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The Developing of Knowledge-Based System for the Medical Treatment with Herbs

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Abstract—This research aims to create a knowledge-based system as a database for self-healthcare analysis, diagnosis of simple illnesses, and the use of Thai herbs instead of modern medicine by using principles of Thai traditional medication theory. These were disseminated by website network programs within Suan Sunandha Rajabhat University. The population used in this study was divided into two groups: the first group consisted of four experts of Thai traditional medication and the second group was 300 website users. The methods used for collecting data were paper questionnaires and poll questionnaires on the website. The statistics used for analyzing data was at an average level. The results were divided into three parts: the first part was the development of a knowledge-based system and the second part was applied programs on website. Both parts could be fulfilled and achieved according to the set goal. The third part was the evaluation of the study: The evaluation of the viewpoints of the experts towards website designs were evaluated at a good level of 4.20. The satisfaction evaluation of the users was found at a good level of average satisfactory level at 4.24. It was found that the young population of those under the age of 16 had less cares about their health than the population of other teenagers, working age adults and those of older age. The research findings should be extended in order to encourage the lifestyle modifications to people of all ages by using the self-healthcare principles.

Keywords—Developing, Herbs, Knowledge-based system, Medical treatment.

I. INTRODUCTION

NOWADAYS the government sector is promoting people to use more alternative medical treatment services than modern medicine treatments. Thai traditional medication is another alternative which can be applied to modify the self-healthcare by diagnosing simple illnesses by means of findings the cause: organs as the disease source, the classical elements and the age span. There is an application of the taste of Thai herbs to cure the symptoms of illness and to promote good healthcare by using principles of Thai traditional medication theory which cost little and the herbs are easy to find. Moreover, they can be grown for use in cooking at home. The researcher developed a knowledge-based system of the disease treatment with herbs by sorting 61 kinds of basic herbs used for healthcare which the Ministry of Public Health has recommended for certain symptoms. It was intended for people of all ages, children, teenagers, those starting working, working age, and aged, to use this program as a tool in inspecting their own classical elements to know themselves and follow suggestions in choosing for self-healthcare and for curing simple illnesses.

The study topic chosen for the present study, "Thai Herbs" was intended to build knowledge basis and applied program on the simple illness symptoms according to the classical elements and also illness treatment with herbs. This was developed on the website: http://www.cs3.ssru.ac.th/herbal and was opened for general public to access as a tool to choose the herbs used for simple illnesses treatment in basic self-healthcare.

II. RESEARCH METHODOLOGY

In this study the researcher used the following methodology:

A. Data Collection

A study of related knowledge and theories divided the topics into three parts:

Part 1: The knowledge-based system was developed on website by choosing relational database management system MySQL [1] together with Java Server Page (JSP) [2].

Part 2: The principles of the disease diagnosis and simple illness treatment were according to Thai traditional medication theory especially on the classical element hypotheses [3] and age hypotheses.

Part 3: Herbs used in basic public health care and the herb properties in disease treatment referred to data from the Institute of Thai Traditional Medicine [4], the Ministry of Public Health and also from texts written by the board of committee in primary health care [5] or others [6].

B. Tools Preparation

The preparation of tools was made for use in system development in the server part under Suan Sunandha Rajabhat University networks in order to collect data for the knowledge base [7] and provide space for the applied program on the web site.

C. Population

For the population, the researcher determined two groups: the first group was comprised of four experts in Thai Traditional Medication, one from a clinic and three from regular teachers of the Department of Applied Thai Traditional Medication at Suan Sunandha Rajabhat University, The second group was comprised of three hundred users of the website. The population was divided into three age groups, using classification criteria based on the assumption of age as it applies to the first occurrence of diseases: under 16 years old, ages 16-32 years old, and those more than 32 years old.

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World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:8, No:7, 2014

The fact is that people in different age spans have different illnesses according to Thai Traditional Medication Theory [8].

