A STUDY ON THE ADOPTION OF A WEB PAGE CONTENT ASSESSMENT TOOL: SPAT

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As more users rely on web-based health information there is a growing need to identify reliable information sources. Currently there are a few evaluation approaches for web-based information but they require paper-based materials for note taking or require utilization on a subjective ranking system. In each case, these approaches require an extended period of time to assess the web page and do not provide a validated measure of accuracy or quality. The broad aim of this study was to measure the validity and the adoption, of the new web page assessment tool, SPAT.

The mnemonic, SPAT, stands for Site, Publisher, Audience, and Text. As a web page assessment tool, SPAT cues individuals to analyze four components of a web page, each showing a sign of reliability. Once individuals inspect the web page with the SPAT criteria, they then make an educated assessment on the quality of the information presented. A cohort of certified diabetes educators were introduced to SPAT and tested its application.

Results revealed that SPAT showed characteristics of validity and routine use. Within the convenience sample of certified diabetes educators there was 100% performance in evaluating a web page for an author and date. Analyzing the web page to perceive the intended web page audience also had 100% compliance, while looking at the text of the web page occurred 90% of the time.

This investigation was accomplished through the completion of a formal research process, each described within the body of this dissertation. The SPAT instrument would not only be of value for health care professionals but for general information consumers as well.

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1. INTRODUCTION

With the evolution of the World Wide Web (WWW) the methods people use to access information have changed. A December 2005 study from the Pew Internet and American Life Project found that, next to email and general searching, reading news is the third most popular activity (Horrigan, 2006). The Internet has granted people an anonymous way to access general information as well as health information. This change in information attainment has assisted in transforming the librarian's role as an information provider to one of educator. Now librarians along with health care practitioners must inform consumers about the quality and reliability of health information they obtain from the WWW (Adelhard & Obst, 1999; Childs, 2004; Curro, Buonuomo, & Onesimo, 2004; Fallis & Fricke, 2002; Fricke, Fallis, Jones, & Luszko, 2005; Fritch, 2003; Ilic, Risbridger, & Green, 2004; Jain & Barbieri, 2005; Pealer & Dorman, 1997; Purcell, 2002; Silberg, Lundberg, & Musacchio, 1997; Wyatt, 1997). Through the WWW, accurate, inaccurate, scholarly and not so scholarly content can be disseminated rapidly. From chat rooms to blogs to personal web pages and listservs™, some of the services attainable via the Internet, content can be posted with minimal effort and be readily accessed. This large quantity of information on the WWW is unregulated and a percentage of that content concerns human health (Jupitermedia Corporation, 2003; Levy, 2003; Siau, 2003; Thakurdesai, Kole, & Pareek, 2004; von Knoop, Lovich, Silverstein, &

Tutty, 2003). With no regulations in place, people must rely on their own knowledge to assess the content they read on the WWW as fact or fiction. Not knowing the accuracy of the information presented and without the skills or proper tool to critique WWW content, people are not protected from incorrect information and just plain bad health care advice (Eysenbach, 2002; Silberg, Lundberg, & Musacchio, 1997). Chris Dede, Harvard University's Timothy E. Wirth Professor in the Graduate School of Education, explains that in today's world, people have "…to filter instead of find – a very different and more complex set of skills" (Dede, 2002). Without the filtering mechanism of a purchase plan utilized by libraries for their holdings, people need to be trained to judge what they read on the WWW by learning how to analyze the content methodically. With information from the WWW a lack of critical judgment can be harmful and costly.

Through investigative research, several studies indicate that not everything is reliable on the WWW (Eysenbach, 2002; Impicciatore, Pandolfini, & Casella, 1997; Oravec, 2001) and that people can easily be misled. JoAnn Oravec claimed in the *Journal of Health & Social Policy* that, "The large amount of misinformation being exchanged on-line has been construed as a "syndrome" that requires a concerted effort by the medical community to overcome." (Oravec, 2001) She then goes on to say that because of the large numbers of consumers using the WWW on their own they need to be equipped to understand its limitations and potentials. While Oravec does not recommend one profession to rectify the problem specifically, she does recommend training health care professionals to inform and teach patients about evaluating information from the WWW.

1.1.1. Existing WWW reliability and validity tools

Although the importance of providing information on evaluating and critiquing WWW content is recognized in the literature, evidence does not indicate that professionals and laypeople are evaluating and critiquing that information. No articles at the time of this investigation provide an easy-to-remember tool that can be used to assess the reliability of any type of web page.

1.1.2. WWW health literacy

The U.S. Department of Health and Human Services publishes national health objectives based upon research in and outside of the government. The report, entitled Healthy People 2010, includes public health priorities and specific measurable objectives for accomplishment by 2010. Increasing households with Internet access, and improving health literacy are two of the six objectives for their priority 'Health Communication' (Office of Disease Prevention and Health Promotion, 2000a). Health Literacy, as defined by the National Forum on Information Literacy, is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (National Forum on Information Literacy, 2003). With the government expressing interest in households having computers with Internet access, it is of utmost importance that consumers have the knowledge with a quick and easy tool to assist them, in evaluating the reliability of the content on a web page.

1.1.3. Public health disparities

Healthy People 2010 has two overarching goals. The first is to "increase quality and years of healthy life," and the second is to "eliminate health disparities" (Office of Disease Prevention and Health Promotion, 2000c). One of the diseases selected for attention by the government is diabetes. In fact, it was listed fifth out of the 28 focus areas in Healthy People 2010 (Office of Disease Prevention and Health Promotion, 2000b) and in 2002, it was the sixth leading cause of death in the United States, according to the Centers for Disease Control (CDC) (United States Department of Health and Human Services, 2005). For 2005, the CDC, estimated that over 20 million people in the United States have diabetes (United States Department of Health and Human Services, 2005). These numbers demonstrate that diabetes has reached epidemic proportions. The New York Times wrote a series on the disease in January 2006. A paragraph from the article, "Diabetes and Its Awful Tool Quietly Emerge as a Crisis," explains the gravity of the problem.

> "'How bad is the diabetes epidemic?" asked Frank Vinicor, associate director for public health practice at the Centers for Disease Control. "There are several ways of telling. One might be how many different occurrences in a 24-hour period of time, between when you wake up in the morning and when you go to sleep. So, 4,100 people diagnosed with diabetes, 230 amputations in people with diabetes, 120 people who enter end-stage kidney disease programs and 55 people who go blind" (Kleinfield, 2006)."

Because the disease attacks vital organs within the human body, physicians and nurses from the fields of endocrinology, cardiology, nephrology, ophthalmology, nutrition, pediatrics, podiatry and more, all care for diabetes in some aspect. Some specialists only treat the disease, while others try to educate the persons with diabetes about their disease. For those that want to specialize in educating persons with diabetes, the National Certification Board for Diabetes Educators has established a testing program for people to obtain certification to teach and support those with diabetes. After successfully completing the certification program, the health professional becomes a Certified Diabetes Educator (CDE).

The primary purpose of a Certified Diabetes Educator is to assist people with diabetes to live a healthier and more productive life (American Association of Diabetes Educators, 2004). These professionals posses specialized knowledge about diabetes and assist persons with diabetes in planning meals, developing schedules for monitoring blood sugar levels, teaching how to recognize when a doctor needs contacted, teaching about how medications work, teaching how to monitor blood glucose to avoid the risk of complications, and supplying general educational materials about the disease itself. The educational materials come in two formats, paper and electronic. Brochures, pamphlets and journal articles usually come in paper formats. These paper information sources have been reviewed and approved by several managerial layers in an organization before being published (Roberts, Coverdale, Edenharder, & Louie, 2004). With this type of scrutiny, the CDE only had to worry about the relevancy of the information for the patient. With the advent of the WWW, diabetes information became available to anyone – un-moderated. CDEs now have educational material for patients that comes in paper and electronic formats. The information from web pages needs to be evaluated personally by the CDE for accuracy and reliability before guiding a patient to that web page to learn about

diabetes. At the time of this writing, there are currently no standard criteria for assessing information about diabetes from web pages (Bedell, Petersen, & Agrawal, 2004). This means the content from a web page does not have to follow criteria or adhere to quality standards (Pealer & Dorman, 1997). Since many printed publications go through a review and evaluation process (Roberts, Coverdale, Edenharder, & Louie, 2004) publishers have developed individual publication standards for quality assurance, mostly guided by the editor-in-chief, for the content appearing within the publication . Having a uniform and objective way to assess web pages would enable a CDE to pass along critiqued web information to patients.

