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# Healthcare practitioners' perspectives on the use of e-health applications to support overweight and obese adolescents

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# HEALTHCARE PRACTITIONERS' PERSPECTIVES ON THE USE OF E-HEALTH APPLICATIONS TO SUPPORT OVERWEIGHT AND OBESE ADOLESCENTS.

by

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# USE OF THESIS


The Use of Thesis statement is not included in this version of the thesis.

# ABSTRACT

The aim of this research was to investigate, from an Australian healthcare practitioners' perspective, whether online and e-health applications could provide support for and be beneficial to overweight and obese adolescents. This research has investigated whether diet and exercise related environmental causes of obesity could be positively affected by using e-health applications to re-educate adolescents about healthy eating and exercise behaviours The research identified what online and electronic resources healthcare practitioners' recommended to their patients, in order to understand how information systems solutions could better assist these patients in achieving healthier lifestyle outcomes. Additionally, the research investigated what content, features and functionality healthcare practitioners' believed should be incorporated into future e-health initiatives. The research was exploratory in design and attempted to identify future research projects.

The research targeted healthcare practitioners who made their contact details publicly available via the Internet, including the online Yellow Pages, and those that routinely treat overweight and obese adolescents. The research had a multidisciplinary approach as practitioners from numerous professions were identified as potential respondents, they included: Aboriginal health experts, cardiologists, child health experts, dietitians, exercise physiologists, general practitioners, health promotion researchers, homeopaths, medical practitioners, naturopaths, nutritionists, nurses, obesity experts, paediatricians, psychiatrists, psychologists, and sports dietitians. The attitude data of these healthcare practitioners is considered to be useful and relevant in regards to the future development of information systems and in designing appropriate resources for patients. Hence, the research was information systems (IS) based, and a survey was selected as the overarching research methodology upon which to conduct this investigation.

The theoretical contribution of this research is in the extension of theory relating to the use of electronic support information as it is perceived by Australian healthcare practitioners. Further, this research highlights healthcare practitioners' attitudes towards, and adoption of current e-health technology. These are significant issues given the rapid growth of e-health information on the Internet and patients growing demand for these resources to be made widely available.

# DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i)     incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education.

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Lastly, I would also like to thank the healthcare practitioners who took the time and trouble to respond to this survey. The care and interest shown by many, has contributed towards my learning.

# PUBLICATIONS BASED ON THIS RESEARCH

**Published refereed conference papers:**

Armstrong, L. J., & Mahncke, R. J. (2004). Developing a Virtual Community for Overweight and Obese Children: A Pilot Study. Research in Progress. *Paper presented at the Enterprise Value from e-Business; Proceedings of the 5th International We-B (Working For E-Business) Conference*, November 25-26, 2004, (CD-ROM), Fremantle, Western Australia.

Armstrong, L. J., & Mahncke, R. J. (2005). The Role of an Online Community to Support Overweight Adolescents: A Survey of Australian Healthcare Professionals. Research in Progress. *Paper presented at the Managing Modern Organizations with Information Technology; Proceedings of the 2005 Information Resources Management Association International Conference*, May 15-18, 2005, (CD-ROM), San Diego, CA, USA.

**Refereed conference paper accepted and awaiting publication:**

Mahncke, R. J., & Armstrong, L. J. (2005). Website recommended by healthcare practitioners for use by overweight and obese adolescents: A review. *Paper to be presented at the 2nd International Conference on Information Management and Business* (IMB 2006), February 13-16, 2006. Sydney, Australia.

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# 1 Introduction

Obesity has become topical in the popular media and has been declared as a worldwide epidemic (Popkin & Monteiro, 2003). The occurrence of overweight related problems in Australia is considered to be of a "great health, social and economic concern" (Sport Industry Australia, 2003). The main health concerns relating to being overweight or obese, are the increased risk of developing serious preventable health related problems and diseases, such as: type 2 diabetes, cardiovascular disease, chronic fatigue, cancers, osteoarthritis, hypertension, kidney and gall bladder disease, musculo-skeletal and respiratory diseases, anxiety and depressive disorders, suicide attempts, limitations in lifestyle due to poor health, insomnia, pain and neurological problems (Sport Industry Australia, 2003).

Some of these problems and diseases can emerge in childhood or adolescence, and can increase the risk of dying prematurely (Freedman, Dietz, Srinivasan, & Berenson, 1999). However, this mortality risk can be reduced by 90% if exercise is increased and weight is lost (O'Brien, 2004). These health risk factors are often not evident in adolescents and it is therefore the "psychosocial problems" that are the most common problems associated with adolescent obesity (Australian Institute of Health and Welfare, 2003). Some problems which may occur relate to depression, social isolation, bullying and lack of acceptance by peers.

The Australian national cost of obesity in 2003 was estimated to be as high as AU$1.3 billion (Australian Institute of Health and Welfare, 2003). This economic cost of treating obesity related diseases is expected to increase together with incidence of obesity, unless effective intervention is successful (Sport Industry Australia, 2003).

An adolescent is defined as a person between the ages of 10 and 19 years old (World Health Organisation (WHO), 2004). Adolescence has been identified as a "danger period" in which being overweight could determine the likelihood of being overweight or obese in adulthood (WHO, 2004). Research by Whitaker, Wright, Pepe, Seidel, & Dietz (1997), indicates that 80% of overweight adolescents are likely to become

overweight adults. WHO (2004) believes that adolescence is "a timely period to address and correct health related behaviours in order to prepare for a healthy adult life, free from preventable diseases". This research will address electronic initiatives aimed at this adolescent cohort in order to determine if online and e-health resources could contribute towards a solution to the obesity epidemic facing Australia today.

## 1.1    Background Information

Overweight and obesity are conditions of the body which are predominantly defined using the Body Mass Index (BMI). This is a measure of a person's weight in kilograms relative to their height in metres squared. In adolescents over the age of fourteen and adults, a BMI calculation of between 25 and 30, indicates that person is considered to be overweight. A BMI of 30 or more defines obesity (Australian Institute of Health and Welfare, 2003). The BMI index has recently been adjusted to redefine overweight and obesity in children and adolescents younger than fourteen (Pulse, 2002).   Figure 1 depicted the adjusted BMI calculations as they relate to a ten year old boy. These adjustments redefine BMI such that a BMI of 19.4 or less would indicate a healthy weight, a BMI of 22.9 indicates that the child is overweight, and a BMI of greater than 25.5 defines obesity.
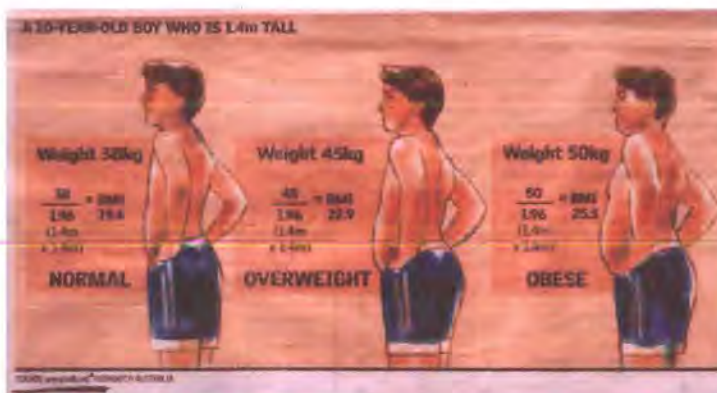


**Figure 1: BMI calculation example** (Halls, 2004)

The BMI measure for male and female adolescents is slightly different as is depicted in the graphs in Figure 2.

The graphs correlate a child's age against their BMI in order to determine their weight range (Halls, 2004). The BMI ratio is a tool utilised by healthcare practitioners as a guide to determine weight range.
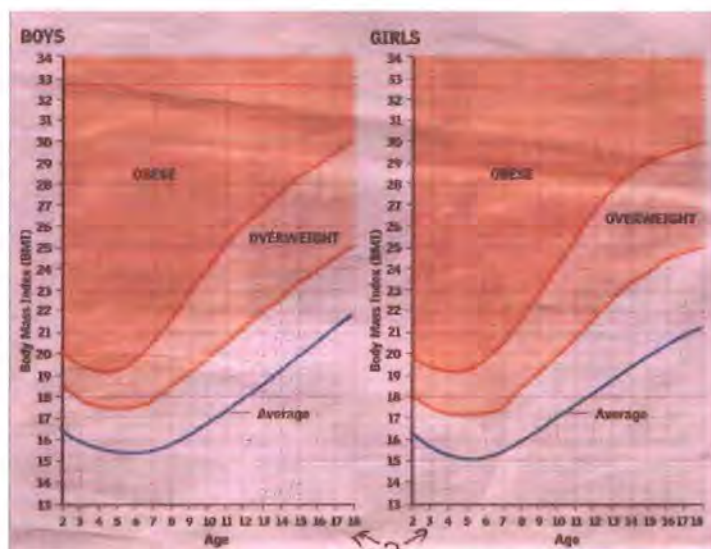


**Figure 2: Updated BMI graph for children** (Halls, 2004)

There are other techniques used by healthcare practitioners to determine the extent to which a child or adolescent is overweight, they include: formal skin-fold observation or fat content assessments, and the standard weight for height centile charts (Pulse, 2002). There are two definitions commonly used for the latter chart, that is, "weight for height over the 95th centile or more than 20 per cent over the median weight for height" (Pulse, 2002). Greater than twice the median weight for height is considered to be morbid obesity (Pulse, 2002). However, the BMI definition appears to be the preferred calculation in this regard.

The causes of obesity are complex and include a genetic predisposition, the cause of, or symptoms to diseases, lack of physical activity, and an excessive intake of food (Hampl, Anderson, & Mullis, 2002). As in adults, obesity in adolescents is usually caused by an excessive intake of food (Pulse, 2002). There are numerous reasons for overeating they include: insufficient exercise to burn off the calorie intake, the availability, ease, enhanced taste and addictive qualities of fast foods and junk foods, a lack of time, stress, emotional eating or other psychological reasons (Pulse, 2002). There may also be

other health related reasons for being overweight, such as the presence of certain viruses or diseases. Pulse (2002) believes that it is necessary to address the relevant health related issue as early as possible. A strategy that should include a family wide approach (Kelley, Krummel, Gonzales, Neal, & Fitch, 2004). Studies have shown that dietary habits learnt during childhood continue into adolescence and adulthood, and as such any dietary interventions to prevent obesity and related chronic diseases needs to be targeted towards children (Kelder, Perry, Klepp, & Lytle, 1994). There is a 40% "variation in body composition" that is estimated to be genetic and addressing these genetic factors alone will not resolve the issues (Hampl, Anderson, & Mullis, 2002) relating to the diet and exercise related environmental factors (Friedlander, 2003). However, regardless of the cause, there is evidence to suggest that it is better to be overweight and engage in supervised exercise, than to be in a healthy weight range and to live a sedentary life (Heart Foundation, 2005).

There is mounting evidence to suggest that dieting does not always deliver the required weight loss results for children and adolescents. "Bright Bodies" is a weight management program that utilises "The Smart Moves Program" for children aged 8 to 16 years old based at Yale-New Haven Hospital in Connecticut (Savoye-Desanti, 2005). "Bright Bodies" is a comprehensive program that applies nutrition education, behaviour modification and exercise to treat overweight and obese children and adolescents. This program is a family centred 12-week program which helps overweight children and their families to learn about better food choices and ways to increase activity (Savoye-Desanti, 2005). This program suggests that adolescents may respond positively to a non-diet approach enabling them to sustain long-term weight loss. It could be possible that this 'behavioural change' approach may well be the only real long-term answer to obesity (Snowball, 2004). Dailey (2003) too has concluded that the public may need a "refresher course in diet, exercise and nutrition".

One emerging solution in healthcare, are e-health initiatives, such as online and e-health applications that are made available via the Internet, mobile or other electronic devices. This research has investigated whether diet and exercise related environmental causes of obesity could be positively affected by using e-health applications to re-educate adolescents about healthy eating and exercise behaviours (Snowball, 2004).

E-health has expanded on what was formerly known as telemedicine (Eysenbach, 2001). E-health initiatives have become a popular means to deliver healthcare services to patients. Numerous definitions exist for the term e-health (Pagliari, Sloan, Gregor, Sullivan, Detmer, Kahan, Oortwijn and MacGillivray, 2005). However, one definition which provides a commonly expressed theme is that it is "the use of information and communication technology to improve or enable health and health care" (Wysocki, 2001). E-health therefore, is the process of providing healthcare via electronic means, in particular over the Internet. It can include "teaching, monitoring (e.g. physiologic data), and interaction with healthcare providers, as well as interaction with other patients afflicted with the same conditions" (Eysenbach, 2001; Oh, Rizo, Enkin & Jadad, 2005). Another reason that people use electronic technology for health-related concerns is to interact with others who have similar conditions for the purpose of sharing experiences and emotional support (Dickerson, Flaig, & Kennedy, 2002; Lasker, Sogolow, & Sharim, 2005).

A report prepared by Mitchell (1999) for the Department of Communications, Information Technology and the Arts (DOCITA) placed e-health within the information economy context as shown in Figure 3. E-health encompasses, but is not limited to, telemedicine, telehealth and health information and itself forms part of the e-commerce industry. E-health creates opportunities to deliver a number of health benefits to users, including adolescents.
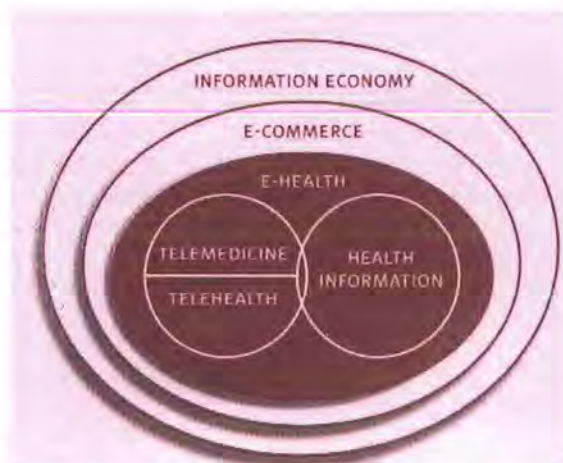


**Figure 3: Relationship between e-commerce, e-health, telemedicine** (Mitchell, 1999, p. 15)

Table 1, adapted from Mitchell (1999) gives a list of the electronic technologies utilised in the delivery of e-health together with examples of how these technologies are utilised in the delivery of e-health.

In order to establish a research direction for this study, a multidisciplinary in-house half-day workshop was held on 8th July 2004. The workshop was titled "Developing a Virtual Community for Children with Eating Disorders". Attendees were invited from within the following Edith Cowan University (ECU) schools: Psychology, Nursing, Sports Science, Nutrition, Education, Kurongkurl Katitjin (Indigenous Studies), Communications and Multimedia, Computer and Information Science. A dietitian not associated with the university also attended the workshop. Attendees were asked to volunteer to give a ten-minute presentation to address the current issues emerging from their discipline's perspective. The purpose of the workshop, to which thirteen people in total attended, was to gauge opinion as to their attitudes on the feasibility in regards to the use of the Internet and virtual communities for the target cohort.

**Table 1: Table listing the two sets of technologies that are increasingly used in e-health** (Adapted from Mitchell, 1999, p.13).

| Examples of information and telecommunication technologies used in health | E-health examples utilising these technologies |
|---|---|
| 1. World Wide Web<br>2. Mobile phone devices<br>3. Personal digital assistants (PDAs) and other hand held devices<br>4. Telephone<br>5. Fax<br>6. Email<br>7. Videoconferencing<br>8. Teleradiology technologies<br>9. Telepathology technologies<br>10. Computer servers, hosting databases of health information, for access via the Internet or an Intranet<br>11. Computers providing facilities for sorting, storage, retrieval of health information, including patients' records and medical images, for accessing via LANs or WANs<br>12. CD ROMs for storage of health information and educational data | 1. Call centres<br>2. Websites and services to hand-held devices<br>3. Combination of Internet and CD ROMs for continuing medical and health education<br>4. Nurses using hand held computers or mobile phones used to access databases on servers<br>5. Telemonitoring devices in homes, linked by phone to health experts<br>6. Remote ECG analysis<br>7. Teleradiology combined with videoconferencing |

The research project scope and direction were discussed at length during the workshop. The group consensus was that, anorexia nervosa and obesity were on opposite ends of the eating disorder spectrum. Although dietitians do not conventionally define obesity as an eating disorder, but binge eating is considered to be an eating disorder. However, not all binge eaters are overweight or obese. The workshop participants concluded that each eating disorder required specific individual attention, including obesity. As a consequence, the project scope was reduced to only examine the area of overweight and obesity in adolescents, as this sector was considered by the workshop attendants to be under supported. The workshop also discussed aspects of e-health applications for adolescents which incorporate an virtual or online community; including the importance of parental and family support of adolescents with eating disorders. In addition, workshop participants were of the opinion that whilst the virtual community had the potential to provide peer support, such adolescents should not be encouraged to sit at and use a computer for long periods of time. One suggestion to alleviate this from eventuating was for the software to utilised 'pop-up' screens to remind users, the adolescents, that they should "go out and exercise" after predefined time intervals of approximately half an hour. Research indicates that there is a significant relationship between childhood obesity and computer usage (Landers, 2004). Studies by Arluk, Branch, Swain, & Dowling (2003) suggest that interventions should be designed to target the total time a child spends on the computer. The workshop participants reached a consensus that virtual communities may benefit overweight and obese adolescents.

The initial aim of the project was to implement an online or virtual community to provide a 'meeting place' for adolescents on the Internet. It was concluded that before such a community could be implemented, it was necessary to establish the feasibility of developing a virtual or e-health application which would provide healthcare via the Internet and mobile devices. It was considered that a survey of health practitioners would provide the means to establish such feasibility of for an e-health application.

The attendees decided that developing and implementing an online community was still too large a scope for an honours project. Further discussion subsequent to the workshop determined that the research should administer a survey to healthcare practitioners, as no research documenting the attitudes of healthcare practitioners relating to the use of e-

health applications for adolescents was uncovered. A paper by Armstrong and Mahncke (2004) provides a detailed summation of the workshop findings.

The seemingly natural progression in this research from a virtual community into an e-health application occurred because online applications or health-related websites have incorporated the aspect of health information into their applications. Virtual or online communities are mostly concerned with a 'sense of community' rather than the sharing of factual health related information and patient education. The area of informal patient education was of particular interest to this research and therefore the use of the term e-health in this research incorporates all the qualities of virtual or online communities into, or as a part of, the e-health application.

The purpose of this report is to outline the research investigation and report on the findings. The report details the aims and significance of the research, a review of the relevant literature, research methodology and design for the research. It further outlines the results and findings of the investigation, and discusses these outcomes in relation to addressing the research questions.

## 1.2   Aim

The aim of this research was to investigate, from an Australian healthcare practitioners' perspective, whether online and e-health applications could provide support for and be beneficial to overweight and obese adolescents. This research has investigated whether diet and exercise related environmental causes of obesity could be positively affected by using e-health applications to re-educate adolescents about healthy eating and exercise behaviours The research identified what online and electronic resources healthcare practitioners' recommended to their patients, in order to understand how information systems solutions could better assist these patients in achieving healthier lifestyle outcomes. Additionally, the research investigated what content, features and functionality healthcare practitioners' believed should be incorporated into future e-health initiatives. The research was exploratory in design and attempted to identify future research projects.

## 1.3 Significance

As e-health applications continue to be developed and increasingly have an Internet presence (Brann & Anderson, 2002), it has become necessary to determine whether these resources do in fact, provide real health benefits to users. This study has investigated whether online and e-health resources can assist in addressing the national obesity epidemic. It has done so by exploring one possible preventative measure which can be delivered to adolescents regardless of socioeconomic constraints or geographical location.

The results of this research have contributed to the body of knowledge relating to: e-health applications as preventative self-care tools for adolescents, online group support for adolescents, and in highlighting new ways to address the issues relating to adolescent obesity. The results of this research may assist other e-health related groups seeking to address adolescent health related issue.

The theoretical contribution of the research is in the extension of the theory of electronic information use based on the recommendations of healthcare practitioners. Further, this research has provided a snapshot of current healthcare practitioners' attitudes towards the use of electronic material. These are significant issues given the rapid growth of e-health information on the Internet and patients growing demand for these resources to be made available.

## 1.4 Research questions

This research has been designed to answer the following questions from a healthcare practitioners' perspective:

Can online and e-health applications benefit and provide support for overweight and obese adolescents?

Further,

a. What electronic, online and e-health application resources do healthcare practitioners' recommend to their overweight and obese adolescent patients?

b. What content, features and functionality do healthcare practitioners' believe should be incorporated into e-health applications targeted towards overweight and obese adolescents?

c. Do healthcare practitioners' believe that online and e-health applications can assist adolescent patients in achieving healthier lifestyle outcomes?

## 1.5 Glossary of definitions

Definitions of the topic specific terminology used in this document are listed in Table 2.

**Table 2: Table of definitions.**

| TERM | DESCRIPTION |
|---|---|
| Adolescent | A person who is between childhood and adulthood (Oxford English Dictionary, 2005). Defined by WHO as a person between 10 and 19 years of age (World Health Organisation, 2004). |
| Application | A computer program with a user interface. |
| Body Mass Index (BMI) | A measure of a person's weight relative to their height (weight in kilograms divided by height in metres squared). |
| E-care | IBM invented the term "e-care" to describe electronic interaction between patients and their healthcare providers (Oh, Rizo, Enkin, & Jadad, 2005). |
| E-health | "E-health is the process of providing healthcare via electronic means, in particular over the Internet. It can include teaching, eLearning, monitoring (e.g. physiologic data), and interaction with healthcare providers, as well as interaction with other patients afflicted with the same conditions. E-health provides an opportunity for some patients to maintain independence longer and an opportunity for providers to monitor some conditions more closely" (Oh et al., 2005). |
| E-monitoring | "E-monitoring", originated to describe electronic monitoring of patient physiologic data remotely, usually from the home or office (Oh et al., 2005). |
| Healthcare practitioner | A professional who aids and assists in treating health related issues affecting people. |
| Information systems | "Information systems are concerned with the effective use of information technology by people and organizations" (Shanks, Rouse, & Arnott, 1993, p.2). |
| Information technology | "The broad subject concerned with all aspects of managing and processing electronic information" (Webopedia, 2005). |

| TERM | DESCRIPTION |
|------|-------------|
| Online Community | Online communities provide a meeting place for people on the Internet, enabling global communities to develop. "People in online communities use words on screens to exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge, share emotional support, make plans, brainstorm, gossip, feud, fall in love, find friends and lose them, play games, flirt, create a little high art, and a lot of idle talk." (Rheingold, 1991). |
| Overweight and obesity | Conditions of the human body which are predominantly defined using the BMI. If an adult's BMI is between 25 and 30, that person is considered to be overweight. A BMI of 30 or more defines obesity (Australian Institute of Health and Welfare, 2003). |
| NVivo | Qualitative analysis software |
| Risk factors | Factors which increase the likelihood of developing obesity related diseases such as: type 2 diabetes, cardiovascular disease, stroke, cancers, osteoarthritis, hypertension, kidney and gall bladder disease and musculo-skeletal, respiratory diseases, depression, alienation (Sports Industry Australia, 2003). |
| Software | The programs, routines, and symbolic languages that control the functioning of the hardware and direct its operation. |
| SPSS | Quantitative analysis software |
| Virtual Community | Is in this report used interchangeably with online community. The virtual or online community is the communication aspect of, and sense of 'community' incorporated into an e-health application. |

# 2　Literature Review

The purpose of this section of the document is review the current literature and previous research findings which are relevant and related to this research. The Literature Review is divided into three sections: studies relating to adolescents and the Internet; studies relating to healthcare practitioners and the Internet; and the identification of currently available websites and e-health applications on the Internet.

## 2.1　Studies Relating to Adolescents and The Internet

One in every fifth person in Australia is an adolescent, that is approximately four million people (Australian Bureau of Statistics, 2002), and a quarter of this cohort is estimated to be overweight or obese (Australian Institute of Health and Welfare, 2003). Figure 3 graphically depicts the proportion of adolescents and young adults aged between 15 and 24 years who were classified in 2001 as being overweight or obese (Australian Institute of health and Welfare, 2003). Therefore, online and e-health applications targeted towards this cohort have a potentially large user base. Occurrence of related health risk factors such as Type 2 diabetes and heart disease, are already evident in adolescents (Freedman, Dietz, Srinivasan, & Berenson, 1999). Additionally, research has shown that all Australians have high health risk factors for obesity due to the accessibility to unhealthy fast and convenience food choices coupled with a national lack of exercise (Ridolfo, Serafino, Somerford, & Codde, 2000). These issues are being addressed by numerous research projects, including those conducted by The Heart Foundation.
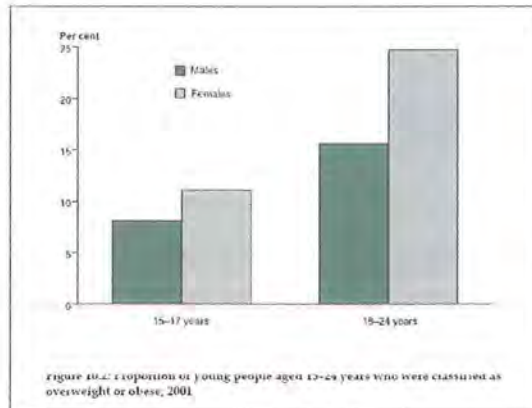
**Figure 4: Proportion of young people classified as overweight or obese in 2001** (Australian Institute of Health and Welfare, 2003)

The Australian Bureau of Statistics (2004) reports that 5.9 million homes have Internet access, 30% of those with the faster broadband access. These figures indicate that there remain a number of the target cohort who may not be able to utilise health related websites from home. However, the Internet is also provided for free in most schools and public libraries. This makes the Internet accessible to a larger percentage of adolescents and extends access to online resources to all adolescents regardless of socioeconomic position or geographic locations. Research indicates that the general public are increasingly using the Internet to access information to assist in making health related decisions (Forkner-Dunn, 2003). This creates a "user demand" which "is driving the development of new e-technologies that will influence the next generation of mobile and Internet-based e-health applications" (Forkner-Dunn, 2003).

Adolescents are quick to adopt these new technologies and this provides additional opportunities to deliver health related information to adolescents (Skinner, Biscope, Poland, & Goldberg, 2003). A number of research surveys, interviews, and focus groups have been utilized to understand the information-seeking and information-retrieval behaviour of adolescents looking for health related information online (Hansen, Derry, Resnick, & Richardson, 2003; White & Dorman, 2000). These studies, including research conducted by Skinner et al. (2003), indicate that adolescents are willing to use technology to seek information relating to their specific medical conditions and other health related issues that interest them.

Weiner (2003) believes that adolescents are ready to learn in "cyberspace" and that the Internet offers an opportunity for adolescents to improve and develop their "health literacy", knowledge and skills (Gray, Klein, Noyce, Sesselberg & Cantrill, 2005). However, ensuring the usefulness of the Internet as a health information tool for adolescents is reliant on their ability to find high quality information that is quickly uploaded, presented in a readable format, and is targeted towards adolescents (Gray, Klein, Noyce, Sesselberg & Cantrill, 2005). Numerous reputable websites on the Internet are currently available, and accessible by adolescents, that are devoted to specific health issues such as rare diseases, diabetes, depression, eating disorders and various other health related concerns.

The Internet can become 'addictive' for adolescents and spending too much time sitting in front of a computer can have negative effects. For example, research indicates that there is a significant relationship between childhood obesity and computer usage (Landers, 2004). It is evident then that an adolescent's use of the Internet or online 'chat' must be time restricted and healthy lifestyle practices encouraged. Other studies have suggested that interventions should be designed to target the total time spent on the computer (Arluk, Branch, Swain & Dowling, 2003). Online and e-health applications such as "blubberbusters" have overcome these issues by limiting chat room sessions and times by only opening the chat forums at 7pm (in the United States). The site also advocates healthy lifestyle practices such as daily exercise.

