

A Prototype of Community Database System by Digital Community Center and Citizen Involvement

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Abstract - This study aimed to create a prototype of community database system with the participation of digital community center and the involvement of the citizen. It was carried out in Mae Ku and Phra That Pha Daeng sub-district, Mae Sot District, Tak Province. The study was divided into two sections. The first section was a study of data usage requirement by the people in the area, the data were analyzed using statistical average and standard deviation. The results from the study showed that the sample required the usage of data in 13 different aspects by dividing them in two groups. The first group was collecting and gathering data from the citizens, which was in accordance with the current problem in the area, the second group were collected and gathered data by government agencies which are statistical information. The second section based on the development of community database by utilizing the requirement of data usage that was revealed in the first section in developing the community databased into a Web Application, the system was developed in PHP language using MVC coding pattern. After the system was developed and fully

tested, satisfactory assessment was conducted on system users. Data were collected with satisfactory assessment model. The data were analysed using statistical average and standard deviation. The assessment result showed that there was high level of satisfaction from system users.

Keywords - Community Database System, Digital Community Center, Citizen Involvement

I. INTRODUCTION

From the Thai government policy implementation, which involve reforming and developing the country by naming the developing and reforming scheme as “Thailand 4.0” as a result, different agencies started to draw out operational plan in order to drive the above mentioned policy. One of the important policy is to develop digital for the economy and the ministry of digital society. This is a method of using information technology and communication in developing every sector in Thailand. The above-mentioned plan consists of six basic strategies, in which the important strategy in the

development of the community is creating equal quality society with the use of digital technology. This focus on developing every citizen in getting access and take advantage from various services from the government through digital technology, thereby reduce inequality in the usage of digital technology and develop the citizens in knowing more about information. However, the operational plan that fall in accordance with the above-mentioned strategy is to expand community ICT learning center across every sub-district in becoming the community service center [1].

This plan was a continuous plan from the operational project on community ICT learning center. The project operates by creating community ICT learning center in every community across the country. The project started from 2007 to 2016 [2].

The main goal of the project was to create community ICT learning center in order to develop people of the community to be efficient and well experience in term of information technology and communication. Thereby reduce inequality in advantage usage and accessibility of digital information to enable the center in becoming source of various information in the community [3].

Whereof, in becoming the main source of information, if the information pertains to different incidents, which occurs in the community and were in accordance with the people everyday lifestyle including problems, which occurs in the community. It will enable the citizen's easy access to such information and utilize them in solving community problem and developing the community at the same time [4].

In terms of digital economic plan for economy and society, it's a continuous process of upgrading community ICT learning center, which has standard operational result, in becoming Digital Community Center (DCC) and additional digital community centers by setting a goal of 600 centers across the country in the first phase [1].

On issue pertaining to useful utilization of community ICT learning center as the main source of community information, the researcher discovered that Mae Tao community in Mae Sot district, Tak province, which has been experiencing various problems, most especially the effect from the problem of cadmium contamination. This is a prolong problem which occur in the community since 2004 until date. Even though there are various projects from both government and private agencies till the operation of this research work, in order to solve the afore mentioned problem, but they have not been able to solve the problem accordingly. Because of unavailable data and lack of communication with the community. The community are still confused and are unaware of the situation concerning the problem solving, including related data with the operation of problem solving and other valuable information are all in different parts [5]. Most of the information are inform of documents, when the time to use the information in order to support the operational process of solving problems arises it always lead to frequent search of information and late results. The part where the citizens work hand in hand with both government and private agencies in order to solve problems, the citizens have enough information as a component in the operation process. From the above-mentioned problem the citizen of Mae Tao create a working board in order to drive the solving of problem by collecting data that are related to solving of the problems. However, the community data working group still lack database information related to specific problems.

The duty of the digital community center combined with the citizen's need for data usage in Mae Tao area as above-mentioned leads to the creation of two digital community centers in the area one in Mae Ku sub-district and the other in Phara That Pha Daeng sub-district. Both center have not started offering public information data, they only offer general services. Therefore, this research presents a prototype of community database system, in which both the citizens and digital

community center participated in the creation of community database in order to use it as a model for digital centers that need to increase their role and duties as the community data source [6].

II. PURPOSE OF THE STUDY

1. To study the community data usage requirement pattern by digital community center and citizen involvement.

2. To create a prototype of community database system.

III. METHODOLOGY

The research was divided into two parts:

A. The Community Data Usage Requirement with the Participation of Digital Community Center and Community Involvement.

This part of the research was a survey of data usage requirement from the community data working group and community citizens in 2 sub-district, namely Mae Ku sub-district and Phra That Pha Daeng sub-district. The details are as follows:

1. **Samples:** The samples used in the study were people from Mae Ku sub-district and Phra That Pha Daeng sub-district. The information was obtained from two groups. The first group was community data working group (CDWG) consisted of 9 people from each sub-district, 18 people in total. The second group was 400 community citizens from 2 sub-districts. The study was carried out by random sampling, choosing samples age between 15-60 years old.