With no validated tool to give patients so they may quickly review a web page's content establishes a void in their education from the CDE. If such a tool existed, the CDE could present the tool to the patient and advise them on the importance of evaluating a web page and how to assess a web page's content. Knowing that the patient has the tools and knowledge that they need could add a degree of self-assurance for the CDE.

1.2. STATEMENT OF THE PROBLEM

Web page content is matter that establishes the components of a web page, specifically, images and text. The quantity of published materials concerning web page content evaluation tools, particularly, criteria lists and assessment tools, demonstrates that health care personnel are concerned about the quality and reliability of health information available on the Web (Curro, Buonuomo, & Onesimo, 2004; Pealer & Dorman, 1997; Purcell, 2002; Smith, 2005; Tsai, 2005).

To this date, there has been no published validated web page content assessment tool. The un-validated criteria that have been published to date are lengthy, arduous, and too time consuming for general use by health care professionals and laypersons (Bernstam, Shelton, Walji, & Meric-Bernstam, 2005). Validation of an easy to use tool is needed.

1.3. STATEMENT OF THE PURPOSE

This research study proposes to measure the acceptance of an assessment tool and the face validity of the tool. The tool called SPAT (Site, Publisher, Audience, Timeliness) is an acronym for a process to assist people in evaluating web page content. It is postulated that SPAT fits within the time frame consumers have for browsing and reading web pages, therefore making it a tool that will be applied. If the web page consumer does what the acronym reminds them to do, they will have performed an inclusive assessment on the quality and reliability of the content on the web page, enabling them to make an educated decision on the reliability of the content for their purposes.

Other tools require the user to have an extended period of time available for proper manipulation, and the use of peripheral devices such as pen and paper, to make an assessment on the web page content. These requirements hinder the likelihood of their use by the general public. Since people have limited time to decide if what they are reading is reliable and accurate, they are not likely to use an evaluation tool that requires pen, paper and time from their already

busy schedule. Consumers and health care professionals need a tool that does not hamper their WWW browsing but works in conjunction with browsing. "According to comScore traffic data, online consumers only spend an average of 4.7 minutes per usage day" on major health web pages (Levy, 2004); this statistic reinforces the need that the tool must be simple to use and will help users quickly and scientifically judge content of a web page.

Having a validated web page content assessment tool provides guidelines for CDEs when evaluating a web page for patient care. To further extend its application, SPAT may also be taught to patients. With patients using the SPAT assessment tool, CDEs may have some reassurance they were using guidelines to assess the web page information for reliability while researching on their own.

The purpose of this study is to validate an assessment tool for measurement of web page content reliability, as well as the rate of adoption for the tool. At this time, an in-depth search of the literature reveals that no validated web page assessment tool exists. This research will test the acceptance and use of the assessment tool known as SPAT. It is hoped that establishing awareness by CDEs of the importance in evaluating the content of a web page, that ultimately CDEs would pass on the knowledge and the tool to their patients. Preliminary data supporting the use of SPAT will provide vital information for teaching health care professionals how to evaluate web content and how to diffuse SPAT to consumers.

1.4. RESEARCH QUESTIONS

This research will study Certified Diabetes Educators (CDEs) within the Pittsburgh, PA region to answer the following research questions:

1. At what level do Pittsburgh metropolitan area Certified Diabetes Educators (CDEs) use information from the Web or Internet in their professional practice?
2. What kind of assessment do Pittsburgh metropolitan area CDEs perform on web based diabetes information before recommending the information to patients?
3. If CDEs perform an assessment of web based diabetes information before recommending the information to patients, what do they do?
4. At what level does the use of the SPAT assessment tool for web based information make a difference in the information CDEs provide to patients?

1.5. THERORECTIAL FRAMEWORK

Research associated with the following concepts form the theoretical basis for the present study: Rogers's Diffusion of Innovation theory, and his Rate of Adoption theory.

1.5.1 Diffusion of Innovation

Everett Rogers published *Diffusion of Innovations* in 1962. Since then the theory of 'diffusion' has developed and proliferated to the point that Rogers now has four volumes discussing the 'Diffusion of Innovation.'

Rogers states that, "Diffusion is a special type of communication, in which the messages are concerned with a new idea," and that, communication "is a process in which participants create and share information with one another in order to reach a mutual understanding" (Rogers, 1983). In this research case, SPAT is the new idea, the innovation that is being communicated to research participants. Communication can be a two-way process, where one person delivers information to another – hence, diffusion, or spreading of the information. Communication may also be mono-directional when one person seeks information from another person. For the innovation to spread some type of change agent informs the potential adopter of the innovation and diffusion begins. The change agent is usually an individual who influences other people in a desired direction (Rogers, 1995). For this study, the investigator is the change agent introducing SPAT.

For diffusion to occur, Rogers defines four processes. They are the following:

1. Innovation

The innovation is an idea, a practice, or object that is perceived as new to an individual. The innovation process can be associated with the progression of decision making. The decision making procedure ends when an individual gives credence to the innovation by deciding to either adopt or reject the innovation.

2. Communication Channels

Explaining how information travels from one individual to another defines the communication channels. The exchange of information can be completed in many ways and formats.

3. Time

The rate in which it takes the innovation to become accepted explains the 'time' of diffusion.

4. Social System

Within the social system, all members collaborate at a minimum to find a solution for a common problem. Having a common problem joins people together thus creating a social system. An example would be people suffering from Type II Diabetes.

This research proposal is based upon the Rogers's Theory of Diffusion. The tool known by the acronym of SPAT is the innovation. The flow of communication about SPAT will happen through two way communication as the investigator performs the role of the change agent presenting the tool to the study subjects. After the subjects have knowledge of SPAT and have used SPAT, it is hoped that they will pass the information along to their immediate friends and colleagues, thus expanding the social network.

1.5.2. Diffusion of Innovation: Rate of Adoption

Rogers defines innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1995). Within the third variable of the diffusion

process, Time, there are three recognized processes; the innovation-decision process, the innovativeness and adopter categories, and the rate of adoption. The second theoretical grounding that this research proposal is based on is the Rate of Adoption process within the diffusion of innovation theory.

The diffusion of innovation theory provides insight into the variable rates in which people will adopt an innovation. Most graphical analysis of innovation adoption produces an S-shaped curve. The curve shows the rate of adoption in respect to the relative speed with which the innovation is adopted by members of a social system (Rogers, 1995). The measurement is attained by taking the number of individuals who adopt a new idea in a specified time frame. This produces a "numerical indicator of the steepness of the adoption curve for an innovation" (Rogers,1995).

Rogers states that there are five attributes in the rate of adoption of an innovation: relative advantage, compatibility, complexity, trialability, and observability (Fig. 1). When the innovation is being diffused there are four attributes that affect the rate of adoption for the innovation: "type of innovation-decision, the nature of communication channels diffusing the innovation at various stages in the innovation-decision process, the nature of the social system in which the innovation is diffusing and the extent of the change agents' promotion efforts in diffusing the innovation."

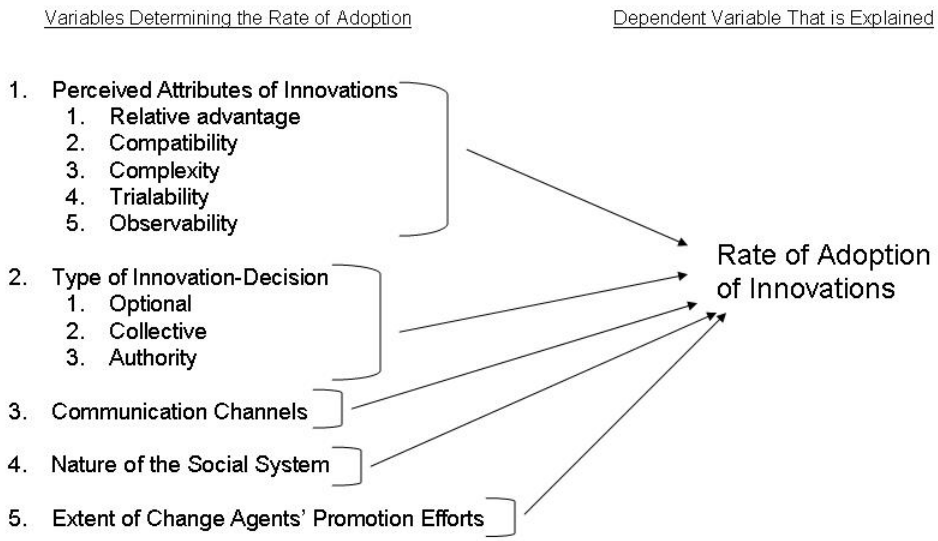


Figure 1.5.2. Attributes determining the rate of adoption. Adopted from Rogers (1995) Diffusion of Innovation.