D. Hypotheses

From defining the population in two groups, the researcher set two hypotheses as follow:

First hypotheses: the viewpoints of the experts towards the web design of the knowledge-based system on disease treatment with herbs were at a good level.

Second hypotheses: The overall satisfaction of the users towards the web design of the knowledge-based system was at a good level.

E. Information Collection

The information collection for the research study was categorized into two parts:

Part 1: On the content of herbs for the treatment which were limited especially for the herbs used in basic public health care announced by the Board of the Committee of Basic Public Health Care, Ministry of Public Health.

Part 2: On the content of symptom analysis which was categorized into two parts: the first part was from the Classical Elements Hypotheses and from Age Hypotheses taken from five hypotheses (primary sources of diseases) according to the Thai traditional medication theory referring information from general texts in the pharmaceutical field by the Medical Registration Division, Office of the Secretary of Ministry of Public Health, and the second part was referred from The Institute of Thai Traditional Medicine. The classification of diseases and illnesses are in 8 groups and symptoms such as stomach disease are shown by the symptoms of bloating, flatulence and colic, diarrhea disease are shown the symptoms of constipation, nausea, vomiting, intestinal parasitic disease, toothache, and anorexia.

The researcher had more information from additional sources like specialists on Thai herbs and also another doctor who were skillful in illness diagnosis; the researcher then brought knowledge from both sources, from texts and specialists, together to extract knowledge for creating the knowledge base in the next steps.

F. Information Extraction

Information extraction was necessary because there was much information after identifying sources such as the domain experts and papers or texts. The researcher would select only the essential information to be extracted for the related information to be collected in the knowledge base so that the information could be searched out for later use.

G. Analysis and System Design

For the analysis and the system design, the researcher chose modelling as a tool. UML (Unified Modeling Language) was considered the standard language of the construction which comprised the following diagrams:

1) Use Case Diagram: As a tool to define the scope of the system under the modules which were the module of the system administrator and the module of the users.

2) Class Diagram: As a tool to define the information base and the knowledge base which were in the forms of relational tables by using class diagrams as a tool aiding the design to show class, attribute, method and relationship between related classes and their relationship.

3) Activity Diagram: As a tool to define the system working process design which used the activity diagram to explain the working process under the two-module systems which were the systems of the administrator and the module of the user.

The interface design was designed by the researcher mostly in the forms of pushing buttons. The members could double click for the access into activities such as signing in, entering the programs, searching for the illness, responding to questions, signing out, etc. The program could assess and showed results on the web page. The result on the illness according to the classical elements could be an option for the users. There were also the results on the details of herbs that could cure certain symptoms and also tips and suggestions of those herb usages.

H. Web Design and Developing

For the design and development of the website on the home page and other related and linked website under the system such as the web page of the administrator, the web page to show the analysis result on the classical elements, the web page that provided icons of the symptom, the page that showed herbs for disease treatment, the web page for the user to be able to fill out the questionnaires about the satisfaction and the web page that showed the result.

For the satisfaction analysis of using of the system, users were made up of all three groups of different age spans.

I. Program and Structure Design

For the design of the structure in the applied program, like the analysis and system design, the researcher divided the program structure into two modules: One module was for the administrator to file, update, delete data and search for the information and knowledge from the database and knowledge-based under the system; The other module was for the user to apply as a member, sign in, check their classical elements, to make enquiries of the illness symptoms according to their element, their age, to search for the illness symptom according to the illness group and also general symptom. Before signing out, they were asked to fill out the questionnaires on their satisfaction.

J. Validity Program Checking

In order to check the validity of the applied program, there was a validity checkup of three working parts as follows:

Part 1: The researcher operated the test herself by the method of using a test case for each condition which could occur by circling the testing until having been confirmed of the working of the program and the result having been correctly displayed.

Part 2: The researcher programmed the tested and modified information on the website and asked the four experts on Thai

World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:8, No:7, 2014

traditional medication to test the program and give suggestions for the future modification.

