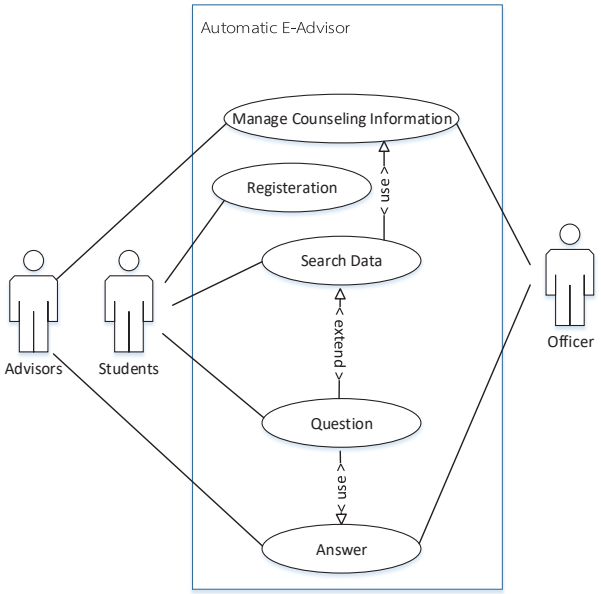

Figure 3. Use Case Diagram of information system for ontology automatic electronic advisor systems for private higher education institutions in Thailand.

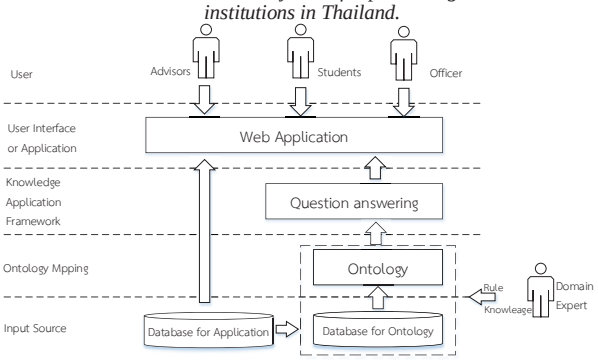

Figure 4. Structure Diagram of information system for ontology automatic electronic advisor systems for private higher education institutions in Thailand.

Use case Diagram in figure 3 explains a work of automatic electronic advisor systems. This diagrams contain three users (1. Students, 2. Advisers and 3. Officers) and had five use case (1. Manage Counseling Information, 2. Registration, 3. Search Data, 4. Question and 5. Answer). Figure 4 shows the architecture of the system. The system consists of five level (1.Input source, 2.Ontology mapping, 3.Knowledge application framework, 4. User interface or Application and 5. User). By design, the system works in parallel with the common web applications and automatic web applications. The user does not know what part of the system is working. The system will automatically adjust the operating mode. It will satisfy to the students well.

Evaluation result to check validity and accuracy to use Use Case Diagram and Architecture Diagram of ontology the automatic electronic advisor systems for private higher

education institutions in Thailand. The authors using the 4-dimension standard evaluation from to evaluation of appropriateness and potentiality by 13 interested persons involved in advisors who understand the ontology system. [13]. The evaluation results were as validity and accuracy is in highly level ($\bar{x}$ = 4.03, S.D. = 0.69). Details shown in table 1.

TABLE I
The results evaluated by the experts

Designing Criteria	$\bar{x}$	S.D.	Validity / Accuracy
1. Utility Standards	4.02	0.62	High
1.1 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand can lead to achievement of the automatic electronic advisor system objectives.	(4.00)	(0.70)	
1.2 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions	(3.92)	(0.49)	
Designing Criteria	$\bar{x}$	S.D.	Validity/ Accuracy
in thailand can respond to the needs and benefit interested persons involved in the automatic electronic advisor system.			
1.3 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand is beneficial to the quality of the automatic electronic advisor system	(4.15)	(0.68)	
2. Accuracy Standards	4.05	0.62	High
2.1 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand can be adapted to practical.	(4.07)	(0.64)	
2.2 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand is in line with the country's the automatic electronic advisor system.	(4.07)	(0.64)	
2.3 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand is not complicated and easy to understand.	(4.00)	(0.57)	
3. Utility Standards	4.05	0.71	High
3.1 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand conforms with the policies of the Office of the Higher Education Commission and its subordinated education institutions.	(4.15)	(0.75)	
3.2 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand conforms with standard criteria of the Office of the Higher Education Commission.	(4.07)	(0.75)	
3.3 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand causes the automatic electronic advisor system. to be more reliable.	(3.92)	(0.64)	
4. Propriety Standards	4.00	0.81	High
4.1 Class and subclass of the ontology the automatic electronic advisor systems for private higher education institutions in thailand are accurate, complete, and concise.	(3.92)	(0.86)	
4.2 The design of the information system for ontology the automatic electronic advisor systems for private higher education institutions in thailand contains a systematic procedure.	(4.07)	(0.75)	
Average	4.03	0.69	High

VI. CONCUSSION

(1) The study of document related research, including interview of the stakeholder and experts in advisors who understand the ontology system helps the authors to be able to design Use Case diagram and Architecture diagram which shows the relationships of those involved in the system with the ontology. If looking at these five modules from Use Case diagram, it will consist of 1.Manage Counseling Information, 2.Registration, 3.Search Data, 4.Question and 5.Answer. However, these three groups of system user will perform action related to automatic electronic advising through information system on web base application which will facilitate them to do anywhere, anytime and with any devices, but still had security, reliability, and efficiency [14]. The information system will work on two modes of the web application, which automatically adjusts the mode. This is consistent with the application of ontology for ecotourism information searching system in lower-southern Thailand that uses Use case diagrams and architecture diagram to analyze and design systems [15]

(2) This design corresponds to concept of Pra Chandresh Kamleshwar [16] that use UML to design an information system for Student Management System. Student Management System uses automatic electronic systems to service students for emphasizing on flexible expansion. It can be adjusted need by user satisfaction and resource allotment focusing on working from the remote area. The diagrams that the author has designed has

elements in accordance with the research of Suriya Pumchalerm and Punlop Piriyasuriwong, That consists of 3 groups stakeholder in the system and และ work on the web application as well [17] but may be different in terms of information technology used in system development.

Result of possible validity and accuracy evaluation by using all two 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 ($\bar{x}$ = 4.03, S.D. = 0.69). This reflects the crucial possibility [18] to apply the diagram to develop to be the information system for the automatic electronic advisor systems for private higher education institutions in Thailand later. This study corresponds to concept and idea of Suriya Pumchalerm and Punlop Piriyasuriwong [17] who applies social media to develop the electronic advisors system to provide effective and efficient management of consultations. 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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