

# Design of an Interactive Website to Promote Healthy Lifestyles among Children and Adolescents

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*Life style factors such as low activity level and poor eating practices are common contributing factors to the development of obesity and overweight in children and adolescents. The dramatic increase of obesity and overweight is demanding urgent strategies to address this problem. Evidence shows that healthy habits continue into adult life when they are established in early ages. Therefore, educating children and encouraging them to adopt healthy eating and active living practices in their childhood can be an effective strategy in preventing long term excessive weight problems. In the light of technology advancements, the use of web technology is gaining popularity in managing behavioural issues. The aim of the present paper is to describe the development process of an interactive website, which is currently being used in a research study. This is a randomized controlled trial with eighty participants, who are school-aged children. The study will assess the effectiveness of the website to improve the knowledge and understanding of the participants in issues relating to healthy life style and their behaviour changes. A number of web components focusing on personal and social factors will be discussed.*

Field of Research: Social sciences, Psychology, Children studies

## 1. Introduction

A fast growing overweight and obesity population is a major concern of public health authorities around the world. The World Health Organization (2006) has classified obesity as a global epidemic since 1998. According to World Health Organization statistics, there were over 1.6 billion overweight adults (over aged 15), while 400 million people were obese in 2005. The World Health Organization (2006) predicts that there will be approximately 2.3 billion overweight adults and more than 700 million obese by year 2015. It is further forecasted that by 2030, approximately 2.16 billion adults will be overweight and 1.12 billion will be obese (Kelly et al. 2008). Excessive weight gain among children is also a key feature in this issue. The global rate of childhood obesity is increasing strikingly. For example, rates in Australia have

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tripled over the last 10 years. Research shows that overweight and obesity in childhood have a significant impact on their health condition and their psychosocial status (Kelly et.al. 2008). Obesity in childhood predisposes an individual to mortality or morbidity that occurs in adulthood (Dietz 1998).

Several studies have shown that unhealthy eating patterns and low physical activity are most common contributing factors to the development of overweight and obesity (Dietz 1998; Ebbeling et al. 2002). Changing people's behaviour and attitude is not that easy, particularly when the behaviour becomes habitual. Evidence shows that healthy habits continue into adult life when they are established in early ages. Therefore, educating children to adopt healthy eating and active living practices in their childhood can be an effective strategy in preventing long term excessive weight problems.

In the light of technology advancements, the use of web technology is gaining popularity in managing behavioural issues. The Web has initially been used as a medium of delivering health information. The access to health information online is considered to be convenient and quick. Gradually, web technologies have been used for more than accessing information; this includes activities such as information sharing and social networking. For example, the use of interactive tools such as chat rooms, email, hyperlinks, interactive multimedia and online discussion boards have become popular features in health-related online activities (Stout et al. 2001; Tate et al. 2001). A number of studies have utilised web technologies as a tool to improve knowledge, manage diseases and modify behaviour in various health and medical fields, including managing asthma, diabetes, smoking cessation and excessive weight problems (Cook et al. 2007; Jago et al. 2006; Long and Stevens 2004; Oenema et al. 2001; Rothert et al. 2006). Most of those studies have reported promising outcomes. Further, there have been several studies on the use of online technologies to promote physical activity and healthy eating among children and adolescents (Jago et al. 2006; Mangunkusumo et al. 2007; Norman et al. 2007; Patrick et al. 2006; Williamson et al. 2006). These studies have concluded that there is a need to undertake more research to determine the effectiveness of this tool. The studies have suggested that the technologies must be further evaluated in order to determine the potential of online applications. Therefore, the design of an online intervention (website) plays a significant role in achieving set goals of the study. The present paper aims to discuss the development process of an interactive website promoting healthy eating and active living, which is currently used in an ongoing research study.

## **2. Research Design**

The present research study is a randomised controlled trial with at least 80 children assessing the effectiveness of web technologies to promote healthy lifestyles relating to physical activity and healthy eating patterns. The children will be randomised to either receiving access to website-delivered program (intervention group) or receiving no treatment (control group).

