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Effects on the Successful Use of Mobile Phone Application for Healthcare

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Abstract. This research proposes the development of mobile application to promote Thai people' health. It consists of three main parts: firstly, to promote healthy consumption for individuals, secondly, to support appropriate work out for individuals, and thirdly, to support people to quit smoking. The group of 34 participants were not trained to use the application. It is found that some of them could have achieved the application's objectives. The results are analysed regarding participant demographics, for examples, age, gender, education background, and job background. Based on the results, it shows that the participants have positive attitude towards the use of mobile application. They agree that the application supports and motivates them to improve their health. Possible directions for further investigations can be elaborated.

Keywords: Thai Health**,** Health Care, Mobile Phone Application, Android

1. Introduction

Health care professionals use medical devices and applications for many purposes, most of which can be grouped under five broad categories: administration, health record maintenance and access, communications and consulting, reference and information gathering, and medical education. The many uses for mobile devices and types of medical applications, for examples, communications and consulting, reference and information gathering, clinical decision-making, patient monitoring, etc. In addition to, personal health records (PHRs) is an "Internet-based set of tools that allows people to access and coordinate their lifelong health information" [1]. The spectrum of PHRs ranges from health care organization-tethered applications that build on a patient's existing electronic health record to standalones in which the patient supplies the bulk of medical information to the PHR [2]. However, in Thailand, current medical devices and applications are mainly purposed for health care professionals [3]. In the other word, all PHRs aim to increase patient access to personal health information in a secure fashion [4]. The potential benefits of PHRs are numerous. Patients can use PHRs to view personal health information, a traditionally burdensome task. It would be the patients' convenience, if they can review laboratory test results, confirm medication lists, follow links to credible health information online, and communicate with providers.

Currently, there are web-based or mobile applications/software that are introduced in order to help in maintaining or improving the state of people health [5][6][7][8][9]. Some applications/software allow users to monitor a wide range of health parameters. Most of software displays information about blood pressure, height, and weight. Otherwise, the software is developed for a particular purpose. For example, a common mistake is to monitor only blood pressure and weight. Especially cardiovascular diseases and diabetes are taken into account. The software is based on scientific evidence and was prepared with the participation of medical doctors. So non-medical professionals may not understand and cannot benefit their own personal health information [5][8]. Additionally, those applications have diverse objectives for users, however, some particular functions are not satisfied by users.

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This research proposes the development of mobile application to promote Thai people' health. It consists of three main parts, mainly supporting healthy consumption, guiding working out, and encouraging people to quit smoking. We compared the use of the application by comparing the demographic characteristics i.e. age, gender, education background, and social economic status of individuals.

2. Methodology

2.1. Study Design

The study included people who are patients and individuals who received care from general practices or doctors. The 34 participants were not trained to use the prototype of our proposed application. The participants were then requested to implement their personal health records and use the application for three months.

To evaluate our work, we proposed an android mobile application [10]. The application consists of three main parts: i) supporting healthy consumption for individuals, ii) offering working-out guides for individuals, and iii) supporting people to quit smoking. As shown in Figure 1, the use case diagrams presenting the functions in the application. The part 1 consists of main functions: a) *PHR managing* that it allows a user to create his/her own personal health record and update the record later, b) *BMR calculating* that it assists a user to calculate information about his/her BMR, TEDD, c) *nutrition planning* that it assists a user to make a plan for appropriate nutrition regarding his/her profile (this function includes calculating suggested consuming calories), d) *alerting* that it reminds consuming calories of the user, and e) *profile viewing* that it allows a user to view his/her own profile and PHR. Moreover, the part 2 consists of main functions: a) *activity managing* that it allows a user to create an activity he/she is going to do and update the record later which it is concerned the calories burning, b) *BMI/BMR calculating* that it assists a user to calculate information about his/her BMI/BMR, c) *working-out planning* that it assists a user to make a plan for working out or exercising (this function includes calculating suggested burnt calories), d) *alerting* that it reminds burnt calories of the user, and e) *activity viewing* that it allows a user to view his/her own activities each day.

