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SCHOLARSHIP RECOMMENDER SYSTEM OF OFFICE OF THE CIVIL SERVICE COMMISSION WITH THE EFFECTIVENESS OF COMMUNICATION FOR ALTERNATIVE SOURCES OF SCHOLARSHIPS AND INSTITUTIONS TO STUDY ABROAD

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Abstract— This research aimed to study the factors that influence the selection of scholarship and educational institutions to study abroad in Thailand's potential, find a set of necessary knowledge for the system development. And, develop Scholarship Recommender System and evaluation of the system used to select the scholarship and institutions to study abroad of office of the Civil Service Commission. The system collected information about Scholarship of office of the Civil Service Commission. And, process data to demonstrate the result information for recommend Scholarship which appropriate with each user. In addition, the system also introduced Education and Scholarship Information, Statistics of the scholarship recommendation on system, and Statistics of Information had been received scholarships from office of the Civil Service Commission to assemble the information for user.

The performance evaluation system by questionnaires. This system evaluated by Computer Specialist 5 persons. The results founded that the performance of the average value 4.25 and the standard division equals 0.61. The demonstrated system performance at a very good level. And, the performance evaluation system by Users of the office of the Civil Service Commission 5 persons founded that the average value 4.24 and the standard division equals 0.66. The demonstrated system performance at a very good level. In conclusion, System could be used practically and was instrumental in supporting introduce a scholarship to support their decision to apply for the scholarship.

Keywords— Scholarship, Recommender System, Education.

I. INTRODUCTION

Learning in the 21st century is to define strategic guidelines in the curriculum by jointly creating a pattern and practice of enhancing the efficiency of learning in the 21st century by focusing on knowledge, skills, expertise and competencies that the learner to live in a society of current changes. It refers to the style developed from a partnership to a corporate network to improve the skills of learning in the 21st century the name of the network, which has developed a framework for P21. Learning in the 21st century by incorporating knowledge, Specialized skills, expertise and knowledge about the various aspects for the success of the students in the field of work and living. [1]

The office of the Higher Education controls and supports all higher education in Thailand while Ministry of Education provides personal gain admission in the 11-year compulsory education program. In addition to the compulsory, education, this also provides scholarships to needy individuals or parties but excelled estate losses. The scholarships may be available from government and the private sector for school or university that realizes the importance of education. Therefore, the researcher used a case study of Office of the Civil Service Commission which is the agency responsible for the Human Resource sector to screen and organize an examination into the Civil Service and conduct a

competitive examination to recruit and select candidates for the general government scholarship to study abroad which match to the needs of the government / state agencies annually. The system was developed as a web application functions to facilitate guidance and advice to those interested to apply for a scholarship within the country and abroad as well.

So, the author has developed the Scholarship Recommender System by a case study of Office of the Civil Service Commission. This is the organization that controls the entire process on scholarships of government and the private sector, and those who have scholarships to graduate.

Recommended system scholarship has been developed to provide users with information about scholarships that appropriate the specifications of each individual user. The system comprises scholarship's education news, scholarship information and information of those who have received the scholarship to be a tool for users to support the decision of choosing the scholarship and educational institutions.

II. LITERATURE REVIEW

The research has focused on Recommending Scholarship of the Office of the Civil Service Commission to obtain data and analyzing effectively. Therefore, this was for studying and searching guideline data, including theory and technology related to the research as follows:

A. Recommender System

Recommender System is recommended system information products and people. Hereinafter referred to as Items to users based on the assumption of learning preferences or needs of the user at that time. The recommendations become an important research topic since the appearance of research Collaborative Filtering. In the mid-1990s, by the early success of the system from the growing business of electronic commerce, recommender systems were useful alternatives to search algorithms since help users discover items they might not have found by themselves. Interestingly enough, recommender systems are often implemented using search engines indexing non-traditional data. In use, the system was recommended. The network currently doing business with the internet and social networking consecutive increase. It is interesting to implement the recommendations to support decision making. [1],[3]