Another concern identified in the literature relates to the vulnerability of overweight adolescents socialising in an online environment. This research on the use of the Internet has shown that adolescents can be vulnerable to paedophiles and other abusers. For example, Friedlander (2003) has shown that overweight or obese children may be more vulnerable to abuse because of their negative self-perceptions, sense of decreased self-worth and low self esteem. Any online e-health application developed for overweight and obese adolescents would need to address these concerns.

'Chat rooms' are an interactive feature of a website and often of online support communities, which allow real time communication to occur. Chat rooms have become increasingly popular as a means of communicating on the Internet (Shoham, 2002) and may provide advantages over the use of email. They facilitate anonymous participation

in real time discussion with other members of a virtual chat room. They enable "non-geographically bound communities which are based on relationships between the chatters" (Shoham 2002). Chat rooms can be formed based on a general or specialised topic, they are open to the general public or they may have limited member access only, they may be moderated or non-moderated. The main advantage of chat rooms is that they provide a means for an individual "to bond socially, look for solutions to personal problems or to satisfy an affiliation need, within a community" (Shoham, 2002). Online chat can contribute to the general well being of the user (Muniz and O'Guinn, 2001).

## 2.2    Studies Relating to Healthcare Practitioners and the Internet

A search of other West Australian (WA) universities for theses relating to adolescents and e-health did not yield any results. A search of the University of Western Australia's (UWA) library website returned no studies relating to e-health or any other electronic health naming variation. The search did reveal some studies relating to adolescent weight and their perceptions of exercise. One study by Watts (2004) related to childhood and adolescent obesity but examined the effects of exercise training on nitric oxide-mediated vascular dysfunction, and was not considered relevant to this research.

Research of the academic databases revealed only a few studies similar to this research, but none that documented healthcare practitioners' attitudes relating to the use of e-health applications. One such study involved the distribution of a survey to healthcare practitioners in the United States of America (USA) who routinely treated overweight and obese adolescents. The research by Trowbridge, Sofka, Holt, and Barlow, (2002) was concerned with the treatment options the practitioner recommended to the patient based on the practitioners' characteristics. Characteristics such as the age, sex, experience, and the practitioner's own weight were analysed and compared to the treatment options they recommended to their patients. Trowbridge et al. (2002) found that there was a large variance in the way in which overweight and obese patients were treated by practitioners. In addition, the research concluded that treatment options should be standardised across the USA, to ensure that all patients receive the same consistent level of care. However, none of their recommendations related to the use of online resources for use by adolescent patients.

A further French study also investigated general practitioner attitudes in relation to their treatment of their overweight and obese patients. The study by Bocquier, Verger, Basdevant, Andreotti, Baretge, et al. (2005) examined practitioner attitudes and practices and reported that approximately 30% of practitioners displayed negative attitudes towards their overweight and obese patients, 57% did not believe that the patient could, or would reduce their weight, and 64% often set weight loss objectives that were more stringent than the guidelines suggested. This study also concluded that practitioners' characteristics influenced their advice and recommendations to their patients. The study found that there was no consistency in nutritional or dietary advice given to patients and treatment was dependant on a doctor's level of obesity related training. Bocquier et al. (2005) concluded that the healthcare system should align practices and training for all healthcare practitioners.

A study by Skinner, Biscope, Poland and Goldberg (2003) attempted to establish the emerging roles for healthcare practitioners by utilising e-health applications more effectively for an adolescent cohort. They identified three emerging roles for healthcare practitioners in e-health; firstly, they must provide an interface for adolescents that will assist them in quickly finding the information they are seeking (Skinner et al., 2003). Content that is designed and tailored towards adult users is considered to be too detailed for adolescents (Flicker, Goldberg, Read, Veinot, McClelland et al., 2004). The result is that they either do not seek this content or skim through without gaining the knowledge they are looking for; secondly, they must provide the means for practitioners to connect with adolescents by extending the ways and times in which they operate (Skinner et al., 2003). For example, making use of e-health applications to interact with adolescents either via e-visits, scheduled times in chat forums or by e-moderation. However, busy practitioners may lack the time to deliver these services to adolescents; thirdly, they must provide the means for practitioners to assist adolescents in becoming critical about evaluating the quality of health-related information available (Skinner et al., 2003).

A research study by Spyt, Watt, Boehm, and Stafford (2002) surveyed cardiac patients, relatives, friends and general practitioners in the United Kingdom (UK) to ascertain if there was a need for an online patient support system and if an online support and information system could be beneficial to patients. The study reported that 78% of respondents showed an interest in the provision of an Internet based support service for cardiac patients. Another motivator for the provision of an online application from this

research was that patients could not recall in detail the treatment options physicians' outlined during appointments. However, if patients were given this information in visual or written format, the research suggested that this could improve the patients' ability to recall the information (Spyt, et al., 2002).

Lasker et al. (2005) raises a number of concerns about the disadvantages of relying on the Internet for information and support. This research investigated 79 research studies relating to the "accuracy, completeness and comprehensibility" of online information and support. The research concluded that the health related websites evaluated, were not always reliable and were regarded negatively by the researchers (Lasker et al, 2005). Among the reasons offered are that these sites often lacked the sensitivity of face-to-face communication and produced large amounts of unrelated mail, whereby users needed to read large amounts of information before they gained any useful benefit from the resources.

Another study which surveyed doctors in the United Kingdom concluded that there were benefits for patients that used the Internet for information, advice and social support (Potts & Wyatt, 2002). This study surveyed 800 Internet literate doctors to ascertain their perceptions about the actual benefits and possible harm to their patients of using the Internet (Potts and Wyatt, 2002). The majority of doctors reported that there were more benefits to patients using the Internet than the possible harm it could cause (Potts & Wyatt, 2002). However, there were more problems than benefits for the doctors themselves, as patients' required greater explanation about the information that they obtained online.

An investigation into the effects of Internet support on the long-term maintenance after weight loss was conducted by Harvey-Berino, Pintauro, Buzzell, and Gold (2004). They compared two weight loss groups over an eighteen month period. One group was conducted online and the other group met face-to-face. Participants of the Internet support group were able to sustain their weight loss equally well over the study period as did the face-to-face-group. The study concluded therefore, that the Internet appears to be a possible "medium for promoting long-term weight maintenance" (Harvey-Berino et al., 2004).

Finally, other similar studies are underway in Western Australia. An investigation is evaluating the effectiveness of an online intervention to build a sense of community and promote healthy behaviours for people with or at risk of, heart disease (Boniface 2005). The research focuses on a continuously accessible communication network that offers online support. The Bonniface (2005) study proposes to establish whether an online intervention can build a sense of community for a group of heart patients who have been identified as in need of a secondary prevention mechanism to reduce their heart disease risk factors.

There are few studies in the literature that describe the therapeutic use of either e-health applications or online communities that assist in treating overweight or obese adolescents. Furthermore, no similar Australian studies were identified in which a large number of multidisciplinary healthcare practitioners were surveyed concerning their opinion about the benefits of similar online and e-health applications and support communities.

## 2.3    Identification of Websites and E-health Applications

There are numerous websites on the Internet that have been designed to support and assist adolescent in losing weight. These sites offer information relating to anorexia nervosa, bulimia nervosa, binge eating, and obesity, as well as information relating to nutrition and exercise. However, few of these websites are specifically designed for overweight and obese adolescents. One study reported by Kent (2003) described the use of the Internet by children and young adolescents enrolled in a fitness program after school. This initiative included such facilities as an online kiosk and email support, which achieved positive outcomes for the users. However, this online support did not include other features commonly available to websites, such as chat facilities, message boards and assessment tools.

In an Australian context, websites have used the Internet to provide resources for adolescents on healthy lifestyle choices. For example health information for adolescents is available from most of the websites reviewed during this investigation which are listed in Table 3. These websites reviewed can be divided into government or

proprietary categories. The government websites such *healthinsite, obesityguidelines*, and *healthyactive* are sources of reference and provide free member registration and access to resources. However, these websites provide largely static health information, and do not incorporate the interactivity that adolescents require. Australian proprietary websites, most notably *csiro, dietclub, mydr, healthybodyclub, kidshealth and onlineslimmingclub* in general provide the more advanced features and functionality for a membership fee, although health information is provided without cost.

**Table 3: Websites reviewed during this investigation**

| | |
|---|---|
| www.weightwatchers.com.au | www.activeforlife.com.au |
| www.nutritionaustralia.com.au | www.sportsdietitians.com |
| www.woolworthsfresh.com.au | www.fitnessaustralia.com.au |
| www.daa.com.au | www.sanitarium.com.au |
| www.ifnotdieting.com.au | www.foodwatch.com.au |
| www.perthdietclinic.com.au | www.dietclub.com.au |
| www.obesityguidelines.gov.au | www.diabetesaustralia.com.au |
| www.asso.org.au | www.chw.edu.au |
| www.fitness2live.com | www.healthyeating.org |
| www.dietworld.com | www.heartfoundation.com.au |
| http://www.csiro.au | www.loseweightaustralia.com.au |
| www.healthboards.com | www.diabetesaustralia.com.au |
| www.mypyramid.com | www.beyondblue.com.au |
| http://optimalhealth.com.au | www.healthinsite.gov.au |
| www.healthyactive.gov.au | www.eda.org.au |
| www.healthybodyclub.com.au | www.onlineslimmingclub.com |
| www.mydr.com.au | www.blackdoginstitute.org.au |
| www.oa.org | www.healthyeatingclub.org |
| www.eatingdisorders.org.au | www.weightloss-in-australia.com |
| www.kidshealth.org/teen | www.blubberbuster.com |
| www.onlineslimmingclub.com | |

There are numerous definitions for e-health as was outlined in the Introduction. This research reviewed websites on the Internet that are listed in Table 3 in order to determine which of them provided functionality beyond static health information, such as the interactivity provided by chat rooms and forums. Therefore, this research was interested in identifying websites which provided advanced functionality and interaction inline with the definition of an e-health application. That is, the delivery of healthcare online in new and exploratory ways that may result in healthier lifestyle outcome for the user. This falls into the emerging area of preventative self-care applications being delivered online. The websites from the review list which most adhered to this notion of being e-health application were m*yyramid* and *dietclub*.

*Mypyramid* developed in April 2005, is an online weight management application made available globally for free by the United States Department of Agriculture (USDA). This application addresses the issues under investigation in this research, namely it provides interactively, support, customised analysis of daily food intake and exercise expenditure, as well as advice regarding corrective action if required. *MyPyramid* allows the user to access the My Pyramid Plan by entering their age, sex and exercise expenditure as shown in Figure 5. Results from the input information delivers one of twelve eating pyramids suitable for the user based on the information received. The site then provides a meal and exercise tracking worksheet and an invitation to anonymously log on to obtain the *mypyramid* Tracker functionality. It is this functionality which renders this site to be more than just a website.



**Figure 5a: MyPyramid home page** (USDA, 2005)
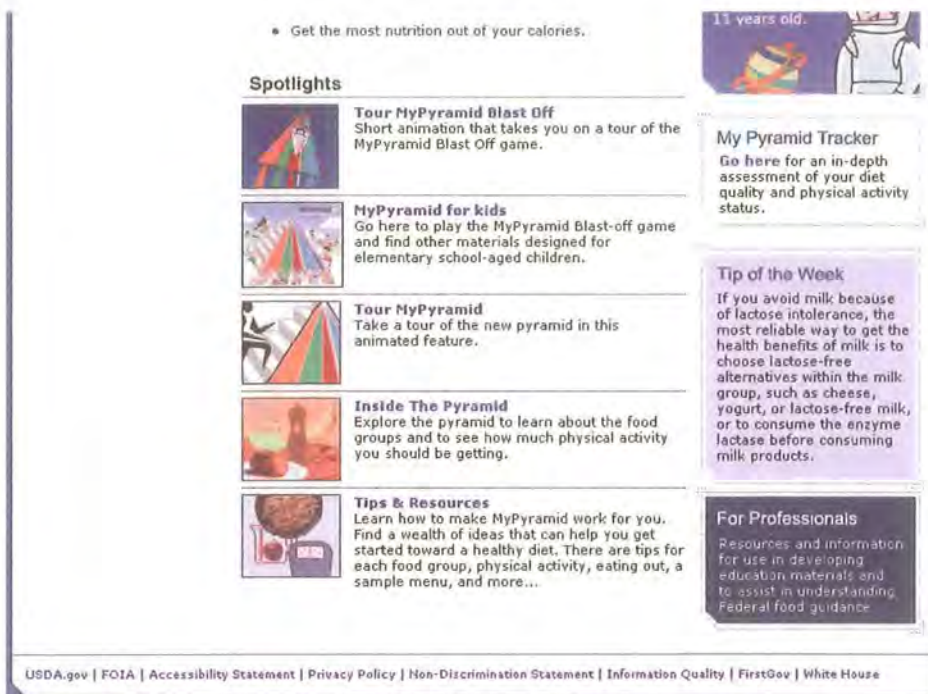
**Figure 6b: MyPyramid home page** (USDA, 2005)

The Tracker offers assessment of the user's food intake and physical activity, see Figure 6. Selecting either of these options offers the user access to analysis screens. The food intake option allows analysis of energy intake, once the calorie intake has been captured for the day. It then proceeds to relate this information into the required vitamin and minerals intake for the day, correct food group choices and an attempt to indicate where the user requires assistance. This application is used on a daily basis, and with a high level of personal discipline could be very effectively. No Australian equivalent of the My Pyramid application was found.

**Assessment**



**Assess Your Food Intake**
The online dietary assessment provides information on your diet quality, related nutrition messages, and links to nutrient information. After providing a day's worth of dietary information, you will receive an overall evaluation by comparing the amounts of food you ate to current nutritional guidance. To give you a better understanding of your diet over time, you can track what you eat up to a year.



**Assess Your Physical Activity**
The physical activity assessment evaluates your physical activity status and provides related energy expenditure information and educational messages. After providing a day's worth of physical activity information, you will receive an overall "score" for your physical activities that looks at the types and duration of each physical activity you did and then compares this score to the physical activity recommendation for health. A score over several days or up to a year gives a better picture of your physical activity lifestyle over time.

**Figure 7: MyPyramid assessment tools** (USDA, 2005)

Academic literature is emerging relating to the usefulness of this application. Mitka (2005) reports that there is mounting evidence that the new food pyramid restructure is nutritionally flawed. Critics also believe that the USDA has "missed its chance to direct individuals toward a healthier diet" (Mitka, 2005). In contrast the Obesity, Fitness and Wellness Week (2005) reported that the "interactive, computer-based version [of *mypyramid*] for children" was available and commended the inclusion of fish into children's recommended diet.

The mobile company Skyscrape has as part of its "commitment to providing consumers with effective health and wellness tools, has made the USDA's *mypyramid* food guidance system available for free to a variety of handheld and smartphone platforms (Health Insurance Week, 2005). The Skyscape's *mypyramid* Food Guide can be downloaded for free from their website (Health Insurance Week, 2005). This represents a commitment to deliver preventative self-care applications to mobile devices. Health Insurance Week reports that the USDA "welcomes initiatives to promote healthy lifestyles". There are a number of other studies that refer to the *mypyramid* website, but only as it relates to nutrition, and not from a technology perspective. No studies were found that investigated the role of the application as an e-health application in providing support for, or healthier lifestyle outcomes for users.

*Blubberbusters*, also a North American website was the best example found of where an online community for overweight children and adolescents had been established. This site was developed by a paediatrician and offers online health and weight loss education and support to several thousands of adolescents worldwide, see Figure 7.

**Figure 7: Bluberbusters teen homepage** (Blubberbusters, 2005)

The site provides self-managed personal weight loss charts and goal setting in a secure private environment. The site has identified the importance of the family unit in tackling the overweight issues associated with their members. Many other sites such as *kidshealth,* also provide a separate interface for parents. However *kidshealth,* displayed as Figure 8, provides more generalised health information.



**Figure 8: Kidshealth homepage** (Kidshealth, 2005)

These last two examples provide examples of successful and sustainable recourses available to adolescents. Locally Borushek's (2005) *dietclub* provides online weight management support community. The Diet Club 'university' offers users lessons related to issues such as behaviour, psychology, nutrition, health and exercise, see Figure 9.



**Figure 9: DietClub's homepage** (Borushek , 2005)

*Dietclub* delivers, for a fee, personal meal planners which are automatically added to the users' diary. Membership allows access to an Australian food database which calculates calories, fat and nutritional information according to the users settings. It allows exercise to be added to the users' diary and calorie totals, which are automatically updated. It allows additional comments and notes to be added into the software. The software can be downloaded onto Personal Digital Assistance's (PDA) for real-time data capture or to access information, and can be synchronised with the users' computer at a later time. There were no studies identifying the usefulness and success of this application. Finally pro-anorexic websites have recently begun to emerge on the Internet. Due to the nature of the Internet any person wishing to create pro-disorder websites are able to do so. Adolescents searching for health related information on the Internet are able to locate and access this information as readily as any other health related information. It is possible that an adolescent is suffering from the disorder that is being encouraged. For this reason it is important to have a trusted network of health related websites that are recommended to patients by healthcare practitioners.

# 3 Research Methodology and Design

The research utilised Checkland's (1985; 1991) philosophy of "organized use of rational thought" as an approach to draw this research together. This model involves the "interrelation" between a framework of ideas 'F', the chosen methodology 'M', and the area of application 'A'. The research utilised an information systems (IS) research framework, and a survey methodology chosen to be administered to healthcare practitioners. Figure 10 represents the connection between F, M and A.
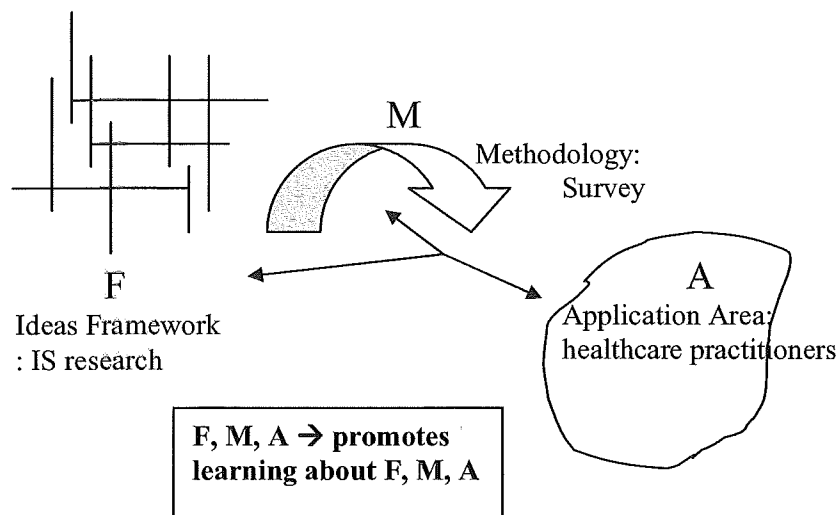


**Figure10: Checkland's FMA Model** (Checkland, 1991, p.4)

IS are concerned with the effective use of information technology by people and organisations (Shanks, Rouse, & Arnott, 1993, p.2). As such, an IS research framework was selected for the research as it best describe the process of investigating the use of online and e-health applications for adolescents. IS encompasses the human factors as equally important as the use of information technology. In this respect IS a "hybrid [of disciplines] relying on technical and social references disciplines" (McDermid, 1998, p.59), as is shown in Figure 11. IS regards technology as an enabling factor, not as the focal point of the discipline.

**Technical disciplines**

**Social disciplines**

**Computing science**

**Software engineering**

**Psychology**

**Sociology**

**etc**

are reference disciplines to

are reference disciplines to

information systems

info systems development
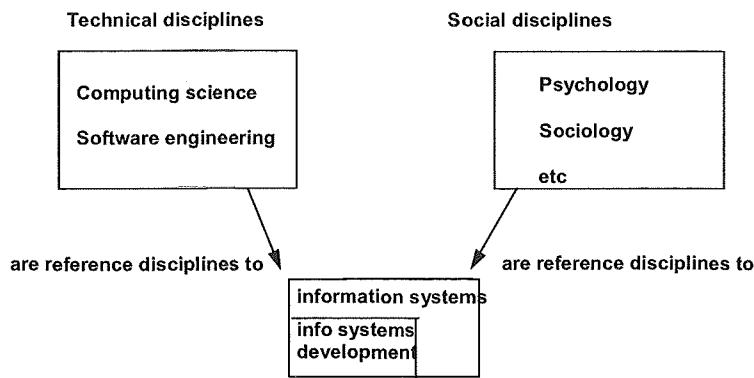
**Figure 11: Relationship between reference disciplines in Information Systems** (McDermid, 1998)

The selection of approach is based on previous work into IS research by Galliers (1990). Galliers (1990) suggests that there are a range of approaches that can be related to IS research, which cover the spectrum from scientific to subjective research. Figure 12 indicates where each of these IS approaches may be positioned along a linear scale.

Experiment          Survey                    Action                  Conceptual
                                              Research                study

        Simulation            Case                  Phenomenological
                              Study                 study

*Positivist,*                                                    *Interpretivist,*
*scientific,*                                                    *subjective,*
*empirical*                                                      *non-empirical*
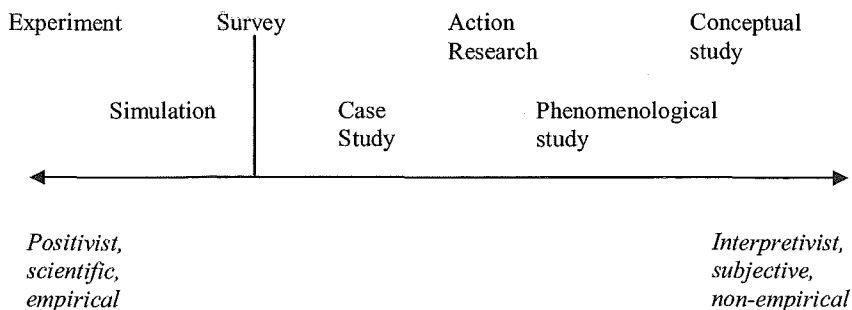
**Figure12: A continuum of approaches to Information Systems research**

Shanks et al., 1993, p.11)

The chosen methodology for the research is a survey. The strength of this approach lies in its ability to derive accurate descriptions of the real-world for a moment in time (Dommeyer & Moriarty, 2000). Its weakness can be seen in the issues involved with controlling bias and whilst the method can capture more variables than experimental methods, it can rarely provide reasoning behind the phenomenon being studied (Williams, 2004). On balance, this approach is applicable to the research in terms of its descriptive outcomes.

The literature review has identified the availability of health related websites, and makes apparent the need to assess healthcare practitioners' opinion as to the significance and effectiveness of online factual information and e-health applications for use by overweight and obese adolescents. The choice of a survey has been identified as the best method to achieve the identified outcomes.

## 3.1    Research Methodology

This section defines how the methodology was translated into an appropriate research design. This design addresses each of the research questions and is consistent with the stated research aims.

The research comprised of three stages. The first stage involved a review of the literature and the subsequent development and distribution of the survey instrument. The second stage involved the data analysis and the third and final stage of this research reported the findings. During these stages the processes of interpretation, analysis and reflection were employed to ensure the quality and rigour of the resultant research.

## 3.2    Research Design

The research utilised a survey as the mechanism by which the data was collected. The survey consisted of fourteen questions which were distributed to 1100 potential respondents across the country. Respondents either received a postal survey or an email survey, but not both, in August and September of 2005. The identified respondents were from a wide range of healthcare professions which was intended to ensure that the research had a multidisciplinary approach. The professions included in this research were: Aboriginal health experts, cardiologists, child health experts, dietitians, exercise physiologists, general practitioners, health promotion researchers, homeopaths, medical practitioners, naturopaths, nutritionists, nurses, obesity experts, paediatricians, psychiatrists, psychologists, and sports dietitians. The attitude data of these healthcare practitioners was considered to be useful and relevant in regards to the future development of information systems and in designing appropriate resources for patients.

Hence, the research was IS based, and a survey was selected as the overarching research methodology upon which to conduct this investigation.

### 3.2.1   Target Population

A purposeful sampling technique was used to select respondents for this research. The technique was purposeful in that the study was only interested in Australian healthcare practitioners working within predefined professions. Ranchhod & Zhou (2001) advise that "careful consideration is required in targeting the right sample population as gathering unusable data would result in inconclusive results". This advice was considered in terms of collecting reputable resultant data. A multidisciplinary approach in obtaining the attitude data of a range of healthcare practitioners in regards to the use of online and e-health applications was considered to be important. The three main professions targeted were dietitians, general practitioners (GP's) and psychologists. Given the incidence of overweight and obesity in adolescents, the assumption was made that the majority of these healthcare practitioners had experience in the treatment of patients with this condition.

A preliminary investigation revealed that there were over 200 000 healthcare practitioners in Australia. Figure 13 portrays the total set of all Australian healthcare practitioners and potential identified respondents against the subset of 1 100 who were randomly selected from within the predefined profession to receive a survey.
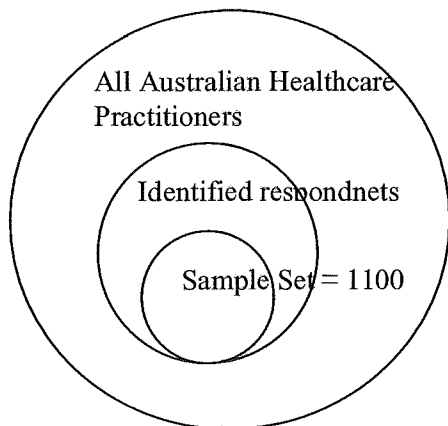


**Figure 13: Sample set, a subset of all Australian healthcare practitioners**

As this research did not have access to an existing network of healthcare practitioners, it was decided to utilise respondents who were predominantly identified via the Internet, namely the online Yellow Pages, The Dietitians Association of Australia (DAA) and the Sports Dietitians of Australia. Additionally, some practitioners were identified through the print and television media.

Research studies indicate that 96% of physicians use the Internet as part of their professional practice (Martin, 2004; Boston Consulting Group, 2004; Spyt, Watt, Boehm, & Stafford, 2002). For this reason it was concluded that most GP's are likely to have access to and be familiar with the Internet at work, and therefore are likely to have an email account. The resultant research data would indicate the attitudes and opinions of practitioners familiar with Internet technologies.

The identified sample set of 1100 Australian healthcare practitioners were randomly selected from within the identified professions. The sample size of potential respondents is considered to be a 'statistically significant' number, and thus expected to deliver reputable results. The random method involved in identifying the sample group comprised of conducting a search for the required profession and then scrolling through the list and randomly selecting a potential respondent. Once a potential healthcare practitioner had been identified, the following set of questions was applied before including the practitioner onto the research database:

- Does the healthcare practitioner work in Australian?
- Does the healthcare practitioner work within one of the identified professions?
- Are there complete contact details, either an email address or complete postal address, available for the healthcare practitioner?

A positive response to all three questions emanated in the practitioner being included in this research. Thus the database consisting of 1100 identified Australian healthcare practitioners was constructed. Each of these practitioners was then either emailed or posted, a questionnaire. Participants identified for inclusion in this research via the media, but who did not made their email address publicly available online, were posted a paper-based survey.

The DAA was the first website from which respondents were identified. The website makes a list of registered practitioners' contact details available, including email addresses. A total of 284 dietitians were identified and emailed surveys who listed their area of speciality as weight management and adolescents. The distribution of these surveys per state was based on the locality of the practitioner and the availability of contact details, namely the email address. The 45 identified sports dietitians were similarly acknowledged as potential respondents as they listed their areas of interest as weight management and adolescents. The remainder of the potential respondents who received email surveys were identified by entering the required profession as a search sting, per state, into the online Yellow Pages. Most professions provided a direct contact email address. However, it was found that the Yellow Pages rarely if ever, gave a personal email address for most GP's. In most cases the practice reception email address was listed or the functionality to email the practice provided directly from the Yellow Pages website. The resultant distribution of email surveys was therefore quite diverse, and it was not possible to balance the number of surveys relative to the population of each state. Table 4 lists the number of potential respondents by profession who were emailed the survey questionnaire.