As shown in Figure, the main functions of the application's part 3 consists of: a) *goal setting* that it allows a user to set his/her own goal to quit smoking by specifying the period of time for quitting process and update the goal (this function is also analyzing his/her personal health record and displaying the profile), b) *smokes updating* that it allows a user to record an instance of smoking (one cigarette per one update) and the application will calculate the toxic concerning one cigarette smoking and give an alert, and c) *reporting* that it allows a user to view his/her own smoking record per day.

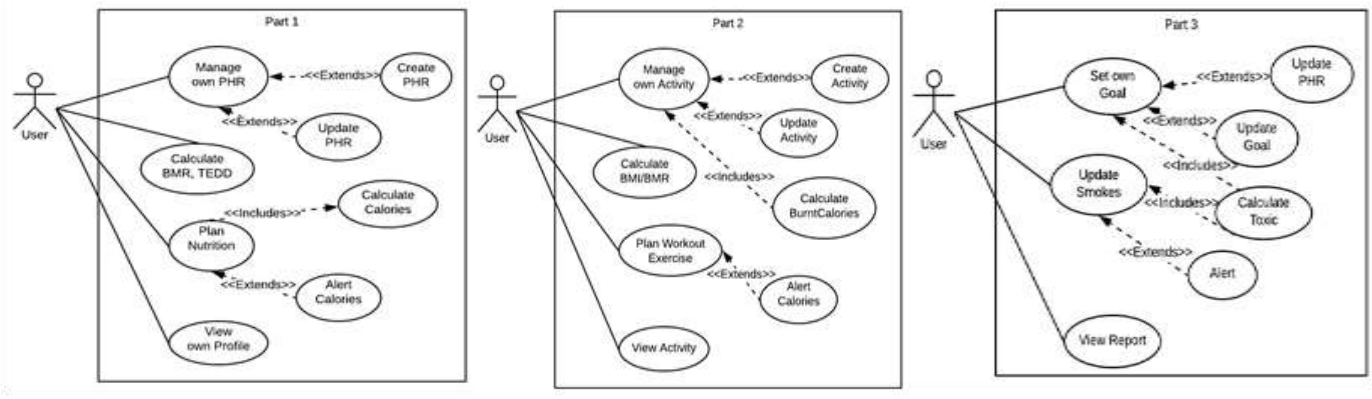
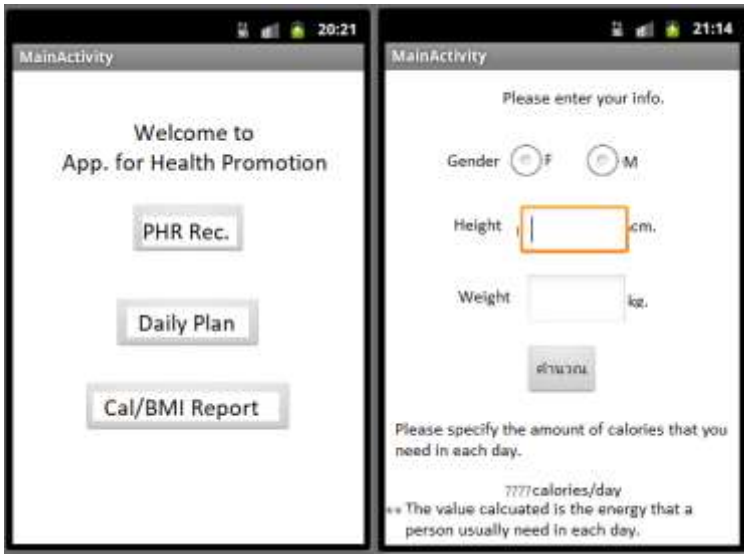


Fig.1: Use case diagrams presenting the functions of application's each part.