2. **Research Process and Data Analysis:** Closed-end using 5 level Likert scale and open-end questionnaire questions were used to obtain the community data usage requirement from both groups of samples [7-8]. The data were analyzed using statistical average and standard deviation. In order to evaluate the findings obtained from data analysis, the following intervals were used: 4.21 to 5.00 the most requirement, 3.41 to 4.20 high requirement, 2.61 to 3.40 moderate

requirement, 1.81 to 2.60 low requirement, and 1.00 to 1.80 the lowest requirement. The most required data from both sample groups were used in developing of the community database system.

B. Development of Community Database Prototype.

The obtained data usage requirement results were analyzed in order to design and develop the community database system. After the system was successfully developed, assessment was carried out in order to obtain the satisfactory level of the system users.

1. **Samples:** The samples used in developing the prototype of community database system and satisfactory assessment consisted of 22 people, CDWG, operators and managers of digital community centers.

2. **Research Process and Data Analysis:** A small group meeting was organized in order to discuss details concerning the features and components of the community database system and process of data management. Web application was developed and designed using Rapid Application Development-Based (RAD) methodology. Joomla! Framework and Yii2 Framework were employed for writing web and command line applications in PHP. Model-View-Controller was used as software architectural pattern. MariaDB program was used as database management system. The use of community database system was demonstrated to users. Finally, system users satisfaction was evaluated using five rating scale questionnaires, in four aspects such as; content, design, usage and system advantage. The results were analysed using statistical average and standard deviation. In order to evaluate the findings obtained from data analysis, the following intervals were used: 4.21 to 5.00 the most satisfaction, 3.41 to 4.20 high satisfaction, 2.61 to 3.40 moderate satisfaction, 1.81 to 2.60 low satisfaction, and 1.00 to 1.80 the lowest satisfaction.

IV. RESULT

A. Community Data Usage Requirement

Based on a survey conducted in this

research, the results showed that community data usage requirement from both sample groups were in accordance together as shown in Table I.

**TABLE I
DATA USAGE REQUIREMENT FROM SAMPLE GROUPS**

Data Set	Data Usage Requirement	
	CDWG	Community Citizens
Common Community Data Requirement (From Closed-End Questionnaire)	1) Water resources ($\bar{x} = 4.55$) 2) History of the community ($\bar{x} = 4.44$) 3) Culture and tourism ($\bar{x} = 4.39$) 4) Natural resources and environment ($\bar{x} = 4.37$) 5) General community information ($\bar{x} = 4.36$) 6) Agriculture ($\bar{x} = 4.32$) 7) Public health ($\bar{x} = 4.22$)	1) History of the community ($\bar{x} = 4.55$) 2) Natural resources and environment ($\bar{x} = 4.35$) 3) General community information ($\bar{x} = 4.34$) 4) Public hazard ($\bar{x} = 4.32$) 5) Agriculture ($\bar{x} = 4.28$) 6) Public health ($\bar{x} = 4.28$)
Community Problem-related Data Requirement (From Opened-End Questionnaire)	1) Cadmium Contamination Level in Soil 2) Cadmium Contamination Level in Human Blood 3) Community-Related Study and Research 4) News and Information of Cadmium Contamination Solving 5) News and Information of Environmental Protection Zoning	1) News and Information of Environmental Protection Zoning

**TABLE II
OBTAINED DATA FROM CDWG AND SWD**

Data Group	Format	Source
History of the community	Document	CDWG
Community-related study and research	Document, MP4	CDWG
CDWG's activity log	Document	CDWG
News and information of environmental protection zoning	Document	CDWG
News and information of cadmium contamination solving	Document	CDWG
Judgment of court document	Document	CDWG
Culture and tourism	Excel	SWD
Natural Resources and Environment	Excel	SWD
General Community Information	Excel	SWD
Agriculture	Excel	SWD
Public Health	Excel	SWD

The required data were gathered from CDWG and Social Welfare Division (SWD) as shown in Table II, in order to be utilized in the development of the community database system prototype. However, unavailable data that could not obtained from CDWG and SWD were water resources, public hazard, cadmium contamination level in soil and cadmium contamination level in human blood.

B. Development of Community Database Prototype

The community database system was divided into two systems, namely CDWG's Database System and SWD's Database System, according to source of data, as shown in Fig. 1.

