

## HEALTHY EATING HABITS REMINDER MOBILE APPLICATION

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### Abstract

Poor eating becomes health issue when students are having transition in their university life, where they are exposed to stress and not enough time to live their student lives. Poor eating habits comprise of skipping breakfast, food bingeing and many more. A questionnaire has been distributed to know their eating habits pattern. From the analysis, shows that students faced the poor eating habits. Therefore, a mobile application which is known as Eating Reminder (EaR) is developed by applying persuasive technology tool strategies to motivate the behavior or attitude changes of users to encourage and remind them to take meals at proper time. Students evaluated the usage of the application on several aspects such as compatibility, content, navigation, interface design using heuristic evaluation of persuasive health technologies method. The result from the testing phase identified that EaR succeeds in reminding the users to take the food after the notification pop out and most of the users are influenced to take meals on time. As a conclusion, most of the respondents agreed that EaR able to remind them to eat on time but others just ignores it due to lack of motivation to change and time to take their meals. On top of that, EaR is a usable application which can motivate and educate students to eat on time and lead to healthy lifestyle. Further works, EaR will add some functions such as time customization, add more varieties meals suggested and display more instruction to help users.

**Keywords:** eating habits, persuasive technology, reminder system, mobile application

### Introduction

Poor eating habits among students become a community health concern who experience changeover from school to university life (Ganasegeran et al. 2012). The poor eating habits include skipping breakfast, food bingeing and more. The research is done on Universiti Teknologi MARA (UiTM) Perlis students. The aim of this paper is to assess the imbalanced or poor eating habits among UiTM Perlis students and the development of a mobile application that merges the Persuasive Technology to motivate full-time students to eat on time to reach a healthy eating habit. Persuasive Technology is the technology

that is designed intentionally to change a person's attitudes (Ijsselsteijn et al. 2006). Persuasive Technology strategies are applied in the development of this mobile application to achieve the objectives of the project.

In this paper, a healthy eating habit refers to numbers of meal skipping; particularly breakfast, snacking and various weight loss dietary behaviors were some of the poor eating behaviors (Chin & Mohd Nasir 2009). The Eating Reminder (EaR) is an application to remind users or students to take food at the proper time and not to skip any of their meals.

### Methodology

The design and development of EaR based on a preliminary investigation which is conducted by distributing questionnaire among twenty UiTM Perlis students to know their eating habit pattern and the usage of mobile application among them. From the analysis, there are more than 70.5 percent of the students skip their breakfast and the rest regularly takes breakfast to start their days. Thus, this shows that UiTM Perlis students faced the poor eating habits and the problem statements are identified.

Therefore, to motivate the students to eating at a proper time, EaR that emerges the Persuasive Technology has been developed. Persuasive Technology Tool Strategies (Khaled et al., 2005) has been applied in the designing EaR which consists of seven tools; Reduction, Tunnelling, Customization/tailoring, Suggestion, Self monitoring, and Surveillance. The user interface design refers to the existing mobile application on healthy eating habits that compatible with the Android operating system of Samsung such as Recovery Record by Jenna Tregarthen (Jenna Tregarthen 2013) and then the design conveyed on the paper for design interface prototype. The Persuasive Technology Tool Strategies that applied in the EaR design and development are;

- i) Reduction - To make the EaR simpler and to reduce the tasks that users need to do, the image or picture or meals and capture new image prepared for users. The users no need to enter the menu of meals that they ate, but they just need to save suggested meals or capture new image using their smartphone.
- ii) Tunnelling - Use of image as the suggested meals, the users will get the appetite to eat. The images trigger the users to take meals as soon as they look at the images.
- iii) Suggestion - The suggestion principle that is applied in EaR is the suggestion of meals that based on the meals commonly taken by the students also based on the Malaysia Food Pyramid.

Figure 1 shows the used of image which is to reduce user action, to trigger user appetite and also gives an idea to users what meals they can take.

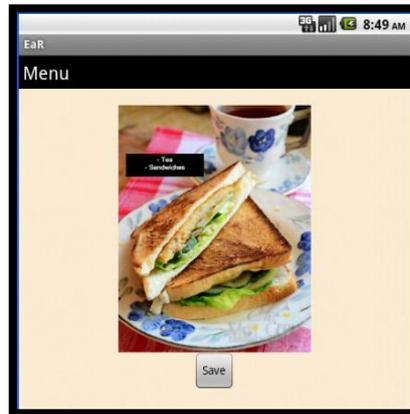


Figure 1 Full View of Menu Screen

- iv) Customization/tailoring - Users are given the option either to save the displayed images or to capture the new images of the meals they ate.
- v) Self monitoring – when the user saved image of the meals they ate, they can monitor their eating habits. The result of their eating style will be generated on the screen progress of EaR. With that, they can identify their own eating habits either it healthy or poor eating habits. Figure 2 shows the progress screen to show the progress of users for every meal they took.