**Table 4: Distribution of email surveys**

| Profession | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Total |
|---|---|---|---|---|---|---|---|---|---|
| Aboriginal health | | 1 | | | | | 1 | | 2 |
| Cardiologist | | 1 | | | | | | 2 | 3 |
| Child health | | 2 | | | | | | 1 | 3 |
| Dietitian | 3 | 97 | 4 | 50 | 27 | 4 | 68 | 31 | 284 |
| Exercise physiologist | | | | 1 | | | 2 | | 3 |
| General Practitioner | 1 | 8 | | 54 | 1 | 2 | 8 | 10 | 84 |
| Health promotion | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 9 |
| Homeopath | 2 | 2 | | 1 | | | 3 | 6 | 14 |
| Naturopath | | 3 | | 1 | | | 2 | 4 | 10 |
| Nurse | 1 | 2 | 1 | 6 | | 1 | 1 | 1 | 13 |
| Obesity expert | | 3 | | | 1 | | 1 | 2 | 7 |
| Paediatrician | | 2 | | | | | 10 | | 12 |
| Psychiatrist | | | | 1 | | 1 | | 1 | 3 |
| Psychologist | | | | 1 | 1 | 2 | 1 | 3 | 8 |
| Sports Dietitian | | 15 | 2 | 10 | 2 | 2 | 10 | 4 | 45 |
| **Total email surveys** | **8** | **137** | **8** | **126** | **33** | **13** | **108** | **67** | **500** |

The first round of email surveys yielded a 3% response rate. Almost all of the responses received were received from dietitians. No medical practitioner, including GP's, responded to the email survey. Due to the low response rate it was decided that a second 'reminder' email would be send to the same initial 500 potential respondents as well as including an additional 600 paper-based postal surveys to be administered to newly identified potential respondents.

Potential respondents of the postal surveys were also all identified via the online Yellow Pages and did not include the 84 GP's who had previously received an email survey. The distribution of the paper-based survey again targeted the three main professions namely GP's, dieticians and psychologists but also included homeopaths. This research was interested in the opinion of GP's as they are considered to be the initial contact practitioner in treating overweight and obese adolescents. Often the GP may then refer the patient to a dietician. For this reason the majority, four hundred, of the postal surveys were mailed of to GP's. Other identified professions whose email addresses were not found for inclusion in the email survey, were psychologists and homeopaths and thus they were also targeted in postal surveys. In addition, dieticians whose email addresses were not made available, were identified to receive postal surveys. Hence, each of the 1100 potential respondents in this research only received one survey either via email or post. Table 5 details the distribution of professions by state of the 600 potential respondents who were posted the survey questionnaire.

**Table 5: Distribution of postal surveys based on profession and state**

| Profession | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Total |
|---|---|---|---|---|---|---|---|---|---|
| General Practitioner | 31 | 57 | 54 | 37 | 69 | 31 | 40 | 81 | 400 |
| Dietitian | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 40 |
| Psychologist | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 80 |
| Homeopath | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 40 |
| Total postal surveys | 56 | 82 | 79 | 62 | 94 | 56 | 65 | 106 | 600 |

The total distribution of the 1100 email and postal surveys combined per profession are listed in Table 6.

| Profession | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Total |
|---|---|---|---|---|---|---|---|---|---|
| Aboriginal health | | 1 | | | | | 1 | | 2 |
| Cardiologist | | 1 | | | | | | 2 | 3 |
| Child health | | 2 | | | | | | 1 | 3 |
| Dietitian | 8 | 102 | 9 | 55 | 32 | 9 | 73 | 36 | 324 |
| Exercise physiologist | | | | 1 | | | 2 | | 3 |
| Health promotion | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 9 |
| Homeopath | 12 | 12 | 10 | 11 | 10 | 10 | 13 | 16 | 94 |
| Medical Practitioner (inclusive of GP's) | 32 | 65 | 54 | 91 | 70 | 33 | 48 | 91 | 484 |
| Naturopath | | 3 | | 1 | | | 2 | 4 | 10 |
| Nurse | 1 | 2 | 1 | 6 | | 1 | 1 | 1 | 13 |
| Obesity expert | | 3 | | | 1 | | 1 | 2 | 7 |
| Paediatrician | | 2 | | | | | 10 | | 12 |
| Psychiatrist | | | | 1 | | 1 | | 1 | 3 |
| Psychologist | 10 | 10 | 10 | 11 | 11 | 12 | 11 | 13 | 88 |
| Sports Dietitian | | 15 | 2 | 10 | 2 | 2 | 10 | 4 | 45 |
| **Total surveys** | **64** | **219** | **87** | **188** | **127** | **69** | **173** | **173** | **1100** |

Table 7 lists the total distribution of surveys by targeted professions and the related percentage of the total surveys each profession received.

Table 7: The total distribution of surveys by profession

| Profession | Total distributed | Percentage targeted |
|---|---|---|
| Dietitian | 324 | 29.5% |
| General Practitioner | 484 | 44% |
| Psychologist | 88 | 8% |
| Other | 204 | 18.5% |
| **Total** | **1100** | **100%** |

The terminology referred to as 'Other' in Table 7 was introduced into this research to identify a group which represents a range of professions that does not include the targeted professions, rather it identifies all other professions into one category.

### 3.2.2 Procedure

The procedure for this research began with the identification of all the research phases. This process began with identification of 1100 possible respondents for the survey as is

depicted in the flow chart in Figure 14. The software design was such that no mandatory answering of any questions was enforced in any of the surveys formats, as is the case with paper-based surveys.
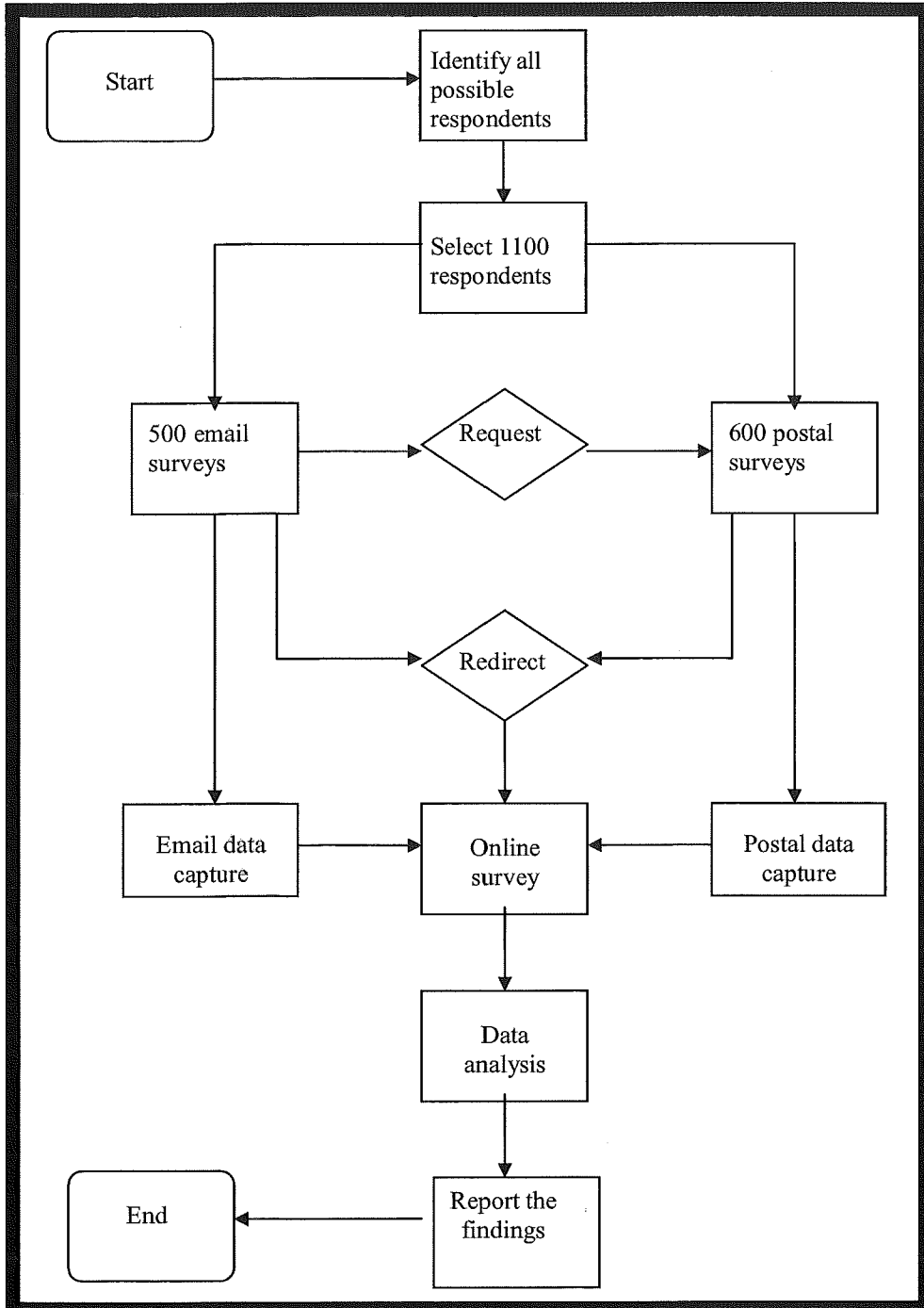


**Figure 14: Project's logical flow chart**

The target group were then all sent either an email or postal survey. Both survey options were additional offered the opportunity, should they prefer, of completing the survey online via a website link. Some respondents chose to complete the online survey, others responded via return email and the balance returned the paper-based surveys completed.

Response to the email survey contained identifiable information, in the form of the respondent's email address. Therefore, the email offered participants two additional options for completing the survey anonymously. Postal respondents were given the option to complete the survey online and email respondents were given the option to either reply to the email or to complete the online survey, or they could request a paper-based survey.

These response medium choices, enabled respondents to elect their preferred method of responding to the survey, in an attempt to increase the response rate to the survey. The electronic collection medium preferred by this research had the advantage of efficiency for both the respondent and the researcher (Ranchhod & Zhou, 2001). The email survey was sent out to the 500 identified respondents on two occasions, two weeks apart. The postal surveys were only distributed once to all 600 identified respondents.

The online survey option provided a link from within the email survey. This required respondents to navigate to the link from within the email and were then redirect to the online survey. Alternatively email respondents could select to have a paper-based survey mailed out to them by returning the email back to the researcher with their postal contact details. The survey consisted of fourteen questions, and took the participants approximately five to ten minutes to complete. All three survey options contained identical questions.

Respondents of e-mail and online surveys have been reported to have a high awareness of technology and extensive knowledge of e-mail applications. Research indicates that proper survey planning and administration are important for Internet-based e-mail and online surveys to be successful (Ranchhod & Zhou, 2001). The respondent benefits from completing the survey by being sufficiently interested in offering their opinion,

and then being prepared to complete the survey. Electronic surveys provide a degree of ease of use for the respondent, and reduce the time required to complete the survey.

Furthermore, online surveys have several important advantages over 'paper- and-pencil' surveys that make them particularly attractive to researchers (Granello & Wheaton, 2004). The advantage to online data collection for the researcher is in eliminating the need to manually capture the survey data. This increasing the speed, efficiency and accuracy of the data, and reduces the time required to begin the analysis phase.

Despite the many advantages of Web-based surveys, concerns about their use have been raised by researchers in many fields in which this methodology has been used. These concerns focus on the limitations of "representative of the sample, response rates, measurement errors, and technical difficulties" (Granello & Wheaton, 2004). These disadvantages are not expected to negatively affect this research.

All surveys were captured into the online survey software either directly by the participant or by the researcher. Once all responses were received, the data was exported from the online server into a Microsoft Excel spreadsheet ready for data analysis and subsequent reporting of the findings.

**Time Line:**

The project commenced in May 2004 with a half day workshop and a review of the literature, with the proposal phase beginning in July 2005. Ethics clearance and approval to commence the project was received on the 9th of August 2005 and the project was completed by the 4th of November 2005. The time table for the stages of the project are outlined in Figure 15.

The preparation phase involved the identification of national potential respondents together with their contact details. The distribution phase of the survey comprised the forwarding of the survey to the 1100 identified participants. The data collection phase began as soon as the first survey responses were received. Data was captured via the online survey and imported into Microsoft Excel. Respective data was further imported

into NVivo and SPSS for qualitative or quantitative analysis as required. Once all data had been analysed then the reporting phase of the research was began.

| Stage of the research | May '04 - June 2005 | July 2005 | August 2005 | September 2005 | October 2005 |
|---|---|---|---|---|---|
| 1. Literature review | | | | | |
| 2. The proposal review and ethics clearance phase | | | | | |
| 3. The preparation phase | | | | | |
| 4. The distribution of the survey phase | | | | | |
| 5. The data collection phase | | | | | |
| 6. The data analysis phase | | | | | |
| 7. The reporting phase | | | | | |

**Figure 15: Project time line.**

### 3.2.3 *Materials and Instruments*

The online survey was constructed prior to the distribution of the email surveys. The software to design the online survey was provided by the School of Computer and Information Science (SCIS). The software allowed the survey to be constructed utilising the predefined design tools. The interface design of the online survey was uniform for all surveys on the server, and could not be customised. The lack of interface customisation is not expected to have affected this study in any way. However, the inability to change some predefined terms on the survey, such as 'specify your own value', which allowed a respondent the option to insert their answer to a question in their own words, should probably have preferably read 'Other' (see Appendix E).

Once the survey was constructed the potential respondents' identified then the contact details of the potential respondents were captured into a Microsoft Excel spreadsheet. This electronic storage of data allowed compatibility in terms of exporting email addresses from the Microsoft Excel spreadsheet directly into the survey email utilising Microsoft Outlook. This degree of software compatibility provided a seamless merger of information, record keeping and tracking of information.

Strategies implemented to affect and improve the response rate, and therefore a greater collection of data for this research, by:

- providing multiple ways of responding to the survey;
- hosting the online survey on a continuously available ECU server;
- Email surveys were designed so that the top portion of the email displayed a coloured ECU logo and briefly listed the most important information for potential respondents. This meant that the respondent did not need to scroll through the email to gain the critical information, such as the research title, intension of the research, consent clarification and the link to the online survey. Emailing the surveys displaying the coloured ECU logo at the top of the email, capitalised on the perception that the survey was reputable;
- providing personally addressed coloured envelopes bearing the ECU logo for the postal surveys;
- providing customised reply paid envelopes addressed directly back to the researcher, again displaying the ECU logo, together with the postal surveys;

### 3.2.4   Data Analysis

It was considered essential that the integrity of the data was maintained throughout this research. The process of ensuring the quality of the data and the subsequent quality of interpretation of the data requires that the principles of the methodology are implemented correctly (Dick, 1993). In order to ensure the accuracy of results from this research, the process of ensuring quality principles were adhered to, was challenged throughout the duration of the research.

Therefore great care was taken by the researcher to accurately capture both the email and postal responses to the survey. Any data that was considered unreadable was not captured and therefore discarded. The data analysis phase involved the detailed analysis and coding of all the response data. The data analysis was conducted using both quantitative and qualitative research methodologies.

The qualitative data was where user input options or opinions were sought which often required lengthy descriptions. This qualitative data was exported from the Microsoft Excel spreadsheet into a rich text Microsoft Word document format ready to be imported into NVivo software for qualitative analysis. Recurrent themes in the data were allocated a researcher assigned 'code'. Whenever that theme reoccurred in the data it was allocated the same code. These codes were checked and agree to by the research supervisor. This process continued until all data was processed and themes were identified in the data.

Qualitative analysis was conducted on data where only a predefined response range was available, which then rendered the data quantifiable. The quantitative analysis was conducted by importing the related Excel spreadsheets directly into the SPSS quantitative software. SPSS then enables numerous analysis options to be conducted using the data.

## 3.3   Required Resources

This research required funding for the postal surveys utilised in the collect the research data. This was provided by a Small Faculty Grant application awarded to Dr Leisa Armstrong. The cost of approximately AU$600, was associated with the postal survey. This grant covered the cost of photocopying, postage, purchase of envelopes and the printing of the reply-paid envelopes.

Additional resources required to undertake the research included:
- Access to further literature on e-health applications for adolescents, IS, and an understanding of quantitative and qualitative analysis as is

applicable in the healthcare context. This was provided through the ECU library databases, as well as other universities such as the University of Western Australia (UWA) under the reciprocal student research agreement.

- Paper and the printing for the postal surveys envelopes. This cost was covered by the researchers RAI research points from the publication of previous papers, and amounted to $240.

- Cost of phone calls to confirm respondents contact details, this was considered to be under $100 and was covered by the researcher.

- Questionnaire and online survey software, this was provided by the School of Computer and Information Science (SCIS);

- NVivo qualitative software, available through the ECU library.

- SPSS quantitative software, available through the ECU library;

## 3.4 Ethical Considerations

An ethics clearance was granted from ECU for this research to proceed. The ethical issues considered when undertaking the research were:

- Protecting the identity of respondents. This was applicable when the email survey was returned answered as the response option of choice. All identifiable details contained within the data were removed through the process of capturing the data into the online survey form prior to analysis, without any identifiable details. All other survey response mechanism were anonymous;

- Respondents gave their consent to be included in this research when they elected to answer the survey questions. This was made known to potential respondents in the information accompanying the survey;

- No data that could identify any respondent was recorded or reported;

- There was no prejudice applied to the data during data analysis that could allow identification of a respondent;

- Data in the form of the online survey was housed on an ECU server and therefore protected by the universities network infrastructure.

## 3.5 Limitations of the Study

The overriding limitation affecting this research is that only the opinion of certain Australian healthcare practitioners was sought. This eliminated the opinions of other healthcare practitioners, the family members of patients and the overweight or obese adolescents themselves. Further research is required into the adolescent users' perspectives in order to determine if overweight and obese adolescents believe that online and e-health applications could provide real health benefit to them.

Additionally the range of healthcare practitioners who responded to the survey represented numerous professional opinions beyond that sought of the targeted professions. This factor may have limited the study in that only a small relatively sample of data was available for each profession. This may have resulted in more general opinions instead of profession specific opinions.

The second important limitation of this research is the sample group of healthcare practitioners surveyed were all identified via the Internet. It was considered important that the sample set be representative of practitioners who routinely use the Internet and understood the technology under investigation. The reasons for this decision were twofold. Firstly the nature of the research required healthcare practitioners to be familiar with available online and e-health resources. Secondly, healthcare practitioners who register their services with the Yellow Pages were included in the group of identified respondents. This may have eliminated a percentage of healthcare practitioners who may not advertise their services online or with the yellow Pages. In general, healthcare practitioners in private practice were predominately the type of respondent that was identified for inclusion in this research. This was due to larger practices advertising the business rather than the names of the practitioners. This research aimed to personally address each of the surveys rather than just sending the survey to a practice.

Another possible limitation of this study may be the selection of the survey research method and the questions in the survey. The survey method was selected since the research was interested in national opinions and the research time framework could not have supported qualitative interviews or focus groups. A disadvantage of surveys may

be that they produce more general responses as opposed to interviews and focus groups (Ranchhod & Zhou, 2001). The survey questions, due to the limitation regarding the number of questions that could be reasonably asked, would have provided possible limitations to the study. The purpose of this survey was to gain a general overview of healthcare opinion in an emerging area of technology, and in this regard the questions were exploratory. This may have meant the questions themselves did not elicit the required information, or could have failed to ask a critical question. A final possible limitation of this research may have been that one person was predominantly responsible for the analysis of the survey response data, although, the research supervisor confirmed the findings.

# 4 Results and Discussion

This section of the thesis outlines the research findings based on the data collected from the survey. The data for this research project was collected nationally between August and October of 2005 (further details relating to the procedure are available in Section 3.2.2 of this document).

The first four of the fourteen survey questions related to the respondents' demographic details, and the fifth question related to the percentage of overweight and obese patients that consult the respondent practitioner. The remainder of the questions were designed to obtain practitioner attitude data and their related recommendations.

The fourteen survey questions were grouped into different result categories as depicted in Figure 16. This categorisation of the results enables correlated questions to be discussed where they are logically relevant as opposed to listing the responses in question number order. The categories are as follows; practitioner demographics, patient information, adolescents and the Internet, practitioner recommendations and practitioner attitude data.

```
                    ┌─────────────────┐
                    │ Practitioner    │
                 ┌──│ Demographics    │
                 │  └─────────────────┘
                 │
                 │  ┌─────────────────┐
                 │  │ Patient         │
                 ├──│ Information     │
                 │  └─────────────────┘
                 │
┌──────────┐     │  ┌─────────────────┐
│ Survey   │     │  │ Adolescents and │
│ Results  │─────┼──│ the Internet    │
└──────────┘     │  └─────────────────┘
                 │
                 │  ┌─────────────────┐
                 │  │ Practitioner    │
                 ├──│ Recommendations │
                 │  └─────────────────┘
                 │
                 │  ┌─────────────────┐
                 │  │ Practitioner    │
                 └──│ Attitude Data   │
                    └─────────────────┘
```
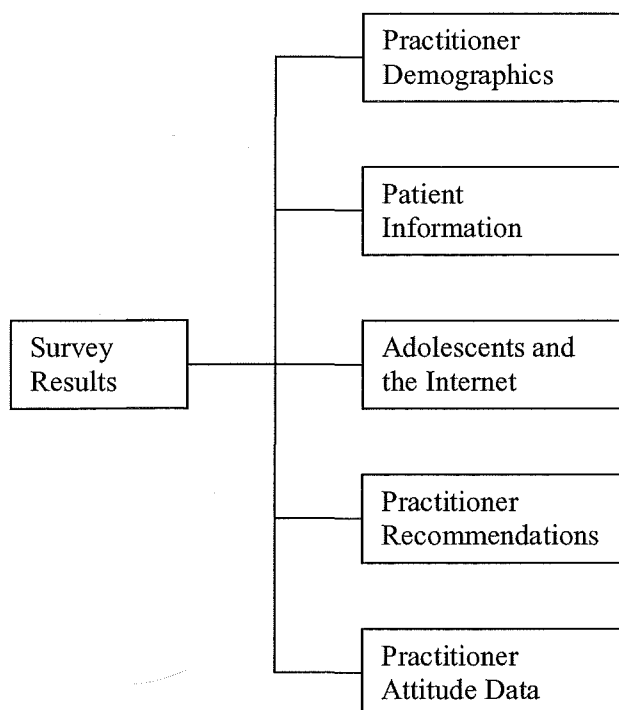
**Figure 16: Survey result categories** (Adapted from Williams, 2001).

## 4.1    Survey Results

As was described in the Target Population Section 3.2.1, 1100 surveys were either emailed or posted to a purposefully selected group utilising a random sample methodology to identify potential respondents. A total of 121 surveys responses were received, equating to an overall response rate of 11%. This response rate was lower than anticipated (the reasons for this are discussed in Section 5).

The first email distribution yielded a response rate of 3%, and for this reason it was decided to redistribute the same survey email to the same list of potential email respondents inclusive of a reminder, two weeks later. The second email increased the response rate for the email survey to 8.8%.

The total survey responses consisted of 16 email responses, 28 online survey responses and 77 postal responses as is shown in Table 8. The online survey responses were received almost exclusively from dietitians who had received the email survey and

elected to be redirected to the online survey. This was determined by accessing the online survey results and viewing the responses which included the respondents' profession. Email surveys returned to the researcher bearing identifiable details of respondents were anonymously captured into the online survey software as stated in the ethics application for this research. Only one respondent to the email survey accepted the offer to be mailed out a postal survey. No medical practitioners, including GP's, responded to the email survey, either by return email or by logging onto the online survey. The paper-based survey was administered two weeks after the second reminder email had been distributed. In this instance the GP's responded to the paper-based survey. The postal survey yielded a higher response rate of 12.8% as opposed to the email survey response rate of 8.8%.

**Table 8: Overall survey response rate**

| Survey Method | Total Distributed | Total Received | | Response Rate |
|---|---|---|---|---|
| Email survey | 500 Redirected to the online survey | 16 28 | (T = 44) | 8.8% |
| Postal survey | 600 | 77 | | 12.8% |
| **Totals** | **1100** | **121** | | **11%** |

Response rates across the three targeted professions, namely dietitians, GP's and psychologist varied. The highest response rate was received from psychologists at 22.7%, followed by the 'Other' category (see Section 3.2.1 for details) at 14.7%. The response rates for the dietitian's was 13.3% and low response rate of 5.8% for the GP's as is detailed in Table 9.

**Table 9: Survey response rate based on profession type**

| Profession | Total distributed | Total received | Response rate |
|---|---|---|---|
| Dietitian | 324 | 43 | 13.3% |
| General Practitioner | 484 | 28 | 5.8% |
| Psychologist | 88 | 20 | 22.7% |
| Other | 204 | 30 | 14.7% |
| **Total** | **1100** | **121** | **11%** |

Possible reasons for this low response rate to the survey may include:

- Potential respondents were over-surveyed;
- Potential respondents did not identify with the research topic;
- Potential respondents were not familiar with the resources under examination;
- Potential respondents were not familiar with the terminology utilised in the survey (this issue is address in the Procedure section of this document);
- Potential respondents lacked the time to answer the survey as the survey predominantly targeted single practice professionals;
- The survey was considered too lengthy to answer;
- The lack of access to an existing network of healthcare practitioners.

Of the 600 postal surveys twenty six were returned advising that the address was unknown, which equated to a 4.3% return rate. This indicates that some of the details listed on the Yellow Pages website are out of date, as this was the only source used to identify all postal participants. Similarly, there were 28 email surveys which were returned as undeliverable, indicating a similar reason that the address was unknown, equating to a 5.6% return rate for the email surveys. Participants to the email survey were identified from three sources as detailed in Section 3.2.1 of this document, indicating that their contact details were similarly not up to date.

## 4.2 Practitioner Demographics

Respondents were asked to indicate their profession, state or territory, work location and age range in the demographic questions.

### 4.2.1 Practitioner Profession Demographics

Respondents to the surveys were from a range of healthcare professions. It was found that 75.1% of the responses were from the three targeted professions, namely, GP's, dietitians and psychologists as is indicated in Figure 17. The remaining 24.8% of respondents were made up of a variety of professions, referred to in this section as 'Other', which are listed in Table 10. The greatest percentage of responses was received from the dietitians at 35.5%, followed by 'Other at 24.8% and then the GP's at 23.1%. The fewest number of responses were received from psychologist at a total of 16.5%, this was due to fewer surveys being administered to this profession. However, once the

number of responses is calculated against the number of surveys administered to that profession, then psychologists had the highest response rate out of all of the professions.

N = 121
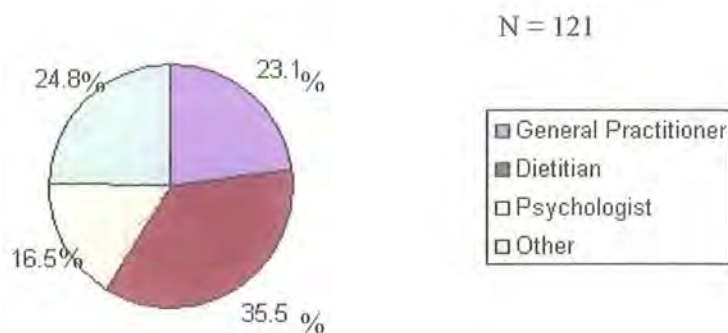


**Figure 17: Percentage of responses per professions**

The design of the survey question allowed respondents to select more than one profession to identify their areas of expertise. For example one respondent identified their profession as, Nurse; Nutritionist; Naturopath; and Doctor of Chinese medicine. This selection design was intended to allow flexibility for the practitioners in order that they were not restricted to only one profession. However, this holistic approach inadvertently created an analysis problem. It was not possible for the researcher to decide which the respondents' main profession was. Equally, it was not possible to register each profession as individual responses, as this would result in too many professions for analysis and in fractions of a person being recorded. The solution was to place those respondents who were not of the three targeted professions and those with multiple professions into the category of 'Other' as listed in Table 10. This ensured that the response data of each survey was only captured once under one professional title, allowing the respondents profession to remain as they had indicated it to be in their survey.