Rogers explains that there are other factors that may affect the speed of adoption. "Innovations requiring an individual-optional innovation-decision are generally adopted more rapidly than when an innovation is adopted by an organization. The more persons involved in making an innovation-decision, the slower the rate of adoption" (Rogers, 1995). He continues to explain that "the communication channels used to diffuse an innovation also may influence the innovation's rate of adoption." Depending on the dynamics of the social system determines the communication channel to use for introducing the innovation. Interpersonal contact with the change agent is important for complex ideas. When opinion leaders adopt the innovation, the rate of adoption increases and the innovation spreads through the social network with little promotion from the change agent.

The diffusion of SPAT will be measured through the reported adoption or rejection of SPAT. The subject's perceived usefulness of the tool and its impact on their work ethic will influence the rate of adoption.

2. LITERATURE REVIEW*

This chapter will include a review of literature related to this study. The World Wide Web (WWW or web) as a tool for information will be addressed as well as the type of information requested from the web. The use of web tools for finding information and the characteristics of the population that uses the web will then be reviewed. The chapter will conclude by examining current web information assessment tools and by presenting information about the epidemic of diabetes in the United States, and the characteristics of certified diabetes educators and the role they play within the consumer health arena.

2.1 THE WEB AS A TOOL FOR INFORMATION

The World Wide Web (WWW) has become a mass communication medium that has revolutionized the way people learn and acquire information. Before to the WWW, people received information through centralized services, such as libraries, newspapers, magazines, the radio, and television. All of those media maintained a structure that reviewed their data before

* Throughout the Literature Review section of this dissertation, the terms Web and Internet are used inter-changeably by other authors. This author defines "Internet" as a network of computers linked together and "Web" as a tool used within the Internet to make information available {Schement, 2002 #677}. Prose of many referenced authors, unfortunately used the terms synonymously. This author has made every attempt to consistently use Web in the proper manner.

releasing it to the public. The WWW has no review board for assessing the reliability and quality information released to the world. The reader of web page information must make an information reliability judgment.

Prior to the WWW people had to actively pursue the acquisition of information. They had to go to a library, go a store to purchase a newspaper or magazine, or take time to request newspaper or magazine delivery. Now with the WWW integrated into our daily lives through its availability at work, school, sidewalk windows of office buildings, gas stations, homes, cell phones, and virtually anywhere else, one does not need to travel to information rich locations to get information. The WWW is one tool supported by the Internet. The extensive growth of the Internet has been analyzed by a few corporations. A 2003 survey by Nielsen/NetRatings stated that 580 million people in the world have Internet access (Nielsen/NetRatings, 2003). An online service called InternetWorldStats combines analysis from Nielsen/NetRatings, the International Telecommunications Union, local network interface cards (NIC) and other sources. As of September 18, 2006, InternetWorldStats reports that over 1 billion people world-wide have access to the Internet (Miniwatts International, 2006). They use the *World-Gazetteer* (January 2006) to report that the United States population is 299,093,237 and as of August, 2006 over 207,161,706 people in the United States have access to the Internet (Miniwatts International, 2006) - over 69% of the United States population. With the Internet having a global user growth of 300 million users in three years, the popularity of the WWW as an information medium is tremendous. The expansive growth and use of the Internet's WWW also exemplifies the public's desire for information.

Many surveys analyze the types of data retrieved from the Internet and find health information as a leading subject area. One online survey in 1999, by an Internet marketing firm,

Cyber Dialogue, Inc., reported the number of people using the WWW for health information was 37.8 million (Ward, 1999). In 2000 Michael Pastore, from CyberAtlas, projected that by 2005, 88.5 million adults will use the WWW for health information (Pastore, 2000). In actual numbers, users of the WWW for health information greatly exceeded his projection. In only three years, according to a 2003 Pew Internet and Life Project survey, nearly 93 million Americans had searched the WWW for health information (Pew Internet & American Life Project, 2003). For that time period, the 93 million represents about 80% of US WWW users.

2.2. TYPES OF INFORMATION REQUESTED FROM THE WEB

The availability of information will not only affect our common knowledge, it will change the information structure in our society. Information on health related subjects is one of the most searched topics on the WWW by consumers. A Pew Internet and Life report tracked WWW subject searches for three years. They queried over 64,000 Americans concerning their WWW use. They state that between the years 2000 and 2003 approximately 73 million Americans had looked for health information online (Madden, 2003).

From a sample of 5,000 people, a study found that 68% of WWW users seek health information online (Rich, Akcayli, Swerdlow, & Rosen, 2001). People are more likely to look online for health information rather than go to a library or bookstore. Anonymity, the relative ease, and lack of physical effort required for inquiries may be some of the reasons for the

WWW's popularity. "Cyberchondriacs" is a term developed by Harris Interactive to label people who go online to find health information. Their study reports that over 100 million adults go online at least three times a month seeking health information (Pastore, 2001). They discovered that most consumers do not search for health information daily; rather they do so sporadically during a month.

One WWW resource that provides reviewed health information comes from the National Library of Medicine. Their web page entitled "MedlinePlus" is one of the more popular health web pages. They record four million unique web site visitors per month (U.S. National Library of Medicine, 2005). This site consists of peer reviewed medical information specifically designed for lay people. The authors of the site chunk the medical content into subject areas, directing the consumers to answers for general questions. The National Library of Medicine is just one example of an institution trying to direct consumers to quality health information.

2.3. WEB TOOLS FOR FINDING INFORMATION

The most popular medium on the WWW for finding health information is a search engine. Currently, the most popular search engine is Google™ (Searchenginewatch, 2003). Studies and search logs, show that people rarely type more than two words in a search engine and often look no further than the second screen of results (Liang Chaoyun & Chen Wei-Ju; Stacey, Stacey, & Chapman). The second method people use to find health information is to use

subject directories. These are either lists of sites recommended by subject, or simply a compiled subject list. Recommendations from friends and family will often lead others to visit web pages.

Boston Consulting Group (BCG) analyst Andreas Poensgen reports that out of a selected group of health sites, WebMD is the leading web site. WebMD benefits over other web sites through its popularity from commercial advertisements and a great name. Yahoo!Health came after the resource "other" in popularity (Poensgen & Larsson, 2001).

To find what web pages people trust most, Jupiter Communications Research, Inc., a well established diversified media and communications company, provided people with a list of different types of sites, i.e. government, hospital, drugstore, etc. Web pages from the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) were the most trusted resources (von Knoop, Lovich, Silverstein, & Tutty, 2003). A physician's personal web page and any web page recommended by a physician came next (von Knoop, Lovich, Silverstein, & Tutty, 2003). With the role that physicians play in our society and the esteem the general public awards to them a physician's endorsement of a web page automatically verifies to the patient that the web page is good. Physician web pages concerned with health conditions came next in the survey, and last in the list of trusted web pages were those from health insurance plans (von Knoop, Lovich, Silverstein, & Tutty, 2003).

2.4. WEB USER POPULATION

When people go online to find health information they are usually seeking information for themselves and about a specific condition (Cline & Haynes, 2001; Haugh, 1999). Cline reports that health searches are often triggered by a diagnosis from a physician and a desire for

treatment information. "More than 90% of health seekers search for material related to physical illnesses" (Cline & Haynes, 2001). Currently, the largest WWW user population seeking health information is women in their 40's (Haugh, 1999). They search for family information, personal information and information for friends. In 2003, Jupitermedia surveyors selected random participants from the Ipsos United States online consumer panel to answer an online survey of 30 closed-ended questions about their online behaviors, attitudes, and preferences to health (Jupitermedia Corporation, 2003). The Jupitermedia report states that people with chronic illnesses are the most frequent users of health information on the WWW. As time progresses the largest user of the WWW for health information will be people 65 years and older (Haugh, 1999). This population will search for personal health information, and for online friends, to help alleviate boredom from institutionalized care, among other reasons.