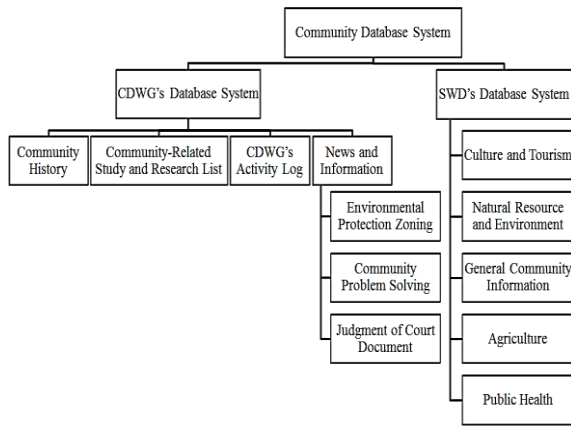


Fig. 1 Division of Community Database System

Object-Oriented analysis and design using Unified Modelling Language (UML) was used for system modelling. Actors consisted of general users and digital community center (DCC) operators. Use cases were divided into 2 categories, general users use case and DCC operator use case, according to actors.

Most data obtained from CDWG were document and MP4 file formats. Content management module of Joomla! Framework consisted of 7 classes of data: 1) Community history management module, 2) Community-related study and research list module, 3) Community-related clip VDO module, 4) CDWG's activity log module, 5) News and information of environmental protection zoning module, 6) News and information of community's problem solving module, and 7) Judgment of court document.

Data obtained from SWD were statistical data which were Excel file format. They were grouped into 30 classes consisting of culture and tourism (2 classes), natural resource and environment (3 classes), general community information (11 classes), agriculture (8 classes), and public health (6 classes).

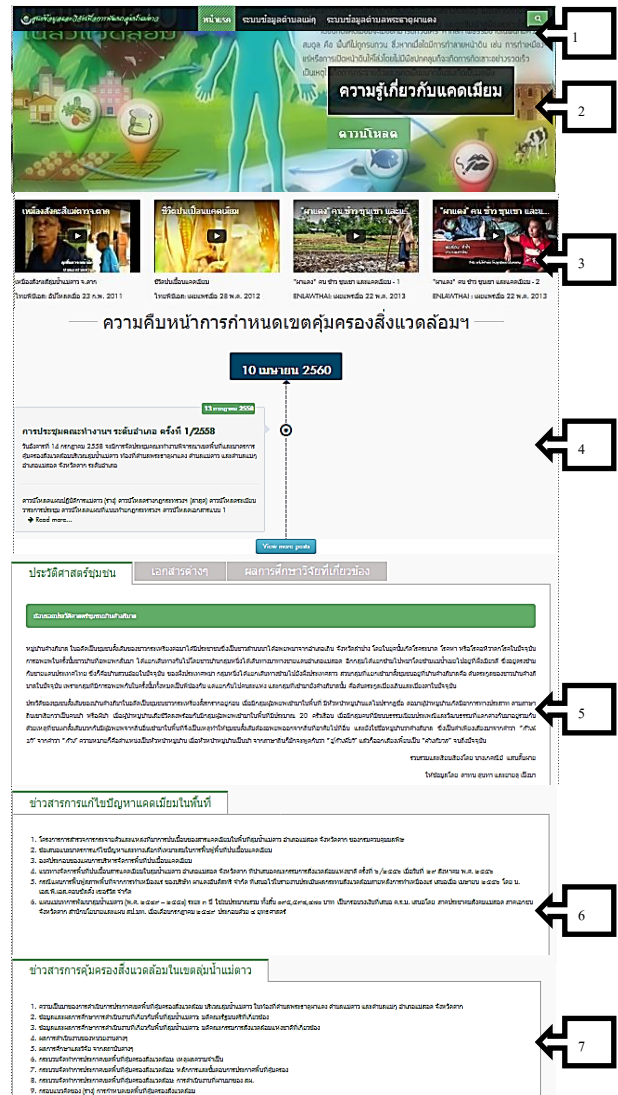


Fig. 2 Screenshots of CDWG's Database System

According to source of data, the community database system was divided into two systems, CDWG's Database System and SWD's Database System. Fig. 2 showed, the display screen of CDWG's Database System. It could be separated into 7 parts as labelled.

The first part was the access of social welfare database of Mae Ku sub-district and Phra That Pha Daeng sub-district. The second part showed knowledge about cadmium. The third part showed video clip about the community. The fourth part showed progressive information of environmental protection zones in the area, as a timeline display. The fifth part showed the community historical information, the result of related research on the community and court

documents related to the problem in the community. The sixth part showed problem solving information related to the community. And lastly, the seventh part showed information related to environmental protection.

the data were corrected according to data cleansing prior to importing of data.

Finally, users satisfaction was evaluated. The results showed the high satisfaction with system function ($\bar{x} = 4.10$), design ($\bar{x} = 3.84$), benefit ($\bar{x} = 3.80$), and content ($\bar{x} = 3.63$).