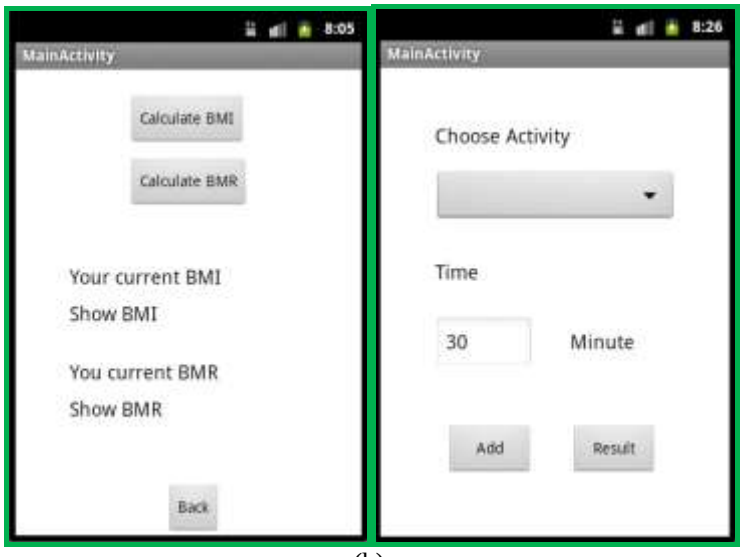
2.2. Implementation

The user interface (UI) design are implemented. Due to space constraints, we are presenting some parts of them. For the first part, as shown in Figure 2 (a), the application consists of Home screen and Screen for obtaining user information. This part of the application is to calculate the need of energy per each day based on individual's height and weight.

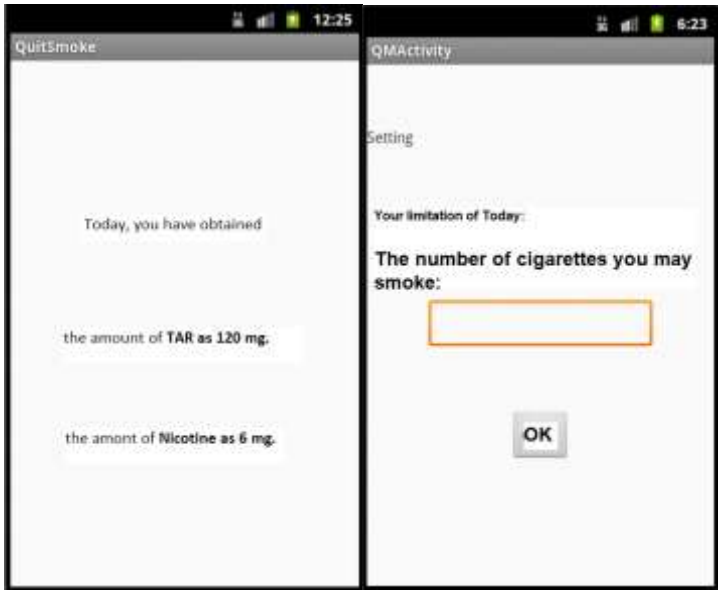
For the second part, as shown in Figure 2 (b), the application consists of screens in order to assess the working-out of individual in each day. The assessment will be compared with his personal health record, in order to can be analysed by general practices. This part of the application is to calculate the BMI and BMR of an individual based on his height and weight. Also, the application will collect the data about activities that a participant performed in each day. For the third part (c), the application consists of smoking recording screen. The application allows an individual record a number of smoking by pressing a button for each cigarette. The application will calculate the amount of nicotin and tar that an individual smoked. The individual will receive the information about the total number of cigarette, nicotin, and tar that he smoked. Moreover, the application allows the individual to set the maximum number of cigarette in the application. So the application can remind the number of cigarette that the individual has smoked and the limitation of each day. This is to assist the individual reminding and limiting himself for smoking. As shown, the application will pop-up the warning screen when the individual smoked over his own limitation. The application allows the user to reset the limitation of smoking in each day. This is designed to remind the user about their smoking and personal health.



(a)



(b)



(c)

Fig.2: (a) – (c): Use case diagrams presenting the functions of application's each part.

3. Results

We identified a group of participants who have experienced with medical services and recalled their own personal health information. The group of 34 participants were not trained to use the application. It is found that not all of them achieved the application's objectives. Regarding participant demographics, we obtained information on individuals i.e. age, gender, education background, and social economic status. As shown in Table 1, we present the number of participants who applied the prototype and achieved the objectives of part 1 and part 2.