Health care professionals access the WWW for personal information as well as clinical information. A survey of 3,347 physicians in the United States in 2004 found that almost all had WWW access and that outside of personal use, the WWW is used for finding journal articles and accessing on-line journals (Bennett, Casebeer, & Kristofco, 2005). Nearly one-third of the respondents to the survey practiced primary care. Reasons for not using the WWW were gathered as well. Physicians reported that the amount of information on the WWW is a barrier and hinders their access. Another reason for not using the WWW is that the information desired is not available (Bennett, Casebeer, & Kristofco, 2005). As society becomes more dependent upon technology and more information is placed on the WWW, accessing the WWW for data will become a skill. Having early knowledge on how to access information and the evaluation of content will be beneficial for any health care practitioner in their life skills and professional skills.

Gabriel Giménez-Pérez led a study in Spain over a six month period monitoring the use of communication technologies by patients with type 1 diabetes mellitus. The two primary technologies were mobile phones and the WWW. Out of the 244 patients interviewed, 58.2% owned a personal computer and 36.5% were regular WWW users (Gimenez-Perez, Gallach, & Prieto, 2002). From the 36.5% of WWW users, almost half had accessed a health-related web page. Those users "had a higher level of education, presented severe hypoglycemia more frequently, and were more likely to have access to the WWW at home" (Gimenez-Perez, Gallach, & Prieto, 2002). Giménez-Pérez et al. found that "only educational level, age, and gender predicted Internet[sic] use." When analyzing other studies, Giménez-Pérez et al. stated that the lack of training in information technology is a main factor for not retrieving medical information from the Web, and age is a determinant of WWW use.

A cross-section of children and adolescents with type 1 diabetes in Sweden, were studied by Sam Nordfeldt et al. to reveal the use of the WWW for finding diabetes related information. Out of 110 patients aged 5-20 years, 90 responded to the postal questionnaire (Nordfeldt, Johansson, Carlsson, & Hammersjo, 2005). Thirty-eight patients reported searching for diabetes information on the WWW and using a search engine to find the information. Thirty-two percent shared the diabetes information from the WWW with others, such as relatives (18%), friends (21%) and school staff (3%) (Nordfeldt, Johansson, Carlsson, & Hammersjo, 2005). Nordfeldt et al. concluded that "The level of use and patient preferences suggests that there is a great need for good quality information and supportive systems…"

2.5. EXAMINATION OF CURRENT WEB PAGE ASSESSMENT TOOLS

A web page assessment tool is necessary to assist people in evaluating the information they take from the WWW. Presently, there exists no validated web page assessment tool (Curro, Buonuomo, & Onesimo, 2004; Fallis & Fricke, 2002; Fricke & Fallis, 2004; Tsai, 2005). There have been a number of studies using various criteria to evaluate web pages and most of the studies use a list of specified content fields that a web page should contain. The consumer is to use the list when accessing the web page to analyze if the page is a 'valid' resource. Most of these lists require an extended period of time to use, and an explanation on how to use. For consumers to employ an evaluation tool, it needs to be easy to remember, self explanatory, and require no additional time on a web page for analysis.

One list containing over 20 criteria is for the Information Quality Tool (IQT). This list developed specifically for consumers, contains 21 features that a web page should have (Mitretek Systems, 1999). The Mitretek company established a point system to accompany the criteria lists they created so the user may evaluate the strength and weaknesses of a web page.

In the article, "Examination of instruments used to rate quality of health information on the Internet*[sic]*: Chronicle of a voyage with an unclear destination" by Anna Gagliardi and Alejandro Jadad, 51 WWW health information rating tools were identified. Of the 51 different tools, 11 were deemed unusable by the researchers, 35 tools were suggested for use with the Internet but did not provide information on how to use them with the WWW, and five tools provided user information and were usable; but, out of all 51 tools used, none had been validated (Gagliardi & Jadad, 2002).

In the medical community one of the most noted efforts to assure quality health information from the WWW is from the Health on the Net Foundation. The Foundation, consisting of telemedicine experts, established eight guidelines a web page or page should follow (HON Foundation, 2005). If a web page developer follows and meets the set guidelines from the HON Foundation, and is approved by the Foundation, then the page may place a HON Foundation image on its site. The image is supposed to denote a quality information site because the developer states that they have met the HON Foundation guidelines. The HON© Code criteria are the following:

Authority – Principle 1 guidelines 1.	Any medical or health advice provided and hosted on this site will only be given by medically trained and qualified professionals unless a clear statement is made that a piece of advice offered is from a non-medically qualified individual or organisation.
Complementarity – Principle 2 guidelines 2.	The information provided on this site is designed to support, not replace, the relationship that exists between a patient/site visitor and his/her existing physician.
Confidentiality – Principle 3 guidelines 3.	Confidentiality of data relating to individual patients and visitors to a medical/health web site, including their identity, is respected by this web site. The web site owners undertake to honour or exceed the legal requirements of medical/health information privacy that apply in the country and state where the web site and mirror sites are located.
Attribution – Principle 4 guidelines 4.	Where appropriate, information contained on this site will be supported by clear references to source data and, where possible, have specific HTML links to that data. The date when a clinical page was last modified will be clearly displayed (e.g. at the bottom of the page).
Justifiability – Principle 5 guidelines 5.	Any claims relating to the benefits/performance of a specific treatment, commercial product or service will be supported by appropriate, balanced evidence in the manner outlined above in Principle 4.

Transparency of authorship – Principle 6 guidelines	
6.	The designers of this web site will seek to provide information in the clearest possible manner and provide contact addresses for visitors that seek further information or support. The Webmaster will display his/her E-mail address clearly throughout the web site.
Transparency of sponsorship – Principle 7 guidelines	
7.	Support for this web site will be clearly identified, including the identities of commercial and non-commercial organisations that have contributed funding, services or material for the site.
Honesty in advertising & editorial policy – Principle 8 guidelines	
8.	If advertising is a source of funding it will be clearly stated. A brief description of the advertising policy adopted by the web site owners will be displayed on the site. Advertising and other promotional material will be presented to viewers in a manner and context that facilitates differentiation between it and the original material created by the institution operating the site.

(HON Foundation, 2005).

One study, reported in *Medical Informatics & the Internet in Medicine*, created a web page content assessment tool that used a scoring system associated with given content categories. Vincenzo Curro et al., established fourteen categories, such as an e-mail address being provided on the page, credentials of the author appearing, all links are working, etc… With each category the web page consumer is to assign either a number zero for poor representation or the number one for satisfying the category (Curro, Buonuomo, & Onesimo, 2004). After completing the assessment of the content on the web page the consumer is to tally the score. The authors took the final score and applied the Kim-based Global Score to statistically weigh the criteria used in the evaluation. Next they used the Wilcoxon Analysis and NetSCORE Global Score to compute a ranking of the web page against other web pages of similar content. After the four

computations, the user finally comes to a conclusion as to whether the information presented is of quality or not. This 'simple approach,' the authors claim, is for non-health care professionals to use while reading web pages that present medical information.

There have been only a few studies that evaluate web page content specific to diabetes mellitus patients. Thakurdesai looked for diabetes patient education material that complied with the eight The HON© Code specifications, the Health Summit Working Group (HSWG) criteria and diabetes core education concepts (Thakurdesai, Kole, & Pareek, 2004). The criteria developed by HSWG were in response to their feeling that some criteria were needed to asses the reliability of web pages. They created the following:

- Credibility: includes the source, currency, relevance/utility, and editorial review process for the information.
- Content: must be accurate and complete, and an appropriate disclaimer provided.
- Disclosure: includes informing the user of the purpose of the site, as well as any profiling or collection of information associated with using the site.
- Links: evaluated according to selection, architecture, content, and back linkages.
- Design: encompasses accessibility, logical organization (navigability), and internal search capability.
- Interactivity: includes feedback mechanisms and means for exchange of information among users.
- Caveats: clarification of whether site function is to market products and services or is a primary information content provider (Systems, 1999).