**Table 10: Table of all 'Other' healthcare practitioners.**

| Profession (as indicated in the survey) | Number of Responses |
|---|---|
| Dietitian and Exercise physiologist | 2 |
| Dietitian and Nutritionist | 3 |
| Exercise physiologist | 1 |
| Gastroenterologist | 1 |
| General Practitioner and Homeopath | 1 |
| Gynaecologist | 1 |
| Health promotion researcher | 1 |
| Medical specialist | 1 |
| Naturopath | 2 |
| Naturopath and physician | 1 |
| Nurse, Nutritionist, Naturopath and Doctor of Chinese medicine | 1 |
| Nutritionist and Exercise physiologist | 1 |
| Nutritionist, Homeopath and Naturopath | 1 |
| Nutritionist and Naturopath | 1 |
| Ophthalmologist | 1 |
| Orthopaedic assistant surgeon | 1 |
| Paediatrician | 3 |
| Physician/endocrinologist | 1 |
| Psychiatrist | 2 |
| Surgeon | 2 |
| Not stated | 2 |
| **Total** | **30** |

Medical practitioners such as psychiatrists, or other medical specialists were not included in the total of GP's as this category was reserved for GP's only. Similarly the dietitian and psychologist categories were reserved only for those respondents who specifically identified their profession as such. Even though a psychologist and psychiatrist both treat issues relating to the human mind, they were considered to be separate professions. Therefore the 'Other' group consisted of practitioners who identified themselves as anything other than GP's, dietitians or psychologists.

The extent of variation in healthcare professions surveyed and the resultant attitude data is considered to be an advantage to this research, even though only a small number of practitioners were surveyed per profession. For example, it was felt that the twenty eight GP's who responded to the survey produced sufficient attitude data to be representative of opinions in that profession, as was the case with all other professions.

### 4.2.2 Practitioners State and Territory Distribution Demographics

Responses were received from all Australian states and territories, as well as from all targeted professions, as is shown in Table 11. The number of surveys distributed was not linked to the size of the population in each state, not the number of practitioners in each state. (Section 3.2.1 details the distribution of the survey). The research outcomes are strengthened by the fact that data was collected from all Australian states and all targeted professions. Table 11 indicates that the greatest number of responses was received from New South Wales (NSW), and the dietitian profession. The least number of responses was received from the Northern Territory (NT) and the psychology profession.

**Table 11: Number of responses of professions based on state**

| Profession | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Totals |
|---|---|---|---|---|---|---|---|---|---|
| Dietitian | 3 | 17 | | 6 | 3 | 2 | 7 | 5 | 43 |
| General Practitioner | 4 | 1 | 5 | 3 | 4 | 2 | | 9 | 28 |
| Psychologist | 3 | | 1 | 5 | 2 | 3 | 3 | 3 | 20 |
| Other | 4 | 4 | 1 | 5 | 6 | 3 | 2 | 3 | 28 |
| Not given | | | | | | | | | 2 |
| **Totals** | **14** | **22** | **7** | **19** | **15** | **10** | **12** | **20** | **121** |

However, when these figures are converted to a percentage relating to the number of surveys received per state divided by the number of surveys distributed per state, then the outcome differs as is depicted in Figure 18. On comparison of each states response rates it becomes evident that the Australian Capital Territory (ACT) had the highest response rate of all the state, followed by Tasmania (TAS), Western Australia (WA) and South Australia (SA). Table 12 provides the descriptive statistics for the results obtained in Figure 18.
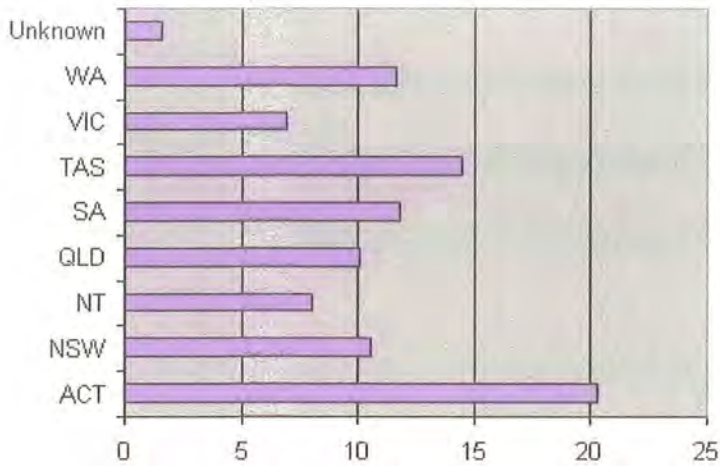
Figure 18: Percentage response rates based on state

Table 12: Descriptive statistics of percentage response rates based on states

|     | Mean | Std. Deviation | N |
| --- | --- | --- | --- |
| ACT | 3.50 | .577 | 4 |
| NSW | 7.33 | 8.505 | 3 |
| NT | 2.33 | 2.309 | 3 |
| QLD | 4.75 | 1.258 | 4 |
| SA | 3.75 | 1.708 | 4 |
| TAS | 2.50 | .577 | 4 |
| VIC | 4.00 | 2.646 | 3 |
| WA | 5.00 | 2.828 | 4 |

### 4.2.3 Practitioners Work Location Demographics

The third demographic question asked practitioners whether they worked in a rural or metropolitan area. Responses were received from all work locations inclusive of rural, metropolitan and both areas. Respondents to this research indicated that 74% work in the metropolitan areas, 18% work in the rural areas and 8% indicated that they work in both rural and metropolitan areas, as is shown in Figure 19. The process of identifying potential respondents did not take their geographic location into account. Regardless of this fact, the distribution of responses was comparative to the geographic distribution of the Australian population (Australian Bureau of Statistics, 2004) between the rural and metropolitan areas.

**Q3. Do you work in:**

A rural area
21 (18%)

A metropolitan area
88 (74%)

Both
10 (8%)

Total: 119
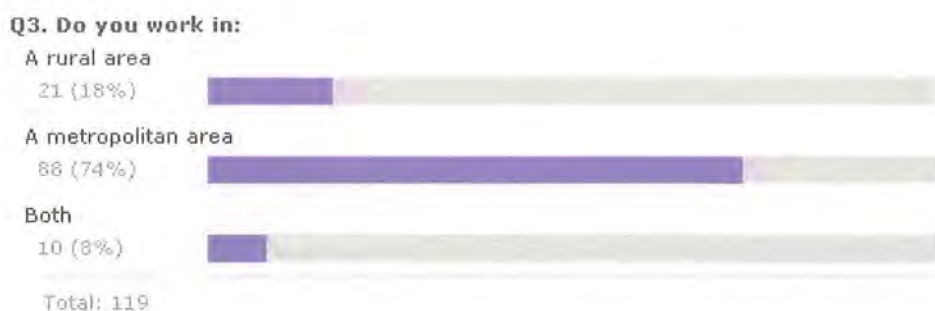
**Figure 19: Distribution of health practitioners based on geographic location**

Table 13 indicates the work location by state or territory for each of the survey responses. The table indicates that responses were received from all work locations in almost all states. Again this distribution of responses ensures that the resultant data reflects the opinions of all Australian healthcare practitioners across all work locations.

**Table 13: Respondents work location based on sate**

| Work Location | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Totals |
|---|---|---|---|---|---|---|---|---|---|
| Rural | | 4 | 1 | 9 | | 2 | 3 | 2 | 21 |
| Metropolitan | 12 | 17 | 4 | 8 | 14 | 6 | 9 | 18 | 88 |
| Both | 2 | 1 | 2 | 2 | 1 | 2 | | | 10 |
| Totals | 14 | 22 | 7 | 19 | 15 | 10 | 12 | 20 | 119 * |

* Two respondents chose not to answer the questions relating to their work location or state

Finally a comparison of the different professions and there distribution across work locations was undertaken (see Table 14). This investigation revealed that all professions from all work locations responded to this survey.

**Table 14: Respondents work location based on profession**

| Profession | A metropolitan area | A rural area | Both | Total |
|---|---|---|---|---|
| Dietitian | 30 | 11 | 2 | 43 |
| General Practitioner | 25 | 3 | | 28 |
| Other | 21 | 4 | 3 | 28 |
| Psychologist | 12 | 3 | 5 | 20 |
| Total | 88 | 21 | 10 | 119 |

## 4.2.4   Practitioners Age Demographics

The fourth and final demographic question asked respondents to indicate their age range. This question was included in the research in order to examine the relationship between practitioners' age range and their opinions relating to the use of e-health applications and Internet technologies. These results are examined later in this section.

Responses were received from all age ranges as is shown in Figure 20. The majority of respondents, 36%, were in the 40 to 49 years old age range. Registration of their business contact details in the online Yellow Pages was the reason that these respondents were identified for this research.

**Q4. Please select your age group:**

Less than 20
3 (3%)

20 to 29
16 (13%)

30 to 39
21 (17%)

40 to 49
43 (36%)

50 to 59
30 (25%)

60 to 69
6 (5%)

70+
1 (1%)

Total: 120
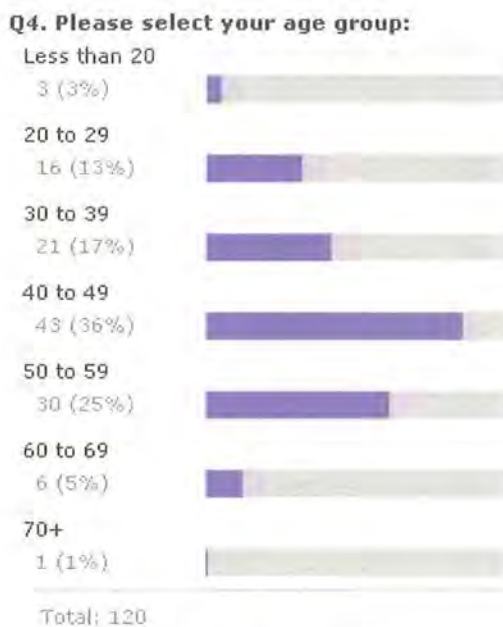
**Figure 20: Respondents age range groups**

The second largest group of respondents were the 50 to 59 year olds, followed by the 30 to 39 years olds and then the 20 to 29 year olds. Finally the respondents at each extremity accounted for 8% of respondents in total. Three respondents identified their age as less than 20, even though all of the targeted professions would have required some years of study. The seven respondents, who indicated that their age was 60 or over, equally contributed valuable opinions to this research.

The line graph in Figure 21 makes a comparison of the age ranges of responses from each profession as a percentage of the total surveys administered per profession. The graph indicates that as a percentage of the total profession psychologists had the greatest number of respondents who where in the 40 to 49 year age range. The dietitians on average were more evenly distributed across all age ranges as compared to the psychologists and GP's.
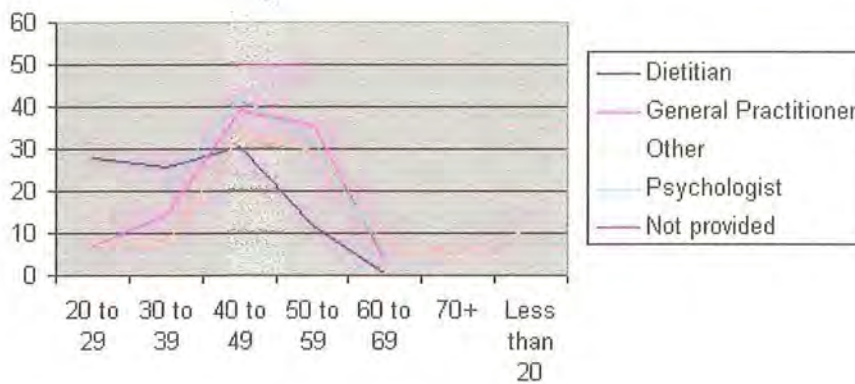


**Figure 21: Age range by profession**

The research investigated descriptive statistics relating to the mean and standard deviation between the professions and the age ranges (see Table 15). A paired sample T-test was performed on the profession and the age range variables. The Ones-Sample Statistics and One-Sample Test tables indicate that the variable was normally distributed, except for the intersection between the 40 to 49 age range and the 50 to 59 age range. Otherwise there were no outlying values.

**Table 15: Stem and leaf tables for descriptive statistics on age range versus profession**

**One-Sample Statistics**

|  | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Less than 20 | 1(a) | 11.100 | . | . |
| 20 to 29 | 3 | 14.133 | 11.9232 | 6.8839 |
| 30 to 39 | 4 | 17.075 | 7.9454 | 3.9727 |
| 40 to 49 | 5 | 39.000 | 7.7279 | 3.4560 |
| 50 to 59 | 5 | 31.700 | 13.7779 | 6.1617 |
| 60 to 69 | 4 | 4.200 | 2.9155 | 1.4577 |
| 70+ | 1(a) | 3.700 | . | . |

a  t cannot be computed because the sum of case weights is less than or equal 1.

**One-Sample Test**

|  | Test Value = 0 | | | | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|
|  | t | df | Sig. (2-tailed) | Mean Difference | Lower | Upper |
| 20 to 29 | 2.053 | 2 | .176 | 14.133 | -15.486 | 43.752 |
| 30 to 39 | 4.298 | 3 | .023 | 17.075 | 4.432 | 29.718 |
| 40 to 49 | 11.285 | 4 | .000 | 39.000 | 29.405 | 48.595 |
| 50 to 59 | 5.145 | 4 | .007 | 31.700 | 14.593 | 48.807 |
| 60 to 69 | 2.881 | 3 | .063 | 4.200 | -.439 | 8.839 |

Correlations applied to the data reveal that there is a significant correlation at 0.05 level (2-tailed) in two of the age ranges. That the differences between the 40 to 49 age range and the 50 to 59 age range has a .913 correlation. All other age ranges are highly correlated indicating that there is a good correlation between all the age ranges.

## 4.3    Patient Information

Respondents were asked to indicate what percentage of their adolescent patients were considered to be overweight or obese. In order to keep the number of questions in the survey to a minimum, it was decided that asking practitioners what percentage of their patients were adolescents, was not considered a vital question for this research given the restriction on the number of questions. The information considered to be critical was determining how familiar respondents were with making recommendations to the cohort under investigation. These details are depicted in Figure 22. Having this information makes it possible to compare attitude data from other questions based on the number of overweight patients the practitioner treats.

## Q5. Of the adolescent patients that consult you, what percentage do you treat for overweight or obesity related conditions?

None
20 (17%)

less than 25%
59 (50%)

25% to 49%
11 (9%)

50% to 74%
11 (9%)

75%+
18 (15%)

Total: 119
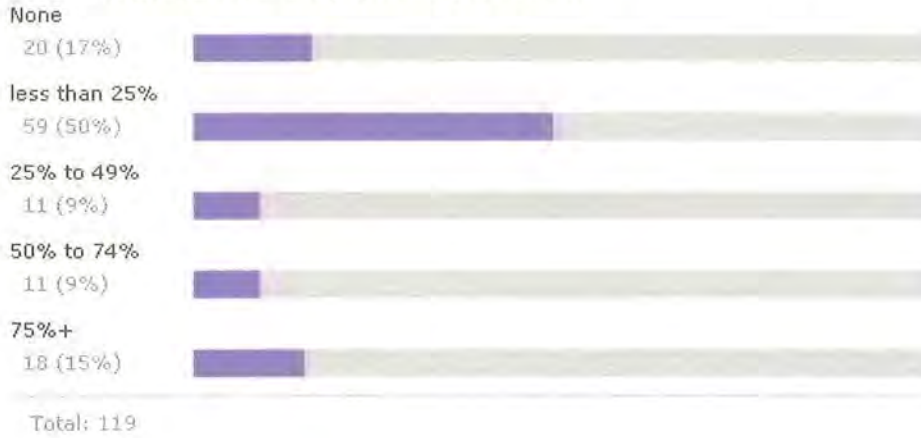
**Figure 22: Groups of patients by percentage**

The research determined that 50% of respondents reported having less than 25% of adolescent patients who were overweight or obese. Given that in Australia 25% of adolescents are considered to be overweight or obese (Australian Institute of Health and Welfare, 2003), it was anticipated that most respondents would have less than 25% of overweigh adolescent patients. However, 17% of respondents indicated that they had no overweight or obese adolescent patients who consult them, yet they still chose to participate in this research. Their attitude data is examined separately under the Discussion section of this document.

The final third of respondents, that is 33%, indicated that they had more than 25% of adolescent patients in this cohort, with only 15% of respondents who indicated that, of the adolescent patients that they treat, the majority are overweight or obese. The opinions and attitude data of the 75%+ cohort of practitioners is similarly discussed in the Discussion section of this document.

The total number of overweight or obese adolescent patients each profession treats based on the percentage of their total adolescent patients is depicted in Table 16. This table indicates that of the 42 dietitians who responded to the survey 14, or 33.3% of dietitians treat 75 or more adolescent patients for overweight and obesity related

conditions. This compares significantly to GP's and psychologists. The survey responses indicated that within these two professions neither indicated that any were completely dedicated to the treatment of overweight or obesity in adolescents. The indication is that more dietitians are familiar with treating the cohort under investigation and are likely to be more aware of the treatment options. This is significant and is discussed later in the Results as it relates to dietitians adoption of online and e-health technologies. The research indicates that psychologists are similarly familiar with the treatment options for adolescents and are therefore more aware of online resources that are available, especially for depression. Data collected from the other professional groups were also of importance given that GP's are often the first to be consulted relating to the treatment options for overweight and obese adolescents.

**Table 16: Percentage of patients treated by each profession**

| Profession | 75%+ | 50% to 74% | 25% to 49% | less than 25% | None | Total |
|---|---|---|---|---|---|---|
| Dietitian | 14 | 10 | 8 | 9 | 1 | 42 |
| General Practitioner | | | 1 | 23 | 3 | 27 |
| Other | 4 | 1 | 1 | 17 | 5 | 28 |
| Psychologist | | | | 10 | 10 | 20 |
| Not provided | | | 1 | | 1 | 2 |
| Total | 18 | 11 | 11 | 59 | 20 | 119 |

## 4.4 Adolescents and the Internet

Previous studies conducted by Skinner et al (2003) indicate that adolescents are actively seeking health related information on the Internet. This research sought to confirm this by asking respondents if their overweight adolescent patients presented them with information obtained from the Internet and what usually happens if that information was discussed with the patient. Question 6 is the same question asked by Williams (2001) of general practitioners and pharmacists in Western Australia regarding whether their patients presented them with information from the Internet. That research reported that in 96.8% of the GP group "had been presented by their patients with Internet information at some time' (Williams, 2001, p.69). This research concludes that only 64% of adolescents have 'been presented by their patients with Internet information at some time'. This suggests that adults are more likely to present information obtained from the Internet to their healthcare practitioner.

Further results from this research are comparable to Williams (2001). In only a third of cases, 29% did the adolescents present their healthcare practitioners with information obtained form the Internet 'Sometimes', 'Often' or 'Regularly' (see Figure 23). In addition, 71% of responses indicated that these patients 'Rarely' or 'Never' present them with information they have researched on the Internet.

**Q6. Do overweight and obese adolescent patients present you with information, obtained from the Internet, regarding their health or medications?**

Regularly
2 (2%)

Often
7 (6%)

Sometimes
24 (21%)

Rarely
41 (35%)

Never
42 (36%)

Total: 116
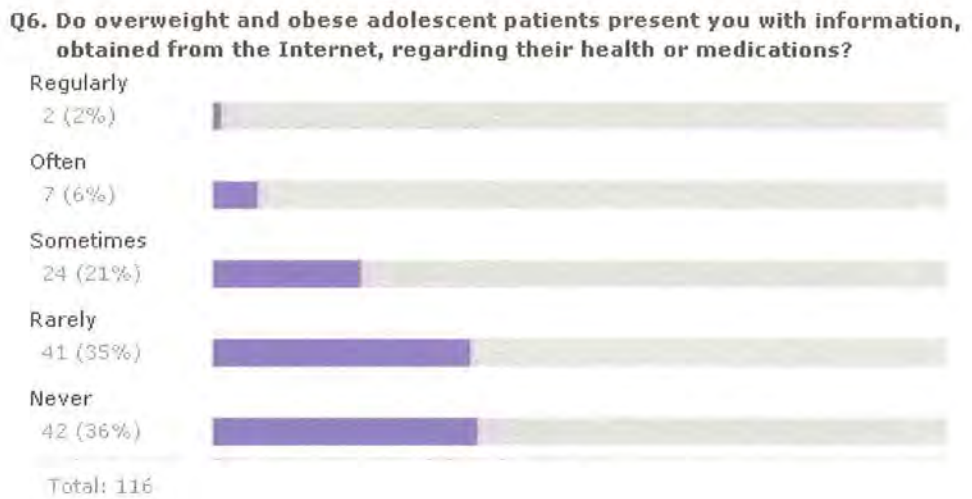
**Figure 23: Information presented from the Internet**

These results indicate that adolescents in most cases do not present information obtained from the Internet to their healthcare practitioner. This research did not explore whether adolescents memorise the information the read online and ask questions regarding their findings in a verbal sense, or if they have printed out the health information but not shown it to their practitioner.

Practitioners' whose patients present them with information located on the Internet were then asked what usually happens when this information is discussed with the patient. 59% of respondents said that the information was 'discussed and useful' indicating that adolescent patients are able to locate useful information from the Internet, as is indicated in Figure 24 (practitioner comments are available in Appendix A).

**If so, what usually happens? The information is:**

Not discussed
10 (13%)

Deemed irrelevant
0 (0%)

Discussed but not relevant
23 (29%)

Discussed and useful
47 (59%)

Total: 80
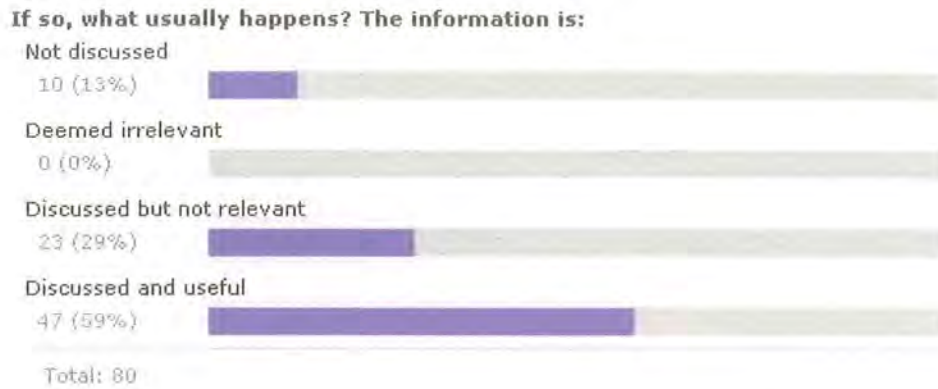
**Figure 24: Usefulness of Internet information**

A third of respondents, 29%, indicated that the information was 'discussed but not relevant' and the remainder of 13% indicated that the information brought to the consultation was not discussed at all. No practitioners' deemed the information presented to them by their patients to be irrelevant. In comparison, Williams' (2001) reported that 54.1% of GP's felt that the information was 'discussed and relevant' and 28.4% felt the information was 'discussed and not relevant'. The findings from this research in this regard, are therefore comparable with Williams (2001) study.

Six respondents indicated, in the 'Additional comments' section for this question, that they would have liked to have selected more than one of these options relating to question 6. For example, they would like to have selected both the 'discussed and relevant' as well as the 'discussed and not relevant' options. This question therefore should have allowed multiple selection answers. Figure 25 graphically displays the percentage of overweight or obese patients that practitioners treat compared to how often they present them with online information.

Percentage of patients versus presentation of information
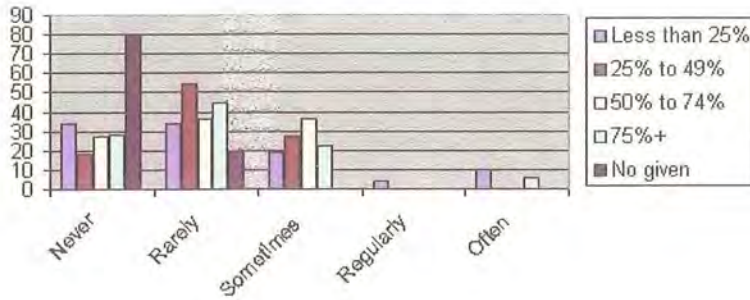
**Figure 25: Percentage of patients versus how often adolescents present them with information**

Figure 26 displays a comparison of the number of patients that a healthcare practitioner treats, versus how often patients' present information to them. The line graphs represent the percentage of respondents who selected each of the options. The graph indicates the intersection between 'Rarely' and 35 which is significant as this is the intersection where the greatest percentages of responses were recorded.



Percentage of patients versus presentation of information
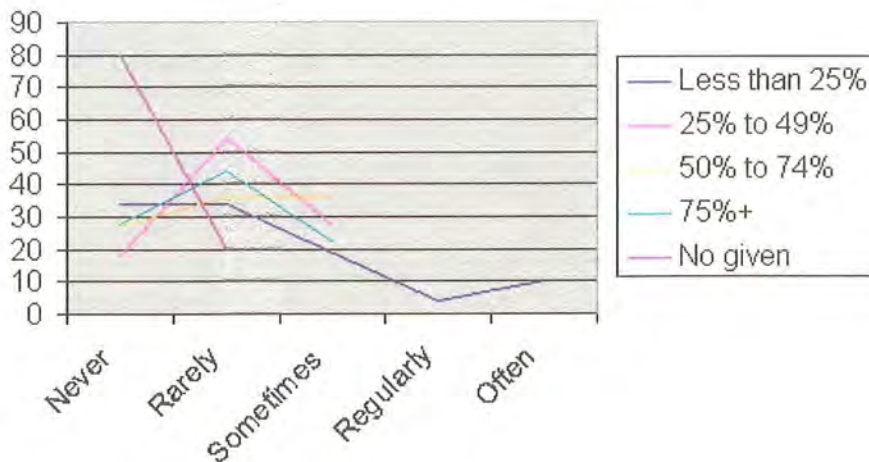
**Figure 26: A comparison of practitioners' percentage of cohort patients and how often they are presented with electronic information**

These findings are supported by the descriptive statistics evident in the stem and leaf tables shown in Table 17. The correlations indicate that the intersection between 'Rarely' and 'Never' are significant at the 0.05 level, and 'Never' and 'Often' at the 0.01 significance level. This is supported by the fact that the 71% of respondents selected these two options.

**Table 17: Descriptive Statistics as a percentage of patients versus how often they present the information to their practitioner**

|  | Mean | Std. Deviation | N |
|---|---|---|---|
| NEVER | 37.440 | 24.4429 | 5 |
| RARELY | 37.840 | 12.8107 | 5 |
| Sometimes | 26.125 | 7.7242 | 4 |
| Regularly | 3.900 | . | 1 |
| OFTEN | 7.900 | 3.2527 | 2 |

**Correlations**

|  |  | NEVER | RARELY | Sometimes | Regularly | OFTEN |
|---|---|---|---|---|---|---|
| NEVER | Pearson Correlation | 1 | -.890(*) | -.416 | .(a) | 1.000(**) |
|  | Sig. (2-tailed) | . | .043 | .584 | . | . |
|  | N | 5 | 5 | 4 | 1 | 2 |
| RARELY | Pearson Correlation | -.890(*) | 1 | .040 | .(a) | -1.000(**) |
|  | Sig. (2-tailed) | .043 | . | .960 | . | . |
|  | N | 5 | 5 | 4 | 1 | 2 |
| Sometimes | Pearson Correlation | -.416 | .040 | 1 | .(a) | -1.000(**) |
|  | Sig. (2-tailed) | .584 | .960 | . | . | . |
|  | N | 4 | 4 | 4 | 1 | 2 |
| Regularly | Pearson Correlation | .(a) | .(a) | .(a) | .(a) | .(a) |
|  | Sig. (2-tailed) | . | . | . | . | . |
|  | N | 1 | 1 | 1 | 1 | 1 |
| OFTEN | Pearson Correlation | 1.000(**) | -1.000(**) | -1.000(**) | .(a) | 1 |
|  | Sig. (2-tailed) | . | . | . | . | . |
|  | N | 2 | 2 | 2 | 1 | 2 |

\* Correlation is significant at the 0.05 level (2-tailed).
\*\* Correlation is significant at the 0.01 level (2-tailed).
a Cannot be computed because at least one of the variables is constant.