Part 3: The researcher disseminated the already tested program to experts, so the general users of all age spans could access the website and were asked to fill out the questionnaires on the satisfaction of the system in order to be analyzed into suggestions and the research result could be modified for the future use.

K. System Assessment

The system assessment was categorized into two parts as follows:

Part 1: The experts' viewpoints assessment towards the design of knowledge-based website on disease treatment with herbs were determined by four experts on Thai Traditional Medication to answer paper questionnaires given five average levels assessment: very good, good, average, low and need improvement.

Part 2: The user satisfaction assessment by answering the questionnaire in the form of a poll on the website. The members were asked to fill out the questionnaires after visiting the website. The analysis results were separated into the three age span. The analysis results were collective, and the members may check by the result by themselves. The assessment was defined by five average levels of assessment: very good, good, average, low and need improvement.

III. RESULT AND DISCUSSION

After the researcher had implemented the research study following the research methodology from step A to K, the research results were categorized into three parts:

A. The Knowledge Base Development

The knowledge-base development was divided into three parts:

Part 1: The collection and filing of the information for the classical elements were categorized into four elements: Earth element, Water element, Wind element and Fire element. Each element comprised the information on personality, characteristic, the food taste according to the element, the illness, health control, tips, and recipes for various menus. The information collected would be analyzed to be resulted for each person of individual element.

Part 2: The collection and the filing of information for the analysis of illness by using the classical elements is individual by birthdate and by age element of each person following the principles of the Thai Traditional Medication Theory that each illness resulted from 42 organs of the body such as hairline, hair, nail, teeth, skin, muscle, etc. The program would display the assessment and provided icons of the illness symptoms for the users' choice. A person of each element had a different illness at different organs.

Part 3: The collection and the filing of the information on the herbs for the basic public health care which can give treatment to that illness according to the Herb Theory in the list of Thai herbs used for the basic public health care Sixty one kinds of herbs were recommended by the Board of

Committee of Basic Public Health Care of the Ministry of Public Health that they were able to effectively cure some symptoms safely.

It was shown that all three working parts were implemented without error.

B. The Applied Program Development

The applied program development on the website was divided into two parts:

Part 1: For the administrator module, there was a collection of information in the database and also the knowledge-based information. The information in this module could be added to, updated, deleted, and searched according to the administrator for the purpose to make the data and knowledge valid and reliable but only the administrator could have the right to do it.

Part 2: For the user module there was a filing and collection of data received from the website members including the display of analysis results of all three parts: the classical elements analysis, illness symptoms analysis and analysis of herbs for the treatment. The users were asked to fill out the questionnaires on the satisfaction of the users (Poll).

The program categorized the analysis results of the satisfaction by age spans of the users into three age spans: less than 16 years old, 16-32 years old, and upper than 32 years old.

It was shown in the illustration on the screen that two parts of the applied program development result have already been implemented without error.
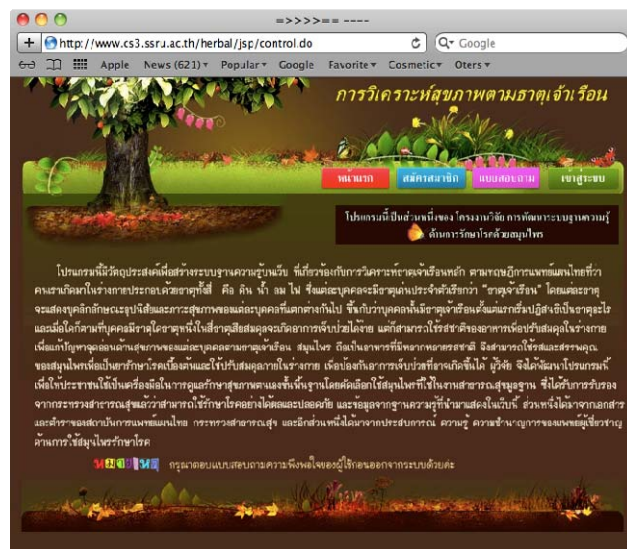

Fig. 1 Screen of Homepage

It was shown in illustration on the screen that both two parts of the applied program development results have already been implemented without error.