The core competencies for diabetes care were established in 1993 by the American Diabetes Association. They are the following:

- Disease information
- Diet
- Exercise
- Drug information-time, method, route of administration and storage
- Blood glucose level monitoring
- Hypoglycemia information
- Foot care and hygiene
- Social support (marriage, job and child)
- Family member support
- Fasting days
- Alcohol and tobacco advise
- Community and mass media resources (American Diabetes Association, 2000; Thakurdesai, Kole, & Pareek, 2004).

The results from Thakurdesai's study located 53 web sites that provided diabetes mellitus patient information. Instead of evaluating a tool or tools to evaluate the content of a web page, the study evaluated the content itself. Most pages were in compliance with HSWG criteria, while only 15 web sites met the criteria for the HON© Code. For the diabetes core concepts, the web pages averaged success in meeting eight of the eleven criteria (Thakurdesai, Kole, & Pareek, 2004).

Another study analyzed information from the WWW for treating fevers in children. The authors, Impicciatore et al., retrieved 41 different web pages on the treatment of childhood fevers. Out of the 41 pages, only four pages provided information close to the approved guidelines (Impicciatore, Pandolfini, & Casella, 1997). The authors summarized their findings to say that "there is a problem with inaccurate consumer health information on the Internet*[sic]*." A follow-up study to Impicciatore's sought to define quality measures a layperson may use to evaluate a web page. They report that indicators to distinguish accurate from inaccurate health information on the WWW are the following: displaying the HONcode logo, having an ".org" or organization domain, and displaying a copyright (Fallis & Fricke, 2002).

There have been many suggested tools (Smith, 2005) and evaluation procedures provided in the literature and on the WWW to assist people in finding 'good,' quality health information. Fricke states that "While there is no indicator that provides a guarantee of accuracy, there are a number of indicators that are more likely to be found on accurate web sites than on inaccurate web sites" (Fricke & Fallis, 2004). They believe that web sites that are current and those that display a copyright date are most likely containing accurate information.

As late as 1996, there had yet to be a tool created to evaluate consumer health information in paper or electronically. In 1997 researchers at the University of Oxford created DISCERN, a 15 question tool to "enable patients and information providers to judge the quality of written information about treatment choices" (Charnock, Shepperd, Needham, & Gann, 1999). While DISCERN was the "first standardized quality index of consumer health information that can be used by producers, health professionals, and patients to appraise written information on treatment choices," it was developed specifically for information in paper formats, concerning information on 'treatment.' It has since been modified for use as an assessment tool for

consumer health web sites (Charnock & Shepperd). It is widely recognized as an evaluation tool in the medical community and consists of 15 questions a person is to think about when considering the health information (Charnock & Shepperd). The authors state that the tool must be used within its entirety, and that persons receiving training exhibited more skill with the tool than those without such training (Charnock & Shepperd; Charnock, Shepperd, Needham, & Gann, 1999). When using DISCERN, the users are provided with a numerical response rating system to each question. Upon completing the assessment the tallied responses produce a cumulative number guiding the user to a reliability judgment of the information. To this date, DISCERN has been the only tool validated for a sub-set of consumer health information in paper.

Ademiluyi evaluated three published tools (DISCERN, IQT (information quality tool) and QS (quality scale)) to assist in WWW information reliability assessment and reported "the most frequently cited quality criteria were those dealing with content, design and aesthetics of the site, disclosure of authors, sponsors or developers, currency of information, authority of source, ease of use and accessibility and availability" (Ademiluyi, Rees, & Shearc, 2003).

In February, 2006, the National Library of Medicine released a web tutorial on evaluating web pages (National Library of Medicine, 2006). They recommend that the user ask nine questions about any web site with health information to judge the web site's reliability. Near the end of their tutorial, which consists of 82 slides, they provide a summary checklist, which condensed the initial nine questions into four. The NLM Tutorial recommends that the viewer print the checklist to use while searching the Web. The presentation closes by telling the viewer that by looking for the provider, the funding, the quality, and for a note about privacy on a web page, they will find reliable information. There is no indication, however, that the NLM web

tutorial has been evaluated or validated. In fact, none of the published and recommended evaluation lists and tools presented here have yet been validated.

Without a governing body or content moderator to screen available free electronic health information, health care professionals, as part of their practice, need to make sure their patients are reading reliable information. The general public is not going to stop looking for information and they are likely not to learn evaluation techniques on their own. Instead of refusing to acknowledge that patients are using the WWW for health information, the health care professional should encourage such use (Chi-Lum, 1998), and include a literacy evaluation to educate their patients in searching and finding health information on the WWW.

2.6. DIABETES EDUCATORS

In the United States 1.3 million people, aged 20 or older, are diagnosed with diabetes each year (National Diabetes Information Clearinghouse, 2004). In 2000 diabetes was the sixth leading cause of death for men and women. When people are first diagnosed with diabetes they may be directed by their clinician to health care information providers. These people are typically nurses, nutritionists, physical therapists and other clinicians who have achieved, through examination, credentials as a Certified Diabetes Educator, from the National Certification Board for Diabetes Educators (NCBDE). This NCBDE is an independent organization consisting of health care professionals with the specific interest in educating people about diabetes (National Certification Board for Diabetes Educators). To obtain the CDE

credential, one must meet stringent criteria and pass a written exam. Attaining the credential "demonstrates that the certified health care professional possesses distinct and specialized knowledge, thereby promoting quality care for persons with diabetes" (National Certification Board for Diabetes Educators). Once one has obtained the CDE credential, it must be renewed every five years in an effort to keep individuals up-to-date with diabetes information.

Diabetes educators provide information to patients in the format of brochures, pamphlets, picture books, handouts, verbal discussions, and many others. A new source of patient information for people with diabetes became available via the WWW in the mid 1990s. While the WWW quickly altered communication mechanisms, it has been slowly integrated for information use with persons with diabetes (Lewis, 2001). In 2001, a survey showed the following findings to explain the slow adoption of the computer: the expense of acquiring the computer, the lack of appropriate software, and the lack of computer literacy by adults (Lewis, 2001). Since that study, the WWW has become more prolific, computers have dropped dramatically in price and computer literacy by adults has improved. There are now a larger number of publicly available web sites with information on diabetes (Bedell, Petersen, & Agrawal, 2004). Research on diabetes information available through the WWW resulted in the assertion that, "There is wide variation in the accuracy and comprehensiveness of online diabetes information and no existing mechanism for consumers to get detailed, objective information about true Web site quality" (Speidman, Steinwachs, & Rubin, 2003).

Having a computer with WWW access is an example of how a single medium altered the boundary of information. Diabetes educators are no longer the gatekeepers for information on diabetes information. The public may now access all types of diabetes information whenever

they desire. “The Internet*[sic]* disempowers one professional but empowers another - "the consumer"” (Oravec, 2001).

A study by John Zrebiec at the Joslin Diabetes Center in Boston had 791 survey respondents regarding a diabetes discussion board that the Center was running. The discussion group was professionally moderated by two CDEs and was developed with the purpose of providing social support, and monitoring “user activity and changes over time, as well as feelings of satisfaction and perceived ability to cope with diabetes” (Zrebiec, 2005). The author found that even though the discussion board was for emotional support, most users wanted information about food. Results from the survey revealed that users preferred information and interaction from peers in addition to the WWW. Out of a list of seven sources of diabetes information, health care professionals were the third choice for information after magazines and newsletters. During the study, Zrebiec, found that 80% of the subjects get diabetes information from the WWW.

3. RESEARCH DESIGN AND METHODOLOGY

The focus of this dissertation was to act as a preliminary study for the usefulness and adoption of the web page content assessment tool known as SPAT. Having a tool for people to employ for assessing the reliability and usefulness of web page content should aid in meeting one goal from *Healthy People 2010*: "Use communication strategically to improve health" (Office of Disease Prevention and Health Promotion, 2000a). The book, *Healthy People 2010,* establishes a set of disease prevention and health promotion objectives for the Nation to achieve by the year 2010. *Healthy People 2010* states that "Health communication encompasses the study and use of communication strategies to inform and influence individual and community decisions that enhance health. For individuals, effective health communication can help raise awareness of health risks and solutions, provide the motivation and skills needed to reduce these risks, help them find support from other people in similar situations, and affect or reinforce attitudes" (Office of Disease Prevention and Health Promotion, 2000a). SPAT was developed solely for the purpose of raising awareness of risks with information presented on the WWW and for assisting people in decision making. Adopting a tool to easily and quickly evaluate information individuals are presented with can be one solution to reduce the risks of believing incorrect or false information.