V. CONCLUSION

This research presented a prototype of community database system with the participation of digital community center and the involvement of the citizen. The motivation of this research was from the problem in Mae Tao community, Mae Ku and Phra That Pha Daeng sub-district, Mae Sot District, Tak Province. The required data were in accordance with the situation of problem in the community. Moreover, data were collected from both government and community citizen sector. Therefore, community citizens could play a role in the operational process of data management together with the digital community center and data supporting agencies from local government within the area. They could involve in a variety of processes, including: 1) data requirement identifying; 2) data selection for public dissemination together with digital community centers; 3) design; and 4) practical participation and process improvement.

จำนวนประชากรจำแนกตามการประกอบอาชีพหลัก	ชื่อ	จำนวน (คน)
1	ช่าง	210
2	พ่ค้า	553
3	พ่ขาย	30
4	เลี้ยงสัตว์	32
5	เทศมนตรี	1
6	พ่ขาย	5
7	ช่างไฟฟ้า	715
8	เกษตร	21
9	ช่างเย็บผ้า	387
10	ช่างทำขนม	12
11	ช่างเย็บ	155
12	ผู้ค้า	27
13	ช่างทำกระดาษ	287
14	ช่างทำเครื่องใช้	50
15	ช่างทำเครื่องใช้	50
16	ช่างทำเครื่องใช้	50
17	ช่างทำเครื่องใช้	50
18	ช่างทำเครื่องใช้	50
19	ช่างทำเครื่องใช้	50
20	ช่างทำเครื่องใช้	50
21	ช่างทำเครื่องใช้	50
22	ช่างทำเครื่องใช้	50
23	ช่างทำเครื่องใช้	50
24	ช่างทำเครื่องใช้	50
25	ช่างทำเครื่องใช้	50
26	ช่างทำเครื่องใช้	50
27	ช่างทำเครื่องใช้	50
28	ช่างทำเครื่องใช้	50
29	ช่างทำเครื่องใช้	50
30	ช่างทำเครื่องใช้	50
31	ช่างทำเครื่องใช้	50
32	ช่างทำเครื่องใช้	50
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36	ช่างทำเครื่องใช้	50
37	ช่างทำเครื่องใช้	50
38	ช่างทำเครื่องใช้	50
39	ช่างทำเครื่องใช้	50
40	ช่างทำเครื่องใช้	50
41	ช่างทำเครื่องใช้	50
42	ช่างทำเครื่องใช้	50
43	ช่างทำเครื่องใช้	50
44	ช่างทำเครื่องใช้	50
45	ช่างทำเครื่องใช้	50
46	ช่างทำเครื่องใช้	50
47	ช่างทำเครื่องใช้	50
48	ช่างทำเครื่องใช้	50
49	ช่างทำเครื่องใช้	50
50	ช่างทำเครื่องใช้	50

(a)

(b)

Fig. 3 Display Screen of SWD's Database System
 (a) Display Screen of Data (b) Display Screen of Importing Data from an Excel File.

For the SWD's database system, Fig. 3(a) shows an example of a display screen of SWD's database system. The data could be imported from an Excel file as shown in Fig. 3(b).

The data management process was design in collaboration with CDWG, Digital Community Centers and SWD. The operators of digital community centers took responsibility for manage the data in a single-point service. CDWG and SWD took responsibility for reviewing the quality of the data and sending the data to the operator of digital community center. Quality and reliability of obtained data would be evaluated by operator of digital community center. Then

From this research, a prototype of community database system was obtained, which was used as a tool in collecting of community data. As a result, the community had a perfect systematically collected data. The people and various organizations could get benefits from the database system. For example, it could be used in the community-learning center and it also could be used in reflecting on the problems situation. In addition, the community could either use the data in giving reason, contradiction, or agree with various projects, which occurs in the community, by using mutually accepted data between the citizens and the government. This made the people protect themselves and know more about their environment and the changes that occurred in the community, which in turn

makes them to be able to rely on themselves in solving problems [6-8].

Collaboration between the community citizen and the digital community center is a way of driving the digital community center forward to be sustainable [9-10]. This allows the people to appreciate and thereby recognizes the importance of digital community centers as their learning centers and community data centers. It is in accordance with the Digital Economy and Social Development Plan that aims to develop community digital center to be the main source of community data [10]. This research is also a guideline for creating new services which is in accordance with the needs of the community, in addition to existing basic facilities [11]. This is an important factor in the sustainability of the digital community center operations [11-12].

VI. RECOMMENDATIONS

1. The digital community center should increase volunteer agencies in order to obtain comprehensive range of data.

2. This study based on specific areas where data requirement may be different from other areas. Therefore, study of data requirement should be carried out in other areas.

3. The prototype of community database system developed in this study was used and test by CDWG. In the next research, the system should be implemented and transferred to people in the community, and should be evaluated for user satisfaction.

4. Apart from transferring and publishing the data, there may be some legal impact, personal or legal information regarding the publishing of data should be considered.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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