In contrast to Question 6, Question 10 was designed to determine if adolescents requested information from the practitioner during the consultation regarding resources available on the Internet. 43% of respondents indicated that this had never happened before and 50% indicated that rarely or sometimes did this occur. Only 7% of respondents indicated that adolescents ask for online resources to be recommended 'Often' or 'Regularly' as depicted in Figure 27.

**Q10. Do any of your overweight or obese adolescent patients ask you to recommend any electronic resources?**

Regularly
1 (2%)

Often
2 (5%)

Sometimes
9 (21%)

Rarely
12 (29%)

Never
18 (43%)

Total: 42
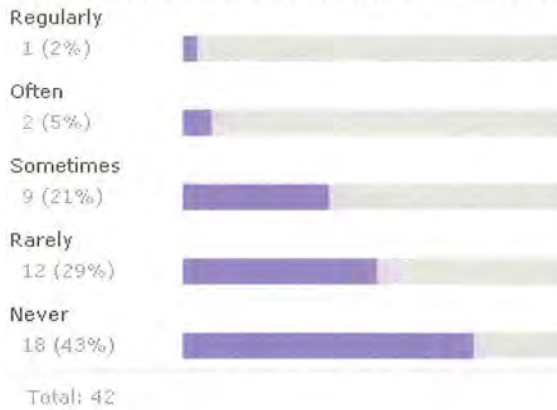
**Figure 27: Adolescent request for Internet information**

A comparison of the practitioners and their responses to how often their overweight adolescent patients present them with information in electronic form, compared to the outcome of the discussion concerning that information with their patient was conducted. Figure 28 indicates that only those practitioners, who 'Never' or 'Rarely' have patients' present information in electronic form to them, do not discuss that information with the patient. Respondents whose patients present them with electronic information 'Sometimes', 'Often' or 'Regularly' indicate that that information is discussed with the patient and in 59% of cases the information is considered to be useful, and only in 29% of cases is the information considered not relevant. Table 17 displays the descriptive statistics based on Figure 27.
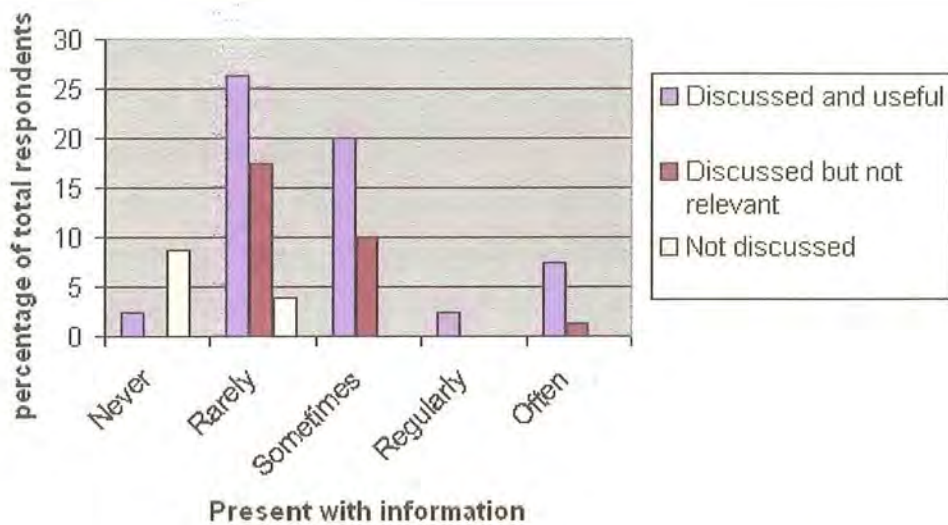


**Figure 28: Present with information versus what happens when that information is discussed**

It may be that adolescents do not ask for online resources to be recommended as either these resources are supplied in paper format by the practitioner or that the practitioner has provided the patient with sufficient verbal information during the consultation. Further research involving adolescent opinions would be required in order to determine any reasoning from the patient's perspective.

**Table 18: Stem and leaf One-Sample T-Test based on Figure 27**

**One-Sample Statistics**

|  | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| NEVER | 5 | 8.40 | 7.570 | 3.385 |
| RARELY | 5 | 8.20 | 6.870 | 3.072 |
| Sometimes | 4 | 5.50 | 3.697 | 1.848 |
| Regularly | 1(a) | 2.00 | . | . |
| OFTEN | 2 | 3.50 | 3.536 | 2.500 |

a  t cannot be computed because the sum of case weights is less than or equal 1.

**One-Sample Test**

|  | Test Value = 0 | | | | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|
|  | t | df | Sig. (2-tailed) | Mean Difference | Lower | Upper |
| NEVER | 2.481 | 4 | .068 | 8.40 | -1.00 | 17.80 |
| RARELY | 2.669 | 4 | .056 | 8.20 | -.33 | 16.73 |
| Sometimes | 2.976 | 3 | .059 | 5.50 | -.38 | 11.38 |
| OFTEN | 1.400 | 1 | .395 | 3.50 | -28.27 | 35.27 |

Table 18 draws a comparison between practitioners' whose patients present them with information, and depending on a positive response, if their patients request information to be recommended to them in electronic form. Overall 29% of respondents said that patients do present them with information and similarly 28% of respondents indicated that adolescents ask them to recommend resources. Equally 71% of respondents indicated that adolescents do not present them with information and 72% said that they do not ask for electronic resources to be recommended.

**Table 19: Comparison of information that is presented and that which is requested**

| Present with information | Never | Often | Rarely | Regularly | Sometimes | Total |
|---|---|---|---|---|---|---|
| Never | 8 | | 1 | | | 9 |
| Often | | | 1 | | 1 | 2 |
| Rarely | 9 | 1 | 5 | | 3 | 18 |
| Regularly | | | | | 1 | 1 |
| Sometimes | 1 | 1 | 5 | 1 | 4 | 12 |
| **Total** | **18** | **2** | **12** | **1** | **9** | **42** |

## 4.5 Practitioner Recommendations

The survey asked respondents what electronic resources they recommend to their overweight patients. A list of possible electronic resources was provided in the survey including the ability for the respondent to input their own response. Sixty six responses were received to this question, indicating 106 resources which they recommend. This means that fifty five or 45.5% of respondents do not recommend any electronic resources, including Internet resources (see Figure 29), to their overweight or obese adolescent patients.
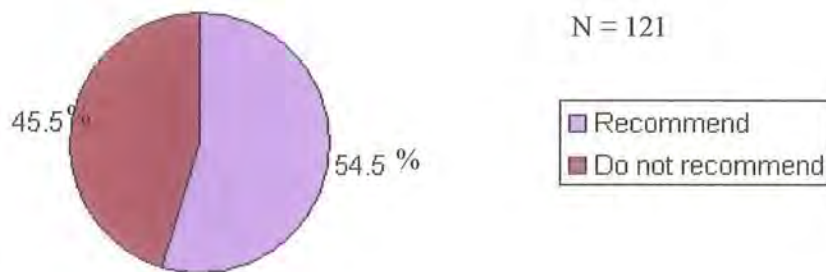


Figure 29: Percentage of respondents who recommend electronic resources

Respondents were asked for their reasons why they did not recommend any electronic resources. The results received are listed in Appendix B. A summary of the specified reasons given by this group of respondents, who accounted for almost half of the healthcare practitioners surveyed, are displayed in Table 20.

**Table 20: Reasons for not recommending electronic resources**

| Reasons | GP | Dietitian | Psychologist | Other | Totals |
|---|---|---|---|---|---|
| Not confident with what's available | | | | 2 | **2** |
| Concerned about the resources accuracy | | 1 | | 3 | **4** |
| Very individualised | | 1 | | | **1** |
| Conflicting information | | 2 | | | **2** |
| Can be taken out of context or misinterpreted | | 2 | | | **2** |
| Not familiar with any of value | | | | 2 | **2** |
| Provide own resources | 2 | 1 | | | **3** |
| Not aware of any resources | 6 | 6 | 5 | 4 | **21** |
| Not online at work | 1 | | 1 | | **2** |
| Patients not online at home | 1 | | | | **1** |
| Computer literacy issues | 1 | | | | **1** |
| More important to do things that are real | 1 | | | | **1** |
| Should discourage time spent at a computer | 2 | 1 | | | **3** |
| May not be effective | | | | 1 | **1** |
| I don't see any/enough overweight adolescents | | 1 | 2 | 4 | **7** |
| Not something I do | 2 | | | 2 | **4** |
| **Totals** | **16** | **15** | **8** | **18** | **57** |

A large proportion of practitioners from all professions, 36.8% reported that they were not aware of any available resources. The 'not knowing' what resources are available transcends into a lack of confidence with what resources are available within Australia. This indicates that healthcare practitioners should be incorporated into the development of electronic resources and should be kept informed regards their availability. The sustainability of these resources, especially those on the Internet, may be dependant on healthcare practitioners being confident about recommending them to their patients.

Figure 30 indicates the type and percentage of resources recommended by the 54.5% of respondents who recommend electronic resources to their overweight patients. Of the 54.5% of respondents, 48% recommended websites, 18% recommend 'Information in electronic form', 9% said an e-diary. The balance of the 35% is shown in Figure 30.

**Figure 30: Recommended electronic resources**

Table 21 lists the number of responses per recommendation. Further discussion regarding the attitude data of both sets of respondents who do, and those who do not, recommend electronic resources will be discussed in Section 5.

**Table 21: List of electronic resources recommended by healthcare practitioners.**

| Resource | Recommendations |
|---|---|
| Websites | 52 |
| Information in Electronic Form | 20 |
| E-diary | 9 |
| Other | 7 |
| Online communities | 5 |
| E-health applications | 4 |
| E-monitoring | 4 |
| E-visits | 3 |
| E-prescriptions | 1 |
| SMS services to mobiles | 1 |
| Services to PDA's | 0 |
| **Total** | **106** |

There were seven additional comments included in the other category listed in Figure 36 and Table 21. Four respondents said 'no', meaning that they had previously indicated that they did not recommend any of these resources, but included the comment in this section as well. One comment from each for: counselling, drug company information and their own knowledge indicating that these should be included in the list of resources.

Respondents, who recommend electronic resources, were asked for the contact details of the resources they recommended to their overweight patients, these are listed in Table 22.

**Table 22 : Websites recommend by respondents**

| | |
|---|---|
| www.weightwatchers.com.au | www.activeforlife.com.au |
| www.nutritionaustralia.com.au | www.sportsdietitians.com |
| www.betterhealth.vic.gov.au | www.fitnessaustralia.com.au |
| www.woolworthsfresh.com.au | www.dairycorp.com.au |
| www.daa.com.au | www.sanitarium.com.au |
| www.ifnotdieting.com.au | www.foodwatch.com.au |
| www.beyondblue.com.au | www.dietclub.com.au |
| http://moodgym.anu.edu.au | www.goforyourlife.vic.gov.au |
| www.dhs.vic.gov.au | www.perthdietclinic.com.au |
| www.betterhealth.vic.gov.au | www.glycemicindex.com |
| www.chw.edu.au | www.weightloss-in-australia.com |
| www.obesityguidelines.gov.au | www.diabetesaustralia.com.au |
| www.asso.org.au | www.quackwatch.com |
| www.fitness2live.com | www.healthyeating.org |
| www.cyh.com | www.weightlosssurgery.com.au |
| www.dietworld.com | www.heartfoundation.com.au |
| www.gudhealth.gov.au | www.pharmacydirect.com.au |
| www.coeliac.org.au | www.diabetesaustralia.com.au |
| www.mypyramid.com | www.beyondblue.com.au |
| http://optimalhealth.com.au | www.healthinsite.gov.au |
| www.med.umich.edu/umim | www.eda.org.au |
| www.dairycorp.com.au | www.med.monash.edu.au/non-cms/mentalhealth |

The websites listed in Table 22 indicate the Internet location of the electronic resources that the healthcare practitioners surveyed recommended to their overweight and obese adolescent patients to use. A review of the recommended websites revealed that they all provide related factual health information. The websites cover a range of topics including; healthy eating, diet, exercise, mood and depression treatments and training,

government websites, e-commerce websites, sales of health products, and even weight loss surgery sites. Referring back to the definition of an e-health application, on evaluation of each of these sites, it was discovered that many of the sites fulfilled the necessary e-health requirements. These requirements include functionality beyond static factual content, such as interaction, support, online chat with registered members and industry experts, message boards, online communities, recipes, games, services to mobile devices and more.

The possibility exists that some respondents misunderstood this question as they did not indicate what resources they were referring to when they indicated that they did recommend these resources. This made it difficult when, for example they said that they recommended online communities but the address details of the recommendations did not identify any such resource.

Approximately two thirds of the electronic resources recommended by the healthcare practitioners were identified during the literature review stage of this research. The resources identified by healthcare practitioners would indicate that they support health information published in university or government websites as opposed to proprietary websites as practitioners did indicate websites such as *weightwatchers*, and *dietclub*.

## 4.5.1   Evaluation of Practitioner Recommended Websites

The literature review conducted prior to the administration of the survey did not uncover some of the resources that healthcare practitioners recommended to their patients. For this reason an evaluation of these additional websites is provided in this section.

An evaluation of the recommended resources (refer to Table 21) will provide some insight into what resources have already been reviewed. Evaluation of the website *MyPyramid*, reviewed in the literature is considered to be the best example of a free interactive diet and assessment tool available on the Internet. However, only one healthcare practitioner was aware of this resource.

Another site identified by respondents was the Australian National University's (ANU) MoodGYM training program (Groves, Griffiths, & Christensen, 2003). Research

indicates that one in five patients who visit their GP's are seeking consultation relating to depression (Groves, Griffiths, & Christensen, 2003). Depression has also been identified as being one of the symptoms or causes of overweight and obesity in adolescents (Pulse, 2002). For this reason the Australian Institute of Health and Welfare (2003) believe that psychosocial problems are most immediate problems associated with overweight and obesity in adolescents. This web application, loads and runs within the users' browser, and delivers cognitive behavioural therapy in real-time as a treatment for depression. The application is part of a research project into depression and first guides the user through a series of questions in order to deliver a customised program suited to the users needs see Figure 31. The aim of this e-health application is to modify the user's behaviours in relation to their depressive thinking and to prevent and decrease symptoms of depression (Groves et al, 2003). The benefit of mood gym over the traditional method of reading books for self-help is that it is interactive in providing real time feedback and advice to users. Two respondents this research survey suggested a similar program for adolescents based on the concepts utilized in MoodGYM, but tailored towards the overweight and obese adolescent.
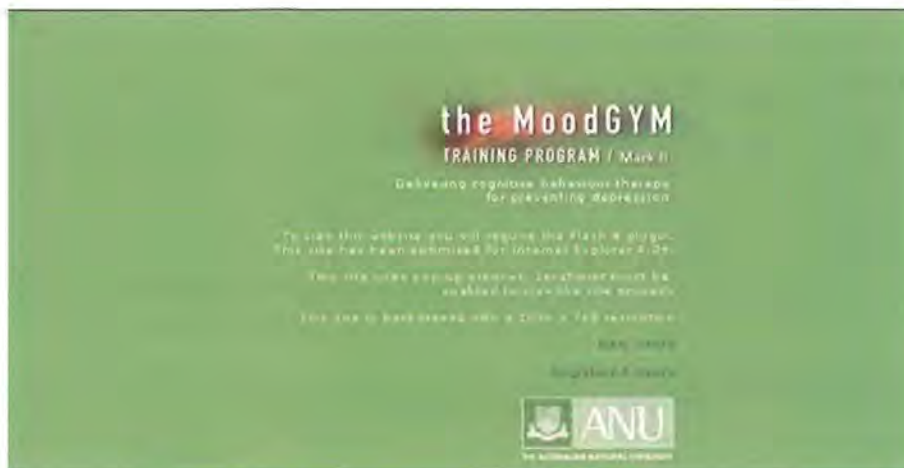


**Figure 31: The MoodGYM homepage** (Groves et al, 2003)

Other features of MoodGYM are that the application provides interactive graphical feedback to the user. Figure 32 is the result of a set of questions which give the user an indication of what their typical thought patterns are like. After navigating the user though a series of modules the applications purpose is to teach the users new ways to modify the way they think about depression (Groves et al, 2003).
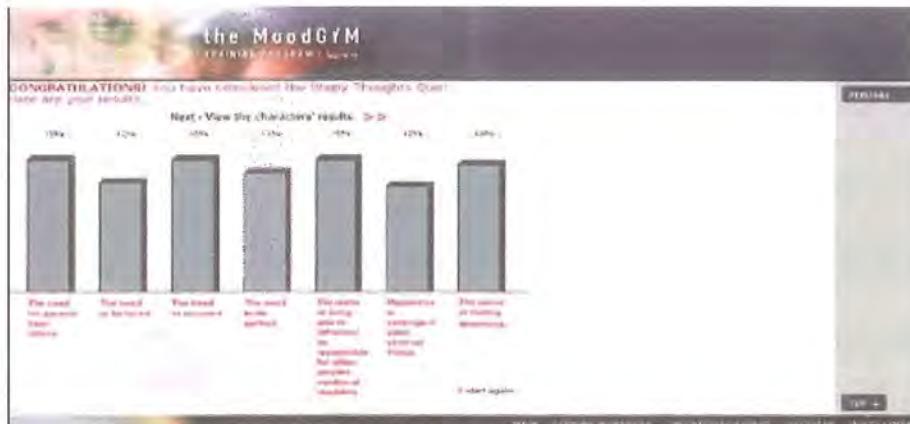
**Figure 32: Users indication of their typical thought patterns** (Groves et al, 2003)

Analysis of the recommended resources however, reveals that many of these resources were developed and intended for adult use and not for adolescents specifically. As such, for adolescents, large amounts of reading may be required before useful information is located. It is possible then that the adolescent may well 'give up' before finding the information which they require. Another issue worthy of mention is the teenage trend to customise English spelling into an easier chat format. A possible issue in locating information therefore may be the inability to locate information due to incorrect spelling of terms. Searching for information on the Internet is a skill taught in schools and still required to be taught in many first year university courses.

## 4.6 Practitioner Attitude Data

### 4.6.1 Benefits of E-Health Applications in the treatment of overweight and obese Adolescents

This section will examine the practitioner attitude data collected during this research. When respondents were asked if they thought there were sufficient online and e-health resources available for overweight and obese adolescents to use, the majority, 71% said that they 'Didn't know', see Figure 33. This data indicates that healthcare practitioners are unable to comment on the availability of resources. Only 7% said no there were not enough resources; 11% said there were too few, and 11% said there were enough resources available.

**Q11. Do you think that there are sufficient online and electronic resources available for overweight and obese adolescents to use?**

Yes
4 (3%)

Enough
9 (8%)

Too few
13 (11%)

No
8 (7%)

Don't know
83 (71%)

Total: 117
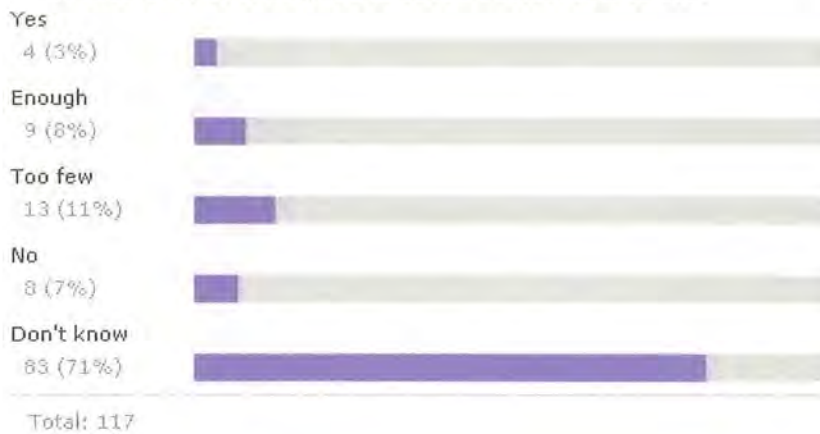
**Figure 33: Availability of online resources**

The purpose of this survey was to provide the data in order to answer the research questions. The main research question being: From a healthcare practitioners' perspective: **Can online and e-health applications benefit and provide support for overweight and obese adolescents?** In order to address this question respondents were asked if they thought e-health applications could be beneficial to overweight and obese adolescents. The definition for an adolescent and for e-health applications, were provided for the respondents at the start of all the surveys, in order that the respondent may understand the terms of reference used in this research. The majority of respondents 47.5% felt that e-health applications could 'Possibly' benefit overweight and obese adolescents (see Figure 34). The second largest response was an affirmative 'Yes' at 40.8% Only 6.7% indicated that they had a 'Neutral' opinion, and 5% indicated 'No', that e-health applications could not benefit the cohort of adolescents under investigation.
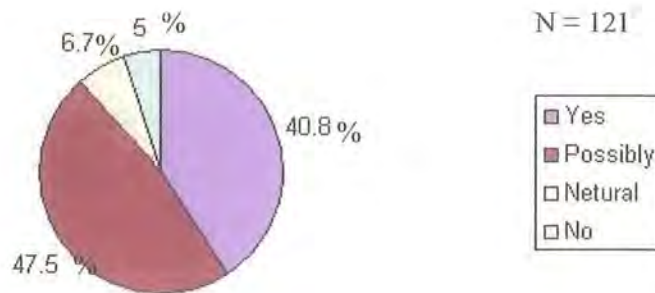
**Figure 34: Respondents opinions of benefits of e-health applications**

The majority of respondents, 88.3% indicated that e-health applications could be beneficial to the cohort of adolescents under investigation. The remaining 11.7% were either 'Neutral' or did not think that e-health applications could be beneficial. This support for e-health technologies is considered to be a positive indication from Australian healthcare practitioners that these resources should be recommended to overweight and obesity adolescents. The research investigated if there was a trend in differences between respondents in different professions. Table 23 indicates the number of practitioners, by profession, and their corresponding response as to whether e-health applications could be beneficial to the cohort of adolescents under investigation.

**Table 23: Respondents opinions on the benefits of e-health**

| Profession | Neutral | No | Possibly | Yes | Total |
|---|---|---|---|---|---|
| Dietitian | 3 | 2 | 21 | 17 | 43 |
| General Practitioner | 2 | 0 | 13 | 12 | 27 |
| Psychologist | 1 | 1 | 8 | 10 | 20 |
| Other | 2 | 3 | 13 | 10 | 28 |
| No given | | | 2 | | 2 |
| **Total** | **8** | **6** | **57** | **49** | **120** |

GP's were the only group in which none of the profession indicated a 'no' response. 7.4% felt 'Neural' and the majority, 92.6% indicated a positive response being either 'Possibly' or 'Yes' that e-health applications could benefit overweight adolescents. This is notable given that the medical fraternity are traditionally conservative about incorporating the use of new technologies (Forkner and Dunn, 2003; Eysenbach, 2001).

Figure 35 details the comparative findings between professions and their perception of the benefit of e-health technologies. Psychologists were the only profession that indicated an affirmative 'Yes' option than any other profession. This may be due to their familiarity with and use of, depression based websites already available on the Internet. Table 24 displays the descriptive statistics based on Figure 35.
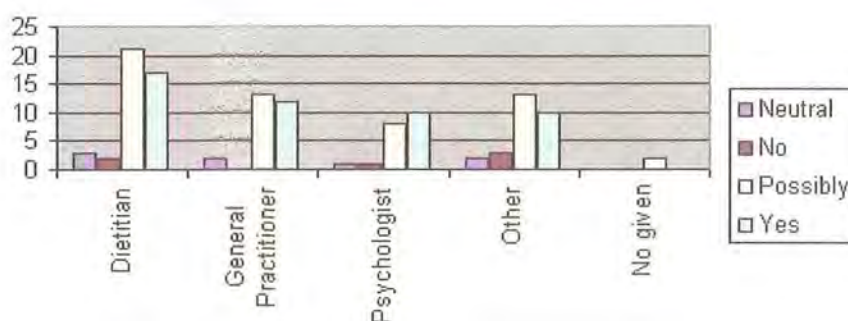


**Figure 35: Profession and benefit**

**Table 24: Stem and leaf descriptive statistics based on profession versus beneficial correlation**

|          | Mean  | Std. Deviation | N |
|----------|-------|----------------|---|
| YES      | 12.25 | 3.304          | 4 |
| POSSIBLY | 11.40 | 7.021          | 5 |
| NEUTRAL  | 2.00  | .816           | 4 |
| NO       | 1.50  | 1.291          | 4 |

**Correlations**

|          |                        | YES     | POSSIBLY | NEUTRAL  | NO   |
|----------|------------------------|---------|----------|----------|------|
| YES      | Pearson Correlation    | 1       | .924(*)  | .865     | .039 |
|          | Sig. (1-tailed)        | .       | .038     | .068     | .480 |
|          | N                      | 4       | 4        | 4        | 4    |
| POSSIBLY | Pearson Correlation    | .924(*) | 1        | .987(**) | .312 |
|          | Sig. (1-tailed)        | .038    | .        | .007     | .344 |
|          | N                      | 4       | 5        | 4        | 4    |
| NEUTRAL  | Pearson Correlation    | .865    | .987(**) | 1        | .316 |
|          | Sig. (1-tailed)        | .068    | .007     | .        | .342 |
|          | N                      | 4       | 4        | 4        | 4    |
| NO       | Pearson Correlation    | .039    | .312     | .316     | 1    |
|          | Sig. (1-tailed)        | .480    | .344     | .342     | .    |
|          | N                      | 4       | 4        | 4        | 4    |

\* Correlation is significant at the 0.05 level (1-tailed).
\*\* Correlation is significant at the 0.01 level (1-tailed).

Figure 36 indicate the age ranges and compares them to whether the respondent thought that they were beneficial. The results are comparable to Figure 34 in that 88.3% of respondents answered either 'Yes' or 'Possibly' to this question.

| Age Range | Number in Group | Yes | Possibly | Neutral | No | Totals |
|---|---|---|---|---|---|---|
| < 20 | 3 | 2 | 0 | 0 | 1 | 3 |
| 20 – 29 | 16 | 7 | 9 | 0 | 0 | 16 |
| 30 – 39 | 21 | 7 | 12 | 1 | 1 | 21 |
| 40 – 49 | 43 | 17 | 21 | 3 | 2 | 43 |
| 50 – 59 | 29 | 13 | 11 | 3 | 2 | 29 |
| 60 – 69 | 6 | 2 | 3 | 1 | 0 | 6 |
| > 70 | 1 | 0 | 1 | 0 | 0 | 1 |
| Unknown | 1 | 1 | 0 | 0 | 0 | 1 |
| Total | 120 | 49 | 57 | 8 | 6 | 120 |

Figure 36: Age range versus beneficial

## 4.6.2 Australian Healthcare Practitioners opinion of support needed in Treatment of Overweight and Obese Adolescents

Respondents were asked what kind of support could be provided by e-health applications for overweight and obese adolescents. This question was asked before indicating to respondents possible suggestions later in the survey. A total of 80 respondents offered their opinions. The purpose of this question was to gain an indication of the perceptions of healthcare practitioners in order to determine a definition for the concept of support. The data was qualitatively analysed and coded into recurrent themes resulting from a total 184 ideas that were offered. Each respondent's opinions were first divided into separate concepts, and then each concept was assigned a code. When the same concept emerged later in the data it was assigned the same code as the same idea had been previously. In this manner, the codes emerged from the data, and were not defined prior to the qualitative analysis process. Appendix A lists the full set of responses provided by respondents.