3.1. DEVELOPMENT OF THE WEB PAGE CONTENT ASSESSMENT TOOL

When this investigator was preparing to instruct masters level nursing students at a large urban academic institution on how to judge if a web site was 'good,' it became obvious that the existing tools available for evaluating a web site were not going to be used by the students. The difficulty in manipulating any tool and the time required for use of the tool was not conducive to the nurses' work environment or for leisure browsing. This revelation spurred the development of SPAT, a web page content assessment tool.

To develop the assessment tool, an analysis of methods used to review paper resources was done and then compared with published methods to review web sites or web pages (Adelhard & Obst, 1999; Agosto, 2002; Charnock, Shepperd, Needham, & Gann, 1999; Childs, 2004; Chin, 2001; Cline & Haynes, 2001; Eysenbach & Kohler, 2002; Fricke, Fallis, Jones, & Luszko, 2005; Fritch, 2003; HON Foundation, 2005; Humphries, 2000; Ilic, Risbridger, & Green, 2004; Jain & Barbieri, 2005; Kim, Eng, & Deering, 1999; Mitretek Systems, 1999; Munies & Medina, 2003; Pealer & Dorman, 1997; Peterson & Aslani, 2003; Wathen & Burkell, 2002). Some features that were mentioned several times in both medians were the following:

- The web page has a date of creation
- The web page has a last update date
- A source of finance is mentioned
- An author's name is present
- Contact information for the author is present
- Author of site provides their qualifications
- A conflict of interest is stated

- Source of information is provided and/or documented and/or referenced
- Links within the page work
- The page loads quickly
- The page permits feedback
- There is minimal to no presence of advertisements
- Graphics are used
- No special software is required for the page to be displayed
- There is a disclaimer
- There is a copyright
- Page is easy to navigate
- There is no evidence of bias
- Awards or seals of excellence are exhibited on the page
- Page design is logical
- The purpose of the page is stated clearly
- There is a name or organization given to the document
- The information ties in with other information you have on the topic
- All aspects of the subject are covered
- The intended audience is given
- The page is not trying to sell something
- The language is elementary
- The information can be verified

A second step in developing a tool that would be used to assess web page content was an informal questioning of six professional colleagues - those who had three or more years of

experience in academic libraries. From these experts, the investigator sought to define the characteristics of a web page content assessment tool that the professional librarians would use and that they felt would be used routinely by others. After collecting librarian opinions, an introspective review was added to the data. Lastly, characteristics of the students who were to use the tool completed the profile of what a web page assessment tool should be. These collected features were the following:

1. Memorable
2. Easy to use
3. Require no additional time when browsing a web page for fun or for information
4. An acronym
5. A word association to the student's profession (in this case nursing)

Tallying the features used in other assessment tools enabled the investigator to place features in categories and then evaluate the data for themes in evaluation. The themes represented the fields for publisher, site, audience and timeliness. With the themes established, the thematic words were shuffled in an attempt to create a mechanism for students to use for evaluating web page content. The end result was the acronym SPAT (Site, Publisher, Audience, and Timeliness).

Before presenting SPAT to the nursing students, the investigator introduced and explained SPAT to the six librarians whom were initially queried for their opinions of characteristics of a tool that would be used. They were given instructions for using SPAT and asked to use it against web pages of their choice. They understood the instructions and completed the SPAT worksheet with ease. After satisfying all component fields for SPAT, each librarian verbally reviewed their self-selected web page and SPAT worksheet with the

investigator. The librarians's easy completion of the SPAT worksheet, and feedback from the review process SPAT triggered, demonstrated positive outcomes for the SPAT tool.

To use SPAT in a formal educational setting, a professional artist created designs for the acronym. Presenting an object in an attractive format makes the item more appealing and likely to be accepted by consumers (Bloch, 1995). Using this logic, SPAT was presented in different design styles and printed as bookmarks as well as a graphic within PowerPoint® slides. To remind the students of what was discussed in class, SPAT bookmarks like the one shown in Figure 3.1. were handed out at the end of class. Figure 3.2. presents one version of a SPAT graphic used to create a slide template in PowerPoint®.

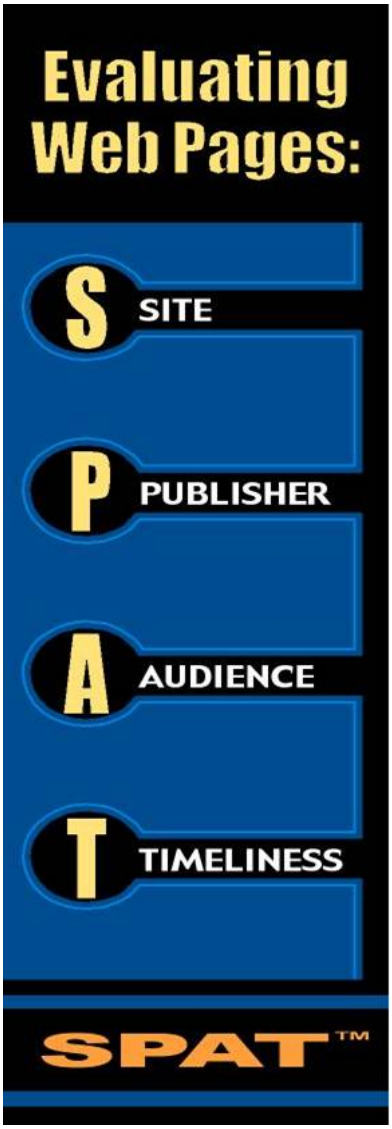


Figure 3.1. SPAT shown on a bookmark

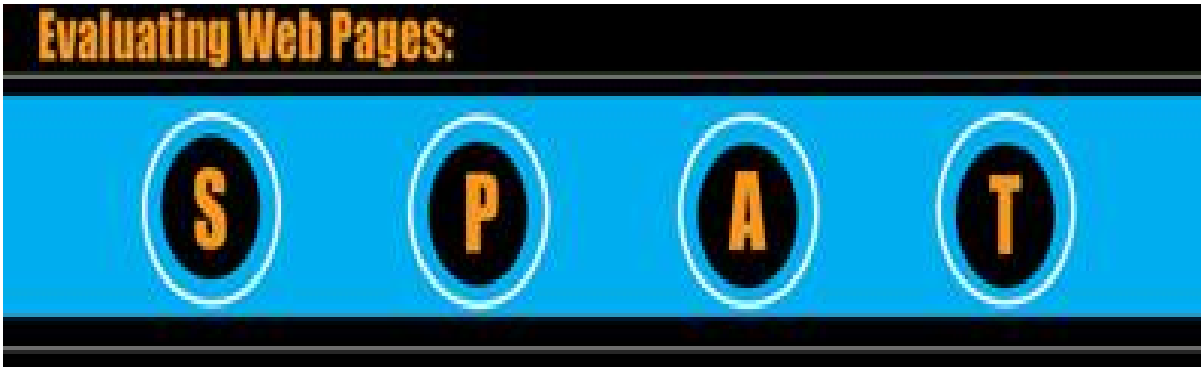


Figure 3.2. A SPAT graphic

Approximately 60 graduate level nursing students at an academic institution were the initial test group for SPAT. The subject matter for the class session was consumer health information. In the formal classroom setting with the students, a narrative explanation was given to demonstrate the importance of evaluating web page content and one example of how to use SPAT against a web page. The students were then given an in-class assignment to use SPAT against three pre-selected web pages. The assignment was reviewed collectively in class and then two more web pages for evaluation with SPAT were assigned for graded homework. Verbal responses to the in-class assignment revealed success in using SPAT to critically review the web pages and presented possibilities for immediate adoption. By completing the necessary SPAT fields in the homework assignment, the students showed encouraging signs that SPAT was understood and they could utilize the tool independently. With the class built upon consumer health issues, it was explained that SPAT can be not only used by them but that they can teach the tool to their patients and emphasize the importance of evaluating web page content. Ingraining the consumer education element in the lecture promoted Rogers's diffusion of innovation theory and supported the concepts of 'change agents.'