B. Scholarship

Scholarship is an award of financial aid for each student for further studies. Scholarships are awarded based upon various criteria, which usually reflect the values and purposes of the donor or founder of the award. Scholarship money is not required to be repaid. Currently, both types of scholarship funding from government and private sector of Thailand are as follows : Scholarships awarded good grades , The lack of aid , Venture further specialized education , Funding activities Extracurricular , Scholarships for disadvantaged social and cultural and Scholarships to promote their business. The first source is the government funding to develop personnel to work for the government in both domestic and international workplaces. However, these fellows want to be selected by consideration of academic ability or social and cultural importance.[5],[6]

C. Collaborative Filtering

Collaborative filtering is a technique used by some recommender systems. [3] Collaborative filtering has two senses, a narrow one and a more general one. In general, collaborative filtering is the process of filtering for information or patterns using techniques involving collaboration among multiple agents, viewpoints, data sources, and soon.[4] Applications of collaborative filtering typically involve very large data sets. Collaborative filtering methods have been applied to many different kinds of data including: sensing and monitoring data, such as in mineral exploration, environmental sensing over large areas or multiple sensors; financial data, such as financial service institutions that integrate many financial sources; or in electronic commerce and web applications where the focus is on user data, etc. The remainder of this discussion focuses on collaborative filtering for user data, and some of the methods and approaches maybe applied to the other major applications as well. Collaborative filtering

systems provide many forms. That can be based on implicit observations of normal user behavior. These systems record what a user has done together with what all users have done and use that data to predict the user's behavior in the future, or to predict how a user might like the chance. These predictions then have to be filtered through given business logic to determine how predictions might affect the actions of a business system. Knowledge discovery in databases (KDD) is the process of discovering useful knowledge from a collection of data. This widely used data mining technique is a process that includes data preparation and selection, data cleansing, incorporating prior knowledge on data sets and interpreting accurate solutions from the observed results. Data mining is the analysis step of the knowledge discovery in databases process. The goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Aside from the raw analysis step, it involves database and data management aspects, data pre-processing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization, and online updating. [2]

III. RESEARCH METHODOLOGY

A research methodology is to develop the Scholarship Recommender System with the effectiveness of communication for alternative sources of scholarships and institutions to study abroad has process in research as follows:

1. Data preparation for the recommendation of scholarships that used to store the scholarships in the form of database storage, studied recommendations and the techniques used to support for the design of the scholarship recommender system, and studied effectiveness of communication for alternative sources of scholarships and institutions to study abroad.
2. Data analysis to be used as a variable for data processing in the analysis utilized the data form total 4 variables, divided into 3 independent variables and 1 dependent variables as Table I.
3. System design process to manage system flow process defining the boundary between the system, or part of a system, and its environment, showing the entities that interact with it. And design data flow to create the system database with MySQL. Furthermore, design Graphic User Interface.
4. System development by program coding with PHP to create system and connect database. Statistics of Scholarship recommender with Collaborative Filtering technique to managed and displayed rating of scholarship from using system.

TABLE I
VARIABLES IN USED THE RESEARCH

Variable	Data Type	Variable Type	Description
Education	Nominal	Independent	Level, Group and GPA of education that user educated. Full stop
Age	Numeric	Independent	Age of user who required Scholarship
Position	Nominal	Independent	Working status of user
Scholarship	Nominal	Dependent	Disciplines and Countries for study

5. System testing when the researchers developed successfully. Then, to test the functioning of the system with the development of Computer Professionals and Users of the Office of the Civil Service Commission. Performance testing has 4 aspects ; (1) Functional Requirement Test (2) The ability as a function of the system Test (3) Usability Test and (4) Security system Test.

After that, when the test successfully researcher improve the system that follow with test result and the opinions of testers.

Finally, researcher install this system to the Office of the Civil Service Commission. The system is an web application.

IV. RESEARCH RESULTS

The test results of scholarship recommender system with the effectiveness of communication for alternative sources of scholarships and institutions to study abroad could be summarized as follows:

A. The result of development the scholarship recommender system of the Office of the Civil Service Commission. The development is divided into 2 groups of users were Users and System Administrators that operating results are as follows:

1) System for Users

a. Main webpage of system for users fill personal information and information about the scholarship requirement to system processes.

b. Scholarships News and Knowledge information webpage about the 10 most popular cities in the world to the annual ranking by 2557 the QS Best Student Cities. And, information about the language Proficiency Test for higher education of each country by the user will gain the knowledge to prepare to apply for a scholarship. Furthermore, system has knowledge information about Culture of each country and a Visa for study aboard.

c. Searching webpage that users can search for the opinions of those who had scholarships.

d. Webpage shows statistic about who had scholarships of the Office of the Civil Service Commission. And, system shows statistic of the

recommender scholarships that users could get statistic show recommend result of users who used system to be the information for support decision to other users.