Moreover, 10 participants of the group who are smokers and willing to quit smoking. They applied the part 3 of prototype. As shown in the table, we present the number of participants who applied the prototype and achieved the objectives of part 3.

Table 1: The number of participants achieved the application's objectives classifying by their characteristics.

	Part 1			Part 2			Part 3		
Characteristics	Total	Achieved	Not Achieved	Total	Achieved	Not Achieved	Total	Achieved	Not Achieved
Gender									
Female	18	3	15	18	6	12	1	0	1
Male	16	2	14	16	2	14	9	1	8
Age									
18-35	23	4	19	23	7	16	10	1	9
36-50	10	1	9	10	1	9	0	0	0
51-65	1	0	1	1	0	1	0	0	0
> 65	0	0	0	0	0	0	0	0	0
Education Background									
Primary school	0	0	0	0	0	0	0	0	0
High school	20	2	18	20	2	18	3	0	3
Graduate school	14	3	11	14	6	8	7	1	6
Job Background									
Students	19	1	18	19	4	15	3	0	3
White collar	15	4	11	15	4	11	2	1	1
Blue collar	0	0	0	0	0	0	5	0	5
Monthly income (Baht)									
< 15,000 Baht	19	1	18	19	4	15	3	0	3
15,000 – 30,000	5	2	3	5	3	2	5	1	4
30,001 – 70,000	5	2	3	5	1	4	2	0	2
> 70,001	5	0	5	5	0	5	0	0	0

The result shows that only 12.82% and 30.77% of all participants have applied and achieved the objectives of parts 1 and 2, respectively. However, the characteristic of gender has an effect to the successful use of application. Based on the achievements, it is found that 60.00% and 75.00% of female participants have achieved the objectives of parts 1 and 2, comparing with 40.00% and 25.00% of male participants have achieved the objectives of parts 1 and 2, respectively. The characteristic of age has also an effect to the successful use of application. According to the different age (between 18-35, 36-50, 51-65, and more than 65 years old), the participants have achieved the objectives differently (80.00%, 20.00%, 0%, and 0%, respectively, for Part 1; and 87.50%, 12.50%, 0%, and 0%, respectively, for Part 2). It is also found that the number of participants who have different levels of education background (high school and graduate school) could be different (40% and 60%, respectively, for part 1, comparing with 12.50% and 87.50%, respectively, for part 2). However, the attribute of monthly income seems not to have an effect to an achievement. Since it shows different figures between participants who have achieved the objectives of application. It is found that 20%, 40%, and 40% of participants who earn less than 15,000 Baht, between 15,000–30,000 Baht per month, and between 30,001-70,000 Baht per month, respectively, could achieve the objectives of application's part 1. As that 50%, 37.50%, and 12.50% of participants who earn less than 15,000 Baht, between 15,000–30,000 Baht per month, and between 30,001-70,000 Baht per month, respectively, could achieve the objectives of application's part 2. For Part 3, there were 10 participants who were smokers and agreed to attempt to quit cigarettes. Most of them failed the objectives of part 3 though.

4. Conclusion and Discussion

Many hospitals in Thailand still lack of sophisticated information-based systems due to some difficulties in practical [3]. This research focused on individuals who have experienced in medical services and recalled their personal health information. We proposed the application for implementing personal health records (PHRs) so people can manage and benefit from their own health records. The prototype of application is developed in order to investigate the proposed application and obtain the feedback of use. As the result, the populations become more comfortable with use of the application, we found that increased age, similar to low education background, will play a role in use of the applications. Although it shows that the participants have positive attitude towards the use of mobile application, the numbers of achievements for application's objectives are still low.

Moreover, a number of possible directions for further investigations have been identified. We provide in the future work of the research, what needs to be done to improve the approach and to increase the benefits of the approach. We intend to extend the application to cover all activities of daily life. It is therefore believed that the approach could benefit by providing more support for People health. In addition, sophisticated techniques for visualization could support the use of the application more efficiently.

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