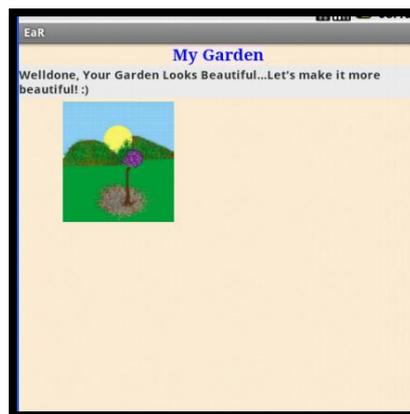
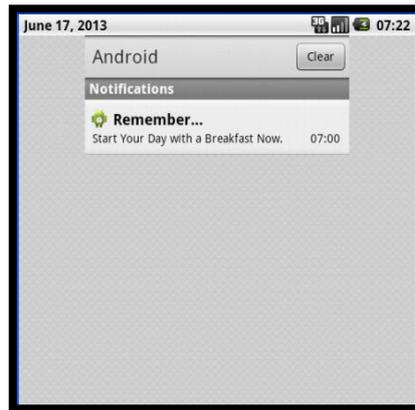


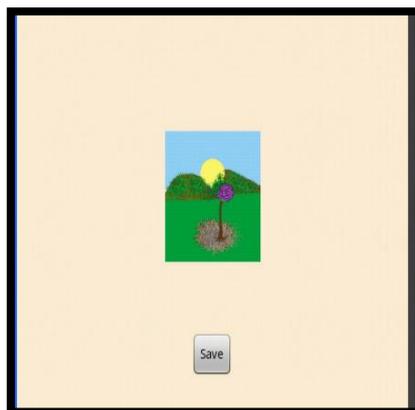
Figure 2 Example of Progress Screen

- vi) Surveillance - The notification shows that the users have been surveillance. They will be notified the eating time for reminds them to take foods at the proper time. The time for them to take meals was ready set by the application without allowing the users to customize as they want because to prevent them from drag their eating time to the improper time. Figure 3 shows the users been surveillance by EaR as the notification will appear as it has been programmed.



**Figure 3** Example Notification pops out at 7 am

- vii) Conditioning -If they eat on time, and save the image as a proof that they already took the meals, they will be given a reward. Thus the tool of conditioning applied in EaR.



**Figure4** Reward for the user

After development of EaR is done, students installed the application and then they need to experience the application for seven days. The usability testing is conducted to assess reactions to compatibility, content, navigation, interface design, persuasive elements and notification or alarm timing. Users then need to evaluate EaR based on Heuristic Evaluation of Persuasive Health Technologies shown in Table 1. The result from the testing phase identified that eighty percent of the respondents that used the application succeed being reminded to take the food after the notification pop out on their mobile phone and seventy five percent of the users are influenced to take food or meals on time.

**Table 1** Heuristic Evaluation for EaR

Aspects	Statements
Appropriate Functionality	The application easy to use in daily life and routine.
Appropriate Time and Place	The interface design and contents are interesting and attractive.
	The notification of application pops out on meal time.
	The application notifies and encourages me to eat on time.
Not irritating or Embarrassing	The application not irritating and disturb me.
Visibility of User's Status	The application gives me results at the end of the weeks to promote continued progress.
	The application keeps me informed about my progress towards motivating me to eat on proper time.
Educate Users	The application makes me live in the healthy lifestyle by eating on time.
	The application educates me to eat at the proper time and would enable me to continue a healthy lifestyle even in the absence of the application.

## Results

EaR is easy to use in daily life and routine and useful to encourage users to eat at proper times due to EaR notification popping out to remind users to take meals. But the notification sometimes appears at the suitable time and sometimes not because users cannot set new notification time that suitable with their routine. Users will get rewards when users save the image of meals thus, that would promote continued progress and

keep users informed about their progress towards motivate them to eat on proper time. EaR encourage users to live in a healthy lifestyle by eating on time and users would be able to continue a healthy lifestyle even in the absence of the application.

### Conclusions and Discussion

From the overall design and developments of EaR, there are several advantages of EaR to the students that used the application. EaR can remind and then motivate students to eat on proper time. One of the psychological factors that effecting eating behavior is felt completely out of controls when it comes to food (Ganasegeran et al. 2012), can be changed to possible to control when using this application because of the students already eating in orderly and their stomach will always fell full.

Limitation of the application is users of EaR cannot customize or personalize the time for them to take food to prevent users from not eating on proper time. If the time customization includes in EaR, the food binging then will occur. Therefore, time customization is not included.

There also students who suggested that they want the application to suggest more meals so that they have many options of what they want to eat. Another suggestion is users want to customize the time for notification to appear or launch but this suggestion is not appropriate to apply due to the problem as mentioned before, food binging.

As a conclusion, EaR succeeds to achieve its objective because of most of the feedback from users or students stated that EaR can motivate them to eat on time, and educate awareness and educate users on the importance of healthy eating habit. In the future, to improve EaR, some new functions can be included such as time customization, suggest more selection of meals and create more attractive rewards for users.

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