The survey design incorporated open-ended questions, and thus allowed respondents to place opinions in any of the text boxes provided. It was found that a number of the suggestions placed in the support answer also formed part of the suggestions for future e-health development. In these cases respondents usually referred back to their previous answers. For this reason, opinions offered in this section have also been incorporated into the later section of opinion data on what needs to be developed. Opinions regarding the support offered by e-health applications were placed into one of four categories: Information, Support, Strategies and Unsure, this is shown in Figure 37.
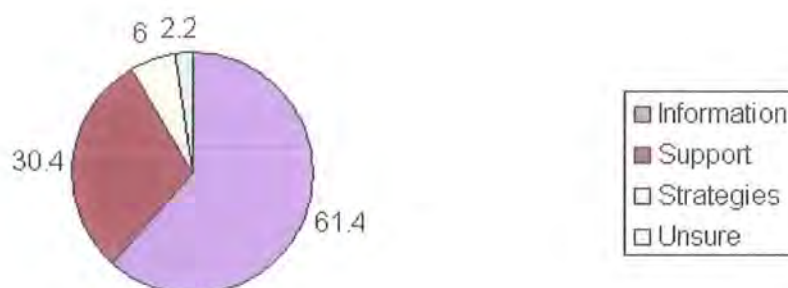


**Figure 37: Types of support recommended by respondents**

Within each of these categories there were numerous opinions offered. Information referred to advice, cooking skills, shopping guides, success stories, trusted factual health related information, goal setting, exercise guidelines, advice on lifestyle change, snack food and take away information, frequently asked question guide, nutritional information, definition of BMI and body fat information, calorie charts, research literature, hints to overcome binge eating, directories of practitioners, recipes, information regarding alcohol, causes and consequences of obesity, core food groups, dieting myths, realistic and healthy weight ranges, helpful hints, portion sizes, dangers of dieting and information for parents and guardians.

Support referred to: feedback between consultations, staying positive, online chat rooms with peers and professionals, supportive information, cognitive learning, qualified online counselling, moderated discussion forums, e-activity logs like a circuit workout

at gym, email and SMS alerts, keeping an individual on track, emotional support, encouragement, altering habits, food diary, guest speakers for forums, interactive assessment, interactive support package, mental health, method of comparing current to recommended food guidelines, e-monitoring, daily or weekly ongoing support, peer support, email contact from practitioners outside of consultations, regular contact at any time of the day, reminders, exercise records,

Strategies referred to: behavioural changes, lifestyle changes, management strategies, practical skills and strategies, reinforcement of diet and exercise messages, self-esteem strategies and strategies for loosing weight. These support categories are explored further under the Discussion section of this document.

### 4.6.3 Australian Healthcare Practitioners opinions on what online or e-health resources should be developed to assist in the treatment of overweight and obesity in adolescents

The survey asked respondents what online or e-health resources they thought should be developed for use by overweight and obese adolescents. The data from the surveys was again qualitatively analysed by identifying recurrent themes in the data and assigning them a code. When the same theme reoccurred in the data it was assigned the same code. Whenever a new theme was identified, it was assigned a new code. Results of the complete responses from the survey are listed in Appendix C. Suggestions for inclusion in the development of future online and e-health resources include in the healthcare practitioners' own words:

> *"Interactivity such as in MoodGYM, website detailing healthy eating and exercise, something suitable for when adolescents don't access a qualified practitioner, user friendly resources, publicise resources, e-monitoring only under the supervision of their practitioner, method of comparing current intake against recommended guidelines, related games, recommendations to qualified practitioners, less writing and more pictures, support networks, help in understanding non-hungry eating, emotional eating etc, self assessment, support groups, One's that are 'short and sweet'. Don't advocate sitting for too long to find things out!, resources in a format that appeals to the age group, coaching and ongoing motivation and trouble*

*shooting, age appropriate resources, designed for young people, 'teenage'*
*personas to discuss topical issues, evidence based, family factors, a place*
*for both family bases strategies and individual based strategies, biological*
*behaviour changes model, program that they work through, feedback*
*between consultation (from an accredited health professional), Interactive*
*sites that includes the health professionals, cognitive learning, Chat rooms*
*for discussion between other overweight adolescents that is mediated by an*
*appropriate health professional, online motivation talks, interactive*
*assessment, e-diaries, email service where the adolescent is sent short*
*snippets of information relevant to them rather than expecting them to*
*remember to log on to a particular website, humour, something easy and*
*fun to use, the content of the site would need to be written and operated by a*
*non-commercial, independent organisation, not drug company driven*
*information, Information to dispel myths about weight loss information on*
*the latest fads, related support websites information, recipes, success*
*stories, recording system that allows adolescents to track progress, a*
*reminder system, information on maintaining weight after weight loss has*
*occurred, needs to be developed by people of that age, appealing web site*
*interface, easy to follow eating and exercise program, Up beat, topical*
*discussions, visual calorie counters and meal analysis, recognition of the*
*psychological aspects of weight gain ".*

### 4.6.4 Prototype Website

Survey respondents suggested a number of the resources and functionality for use within an e-health application. For example it includes functionality such as articles in which factual health information and research can be made available to the users. Suggested interactivity such as e-diary, success stories, member postings, weight trackers software, as well as e-monitoring through chat and forums, are included. Resources to be added to this list include email services, as well as content, database tracker and SMS services to PDA's and mobile telephone devices. Figure 38 is a possible website navigational diagram developed by Vy-Shane Sin Fat and the researcher at the beginning stages of this honours research when it was anticipated that a specialised website for overweight adolescents would be developed.

The purpose of this navigational diagram is to visually portray the healthcare practitioners' suggestions as rectangular images in the diagram and as may appear in an

interactive custom developed e-health application for adolescents. The navigational diagram displays many of the resources and functionality suggested by survey respondents. For example it includes functionality such as articles in which factual health information and research can be made available to the users. Suggested interactivity such as e-diary, success stories, member postings, weight trackers software, as well as e-monitoring through chat and forums, are included. Resources to be added to this list include email services, as well as content, database tracker and SMS services to PDA's and mobile telephone devices.

The majority of the development opinions offered by the healthcare practitioners already exist and are in use on the Internet within websites already, and a number have been discussed under the Literature Review section of this document. No suggestions relating to more advanced e-health functionality such as mobile devices were mentioned by the survey respondents. These services are included in websites and are delivered to mobile devices such as in use by *dietclub and MyPyramid.* These devices deliver services that enable users to input data and view the details graphically in real time. Pharmaceutical companies such as Galderma Australia are delivering text messages to subscribers in regards to acne information and reminders to administer the treatment correctly. This same functionality could be applied to online resources provided for the cohort under investigation.

Respondents were asked what features and functionality should be incorporated into electronic and e-health applications for overweight and obese adolescents after they were asked to indicate what resources need to be developed. A list of possible features and functionality were provided, as well as the option to input other ideas. The results received from this question are listed in Table 25. Each item indicated by each respondent was tallied and are represented as a percentage of the total 112 respondents. Exercise advice was the most selected item with 79.5% of respondents believing that this information should be included in an e-health application target towards overweight adolescents. This supported by other research findings which indicate that Australians as a nation do not engage exercise sufficiently (Ridolfo, Serafino, Somerford, & Codde, 2000). Following closely was information relating to factual health related content and support.
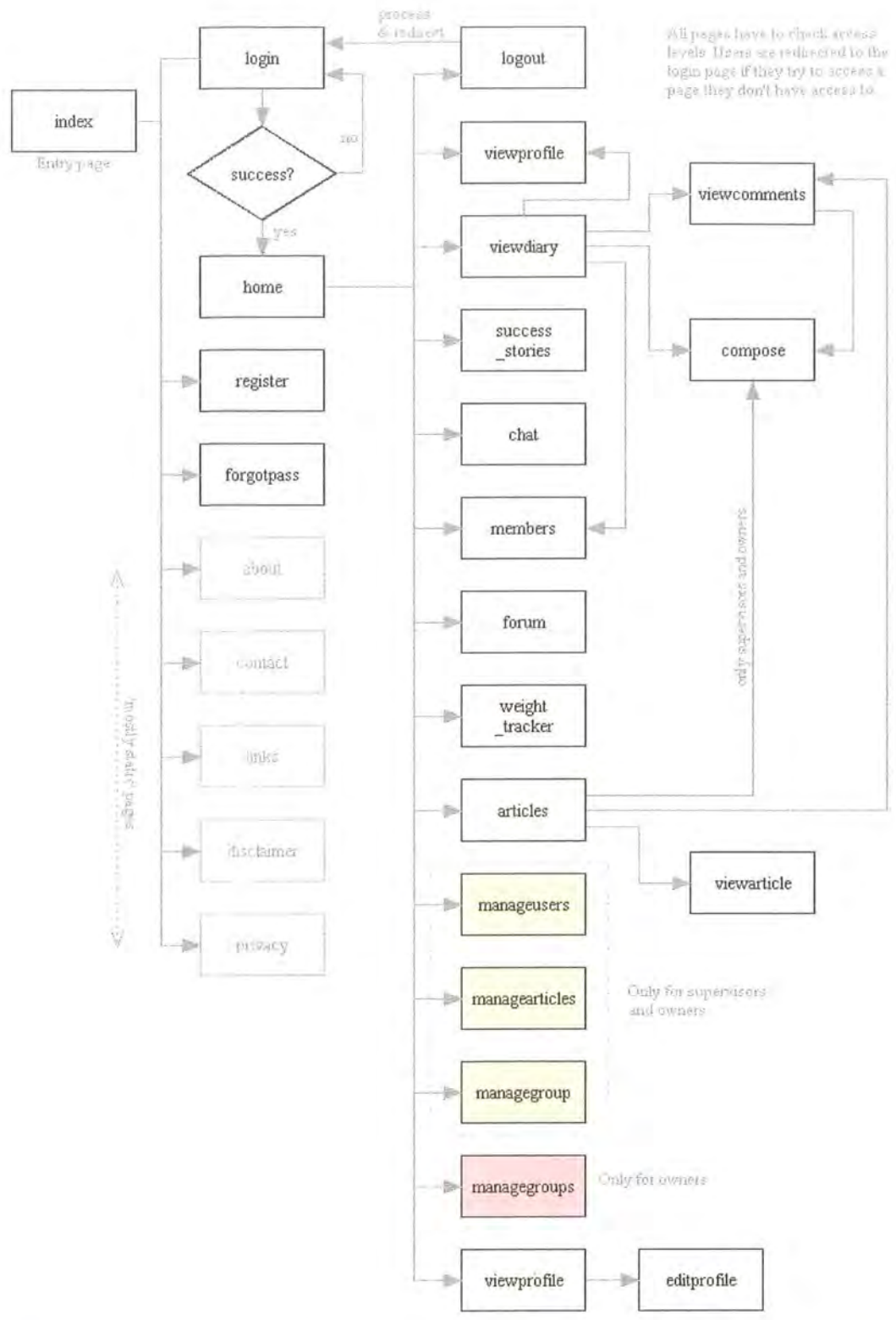
**Figure 38: A navigation diagram of prototype e-health application based on the Australian healthcare practitioners recommendations.**

**Table 25: Suggested features and functionality**

| Feature or functionality | Percentage |
|---|---|
| Exercise advice | 79.5% |
| Factual health related content | 75.0% |
| Support | 72.3% |
| Interactivity | 68.8% |
| Recipes | 60.7% |
| Tailored 'teen language' | 59.8% |
| Success stories | 59.8% |
| Online chat with an expert | 58.9% |
| Parent/guardian information | 57.1% |
| Personalised eating plan | 42.0% |
| Private weigh in page | 37.5% |
| Real-time member chat rooms | 36.6% |
| Private diary | 31.3% |
| Message boards/forums | 26.8% |
| E-monitoring | 23.2% |
| Related online games | 23.2% |
| Services to mobiles and PDA's | 19.6% |
| Personal postings | 15.2% |
| E-visits | 12.5% |
| Additional comments | 10.7% |

The item on this list which is most controversial is whether the language of the site should be tailored into chat language or 'teen language'. This is an unofficial adaptation of the English language by the teenagers themselves. 59.8% of respondents indicated that they thought this was a good idea. However, other respondents were passionate about their responses such as: *"forget teen language 'crap' just plain talk"*.

Another indication that was contrary to the literature review conducted for this thesis was that only 57.1% of respondents believe that parental or guardian information should be included when developing an e-health application. Comments emerging from the survey such as *"the biggest onus of responsibility falls to the parents. Experience tells me that regardless of the subject in question, all facets of learning, education, responsibility, self-esteem, pride and achievement begin squarely with parents and even the extended family including grandparents, uncles etc"*. This is in line with research which indicates that the influence of the family is an important factor to be considered in overweight adolescents.

Another area of controversy is the use of chat rooms. They provide a meeting place for registered members to discuss their health related issues and socialise with adolescents in a similar position to themselves. 58.9% of respondents indicated that online chat with an expert would be desirable compare to 36.6% who indicated that member chat rooms should be a feature. However, strong objection to chat rooms were voiced by practitioners, with comments such as "*definitely not real-time chat rooms and not online games*". However, there is research to suggest that online chat can contribute to the general well being of the user (Muniz and O'Guinn, 2001).

Services to mobiles featured were selected by only 19.6% of respondents. This result is of interest given the explosive growth in mobile sales and resultant services that are currently being developed and delivered to mobile devices (Zastrocky, Yanosky, & Harris, 2004). A final comment relating to Table 25 is that of the 12.5% of respondents who elected e-visits as a functionality to be included in e-health applications. Currently in the USA, medial aid insurance companies offer rebates to patients on a portion of the costs associated with e-visits when they consult a healthcare practitioners' online (Foremen, 2003). It is anticipate that this will become a future trend as the technology and services mature globally (Burghard, 2005).

Respondents were asked to indicate any concerns they may have about the use of online and e-health applications. A total of 107 responses were received. Of these the possibility of possible incorrect advice was the highest concern with 75.6% of respondents selecting this option. Figure 39 gives a graphical representation of these concerns by the number of respondents who selected each of the options. This concern was followed by conflicting advice at 72% of respondents and the lack of monitoring at 59.8%. Intruders, harassment/bullying and legal liability were considered by less than 50% of respondents to be concern priorities. Given the issues relating to legal liabilities in healthcare practices it was anticipated that this option would have been considered as more of a concern than indicated by respondents.
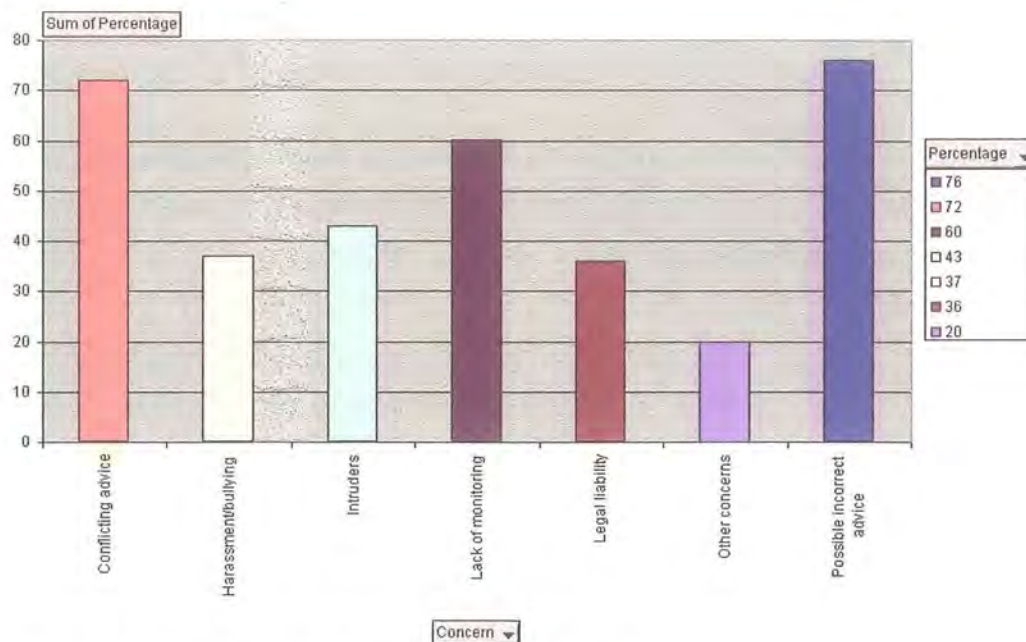
**Figure 39: Concerns relating to e-health applications**

There were 19.6% of respondents who indicated that they had additional concerns. These included time spent on computers, misunderstanding of information, the encouragement of eating disorders, excessive focus on weight and not on the issues causing the weight gain, removes face-to-face interaction and personal assessment of the individual, biased advice form food or pharmaceutical companies, self prescribing own diet/exercise plan that may not be realistic, underage issues that is under the legal chat room age of 13 years, duty of care issues, information provided is of a general nature and not personalised to the individual. These issues are considered to be significant.

One concern relates to the amount of time spend sitting at a computer instead of being outside 'playing'. That is approximately 11% made reference to the fact that children should not be spending too much time on a computer. This theme also emerged during the May 2004 workshop and in the literature (Landers, 2004; Arluk et al, 2003). The concern predominantly is that of adolescents who spend more than twenty hours a week on a computer or watching television (Arluk et al, 2003).

Additional concerns included: concern relating to how the information gained on the site was used, misunderstanding information, encouragement of disordered eating, excessive focus on weight, removes professional opinion and assessment of the individual

situation, may encourage isolation, vested interests biasing advice by pharmaceutical companies and the food industry, underage issues, and duty of care issues.

The final concern related to the availability of anorexic websites on the Internet. Some of these websites were identified by the research. Due to the very nature of the Internet, unhelpful information such as this is equally available to adolescents as is the reputable information. The concern relates to the fact that adolescents may uncover these sites if not appropriately directed by a responsible adult or their healthcare practitioner. For this reason a known network of recommended sites would be helpful.

## 4.7 Additional comments

This was the final opportunity offered to respondents in the survey, to express any additional comments which they relating to the survey. It was concluded that a number of these comments could be beneficial in addressing future research directions. Results of the responses received for this part are listed in Appendix D. The main themes to emerge from these comments included the following:

*Avoid the shame of speaking in person, being at developmentally different stages, overweight in teenagers is a complex issue and very different for each individual, it's great to provide accurate and teenage friendly information, site content of the would need to be written and operated by a non-commercial independent organisation, time with clients for psychological support i.e. self-esteem, family issues are often more of the problem than the obvious wrong eating patterns, lack of exercise etc, online has some advantages for rural people but often a sensible professional has been seen, it requires the user to be able to identify the real problem/s this is the same reason why classes don't work + newspapers + magazines, would be a good additional resource to individual treatment and its easy to lie to a machine.*

# 5. Conclusion

## 5.1 Discussion Addressing the Research Questions

This section outlines a discussion of the research findings address the research questions as outlined in Section 1.4. This research survey provided a means to obtain demographic, recommendations and attitude data of healthcare practitioners across all Australian states. Analysis of the data has given an overview of the opinions from professionals such as dietitians, general practitioners and psychologists who accounted for 75.2% of all respondents (see Section 4.2). These respondents consisted of representatives from each Australian state, and included both rural and metropolitan practitioners (see Section 4.2). Therefore, the resultant data is considered to have yielded reliable research results. Analysis of these results has provided the evidence required to answer each of the research questions.

An investigation of the literature did not reveal another similar study which was specifically reported on the use of online technologies in the treatment of overweight and obese adolescents. However, two research studies by Trowbridge, Sofka, Holt, and Barlow (2002) and Bocquier, Verger, Basdevant, Andreotti, Baretge, et al. (2005) investigated general practitioner attitudes in relation to their treatment of their overweight and obese patients. Both studies concluded that there was no standardisation of the treatment options recommended to overweight and obese patients. Additionally Bocquier et al. (2005) concluded that there was no consistency in nutritional or dietary advice given to patients, and treatment was dependant on a doctor's level of obesity related training. A study by Skinner, Biscope, Poland and Goldberg (2003) attempted to establish the emerging roles for healthcare practitioners by utilising online technologies more effectively for an adolescent cohort. These recommendations outline in the Literature Review were not evident in the practices of healthcare practitioners surveyed in this research.

In regards to the main research question, from a healthcare practitioners' perspective **"Can online and e-health applications benefit and provide support for overweight**

**and obese adolescents?"**, it can be concluded that healthcare practitioners predominantly believe that online and e-health applications can benefit and provide support for overweight and obese adolescents. This conclusion is supported by the outcome to two of the survey questions. Firstly, when healthcare practitioners were asked if e-health applications could be beneficial to overweight and obese adolescents, the majority of healthcare practitioners, 88.3%, indicated that e-health applications could positively benefit to the cohort of adolescents under investigation (see Section 4.6). However, this opinion was not consistent for all healthcare practitioners with 12% expressing either neutral or did not think that e-health applications could be beneficial. This indicates an enormous support for e-health and is considered to be a positive indication from Australian healthcare practitioners that these resources should be made available to overweight and obesity adolescents via the Internet. This finding is comparable with other studies conducted by Forkner-Dunn (2003) which support the use of online technologies as a treatment option for patients.

Secondly, in relation to the main research question, when asked what kind of support, if any, they thought could be provided by e-health applications developed for use by overweight and obese adolescents, healthcare practitioners provided a range of opinions. Greater than 65% of respondents answered this question, contributing over 180 ideas relating to their opinion on what support could be provided by e-health initiatives (see Section 4.7).

These ideas were divided into three different categories, information, support and strategies. Of the respondents who chose to answer this question, 61% indicated twenty seven different types of information which could be provided by e-health initiatives and would constitute support to users of such applications. Similarly, 30% of respondents indicated twenty nine different types of encouragement strategies that could be utilised by e-health application. Finally, 6% of respondents identified nine different strategies that could be utilised to support overweight and obese adolescents via e-health initiatives. The accumulative response in identifying what is considered to be support, positively indicates that healthcare practitioners' believe that support can be provided by online and e-health applications.

The ability to offer online support to adolescent patients provides opportunities to deliver age appropriate content. This can assist with the behavioural changes (Snowball, 2004) required to address the issue that dieting does not always deliver the required weight loss results (Savoye-Desanti, 2005). Additional support and motivational opportunities can be provided by the use of e-health applications. This is supported by Hansen, Derry, Resnick, & Richardson (2003) and White & Dorman (2000) who believe that adolescents are seeking specific medical information on the Internet.

There were three sub-questions relating to the main research question. The sub-questions were designed to explore different aspects of online and e-health applications, in order to address the issues relating to the main research question. The first sub-question "**What electronic, online and e-health application resources do healthcare practitioners' recommend to their overweight and obese adolescent patients?**" received a positive response from the 55% of healthcare practitioners who answered this question. However, from the remaining 45% of respondents who did not recommend any electronic resources, sixteen still elected to answer the question relating to the sources they recommend which increased the number of respondents to greater than 65% of the total (see Section 4.5).

Of the resources that were recommended 48% were websites, 18% was information in electronic form and the remaining 34% were other forms of electronic resources. These responses together with the forty four different website addresses supplied by respondents as the electronic resources they recommend, is considered to be a sufficient to address this question. This indicates, from this sample base, that assumptions can be made relating to what resources healthcare practitioners' recommend across Australia. No similar studies were identified which reported similar results.

Analysis of the recommended websites indicates that, whilst healthcare practitioners are aware of the abundance of information available on the Internet, collectively they do not know which resources are the most useful to their patients. Further, the healthcare practitioners who do not suggest any additional resources beyond that provided during consultations, did so for a variety of different reasons and 71% indicated that they did not know if there were sufficient online and e-health resources available.

A recurrent theme from both the workshop and identified in the literature review is the role of the family in addressing these health related issue (Kelley, Krummel, Gonzales, Neal, & Fitch, 2004). Online resources need to provide the information and support required to the adolescents' family in order that a holistic approach can be implemented. These results would indicate that healthcare practitioners believe that the use of online technologies could provide secondary to overweight and obese adolescents.

The second sub-question **"What content, features and functionality do healthcare practitioners' believe should be incorporated into e-health application targeted towards overweight and obese adolescents?"** was positively addressed by response data to the survey questions. Respondents were asked to select the options of content, features and functionality from a list of twenty different options, including the ability to add other options to the list, which they thought should be incorporated into e-health resources designed for overweight and obese adolescents. Eight hundred and eighty two options were selected by the 112 respondents who answered this question (see Section 4.6). Of these responses, exercise was considered to be the most important. This is consistent with other research findings which report that Australians do not engage in sufficient exercise (Ridolfo, Serafino, Somerford, & Codde, 2000). It also reconfirms the view that it is better to be overweight and exercise, than to be in a healthy weight range and to live a sedentary life (Heart Foundation, 2005). The next most important response was advice, followed by factual health related content, support and interactivity. Least important, to name only a few, were e-visits, personal postings, services to mobiles and PDA's, and related online games. The data collected is considered to be sufficient to have yielded reputable results pertaining to this research question.

The third and final research sub-question **"Do healthcare practitioners believe that online and e-health applications can assist these patients in achieving healthier lifestyle outcomes?"** required qualitative interpretation of the data. To address this question in part, respondents were asked whether adolescents presented them with information obtained from the Internet, and whether these adolescents asked for electronic and online resources to be recommended during the consultation. The

purpose of these questions was to determine if this cohort of patients were seeking assistance from online resources which they wished to be verified by their healthcare practitioners, or for any indication that these resources could assist them in achieving healthier lifestyle outcomes. Skinner, Biscope, Poland, & Goldberg (2003) conclude from their research that the Internet provides additional opportunities to deliver health related information to adolescents.

Research findings from the survey questions were inconclusive as 71% of respondents indicated that patients almost never present them with information and an almost equivalent amount, 72% almost never asked for resources to be recommended (see Section 4.5). However, of the 29% of respondents whose patients do see and request electronic resources to be recommended, indicated that in 59% of cases the information discussed was useful. Also in regards to this research question, respondents were also asked what online or e-health resources need to be developed for use by overweight and obese adolescents. The resultant list of forty nine different suggestions for inclusion into the development of these resources indicates that the inclusion of such things as factual information, interactively, support, humour and age appropriate resources could assist this cohort of patients in achieving healthier lifestyle outcomes by providing the secondary support opportunities for potentially the one million Australian adolescents who are considered to be overweight or obese (see Section 4.5). More importantly, these resources may be critical to those adolescents who can not access a healthcare practitioner for a variety of reasons. This research has therefore positively concluded that online and e-health applications can assist overweight and obese adolescents to achieve healthier lifestyle outcomes. This research concludes that healthier lifestyle outcomes can be provided to adolescents by online and e-health applications as a delivery option for the re-education required for a "refresher course in diet, exercise and nutrition" (Dailey, 2003)

## 5.2 Summary

This research has investigated the benefit of and the extent to which Australian healthcare practitioners advise overweight and obese adolescent patients of reliable sources of information on the Internet. The research has concluded that there is sufficient factual health related information and content available on the Internet, provided by websites. These websites offer healthy sensible eating and exercise related advice online. The information in electronic format, identified by a review of the literature (see Section 2) and by the survey respondents, is suitable for use by overweight and obese adolescents. However, this research concludes that these resources are not provided in an interactive, age appropriate format. Adolescents need information to be presented to them in a manner in which they can easily locate and that is the relevant information which they seek. In addition rural respondents indicated that English is often not the adolescents' home language, although it is the language most often utilised by Australian websites to present this health related content. Rural respondents also indicated that their patients would appreciate more pictures instead of words.