The initial success of SPAT with the initial populations of librarians and nurses justified the introduction of SPAT to other health science disciplines, such as dentistry, physical therapy, occupational therapy and medicine. In the past five years, people of various ages and from several academic institutions have used SPAT successfully. Acting as the 'change agent' in the way one looks at a web page, this investigator diffused the SPAT innovation to general educators (K-8) educators outside of higher academia. As a result of learning and believing in SPAT, it is now a core component in an introductory informatics course for nurses at an urban university different from the one where it was developed. Within that course SPAT continues to achieve positive outcomes.

While the methodology for creating SPAT was not rigorous, the investigator believes that the methodology coincides with the purpose of the tool: easy to use, easy to remember, and requires no more time than normally allotted when browsing a web page.

3.2. DEVELOPMENT OF THE WEB PAGE TEST SETS

Two sets of web pages were pooled for a pre and post analysis with SPAT. Each set contained two live, publicly available web pages discussing diabetes. One web page within each set meets all the SPAT criteria, providing a gold standard within each set. CDEs must be familiar with diabetes information resources to do their job and with the American Diabetes Association (ADA). Because of the potential affiliation with the ADA and the likelihood of familiarity with the ADA's web page, using web pages from recognized organizations and/or associations within the diabetes domain and listed on the ADA web page was specifically avoided. By avoiding

such web pages, it was hoped that the CDE would perform a critical appraisal of the web pages presented because not only did they not know the web page but they did not know the publisher or author of the web page. Having different web pages in the test sets assured that the research subjects were consistent in their judgment and in the use of the tool, therefore satisfying the measurement of intra-rater reliability.

Only four web pages were reviewed to coincide with the typical web page attention span. Statistically, it has been found that people browse only a few pages before beginning another search. A study of search logs from the search engine AlltheWeb.com entitled, "An Analysis of Web Documents Retrieved and Viewed" by Bernard Jansen and Amanda Spink, concluded that people view on average eight web documents per web search and 66% of the web users view less than five web pages per search (Jansen & Spink, 2003). They report that users usually view two to three documents per query. To analyze four web pages with SPAT fits the typical user information retrieval behavior from the Web as found by Jansen and Spink.

Jansen and Spink also found that from their sample of 530 search queries nearly 40% of the users viewed a web page for less than three minutes and over 75% of the users viewed a web page for less than 15 minutes (Jansen & Spink, 2003). In a more recent study by Stenmark, using a data set of 26,205 log files from an intranet search engine, he found that the average amount of time spent on a web page is less than four minutes (Stenmark, 2005). Eysenbach and Kohler found a median of only 37 seconds spent on a web page with a study of 16 participants, with the mean age of 38 (Eysenbach & Kohler, 2002). In the study there were three participants who were nurses. They had a median viewing time of 28 seconds per web page. "Performance should always be evaluated at the duration that will be required in real life, whether in applying skills or knowledge…" (Binder, Haughton, & Van Eyk, 1990). By keeping the number of web

pages to be reviewed small, the CDEs will not feel pressed for time to complete the study and may act in a normal behavior when looking at the web pages resisting the likelihood of the Hawthorne effect occurring.

The selected web pages were retrieved from blogs supporting the idea that people making references to the web pages in blogs likely have diabetes or are affiliated with someone who has diabetes. If the blog owner mentioned a web page in the blog, then they believe that some valuable information is contained within the referred web page. The investigator is not filtering the information on the web pages for accuracy, but simply presenting freely accessible web pages for research participants to analyze against SPAT. Therefore, no reliability or validity testing of the information within the web page occurred.

Technorati™, a leader in tracking blogs, reports over 27.2 million blogs established and 50,000 posts per hour (Sifry, 2006). Technorati™ provides a structured vocabulary to index and search the blogs. The developers call this vocabulary a 'tag' system. With the tag 'diabetes,' Technorati™ searches tagged 'diabetes' blogs and presents the explored blogs in order of authority. Authority is achieved by the number of sites linking to the blog. The more people link to a blog, the more authoritative and popular it must be.

From the most popular blogs found in Technorati™, the posts were scanned for links to diabetes web pages. When a link was presented and the URL ended in a .com, or .org, the page was reviewed with the SPAT criteria. Test Sets One and Two contains one web page that does not meet the SPAT criteria and one web page that does. The accuracy of the text and information within the web page was not evaluated by the investigator but the criteria necessary to meet SPAT was assessed against the web page. By not evaluating the information on the web page, there was no level of domain knowledge necessary to use SPAT.

For final selection of the web pages for the test sets, a link check was performed for the potential web sites to make sure the web page is not totally obscure but can be found by a search engine and recognized by people. A link check was performed in Yahoo.com search 'Site Explorer' (http://siteexplorer.search.yahoo.com/explore) using the 'inlink' feature. This command in Yahoo.com Search 'Site Explorer' finds the number of pages linking to the page in question. A comparison search was made in Google.com to assure popularity of the web sites. Within Google.com the search command, 'link:' followed by the URL (universal resource locator) in question is entered in the search box and the search results show the number of pages linking to the provided URL. See Table 3.2.1. for the selected pages and their popularity within the Web.

Table 3.2.1. Web page link popularity analysis

	Web page and web page address	Yahoo.com link report	Google.com link report
Test	Diabetesnet (The Diabetes Mall) http://www.diabetesnet.com	75,388	238
Test	Diet Advice for You http://www.dietadviceforyou.com	656	0
Test	Beating Diabetes http://www.beatingdiabetes.org	641	40
Test	Insulin Pumpers http://www.insulin-pumpers.org	3,374	114

For qualification criteria the investigator decided that a web page must have more than 100 'inlinks' for this study. Attention was given to the root of the linking URLs to assure that not all linking pages came from same web site.

The process described above is depicted in this account of the selection process for Test Set One. The Diabetes Mall (diabetesnet) (http://www.diabetesnet.com) site was listed on http://artistmom2two.blogspot.com/ which displays a 2005 birth year. The http://artistmom2two.blogspot.com/ web page did not register with Technorati™ for the service reporting statistics on the number of readers it has. As of April 2006, Google.com reported 242 inlinks to the Diabetes Mall web page and Yahoo.com reported 75,388. The page itself presents with images and a large amount of small text. There are many links on the left hand side of the page as well as below the images. After reading a few words on the page and glancing at the images, it becomes apparent that the page is selling devices for diabetes as well as information. The fact that it is selling items related to diabetes probably influenced its name – Diabetes Mall. When SPATing this page, one sees that it is a .com, a commercial site, that it has a publisher, Diabetes Services, Inc., and a copyright date of 2005 as well as information for its birth being in 1994. For the audience, one can see that the information is for anyone with diabetes or an interest in diabetes information and that the content within the page is written for an audience with a high level of education. As evidence of the complicated text presented on the web page hosted by Diabetes Mall, it says, "The vast oceans on the earth host uncounted viral hoards, and global warming makes breeding and mutations easier. Adenovirus transmission often goes from wild birds or bats to chickens, then pigs, and finally to humans." To continue the discussion of the flu the text states, "Preventing a flu and pneumonia is easier than preventing a cold through administration of simple vaccines. Obtaining a flu vaccine is recommended for everyone with diabetes before the middle of November each year, but even a late vaccine is better than no vaccine. Vaccination also helps avoid spread of the flu to your family." Microsoft® Word's Flesch-Kincaid Grade reading level software reports these sentences to be grades 11.5 and 12.0

respectively. Knowing the Flesch-Kincaid reading level and reading the words used when talking about the flu, reveals that one must have a high level of education to read the text. Although Diabetes Mall is for the advanced reader, it passes all other requirements for SPAT and the user may decide if Diabetes Mall is a page personally worthy of use for information.

The second web page Diet Advice for You (http://www.dietadviceforyou.com) has three links going to the web page, http://www.dietadviceforyou.com; according to Technorati™, two are from blogs and one link not from a blog. Google.com reports no inlinks to the Diet Advice for You web page and Yahoo.com report 656 inlinks. When SPATing the Diet Advice for You web page, one sees that it is a .com site, and there is no publisher. The page does state that it is powered by WordPress. Clicking on the link for WordPress goes to the WordPress web site where the reader can learn that WordPress is software for blogging. This means that there is no author for the Diet Advice for You web page and that web page is a disguised blog.