## **2.1. Participants**

Participants will be included in the study if they meet the following inclusion criteria: (a) aged 8 to 14 years, (b) able to read and write, (c) have access to and are familiar with computers and the Internet, (d) have no primary nutritional problem and (e) receive no prescribed supplemental food treatment. Participants are disqualified from the study if they are (a) receive treatment for weight problem and eating disorders prior to baseline measure and (b) insufficient English Language proficiency.

## **2.2. Ethical Considerations**

Ethical approvals for the research study are obtained from Human Research Ethics Committee of the University of Queensland and Royal Children's Hospital, Brisbane, Queensland Australia. The research project has received Institutional Approval from the Royal Children's Hospital Executive Committee. Voluntary written consent and assent are required from both parents and their children, since they are young participants (age <18 years).

## **3. Intervention Study**

The primary objective of the research study is to examine the effectiveness of a website to improve knowledge and to promote healthy behaviour in eating and physical activity. We have developed a website for the purpose of this research study. The website is called "Eat Smart...Stay Active...A Healthy Me!" A combination of store-and-forward communication and synchronous interactive elements has been employed in the website.

Eligible participants will be randomised either to control or intervention group. Participants in intervention group will be granted the access to this website. They use the website to retrieve information and take part in a number of activities. The information and activities provided in the website are related to healthy diet and physical activity.

Participants in the control group will not receive the access to the website. They will go on with their usual daily life. However, the participants in the control group will be offered access to the website upon completion of the follow-up process. In the following section, we will describe the process of the development of each component in the website.

### **3.1. Development of the Website**

In line with the objective of the research study, the primary goal of the website is to provide the study participants access to the relevant information in healthy eating and active life-styles, engage them in activities that promote interest in these areas, and improve social support. Table 1 specifies the objectives of the current website promoting health lifestyle.

Table 1. Objectives of the website

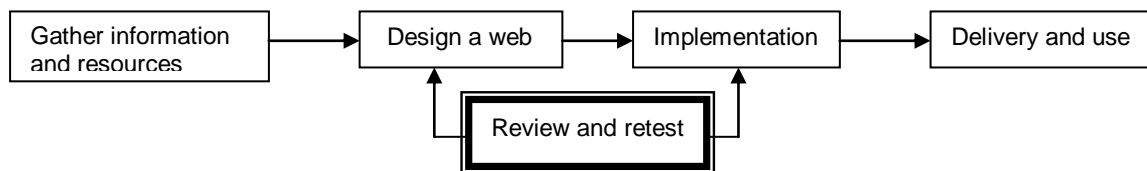
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1	Deliver health-related messages and information
2	Encourage self-efficacy and self-management skills
3	Promote social support among website users

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The design process of the website can be divided into four phases: (i) information gathering (ii) web design (iii) Implementation plan (iv) use and delivery of the website. Figure 1 outlines stepwise process in the website development.

Figure 1. Processes in Web Intervention Site Development



### 3.1.1. Information And Resources Gathering

The first task was to gather relevant information on healthy eating and active living for children that can be included in the website. The content of the website is based on a validated health education program developed and evaluated at the Harvard School of Public Health, United States (Carter et al. 2007). In making the website relevant to the Australian context, the content is modified in accordance to the Australian Guide to Healthy Eating and Physical Activity recommendations (Department of Health and Ageing 2008). In addition, a number of other relevant websites were researched and related themes were collected. While selecting information from those websites, we were particularly careful to ensure the quality of health information. Therefore, we only selected web links published by accredited and official organizations. To engage participants in web activities, we also included a number of online games and quizzes as part of the web content. These games and quizzes are closely related to healthy eating and physical activity themes.

### 3.1.2. Web Design

The 'look' and 'feel' (graphical user interface) are important features of a website (Sklar 2006). This comprises elements such as colour, shapes, layout, typefaces and behavior of dynamic elements such as navigation buttons and menus. For instance, "the look" can be described when users read texts, view graphics and "the feel" relates to experience of using the website such as when users make associations with links and feel funky, serious or warm when visiting a website. The "look and feel" is affected by the mixture aspects of information design, navigation, interface cues, style of writing to present the content, layout, font styles and sizes, colours, page loading, icons, graphics and animations.