The review of existing websites and survey of healthcare practitioners' knowledge of available Internet resources suggests that there is a need to develop online health resources specifically for adolescents in Australia. The related resources of interest to this study are preventative self-care applications that incorporate diet, health and exercise components. Current resources appear to provide mostly adult content in a predominantly static information-related environment. However, majority of websites reviewed did not provide the degree of interactivity, or customised interfaces that adolescent users require.

Provision of chat facilities remains controversial due to the possibility of misinformation and harm that can result in unmonitored environments. A concern that was raised in the literature and by a number of healthcare practitioners', relates to adolescents spending too much time in front of a computer, and not being outside playing and being physically active. Adolescents need to be made aware of appropriate time restrictions in relation to time spent on computers and watching television.

Equally, educating adolescents about the benefits of exercise in terms of its ability to improve health outcomes and as a cure for mild depression would be beneficial to them. Given adolescents passion for technology it is anticipated that this cohort would be quick to adopt new e-health initiatives.

Respondents across all states also indicated that such features as e-monitoring, e-diaries, dynamic daily intake comparative tools and numerous other resources are not readily available to adolescents. There are only a few reputable proprietary websites that have developed and included a number of these interactive and supportive technologies into their offerings. However, given that the obesity epidemic affects all Australians regardless of geographic location or socioeconomic situation, these resources should possibly be made available to the Australian public in the same way as *mypyramid* is offered in the USA. No research studies have been carried out from the users' perspective to quantify the benefits of e-health applications. An abundance of literature relating to the use of online resources such as the *mypyramid* website suggests that there is a commitment to providing these users with effective health and wellness tools in order to promote healthy lifestyles.

A future research direction would be to survey a sample group of overweight and obese adolescents to determine what online and e-health resources they utilise and to gain their opinion on what resources need to be developed for their use. As one respondent pointed out "while e-health initiatives can provide supportive advice, they are not the solution to the current obesity epidemic by any means. The current epidemic is not simply the fault of individuals - it is an environmental problem. We need to make healthy choices easy choices and make the environment more conducive to increasing physical activity." This statement reconfirms that the issue of overweight and obesity in adolescents requires a holistic approach, and that the availability of suitable e-health resources is only a small part of the solution.

There are few studies in the literature that describe the therapeutic use of either e-health applications or online communities that assist in the treatment of obesity in adolescents. Furthermore, no similar Australian studies were identified in which a large number of multidisciplinary healthcare practitioners were surveyed concerning their opinion regarding the benefits of online and e-health applications or support communities.

This research has outlined the project aims in terms of providing an in depth investigation, according to Australian healthcare practitioners in regards to the use of online and e-health resources for overweight and obese adolescents. The introduction provided relevant Australian demographics regarding the definitions of obesity in Australia and the resultant health related risk factors. The background discussion introduced the emerging technologies a shave been developed and implemented in e-health as a tool to assist and improve the health outcomes of patients concerning a variety of health related issues. The introduction further outlined the aims, significance and research questions as they relate to this study.

The literature review examined and discussed the relevant literature as it relates to this research and to adolescent obesity, the Internet, and e-health applications, as well as outlining similar studied relevant to this research. The research methodology and design was outlined as it related to the distribution and administration of the survey instrument utilised to collect the research data for analysis. The survey design, development and administration were then discussed and outlined. The document has justified the need to survey Australian healthcare practitioners to ascertain their attitude data in relation to the future development of online and e-health initiatives. Once the data had been collected, it was then analysed using both qualitative and quantitative research methodologies. The research findings were then outlined together with the results from each of the survey questions. Finally the research questions were addressed and found to have positively concluded that online and e-health applications can support and be beneficial to overweight and obese adolescents.

# 5 References

Arluk, S. L., Branch, D., Swain, D. P., & Dowling, E. A. (2003). Childhood obesity's relationship to time spent in sedentary behaviour. *Military Medicine, 168*(7), 583. Retrieved June 24, 2005 from ProQuest Database.

Armstrong, L., & Mahncke, R. J. (2004). *Developing a Virtual Community for Overweight and Obese Children: A Pilot Study*. Paper presented at the We-B 2004 International Conference, Perth, Western Australia.

Australian Bureau of Statistics. (2002). *Health. Special Article - Chronic diseases and risk factors*. Retrieved March 27, 2005, from http://www.abs.gov.au/ausstats/abs@.nsf/dc057c1016e548b4ca256c470025ff88/fd1e556110f76d2ca2569de0024ed70!OpenDocument

Australian Institute of Health and Welfare. (2003). *Australia's young people: their health and wellbeing*. Retrieved August 5, 2004, from www.aihw.gov.au/publications/phe/ayp03/ayp03-c00.pdf

Bocquier, A., Verger, P., Basdevant, A., Andreotti, G., Baretge, J., Villani, P., et al. (2005). *Overweight and Obesity: Knowledge, Attitudes, and Practices of General Practitioners in France*. Retrieved June 24,, 2005, from http://www.obesityresearch.org/cgi/content/abstract/13/4/787

Boniface, L. (2005). Evaluating the effectiveness of an online intervention in building community, promoting healthy behaviours and fostering philanthropy. A proposal submitted in partial fulfilment of a PhD to Edith Cowan University, Perth, Australia.

Borushek, A. (2005) Diet Club Inc. Retrieved November 3, 2005 from http://www.dietclub.com.au

Brann, M., & Anderson, J. G. (2002). E-medicine and healthcare consumers: recognizing current problems and possible resolutions for a safer environment. *Healthcare Anal., 10*(4), 403-415. Retrieved August 5, 2004, from ProQuest Database.

Burghard, C. E. (2005). *Collaboration Between Health Plans and Providers Is Key to Success*. Retrieved June 12, 2005, from http://www.gartner.com

Checkland, P. (1981). *Systems thinking, systems practice*. Chichester, UK: John Wiley & Sons.

Checkland, P. (1991). From framework through experience to learning: the essential nature of action research. In H. E. Nissan & H. K. Klein & R. Hirschheim (Eds.), *Information Systems Research: Contemporary approaches and emergent traditions* (pp. 1-7). North Holland: Elsevier Science Publishers B.V.

Dailey, P. B. (2003). Responsible behaviour. *Restaurants & Institutions, 113*(15), 12. Retrieved June 24, 2005 from ProQuest Database.

Dickerson, S. S., Flaig, D. M., & Kennedy, M. C. (2002). Therapeutic connection: help seeking on the Internet for persons with implantable cardioverter defibrillators. *Heart Lung, 29*(4), 248-255. Retrieved June 12, 2005 from ProQuest Database.

Borushek, A. (2005). Diet Club. Retrieved November 3, 2005 from http://www.dietclub.com.au/

Dommeyer, C. J., & Moriarty, E. (2000). Comparing two forms of an e-mail survey: embedded versus attached. *Journal of Market Research, 42*, 39-50. http://www.jmir.org/

Eysenbach, G. (2001). What is e-health? *Journal of Medical Internet Research*, 3(2), e20. Retrieved June 29, 2005 from http://www.jmir.org/2001/2/e20

Flicker, S., Goldberg, E., Read, S., Veinot, T., McClelland, A., Saulnier, P., et al. (2004). HIV-Positive Youth's Perspectives on the Internet and e-health. *Journal of Medical Internet Research, 6*(3), e32. http://www.jmir.org/2004/3/e32.

Foremen, J. (2003). How would you like to email your doctor? Retrieved November 1, 2005 from http://www.myhealthsense.com/F030225_emailYourDoctor.html

Forkner-Dunn, J. (2003). Internet-based Patient Self-care: The Next Generation of Healthcare Delivery. *Journal of Medical Internet Research, 5*(2), e8. Retrieved June 24, 2005 from http://www.jmir.org/2003/2/e8.

Freedman, D. S., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (1999). The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. *Pediatrics, 103*(6), 1175-1182. Retrieved June 24, 2005 from ProQuest Database.

Friedlander, S.L. Larkin, E.K. Rosen, C.L. Palermo, T.M. & Redline, S. (2003). Decreased Quality of Life Associated With Obesity in School-aged Children, *Pediatrics & Adolescent Medicine, 157*(12), 1206-1211. Retrieved June 24, 2005 from ProQuest Database.

Galliers, R. D. (1990). Choosing appropriate information systems research approaches: A revised taxonomy. In H. E. Nissan & H. K. Klein & R. Hirschheim (Eds.),

*Information systems research : Contemporary approaches and emergent traditions.* (pp. 155-173). Amsterdam: North Holland.

Granello, D. H., & Wheaton, J. E. (2004). Online Data Collection: Strategies for Research. *Journal of Counseling and Development, 82*(4), 387. Retrieved June 24, 2005 from ProQuest Database.

Gray, N.J., Klein, J.D., Noyce, P.R., Sesselberg, T.S., & Cantrill, J.A. (2005). The Internet: a window on adolescent health literacy. Journal of Adolescent health,.37(3), 243.

Groves, C., Griffiths, K., & Christensen, H. (2003). Working out MoodGYM: A user's guide. Centre for Mental Health Research: Canberra, 2003.

Halls, S. B. (2004). Health calculators and charts. Retrieved July 20, 2005, from http://www.halls.md.

Hansen, D. L., Derry, H. A., Resnick, P. J., & Richardson, C. R. (2003). Adolescents Searching for Health Information on the Internet: An Observational Study. *Journal of Medical Internet Research, 5*(4), e25. Retrieved June 24, 2005 from http://www.jmir.org/2003/4/e25.

Hampl, J. S., Anderson, J. V., & Mullis, R. (2002). The role of dietetics professionals in health promotion and disease prevention. *Journal of the American Dietetics Association,* 102, 1680-1687. Retrieved November 2, 2005 from http://www. eatright.org/cps/rde/xchg/SID-5303FFEA-80836896/ada/hs.xsl/ home_adar1102_ENU_HTML.htm

Harvey-Berino, J., Pintauro, S., Buzzell, P., & Gold, E. C. (2004). *Effect of Internet Support on the Long-Term Maintenance of Weight Loss.* Retrieved June 24, 2005, from http://www.obesityresearch.org/cgi/content/abstract/12/2/320

Health Insurance Week. (2005). Skyscape Inc.; Mobile references provider makes online application of MyPyramid available free. Retrieved November 3, 2005 from ProQuest database.

Heart Foundation (2005). Heart Foundation Research. Retrieved August 17, 2005 from http://www.heartfoundation.com.au/index.cfm?page=793

Kelder, S. H., Perry, C. L., Klepp, K. I., & Lytle, L. L. (1994). Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviours. *American Journal of Public Health, 84,* 1121-1126. Retrieved June 24, 2005 from ProQuest Database.

Kelley, C., Krummel, D., Gonzales, E. N., Neal, W. A., & Fitch, C. W. (2004). Dietary Intake of Children at High Risk for Cardiovascular Disease,. *Journal of the*

*American Dietetic Association, 104*(2), 222-225. Retrieved June 24, 2005 from

ProQuest Database.

Kent, H. (2003). UBC focuses on obese kids. *Canadian Medical Association Journal,*

*169*(5), 464. Retrieved June 24, 2005 from ProQuest Database.

Landers, S.J. (2004). Kids, TV a weighty blend of trouble, *American Medical News,*

47(12), 26-28. Retrieved June 24, 2005 from ProQuest Database.

Lasker, J. N., Sogolow, E. D., & Sharim, R. R. (2005). The Role of an Online

Community for People With a Rare Disease: Content Analysis of Messages

Posted on a Primary Biliary Cirrhosis Mailinglist. *Journal of Medical Internet*

*Research, 7*(1), e10. Retrieved June 24, 2005 from

http://www.jmir.org/2005/1/e10.

Martin, S. (2004). Younger physicians, specialists use Internet more. *Canadian Medical*

*Association Journal, 170*(12), 1780. Retrieved June 24, 2005 from ProQuest

Database.

McDermid, D. (1998). *The Development of the Business Rules Diagram.* Unpublished

Doctorate, Edith Cowan University, Perth, Western Australia.

Mitchell, J. (1999). The unstoppable rise of e-health. Report prepared for the

Department of Communications, Information Technology and the Arts

(DOCITA). Retrieved September 22, 2005 from

http://www.jma.com.au/tmed99.htm

Mitka, M. (2005). Government Unveils New Food Pyramid: Critics Say Nutrition Tool

Is Flawed. *Journal of the American Medical Association, 293*(21), 2581-2582.

Retrieved November 3, 2005 from ProQuest database.

Muniz, A. & O'Guinn, T. (2001). Brand community. *Journal of Consumer Research.*

*27,* 412-432. Retrieved June 24, 2005 from ProQuest Database.

Obesity, Fitness and Wellness Week. (2005). Diet & Nutrition; New U.S. Dept. of

Agriculture computer-based MyPyramid food guidance system for children

applauded. Retrieved November 3, 2005 from ProQuest database.

O'Brien, P. (2004). Diets fail obese. Monash University, Melbourne.

Oh, H,, Rizo, C., Enkin, M., & Jadad, A. (2005). What Is eHealth (3): A Systematic

Review of Published Definitions. *Journal of Medical Internet Research,*7(1):e1.

Retrieved June 29, 2005 from http://www.jmir.org/2005/1/e1.

Oxford English Dictionary. (2005). Retrieved July 27, 2005 from

http://www.askoxford.com/concise_oed/adolescent?view=uk.

Pagliari, C., Sloan, D., Gregor, P., Sullivan, F., Detmer, D., Kahan, J. P., Oortwijn, W. & MacGillivray, S. (2005). What is e-health (4): A scoping exercise to map the field. *Journal of Medical Internet Research, 7*(1), e9. Retrieved June 24, 2005 from http://www.jmir.org/2005/1/e9.

Popkin, B., & Monteiro, C. (2003). *Demographic and Health Survey Analysis*: World Health Organisation Global Database on BMI.

Potts, H. W., & Wyatt, J. C. (2002). Survey of doctors' experience of patients using the Internet. *Journal of Medical Internet Research, 4*(1), e4. Retrieved June 24, 2005 from PubMed Database.

Pulse. (2002). Obesity in children. *Pulse, 59*. Retrieved June 24, 2005 from ProQuest Database.

Ranchhod, A., & Zhou, F. (2001). Comparing respondents of e-mail and mail surveys: Understanding the implications of technology. *Marketing Intelligence & Planning, 19*(4), 254-262. Retrieved June 24, 2005 from ProQuest Database.

Rheingold, H. (Ed.). (1991). *A slice of life in my virtual community*. Cambridge, MA: MIT Press.

Ridolfo, B., Serafino, S., Somerford, P., & Codde, J. (2000). *Health measures for the population of Western Australia: Trends and comparisons*. Perth, Western Australia: Health Department of Western Australia.

Savoye-Desanti, M. (2005). Bright bodies weight management program for children. Retrieved July 20, 2005, from http://brightbodies.com.

Shanks, G., Rouse, A., & Arnott, D. (1993). *A review of approaches to research and scholarship in Information Systems* (Working paper series). Australia: Department of Information Systems, Faculty of Computing and Information Technology, Monash University.

Shoham, Y. (2002). Stanford institute for theoretical economics, 2002 summer workshop. Retrieved August 16, 2005 from http://www.stanford.edu/group/SITE/ fnlprog2002.html

Skinner, H., Biscope, S., Poland, B., & Goldberg, E. (2003). How Adolescents Use Technology for Health Information: Implications for Health Professionals from Focus Group Studies. *Journal of Medical Internet Research, 5*(4), e32. Retrieved June 24, 2005 from http://www.jmir.org.

Snowball, C. (2004). Join forces against obesity. *Marketing, 31*. Retrieved June 24, 2005 from ProQuest Database.

Sport Industry Australia. (2003). *Sport Industry leaders Summit, Giving our kids a sporting chance. A national approach to overcoming childhood obesity.* Retrieved October 23, 2004, from www.sportforall.com.au/SportSpeak/Volume%202%20Issue%2013%2003%201 0%2003.pdf

Spyt, T. J., Watt, P. A. C., Boehm, M. C., & Stafford, P. R. (2002). Online patient support systems - is there a need? *British Journal of Clinical Governance, 7*(4), 250-254. Retrieved June 24, 2005 from ProQuest Database.

Trowbridge, F. L., Sofka, D., Holt, K., & Barlow, S. E. (2002). Management of child and adolescent obesity: Study design and practitioner characteristic. *Pediatrics, 110*(1 Part 2), 205-209. Retrieved June 24, 2005 from ProQuest Database.

United States Department of Agriculture (USDA). (2005). My Pyramid. Retrieved August 5, 2005 form http://www.mypyramid.com

Watts, K.L. (2004). Birth weight, childhood and adolescent obesity and nitric oxide-mediated vascular dysfunction: effects of exercise training. Ph.D Thesis. University of Western Australia, Perth, Australia.

Webopedia. (2005). Online dictionary and search engine for computer and Internet technology definitions. Retrieved July 27, 2005 from http://www.webopedia.com.

Weiner, C. (2003). Key Ingredients to Online Learning: Adolescent Students Study in Cyberspace – The Nature of the Study. *International Journal on E-Learning 2*(3), 44-50. [Online]. Available: (CD-ROM), San Diego, CA, USA.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine, 37*(13), 869-873. Retrieved June 24, 2005 from ProQuest Database.

White, M. H., & Dorman, S. M. (2000). Online support for caregivers. Analysis of an Internet Alzheimer mailgroup. *Comput Nurs, 18*(4), 168-176. Retrieved June 12, 2005 from ProQuest Database.

Williams, P. A. H. (2001). An investigation into the use of the internet for medical informatics. Thesis submitted to Edith Cowan University, Faculty of Communications, Health and Science, Perth, Western Australia.

Williams, P. A. H. (2004). An investigation into clinical decision-making and the use of electronic information. Research Proposal for Doctor of Philosophy Computer Science. Edith Cowan University, Faculty of Communications, Health and

Science, School of Computing and Information Science Perth, Western Australia.

World Health Organisation. (2004). *Adolescent Health and Development*. Retrieved March 27, 2005, from http://www.who.int/child-adolescent-alth/OVERVIEW/AHD/adh_over.htm

Wysocki, (2001). What is e-health? Retrieved November 3, 2005 from http://www.suite101.com/article.cfm/9670/57010

Zastrocky, M., Yanosky, R., & Harris, M. (2004). *E-Learning in higher education: A quiet revolution*. Gartner. Retrieved 25 September, 2004, from http://www.gartner.com

# 6 Appendices

## 6.1 Appendix A - Responses to Question 8

What kind of support, if any, do you think could be provided by e-health applications for overweight and obese adolescents? This question was asked prior to giving the respondents any ideas about what kind of support could be provided by e-health applications. See the survey in Appendix E.

| |
|---|
| Straightforward information in non-jargon<br>Visually appealing web sites (draws them in)<br>Resource information with appropriate riders about duty of care for practitioners.<br>How-to-talk to parents tips perhaps on-line advice,<br>Underage issues need to be thought through for this, as do duty of care issues for the on-line advisor monitored networking forums for peer support. |
| Correct information regarding diet and exercise!<br>Encouraging different ways to increase activity and modify diet in ways that teenagers are likely to find appealing and practical |
| Knowledge, skills, practical strategies, motivation |
| Unsure |
| Answering questions relating to general health and healthy eating, and exercise. |
| General nutritional information e.g. healthy snacks, take always or any other info re healthy eating which may not have been covered by their dietitian. Hints to overcome binge eating. |
| Suggestions of appropriate professionals to contact for help |
| Getting onto the popular sites they visit via MSN and giving up beat, topical discussions that they would accept eg talking about the choices for a healthy thirst quenching drink other than cola. |
| Ongoing support in the form of ideas to motivate as well as to inform re choosing 'best' food options and activities |
| Stories from other adolescents about how they have managed to reduce weight.<br>Tips on reducing energy load of takeaways and reducing alcohol intake.<br>Nutrition information about soft drinks etc.<br>Budgeting information |
| Peer support groups<br>Between consultation feedback (only if done by an accredited health professional) |
| Behavioural changes, shopping guides, label reading, recipes |
| Am concerned about body image issues and the effect of inappropriate information on the potential development of eating disorders |
| Maybe chat rooms for support and information- self esteem, nutrition, exercise |
| Health information |
| Sensible advice on long term healthy lifestyle |
| Diet & lifestyle advice<br>Support groups |

| |
|---|
| Need to show dieting myths (eg. Carbs are bad)<br>Explain healthy weight ranges.<br>Address basic healthy eating, the core food groups and why we need each one<br>Alcohol |
| I believe you could have regular contact at any time of the day.<br>A reminder, helpful hints, discussion with people with similar problems |
| Reinforce positive message given by health professional – provide guides |
| For youth services etc where adolescents don't always access a qualified dietitian |
| Appropriate contact details so they know which professional to contact i.e. dietitian etc.<br>Enough information cited by relevant references for them to identify that the info is an appropriate source. |
| Credible and reliable information about sensible eating patterns and the dangers of dieting |
| Reinforce positive message given by health professional – provide guides |
| Food diary<br>Exercise records<br>Recipes |
| Answers to frequently asked questions about obesity |
| Regular up to date information and encouragement |
| Preferred sites for credible nutrition and health information<br>Method of comparing current intake against recommended guidelines |
| BMI/ Body fat assessment tools<br>Dietary advice<br>Care Studies (success stories) |
| Good advice |
| Information re ideal weights, consequences of obesity, causes of obesity and management strategies.<br>Interactive support package. |
| No idea |
| FACTUAL INFORMATION, not drug company or product driven would be great |
| Quality information<br>CBT module approach - goal setting, behavioural strategies, scoring, monitoring, cognitive support learning.<br>Support |
| Exercise suggestions<br>Activity suggestions<br>Diet suggestions<br>Mental health - support |
| Dietary advice<br>Exercise options<br>Support groups |
| Direction to further services<br>A question and answer service |
| Regular emails |
| Being positive |
| Pointing individuals in right direction to provide personalised advice |
| Dietary advice - EAT LESS! Activity advice - BE MORE ACTIVE! |
| Ongoing support - eg daily or weekly log in |
| No idea |

| |
|---|
| Discussion forum<br>Variety of strategies for loosing weight - motivational/practice<br>Practical advice/information<br>Calorie charts of food items, calorie value of variety of exercise for calorie charting |
| Encouragement to exercise (change lifestyle)<br>Encouragement/peer support<br>Information (nutritional) and direction to nutritionists (if desired) |
| Similar websites could be set up for obesity as have been for depression - see moodgym anxiety and panic online.<br>Weight watchers have some online information |
| Don't know |
| Information<br>Online counselling<br>Forums (moderated)<br>Discussion groups (moderated)<br>Online guest speakers |
| Good literature<br>Evidence based medicine |
| Provision of information on topic<br>Interactive assessment<br>Peer support and stories<br>Nutritional advice<br>Exercise advice |
| E-activity logs or activity ideas that are frequently updated like a circuit workout at a gym.<br>- Automatic email/SMS alerts to keep individual on track regarding food and activity choices/goals |
| chat rooms<br>recipes<br>food diary |
| Counselling and information if the person providing it is appropriately qualified.<br><ul><li>Professionally reviewed websites</li><li>Potential for more direct communication with clients via email (outside consultations)</li><li>Possibly chat rooms & health professionals participating (? security of this option ie proof of health prof. credentials etc).</li></ul> |
| <ul><li>exercise programs</li><li>realistic aims/goals</li></ul> |
| Recent studies related to their age group.<br><ul><li>sound nutritional advice (not brand specific in recommendations) with brief explanations as to why and functions of nutrition.</li><li>Advice on lifestyle change eg. exercise, stress management, smoking, drinking etc.</li></ul> |
| info updates<br>support + encouragement<br>Q+A interactive |

| support and advice re diet and exercise |
| --- |
| <ul><li>chat rooms</li><li>parameter games</li><li>inner self</li></ul> |
| Websites |
| Information and services that they may otherwise be too embarrassed to seek out. |
| Results of research<br>low GI foods<br>What constitutes protein, carbs etc<br>Foods that are healthy ie how many serves per day<br>List rubbish foods |
| Chat line = support with peer groups and professionals |
| Information - sensible factual and brief<br>pragmatic info about exercise - how much, what sort; + meal regularity |
| Lists of suitable one-on-one professionals |
| present success stories of kids - just like them - who have got slim, fit and healthy + are now theoretically enjoying their adolescence. Put them in touch with some of these youngsters who have done it. Give them detailed regiments for losing weight + regaining their physical beauty + strength. |
| Definition of overweight/obesity<br>Dietary modification<br>Exercise programs |
| Accurate information, easy access to emotional support. |
| - Info on exercise types + intensity for optimal weight loss<br>- Dietary info - how to eat healthy when out and about<br>- Recipes |
| This could encourage self responsibility to the client |
| <ul><li>healthy choices for snacks and take aways</li><li>Portion information</li><li>simple meal plans</li></ul> |
| <ul><li>monitoring</li><li>encouragement</li><li>education</li></ul> |
| Factual information on behavioural change |

| |
|---|
| General information about nutrition and exercise. But we do not need children sitting on their backsides looking at information on a computer. They should be outside being physically active! |
| Factual information |
| Advice on alcohol intake Activity guidelines + alternatives Advice on snack foods, eating out etc Cooking skills |
| Troubleshooting facts + figures Monitoring |
| general exercise advice Specific nutrient advice to certain foods |

## 6.2 Appendix B – Responses to Question 9, Part 2.

| |
|---|
| I don't see people under 18 so it's a bit theoretical. However, a fourteen year old is in a developmentally different state than a nineteen year old. I may well 'refer' older teens to resources, but I would tend to keep a closer watch on younger kids for the obvious reason that their understanding needs to be monitored more closely and misconstruing dealt with . |
| Not familiar of any of value. |
| I'm not confident with what's available and its accuracy. |
| I provide my own resources. I am not really aware of resources that are available on the internet. |
| Not aware of any |
| I am not familiar with appropriate Australian websites to meet this purpose |
| Not aware of how to use |
| I don't see enough overweight adolescents to have considered this path much. |
| Not online at surgery<br>On minimal net hours at home |
| Not aware of resources available |
| I am unaware of any of the above |
| Not aware of any specific for adolescents |
| I am not familiar with these resources |
| Not something I do |
| No |
| Don't know any |
| Not aware of them |
| I do not consult patients in my practice |
| I am not aware of any of these resources, and being older relatively computer illiterate |
| Don't know about them |
| N/A |
| Because it is more important to do things that are real and not sit at a computer i.e. I recommend them to do something |

Very individualised. Would not recommend due to being over informed or being confused which way to go

Trying to discourage time spent in front of a computer. Too easy for people to get obsessive

None- They are counter productive to the very problem of obesity - it is from <u>sitting</u>!
I give my own advice: Eat 2/3 of the food on your plate - eat less, exercise more + medication to assist (Diatomite)

No

Don't usually deal with obesity

Not familiar of any of value.

Conduct clinic once a fortnight from a public hospital out-patient dept with limited resources - we do however enrol families in a program by which they receive fortnightly mail outs of information regarding healthy lifestyle habits

Don't get round to it

Although I do recommend these and on occasion others I only recommend sites I've recently reviewed as a part of my professional responsibility + credibility.

Use written resources or referral

I've never considered this an option.

No current recommendations

May not be effective

There is a lot of rubbish on the net that people think are gospel

Ignorance

Nil - most of my patients don't have access to Internet, speaking English as 2nd language.

Information often not accurate, or misinformed. Can be taken out of context or misinterpreted.

Don't - will do if I know them.

I'm unaware of websites for obese kids. i don't see many youngsters who have an obesity problem.