C. The System Assessment

The system assessment was divided into two parts:

Part 1: The assessment results on the viewpoints of the experts towards the design of the website on the knowledge-

World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:8, No:7, 2014

based system on the illness treatment with herbs. Collected from four experts, the assessment is shown on Table I.

In the overall picture of the assessment the average value of the experts' viewpoints was at 4.20 which should be considered at a good level. It was in accordance to the first hypotheses set at the beginning of the study.

Part 2: For the assessment results on satisfaction of the users, the data were collected from the population, or the user, from January 1 to March 15, 2555. There were altogether 300 users divided into three age spans:

TABLE I
THE ASSESSMENT SUMMARY ON THE VIEWPOINT OF EXPERTS IN THE THAI TRADITIONAL MEDICATIONS

Item of Assessment	avg	level
1. Appropriate form of web site	4.00	good
2. Easy usage of the program	4.50	v.good
3. Beautiful display of results in the web site	4.25	good
4. Compatible match between pictures and information of herbs on the website	4.25	good
5. Practical application of knowledge from the web site	4.50	v.good
6. Easy to understand context in the web site	4.00	good
7. Appropriate grouping of context	4.00	good
8. Suitable size of context quantity in the web site.	4.25	good
9. Correct content in the web site	4.00	good

Group 1: Those from newborn baby to 16 years 6 months of age, 80 users.

Group 2: Those users of 16 years 7 months of age to 32 years 6 months of age, 120 users.

Group 3: Those users of more than 32 years of age, 100 users.

TABLE II
THE ASSESSMENT RESULT ON THE SATISFACTION OF THE USERS

Assessment Items	group 1		group 2		group 3	
	avg	level	avg	level	avg	level
1. Speed of web site	3.78	good	3.82	good	4.29	good
2. Validity of data	4.01	good	4.25	good	4.50	v.good
3. Accuracy in using	3.98	good	4.53	v.good	4.43	good
4. Accuracy in result of body element	3.98	good	4.51	v.good	4.44	good
5. Accuracy in result of illness	3.98	good	4.53	v.good	4.43	good
6. Knowledge-gained from using herbs	3.98	good	4.62	v.good	4.59	v.good
7. Detail on herbs	3.92	good	3.97	good	4.50	v.good
8. The web beauty	3.95	good	3.94	good	4.45	good
9.The using of data	3.90	good	3.93	good	4.52	v.good

In conclusion, the users of group one were still young and their attention to health was less than those in other groups, so their satisfaction was at good level. While those users in group two or three had more attention to their health. Their satisfaction was at a very good and good level. In the overview of the assessment, the average value was at 4.24 which was considered a good level, and it was accordance with the hypotheses that the research had set at the beginning.

IV. CONCLUSION AND SUGGESTION

This research could make suggestions to those who wanted to expand the research findings as follows:

A. Research Conclusions

From the research results, it was concluded that the illness condition in every age group whether young, teen age, or old age, could occur referring to the principles of Thai traditional medication on the classical elements and other components such as environment or age, manner, the way one eats, etc.

One could have good health whether during regular times or when ill. One could start by themselves by knowing which element one had and bring the knowledge into use and modify one's own lifestyle in each age span by applying food taste and herbs in making body balance to regularity by using the information in the knowledge-based and the applied program on this website which had been proven in the research that the study result was at a good level. It should be applied to people of all age spans with the supplement of self health care principles.

B. Suggestions

The researcher suggested other researchers who want to study further the same subject that they should expand on these findings on the methods of helping people of all age span to modify their lifestyles by applying the self health care and they should conduct other research to find methods that could encourage children to pay attention to their health; for example, they should exercise regularly instead of playing computer games; or they should choose healthy food instead of snacks such as potato chips, etc.

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World Academy of Science, Engineering and Technology
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Vol:8, No:7, 2014

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