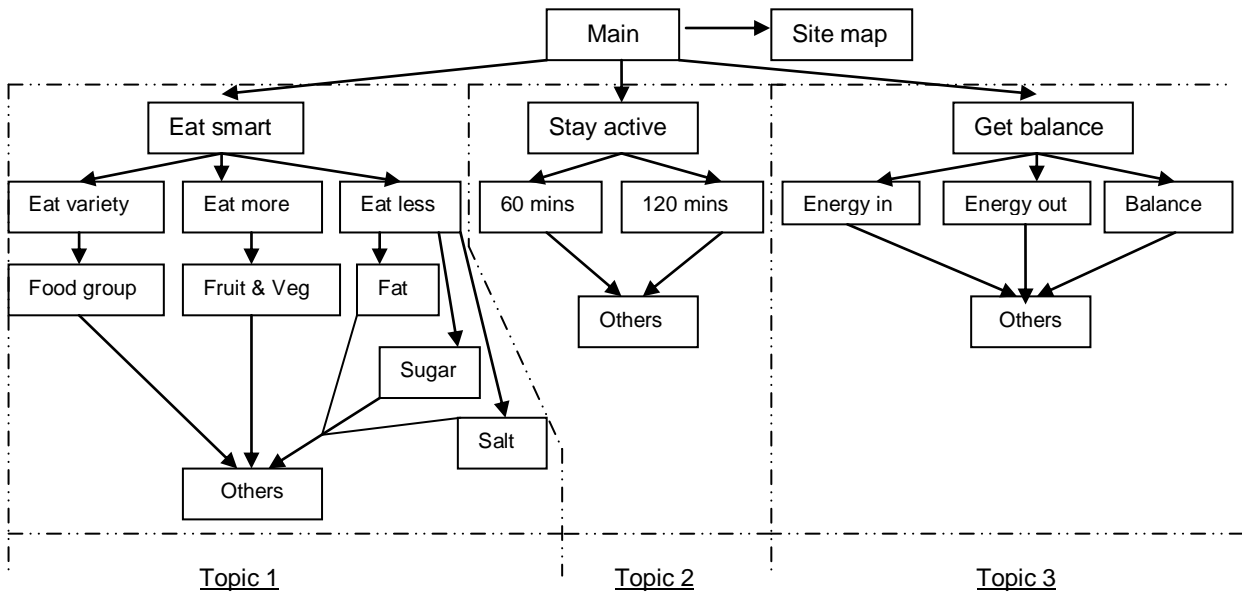
Preparation of contents for a website (hyperdocuments) is different from written text (Sklar 2006). Studies relating to how the Web users read found that they scan the contents on web (Morkes and Nielsen 1997). Studies on web usability concluded that users scan the web pages, users do not like long scrolling pages and users prefer factual information. Experts suggested that writing for online content must be brief, concise, simple, informal style and clear (Nielsen 1998; Sklar 2006). Considering these factors, we categorized the content into two primary topics with short and concise messages. Table 2 provides key messages as the primary topic for the web content.

Table 2. Key health messages of the website

Themes	Healthy eating (Eat smart)	Physical activity (Stay active)
<b>Health Messages</b>	Eat a variety of food	Stay 60 active minutes
	Eat more fruits and vegetables	Enjoy 120 screen minutes
	Eat less fat, food and sugar in food	

The website is designed in a cluster structure. It is similar to hierarchical approach with the top page intended to allow access to other every page except every topic area has a group of information. This approach encourages users to explore the information within topic areas. Both website flowchart and storyboarding techniques were used to plan navigation of the site. Planning of navigation structure is an important aspect of the easy use of a website to travel through. Good navigation is when users travel easily and efficiently throughout a website (Morkes and Nielsen 1997). Figure 2 illustrates the cluster structure used by the current website to present the content. A site map is also used to give a broad view of the node-link structure for users by displaying the entire node-link structure. Chen and Rada (1996) strongly support the use of site maps. Their research concerning on comparing and synthesizing 23 experimental studies of hypertext concluded that site map can be described as “graphical maps that visualize the organization of hypertext have significant impact on the usefulness of a hypertext system”.