Don't know of any

Don't really know of any

Lack of awareness

Lack of direct web access in consultancy room

Do not know of these resources

Not aware of <u>good</u> e-resources

I am still researching websites etc

For adults I stress a biological behaviour changes model. My Development. Also obesity in my practice is usually the end result of psychological issues.

| |
|---|
| Not familiar with them myself |
| E-monitoring only under the supervision of their practitioner. |
| All information needs to be carefully screened so children are not receiving misinformation on fad diets or nutritional supplements which are claimed to assist weight loss |
| I rarely deal with overweight adolescents |
| Have been wary to get people onto web due to mixed information that is provided. Info can be read out of context. |

## 6.3 Appendix C – Responses to Question 12

| |
|---|
| Qualified health professionals providing coaching and ongoing motivation/ trouble shooting |
| A website detailing healthy eating, portions, how to lose weight sensibly, the dangers of crash dieting, simple recipes, suggestions for healthy snacks, issues re peer pressure, etc. |
| as per question 8. The resources obviously need to be in a format that appeal to the age group. |
| Easy to follow eating and exercise program<br>Interactive 'teenage' persona – who could discuss topical issues and possible scenarios for health |
| Something easy and fun to use. Perhaps, even an email service, where the adolescent is sent short snippets of information relevant to them rather than expecting them to remember to log on to a particular website. |
| support networks, health information, similar towww.realitycheck.com.au which is designed for young people with type 1 diabetes and very popular |
| Peer support groups that are regulated by accredited health professionals to clarify any dodgy ideas. |
| As per question 8 |
| as listed above. I like the edairy suggestion |
| See Q10 |
| Useful websites |
| Good, adolescent directed sites (+ too many "dodgy" sites)<br>One aimed at adolescents - so potentially needs to be developed by people of that age |
| As above |
| basic advice to make specific lifestyle changes e.g. |
| Ones that are age specific particular chat groups that could offer support and accurate information to dispel myths about weight loss information on the latest fads etc also a reminder system or a recording system that allows them to track progress. There should be information on maintenance after losing weight, and prevention of weight gain if they don't need to lose weight. Ideas about making it fun rather than chore |
| An interactive program that they work through |
| An interactive program that they work through |
| basic nutrition and healthy lifestyle<br>information<br>healthy eating information<br>link to DAA website wi6th disclaimer that info provided is of a general nature only and that for individual advice should see and APD |
| self assessment<br>motivation talks |
| ones that address eating habits holistically eg. help in understanding non-hungry eating, emotional eating etc, include healthy meal and snack options, links to further support eg. dealing with binge eating behaviour |
| Unknown |
| Unsure |
| See Q8 |
| Pedal generators to power computers |
| As above realistic factual resources |

| |
|---|
| Basic calorie counters and meal analysis <u>Visual -</u> calorie counter i.e. show toore on screen + give calorie count |
| Mogram line moodgym |
| How to turn off the computer and go outside |
| Support groups |
| interactive sites including the health professionals |
| One's that are 'short and sweet'. Don't advocate sitting for too long to find things out! |
| Humour involved |
| Information that details the current thinking and looks at the alternatives to dispel the myths |
| see Q8 |
| It would be useful to have a website especially targeting adolescents - I would suggest it is an interactive site such as moodgym |
| See Q8 |
| Schools |
| Enough are available, however need more publicity, possibly reviewed by adolescents with view to making them more user friendly. I do not know of any interactive sites or support sites, therefore beyond pure information provision, probably needs some development. |
| chat rooms for discussion between other o/o adol, mediated by an appropriate health professional |
| there are some good websites in the US I have seen via their Dietitians Assoc. |
| Unsure |
| Of what I see there needs to be more resources specific to adolescents re sending a message/being accessible to this audience/ or group of participants. |
| As in Q8 exercise programs realistic aims/goals |
| info pages specifically for adolescents |
| see before |
| age appropriate resources |
| Not sure of current level of resources |
| Do not know |
| Recommend list of qualified practitioners A phone number they could contact for referrals for help. |
| Don't know at this point - my patient group would appreciate less writing and more pictures |
| Not the appropriate form of communication |
| As detailed in Q8 |
| user friendly resources to help recognise that they have a problem |
| monitored discussion groups/support groups Could avoid shame of attending in person + spealy of cravings etc. |
| Unsure |
| Educational online support |
| Diaries tips to maintain motivation |
| Do not think weight reduction technology will help in my practice |
| Sensible dieting/exercise programs |
| Factual based information Experience of healthy weight loss as reported by those who have achieved it. |
| Need to ask the kids, probably everything in Q13 |

## 6.4 Appendix D – Additional Survey Comments

| |
|---|
| Overweight in teenagers is a complex issue and very different for each individual. It's great to provide accurate and teenage friendly information but beware of 'advice' that may not suit everyone and may be taken to the extreme by some teenagers. |
| Great ideas |
| The content of the site would need to be written and operated by a non-commercial, independent organisation |
| What on earth is a "value"? <br> Unable to determine what "value" choice is on all Qs. <br> You do not ask what % of my patients are adolescents. |
| Q6 Discussed and sometimes useful, sometimes not useful |
| Q6 Discussed and useful |
| the passing on of unhelpful advice |
| My practice is almost entirely geriatric with average patient age of 84.4years! <br> The remainder of the questionnaire really does not apply to my practice. |
| I'm sorry - this survey is of no interest to me. |
| Its easy to lie to a machine |
| Family factors, lifestyle essential issues <br> But increase teens relate to peers. <br> Place for both family bases strategies and individual based strategies |
| Computer geeks would be a better target, most of them are obese and are a good disincentive to spending time on a computer. They also are more high risk for ischaemic ht D & Ca etc being older & stressed. |
| While e-health initiatives can provide supportive advice, they are not the solution to the current obesity epidemic by any means. The current epidemic is not simply the fault of individuals - it is an environmental problem. We need to make healthy choices easy choices and make the environment more conducive to increasing physical activity. |
| Q6 Adult patients do, but no adolescents i can remember, when discussed with adults, discussed and useful <br> Q7 But the point is they are overweight because they ARE sitting on the Internet instead of running around outside, playing sport etc!! |
| Really do not know. Any thing which helps a fuller and happier life. Like my homeopathies help people become more effective and balanced |
| Need to provide evidence based, user friendly information, considering the psychological aspects of weight gain, and watch for vested interests i.e. conflict of interest |
| "anorexia" websites |
| Online and e-health applications like any other mediums of communication health information can lack the human element i.e. eye to eye caring communication that needs to be a part of developing a successful approach to health issues what ever they are. i.e. need to be used as a part of an overall approach. |
| I prefer the time with my clients as the psychological support ie self-esteem, family issues are often more of the problem than the obvious wrong eating patterns, lack of exercise etc. |

| |
|---|
| Forget teen language 'crap' just plain talk<br>The biggest onus of responsibility falls to the parents.<br>Experience tells me that regardless of the subject in question, all facets of learning, education, responsibility, self-esteem, pride and achievement begin squarely with parents and even the extended family including grandparents, uncles etc.<br><br>It seems that families cook less (with no involvement of children), far too much consumption of fast/fried/sweetened/processed foods, and treated as the norm and OK.<br><br>Prolific availability of inappropriate foods (?). |
| Over focus on time spent on computers! How to guarantee good sites with correct info! |
| Interesting study - good area to look at! Best wishes for your project :) |
| Good luck! Any services that can help young people heal, grow + individuate must be good. |
| Online has some advantages for rural people but often a sensible professional has been seen. It requires the user to be able to identify the real problem/s.<br>if they are able to do this, they would not have a problem. This is the same reason why classes don't work + newspapers + magazines are ?? at least |
| Most common sites accessed by adolescents appear to be eating disorders related |
| Most of my adolescent clients with eating related issues are underweight + with symptoms of anorexia - e-support for them would also be very useful.<br>My experience indicates that adolescents are unlikely to see a psychologist "shrink" as useful for overweight issues - usually it is adults who seek assistance in relation to this topic. |
| Would be a good additional resource to individual treatment |
| Possible incorrect advice - not individualised advice<br>- lack of dealing with underlining causes i.e. emotional etc<br>- lacking human connection i.e. face to face |
| Behavioural change is difficult especially in relation to eating - are you addressing this or are you going to deliver more of what already is? |
| Internet info is often too generalised and can be incorrect when applied to an individual, although generally correct. |
| Q6 discussed if relevant |
| Q6 Discussed but not relevant as well |
| Encouraging more sit down use of computer - reducing activity further |

## 6.5 Appendix E – The Online Survey

The role of online and e-health applications to support overweight and obese adolescents.

Welcome and thank you for participating in this survey.

This survey should take between 5 and 10 minutes to complete.

Aim of this survey
The aim of this research is to investigate whether e-health applications could be beneficial to overweight and obese adolescents. Furthermore, the study aims to establish what electronic resources healthcare practitioners recommend to their overweight and obese adolescents patients. The research is exploratory in design and will attempt to identify future research projects.

Confidentiality
This survey is completely anonymous and information gathered will only be used for its intended purpose. No identification codes will be assigned to the data. Only the researcher and the supervisor will have access to the original information gathered. The information you provide will not be disclosed to any third parties. The data will be used for research purposes and subsequent publications of the findings only.

Instructions
Please read each question and then choose a radio or check box option that best describes your answer. You will be alerted to questions that may allow more than one response. Comment boxes are also provided. Please feel free to enter any relevant comments; your qualitative feedback will be highly valued. Although it is not compulsory to answer any questions, the effectiveness of this survey will be greatly enhanced if a response is given to all questions. You will only be able to save the survey once, and the survey website will time out after 45 minutes.

Definitions
Adolescent: A person between 10 and 19 years of age.
E-health: "E-health is the process of providing healthcare via electronic means, in particular over the Internet. It can include teaching, monitoring (e.g. physiologic data), and interaction with healthcare providers, as well as interaction with other patients afflicted with the same conditions" (Oh, H,, Rizo, C., Enkin, M., & Jadad, A. (2005). What Is eHealth (3): A Systematic Review of Published Definitions. Journal of Medical Internet Research,7(1):e1. Retrieved June 29, 2005 from http://www.jmir.org/2005/1/e1.).

Any questions should be directed to the researcher:
Rachel Mahncke rmahncke@student.ecu.edu.au or the supervisor:
Dr. Leisa Armstrong l.armstrong@ecu.edu.au

Once you have completed answering the questions, please scroll to the top of the survey and select the 'Save and Close" tab to submit the survey form.

Thank you for your contribution.

Q1. What is your profession? (more than one option may be selected):

- [ ] General Practitioner
- [ ] Paediatrician
- [ ] Cardiac specialist
- [ ] Nurse
- [ ] Dietitian
- [ ] Nutritionist
- [ ] Psychologist
- [ ] Psychiatrist
- [ ] Exercise physiologist
- [ ] Sports science specialist
- [ ] Homeopath
- [ ] Naturopath
- [ ] Specify your own value:

Q2. Where is your work located? (more than one option may be selected):

- [ ] Australian Capital Territory
- [ ] New South Wales
- [ ] Northern Territory
- [ ] Queensland
- [ ] South Australia
- [ ] Tasmania
- [ ] Victoria
- [ ] Western Australia
- [ ] Specify your own value:

Q3. Do you work in:

- [ ] A rural area
- [ ] A metropolitan area
- [ ] Both

Q4. Please select your age group:

- [ ] Less than 20
- [ ] 20 to 29
- [ ] 30 to 39
- [ ] 40 to 49

☐  50 to 59

☐  60 to 69

☐  70+

Q5. Of the adolescent patients that consult you, what percentage do you treat for overweight or obesity related conditions?

☐  None

☐  less than 25%

☐  25% to 49%

☐  50% to 74%

☐  75%+

Q6. Do overweight and obese adolescent patients present you with information, obtained from the Internet, regarding their health or medications?

☐  Regularly

☐  Often

☐  Sometimes

☐  Rarely

☐  Never

If so, what usually happens? The information is:

☐  Not discussed

☐  Deemed irrelevant

☐  Discussed but not relevant

☐  Discussed and useful

Q7. Do you think that e-health applications could be beneficial to overweight and obese adolescents?

☐  Yes

☐  Possibly

☐  Neutral

☐  No

☐  Definitely not

Q8. What kind of support, if any, do you think could be provided by e-health applications for overweight and obese adolescents?

[ text input box with formatting toolbar ]

Q9. Do you recommend any of the following electronic resources to your overweight and obese adolescent patients? (more than one option may be selected):

- ☐ Information in Electronic Form
- ☐ Websites
- ☐ Online communities
- ☐ E-health applications
- ☐ E-monitoring
- ☐ E-diary
- ☐ E-prescriptions
- ☐ E-visits
- ☐ SMS services to mobiles
- ☐ Services to PDA's
- ☐ Specify your own value:

If you recommend any of these resources, please specify the names and web addresses:

[ text input box with formatting toolbar ]

If you do not recommend any of these resources, please give your reasons why not?

[ text input box with formatting toolbar ]

Q10. Do any of your overweight or obese adolescent patients ask you to recommend any electronic resources?

- ☐ Regularly
- ☐ Often
- ☐ Sometimes

☐ Rarely

☐ Never

Q11. Do you think that there are sufficient online and electronic resources available for overweight and obese adolescents to use?

☐ Yes

☐ Enough

☐ Too few

☐ No

☐ Don't know

Q12. What online or e-health resources, do you think need to be developed for use by overweight and obese adolescents?

A Ä| B *I* U | ≣ ≣ ≣ | ≣ ≣ ≣ ≣ | A ◈ | ▸¶ ¶◂

Q13. What features and functionality do you believe should be incorporated into electronic and e-health applications for overweight and obese adolescents? (more than one option may be selected):

☐ Interactivity

☐ Support

☐ Real-time member chat rooms

☐ Online chat with an expert

☐ Message boards/forums

☐ Factual health related content

☐ Private diary

☐ Private weigh in page

☐ Personal postings

☐ Success stories

☐ E-monitoring

☐ E-visits

☐ Services to mobiles and PDA's

☐ Personalised eating plan

☐ Recipes

☐ Exercise advice

☐ Tailored 'teen language'

☐ Related online games

☐ Parent/guardian information

☐ Specify your own value:

Q14. Please indicate any concerns you may have about adolescents using such online and e-health applications? (more than one option may be selected):

☐ Possible incorrect advice

☐ Conflicting advice

☐ Legal liability

☐ Lack of monitoring

☐ Intruders

☐ Harassment/bullying

☐ Specify your own value:

Any additional comments relating to the survey (unlimited space):

A A̅ | **B** *I* <u>U</u> | ☰ ☰ ☰ | ☷ ☷ ☶ ☶ | **A** ◈ ◀¶ ¶▶

Please scroll to the top of the survey and select the 'Save and Close' tab.

**Thank you for your time and effort in completing this survey.**

## 6.6 Appendix F - Email to Participants

# The role of online and e-health applications to support overweight and obese adolescents.



Your participation in this research would be greatly appreciated.

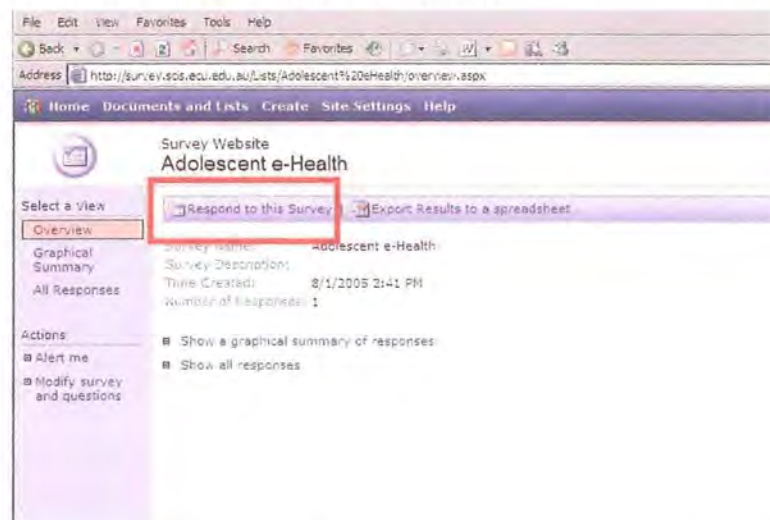By completing the survey you are consenting to take part in this research.

**The Survey Disclosure Information and questionnaire are included in this email.**

There are **three options for completing this survey**, please select one of the following:

1. To complete the anonymous online survey please click on the following link:

   http://survey.scis.ecu.edu.au/Lists/Adolescent%20eHealth/overview.aspx

   Select the '**Respond to this Survey**' tab.



Once you have completed answering the questions please select the '**Save and Close**' tab before closing your browser window.
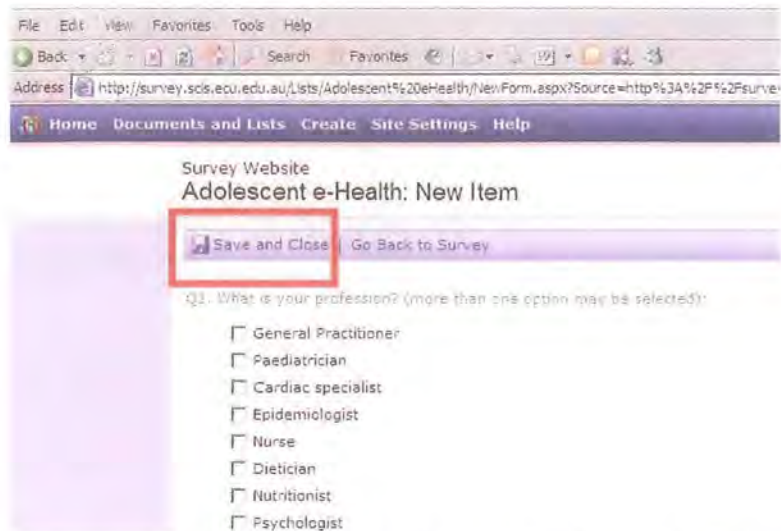
2. The survey is included in this email, should you prefer this option, please select the reply tab in your email application and navigate down to the start of the survey. Once you have completed answering the questions, select the send tab in your email application. All identifiable information will be removed prior to data analysis.

3. Should you prefer to receive a paper-based postal survey, please select the reply tab in your email application, supply your name and postal address details, and return the email back to the researcher. The survey will then be posted to you together with a reply paid envelope.

Name:

Address:

Postal code:

State:

# Research Survey Disclosure Information

## The role of online and e-health applications to support overweight and obese adolescents.

Thank you for volunteering to participate in this study, your contribution is greatly appreciated.

**Researcher and Contact Details:**

**Researcher:**
Rachel Mahncke,
School of Computer and Information Science

**Supervisor:**
Dr Leisa Armstrong,
School of Computer and Information Science

Faculty of Computing Health and Science
Edith Cowan University,
2 Bradford Street,
Mount Lawley
Western Australia 6050
Tel:   +61 8 6304 5914
Fax:   +61 8 9370 6100
Email: rmahncke@student.ecu.edu.au

Faculty of Computing Health and Science
Edith Cowan University,
2 Bradford Street,
Mount Lawley
Western Australia 6050
Tel:   +61 8 9370 6506
Fax:   +61 8 9370 6100
Email: l.armstrong@ecu.edu.au

This research project is being undertaken as part of the requirements of a Bachelor of Science (Software Engineering) with Honours, degree at Edith Cowan University.

**Research Description**

The aim of this research is to investigate whether online and e-health applications could be beneficial to overweight and obese adolescents. Furthermore, the study aims to establish what electronic resources healthcare practitioners recommend to their overweight and obese adolescents patients. The research is exploratory in design and will attempt to identify future research projects.

The research project will consist of a single survey administered nationally to a diverse group of healthcare practitioners. The survey will consist of fourteen questions which should take approximately 5 to 10 minutes to complete. You are invited to participate in this research as a healthcare practitioner, practising or recently practising, in Australia. Your participation in this research will require you to complete the survey either via: the online survey, this email or by post.

With the completion of the Honours thesis, the expected theoretical contribution will be in the extension of the theory of electronic information use. Further, this research may highlight healthcare practitioners' attitudes towards, and adoption of e-health technology today. These are significant issues given the rapid growth of e-health information on the Internet and patients growing demand for these resources to be made available.

Participation in this research is voluntary and you are free to decline this invitation to participate, or to withdraw at any time. Your decision not to participate, or to withdraw later will not be disclosed by the researcher to anyone else.

The confidentiality of all information will be maintained. Any identifiable information will be removed from the research data prior to analysis. No identification codes will be assigned to the data. Only the researcher and the supervisor will have access to the original information gathered. The information you provide will not be disclosed to any third parties. The data will be used for research purposes and subsequent publications of the findings only.

This research is not concerned with specific patient outcomes. No patient or clinically specific information is sought, nor will any patient specific cases be discussed. Therefore, according to the guidelines devised by the NHMRC, this stage of the research does not breach patient confidentiality or any other patient/doctor privacy issues.

If you have any questions or require any further information about the research project entitled "The role of online and e-health applications to support overweight and obese adolescents", please contact the researcher, Rachel Mahncke or the supervisor Dr Leisa Armstrong on the contact details provided above.

If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact:
Research Ethics Officer
Human Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone:      (08) 6304 2170
Email: research.ethics@ecu.edu.au      "

This is an anonymous survey. By completing the survey you are consenting to take part in this pilot study research.

There are three options for completing this survey as outlined at the start of this email.

Please select one of the following options:

1.  The online survey option available at:

    http://survey.scis.ecu.edu.au/Lists/Adolescent%20eHealth/overview.aspx
    ;

2.  The email survey option;

3.  The paper-based postal option:

Your participation in this research is greatly appreciated.

Rachel Mahncke

rmahncke@student.ecu.edu.au

## Survey Questions

Welcome and thank you for participating in this survey.

Instructions for completing the email survey option:
Please read each question and then select your answer by highlighting the required text or by inserting your text answer. You will be alerted to questions that may allow more than one response. Please feel free to enter any relevant comments; your qualitative

feedback will be highly valued. Although it is not compulsory to answer any questions, the effectiveness of this survey will be greatly enhanced if a response is given to all questions.

Definitions
Adolescent: A person between 10 and 19 years of age.
E-health: "E-health is the process of providing healthcare via electronic means, in particular over the Internet.
It can include teaching, monitoring (e.g. physiologic data), and interaction with healthcare providers, as well as interaction with other patients
afflicted with the same conditions" (Oh, H,, Rizo, C., Enkin, M., & Jadad, A. (2005).
What Is eHealth (3): A Systematic Review of Published Definitions.
Journal of Medical Internet Research,7(1):e1. Retrieved June 29, 2005 from
http://www.jmir.org/2005/1/e1.).

Any questions should be directed to the researcher: Rachel Mahncke
rmahncke@student.ecu.edu.au or the supervisor:
Dr. Leisa Armstrong l.armstrong@ecu.edu.au

Once you have completed answering the questions, please select the 'Send' tab in your email application.

Thank you for your contribution.

**Rachel Mahncke**

Should you prefer to respond by selecting reply to this email, please indicate your answer selections by using one of the following methods to indicate your answers, either: **Bold,** highlight or coloured text.

## 6.7 Appendix G – Postal Letter

# The role of online and e-health applications to support overweight and obese adolescents.

## Explanation to potential Questionnaire Respondents

### Introduction
The aim of this research is to investigate whether online and e-health applications could be beneficial to overweight and obese adolescents. Furthermore, the study aims to establish what electronic resources healthcare practitioners recommend to their overweight and obese adolescents patients. The research is exploratory in design and will attempt to identify future research projects.

### Explanation
This is an anonymous survey. By completing the survey you are consenting to take part in this research. If you agree to assist in this research would you please fill in the attached questionnaire and return it in the pre-paid envelope provided as soon as possible. Alternatively, you may wish to complete the online survey option available at: http://survey.scis.ecu.edu.au/Lists/Adolescent%20eHealth/overview.aspx;
Select the '**Respond to this Survey**' tab. Once you have completed answering the questions please select the '**Save and Close**' tab before closing your browser window.

### Duration`
The questionnaire takes approximately 5 minutes to fill in.
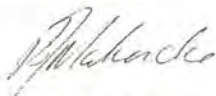
### Contact Details:

| Researcher: | Supervisor: |
|---|---|
| Rachel Mahncke | Dr Leisa Armstrong |
| School of Computer and Information Science | School of Computer and Information Science |
| Faculty of Computing Health and Science | Faculty of Computing Health and Science |
| Edith Cowan University, | Edith Cowan University, |
| 2 Bradford Street, | 2 Bradford Street, |
| Mount Lawley | Mount Lawley |
| Western Australia 6050 | Western Australia 6050 |
| Tel:    +61 8 6304 5914 | Tel:    +61 8 9370 6506 |
| Email: rmahncke@student.ecu.edu.au | Email:  l.armstrong@ecu.edu.au |

If you have any questions or require any further information about this research project please contact the researcher, Rachel Mahncke or the supervisor Dr Leisa Armstrong on the contact details provided above. Your participation in this research is greatly appreciated.

Rachel Mahncke

9 September 2005

# Survey Questions

For the purposes of this research:

An adolescent is defined as: A person between 10 and 19 years of age (WHO, 2004).

E-health is the process of providing healthcare via electronic means, in particular over the Internet. It can include teaching, monitoring (e.g. physiologic data), and interaction with healthcare providers, as well as interaction with other patients afflicted with the same conditions.

**The role of online and e-health applications to support overweight and obese adolescents.**

The questionnaire, identical to the online survey questionnaire, was inserted at this point.

**End of survey.**

## 6.8 Appendix H – Ethic Clearance Letters

10 August 2005

Mrs Rachel Mahncke
6A Astra Court
Ocean Reef   WA   6027

Student #  2003347

Dear Mrs Mahncke,

*Course:*          *Bachelor of Science (Soft Eng) Honours*

*Thesis Title:*    *The role of online and e-health applications to support*
                   *overweight and obese adolescents.*

*Date Approved:*   *9ᵗʰ August  2005*

Please be advised that your application for Ethics Clearance has been approved by
the Faculty of Computing, Health and Science Ethics Sub-Committee for the
conduct of Human Research.

This approval is granted subject the procedures outlined in your application.

Please note that the collection of data for your research must adhere to these
conditions.

I wish you all the best in your studies.

Regards,

A/Professor Paul Lavery
Acting Associate Dean (Research & Higher Degrees)
Faculty of Computing, Health and Science
Phone: 08 6304 2617
Fax:    08 6304 2805
Email: p.lavery@ecu.edu.au

cc.    *Student File*
       *University Ethics Committee*
       *Supervisor – Trish Williams*
       *Postgraduate Coordinator – Michael Collins*

## EDITH COWAN UNIVERSITY        MEMO
## FACULTY OF COMPUTING, HEALTH AND SCIENCE

### Human Ethics Subcommittee

TO:        Christianne White, Admin. Officer, Higher Degrees
FROM:     Angus Stewart, Chair, Faculty Human Ethics Subcommittee
SUBJECT:  Human Ethics Clearance Application/s
DATE:     9th August, 2005.

Dear Christianne,

       The following ethics application is approved (Category 1), subject to the following conditions: NIL.


| Rachel Mahncke | J | The role of online and e-health applications to support overweight and obese adolescents. |
|---|---|---|


Best wishes,


Angus

## 6.9 Appendix I – Additional Publications

**Published refereed conference papers:**

Williams, P. A. H., & Mahncke, R. J. (2005). The blurring of on-campus and off-campus education: A position paper. *Paper presented at the Managing Modern Organizations with Information Technology; Proceedings of the 2005 Information Resources Management Association International Conference*, May 15-18, 2005, (CD-ROM), San Diego, CA, USA.

Williams, P. A. H., & Mahncke, R. J. (2005). Investigating student interaction: A forum analysis. *Paper presented at the Transforming Information and Learning Conference; proceedings of the 2005 inaugural conference,* October 1, 2005, (USB drive), Perth, Western Australia.

Williams, P. A. H., & Mahncke, R. J. (2005). A new breed of risk: Electronic Medical Records Security. *Paper to be presented at the 6th Australian Information Warfare and Security Conference*, November 24-25, 2005. Melbourne, Australia.