2) System for Administrators

a. Login webpage for Administrator to manage the system by sign in with username and password to verify administrator identity.

b. Scholarship webpage, Administrator to add, delete, edit and search for scholarship information that manage with fill Scholarship Name, Scholarship Link, data fields of scholarship to study, can choose to allow users to download scholarship data files. And, manage all of system and database.

The research results founded that the factors that influence the selection of scholarship and educational institutions to study abroad in Thailand's potential as Table II.

TABLE II
THE FACTORS THAT INFLUENCE THE SELECTION OF SCHOLARSHIP AND EDUCATIONAL INSTITUTIONS

Topics	Factors
The organization provides scholarships	1) Organization involved with work of applicants
	2) Type of restitutionscholarships
	3) The amount of money
	4) Conditions of contract Scholarships
	5) Qualification of applicants
The educational institutions to study abroad	1) The popularity of the field to study
	2) Expenditure
	3) Language
	4) Internationally authentic education
	5) Work after graduation

B. The performance evaluation of system

The performance evaluation of system with Computer Professionals. Performance testing the scholarship recommender system of the Office of the Civil Service Commission for test the integrity and accuracy of the system and to evaluate the performance and satisfaction in the work of system that testing has 4 aspects; (1) Functional Responsiveness (2) Functional ability (3) The system usability and (4) The system security. The results are as Table III.

TABLE III
THE PERFORMANCE EVALUATION OF SYSTEM WITH COMPUTER PROFESSIONALS

Evaluation descriptions	Effective levels			No.
	\bar{X}	S.D.	Qualitative Average mark	
1. Functional Responsiveness	4.40	0.58	Good	1
2. Functional ability	4.40	0.57	Good	2
3. The system usability	4.27	0.53	Good	3
4. The system security	4.13	0.78	Good	4
total	4.30	0.62	Good	

The overall of the research results reveals effectiveness of 4 aspects, total effective are in good level ($\bar{X} = 4.30$). Recommendations of performance evaluation system is to add scholarship information from other organizations to suggest for users. The format of the system administrator should be organized for easy to use. The format of the background and font colors blend too should change the background color to a character more clearly.

C. The satisfaction evaluation of system
The satisfaction evaluation in using of system with users for test the integrity and accuracy of the system and to evaluate the performance of system that had 4 aspects; (1) Functional Responsiveness (2) Functional ability (3) The system usability and (4) The system security. The results are as Table IV.

TABLE IV
THE PERFORMANCE EVALUATION OF SYSTEM WITH USERS

Evaluation descriptions	Effective levels			No.
	\bar{X}	S.D.	Qualitative Average mark	
1. Functional Responsiveness	4.28	0.67	Good	2
2. Functional ability	4.30	0.55	Good	1
3. The system usability	4.14	0.75	Good	4
4. The system security	4.26	0.69	Good	3
total	4.24	0.66	Good	

The overall of the research results reveals effectiveness of 4 aspects, total effective are in good level ($\bar{X} = 4.24$). Recommendations of performance evaluation system should have information from other sources and the most current updates.

CONCLUSIONS AND DISCUSSION

Development Scholarship Recommender System of the Office of the Civil Service Commission with the effectiveness of communication for alternative sources of scholarships and institutions to study abroad that had important processes in development as; Database design, System security, Scholarship information. Result use to be benefit in the academic and the application are as follows: 1) The academic knowledge in scholarships to study abroad on the online medias aspect of web application functionality. Education Online website as a channel to disseminate information and be learning resources. 2) The result of the application can be used as a suggestion for

planning to study abroad in higher education. To permit and develop the study of Thailand. 3) The practice will lead to a recommendation to develop the scholarship recommender system and improving the quality of life of users to make progress in education. And, recommend and support decision to choose Scholarship, Institutions and Countries for study abroad that match with each person. Statistics of the scholarship recommendation on system, and Statistics of Information had been received scholarships from office of the Civil Service Commission to assemble the information for user.

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