Figure 2. Cluster structure



The navigation structure of current website has assisted to development of page layout. We use style “combination of top and left bar”, which divided into two logical grouping (Burrell and Sodan 2006). Figure 3 shows the development of web page layout. The top horizontal list of navigation bars provide hyperlinks to knowledge and information; eat smart, stay active, get balance and other web links. The vertical list of navigation-link menus direct to communication platform and short quizzes; e-discussion, e-talk, email and test your knowledge. Both vertical and horizontal navigation-link menus are graphic-based. In planning a successful user experience, it is important to consider such details like appropriate icons, animations, placement of navigation buttons, balance of texts and graphics, choice of colour, font size and style; limitation of texts in a page to avoid of too much scrolling task and hypertext linking.

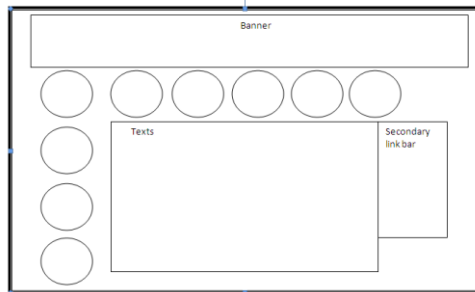
Consistency is the key factor while designing the layout for every page of the website. Interactive features aiming to promote self-management skill, social influence, social supports and social motivation are also included. Those features including discussion board, real-time chat session, and email have been embedded into the website system. Details of the use and delivery of each feature will be discussed in the following sections.

### 3.1.3. Implementation Plan

At this phase, a prototype on computer medium is developed. We published the website by uploading to server system for the purpose of testing exercise. The website has been pilot-tested to four children who were aged 8 – 12 years. Web usability is the main concern during the testing exercise. It includes understanding of the web content, finding information, information feedback, visual clarity,

compatibility and consistency. The website has been modified according to feedback and comments received. Revising and retesting tasks were taken place at this stage.

Figure 3. Web page layouts



Rough draft



Final draft (web screen)

### 3.1.4. Delivery And Use Of Website

At the start of the intervention study, each participant will receive the web address, a unique username and password to enable them access the website for eight weeks. They will be allowed to explore the website at their own time pace. They were advised to spend less than 30 minutes a day for surfing the website. Weekly emails reminding participants to access the website frequently will be sent.

Participants are invited to participate in several online activities including goal-setting exercise, discussion forum and real-time chat sessions. These activities promote both personal and social factors. Table 3 describes overview of web participation. Weekly basis goal-setting activities are divided into food diary, activity log and sedentary activity. These activities are targeted to improve eating and exercise behaviour; and cut down sedentary activities.

Table 3. Activity levels on the website

Level	Individual	Group
<b>Activities</b>	Web exploration Food diary Activity log Power down screen time Games and quizzes	Discussion forum Chat session

Social support has been identified as an important tool in managing behavioural changes (Bandura 2004; Jackson and Warren 2000). In the current project, the website provides discussion forum and chat session to share experience and opinions among the participants. The discussion forum aims to provide participants a social networking opportunity through which motivation, peer influences and encouragement in behaviour change is focused. Participants are given opportunity to share their topics with others. However, the principal investigator will moderate and monitor the discussion forum regularly to ensure the forum at all times in relation to the basic themes; healthy eating and active living. The principal investigator will have

contact with the intervention group several times each week through emails, the online discussion board and chat sessions. The chat session is conducted in pre-arranged time.

Participants in the control group will receive no access to the website. They will go on with their usual daily life without any treatment given. However, the web-based program will be offered to the control group at the conclusion of the two month follow-up.

#### **4. Conclusion**

A randomised controlled trial is proposed to investigate the effectiveness of web intervention for the prevention of overweight and obesity in children and adolescence. Findings from the present study will add significant evidence to the growing literature regarding obesity and overweight prevention research. The study will also offer alternative ways in delivering healthcare principally employing e-health techniques for promoting healthy eating and exercise habits particularly in children and adolescence.

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