When looking for the Time in SPAT, the Diet Advice for You page reports that its last update (at the time of this study's instrument selection) was April 23, 2006. The audience for the web page would be for anyone who has time to browse, as the page presents no authentic content; it is primarily a page of links to external web sites. With no text to evaluate, and no publisher, this page does not pass the SPAT criteria. Anyone looking for information on diabetes from this web page should ignore it and continue looking.

Out of the two web pages presented in Test Set One, the Diabetes Mall passed SPAT and Diet Advice for You did not. Therefore, the Diabetes Mall web page was the gold standard.

In Test Set Two, the http://www.beatingdiabetes.org web page was listed on the http://www.diabetesmine.com blog. The Diabetesmine.com blog had 539 inlinks to it and 187 come from blogs. Yahoo.com reported 584 inlinks to BeatingDiabetes.org web page and

Google.com reports 86 inlinks to it. When SPATing the page, one can see that BeatingDiabetes.org comes from an organization and the publisher is Steve Caswell. Mr. Caswell appears to be the creator of the organization. There is no information on the web page about the organization. The audience is anyone with interest in diabetes management and exercise and the text reveals that the page makes a sales pitch for joining a nutrition and exercise program to help people with diabetes gain control of their lives.

To find the Timeliness for SPAT, one sees at the bottom of the page that it was created in 2005. Because BeatingDiabetes.org comes from an organization, has a Publisher and a date presented, it passes the SPAT criteria. The text presented on the page was aesthetically pleasing and easy to understand. Overall, at first glance, this web page passes SPAT with the audience criteria as well, but further investigation into the page reveals that the web page only presents a product to the audience for purchase. This piece of information should make the user more aware of the distributor and more cautious in purchasing the program. With further investigation of the web site, the user can find that Mr. Caswell has no credentials for nutrition, making him an unreliable source that may produce a poor product and may be trying to make money from people with an illness. BeatingDiabetes.org does meet all of the SPAT criteria but the user has to take further steps to evaluate the audience, publisher and wonder how one person can be an organization.

The second page in Test Set Two, http://insulin-pumpers.org, presents a web page with many graphics and some animated graphics. This web page had over 3,000 inlinks reported by Yahoo.com and over 100 inlinks reported by Google.com. The initial page (homepage) for Insulin-Pumpers contains primarily links represented by categories. Looking for the site, one sees that the URL is an .org signaling that the page is presented by an organization. To find the

publisher, one looks at the bottom of the page and sees a link for contact information. Clicking on this link takes the user to a page providing information about the non-profit group in California that hosts the site. They proceed to explain that the sight is managed by volunteers and supported through financial donations. Recognizing that the web site content is posted by volunteers, each page within the site needs to be evaluated for a publisher. To evaluate the audience the user must go back to the homepage. Insulin-pumpers does not provide much text on the homepage so the user must select a topic of interest and click into the page to see text. After evaluating many of the pages on the second and third level down on the page, the pages vary greatly. Some pages only have more links; some pages link out of the site; some pages link to PowerPoint ™ presentations within the site, and some pages contain charts, graphs, and tables. Reading much of the text reveals that the content is written and posted by lay people and professionals, all stating their experiences and knowledge with diabetes. This leads the user to feel that the audience of Insulin-Pumpers is anyone with questions about insulin. While browsing through the web pages of Insulin-Pumpers, any content that is read for information should be checked with a date for Timeliness in SPAT as well as the 'P' for publisher. Some pages within Insulin-Pumpers had a date and listed a publisher and some did not. Therefore, Insulin-Pumpers does not pass SPAT. While the information presented on Insulin-Pumpers may be interesting, it is not validated consistently. The actual SPAT appraisal forms may be reviewed in Appendix D.

3.3. PILOT STUDY AND RESULTS

A pilot study of the data collection tools and selected web page test sets for the study took place in the School of Nursing at the University of Pittsburgh. Ten people comprised the sample population of faculty members, graduate students, and Pittsburgh community members completing a usability study of the assessment tools and the web page test sets. The pilot test population included nine females and one male. By using primarily women in the pilot test, the population was similar to the population of CDEs. Feedback on the assessment tools and web page test sets was elicited by applying the think-aloud technique. The investigator was aware of usability issues and/or problems within web page interfaces (Jokela, Livari, Matero, & Karukka, 2003; Nielsen, Clemmensen, & Yssing, 2002) but those issues did not hinder the study or assist in creating conflicting data results. SPAT does not evaluate the appearance of a web page – only the content. Feedback was also sought concerning their understanding of the instructions for participation in the study. Analysis of the survey results found that all questions were understood and routinely answered. The characteristics of the sample population in terms of demographic information include: gender and age. The results are presented in Table 3.3.1.

Table 3.3.1. Demographic pilot participant data percentiles

Percent (%) n=10

	Male	Female		24-34	35-46	47-58	59-over
Gender	10	90	**Age**	20	20	40	20

Data results from the demographic questionnaire for the pilot group are presented in Table 3.3.2.

Table 3.3.2. Pilot study data for frequency of use of Internet services

Internet Service	Frequency of Use for Professional Purposes Percent (%) n=10 Never	Rarely	Sometimes	Often	Very Often	Mean	S.D.
E-mail	0	10	10	20	60	4.3	.36
The World Wide Web	0	10	10	10	70	4.4	.39
Blogs	100	0	0	0	0	1.2	.13
USENET newsgroups	70	30	0	0	0	1.3	.15
Forums/Listservs™	60	20	10	10	0	1.7	.36
Google	0	0	40	10	50	4.1	.31
Yahoo	20	30	20	10	20	2.8	.47

Internet Services	Frequency of Use for Personal Purposes Percent (%) n=10 Never	Rarely	Sometimes	Often	Very Often	Mean	S.D.
E-mail	0	0	20	20	60	4.4	.84
The World Wide Web	0	0	40	20	40	4.0	.94
Blogs	60	30	10	0	0	1.5	.71
USENET newsgroups	90	10	0	0	0	1.1	.32
Forums/Listservs™	40	50	0	10	0	1.8	.92
Google	0	0	20	20	60	4.4	.84
Yahoo	20	20	20	20	20	3.0	1.5

The pilot study revealed that participation required, on average, 30 minutes for completing the assessment tools and reviewing the web page test sets. As a result from the pilot study, two minor changes were made. One change was adjusting the layout of instructional information in the data collection instrument, and the other modification was the sequence of web pages within the test sets.

3.4. INSTRUMENTS

This section will describe the instruments administered in the study.

3.4.1. Demographic questionnaire

The instrument used to gather demographic information was adapted and modified from a previous study by Ali Al-Asmari who studied the use of the Internet by instructors of English as a Foreign Language (Al-Asmari, 2005). As noted by Al-Asmari, that while his questionnaire was modified to fit the necessary research, the questions are grounded in the Rogers's theory of Diffusion of Innovation. For this specific research study, the age groups queried from the questionnaire were altered from Ali Al-Asmari's. To add uniformity for future indexing of this research, the age groups on the questionnaire were aligned with the ages of the population of study - meaning everyone would fall into the 'adult' and 'middle-aged' range within CINAHL® and Medline® - so the age segments were divided upon the average age of completing school and the age range of people that have the necessary qualifications for employment. This adjustment to the questionnaire relates to the age groups in the primary health care databases and is appropriate for the population of this study.

There were three dichotomous questions: one related to gender and two concerning attendance at a 'how to use the Internet' course. The remaining questionnaire consisted of five sections all containing questions based on a Likert-type scale.

The first section examined the CDEs' use of the WWW as a professional, and then for personal use, by asking the same seven questions for each domain. The question represented various Internet services measured on a five point Likert-type scale ranging from 1 (Never) to 5 (Very Often). The second section measured the level of access to the Internet. Four different locations, i.e. coffee shop, library, etc…, were listed asking for the number of hours of Internet access in those environments. The final section required the CDEs to provide information on their level of perceived computer and WWW expertise and how they view the WWW in regards to their profession.

The sample population in the pilot study was primarily women. This was consistent with the attainable CDE population in the Pittsburgh metropolitan area. The pilot study found the demographic questionnaire to be reliable in data collection. The statistical analysis of the instruments primarily focuses on the demographic questionnaire because of the number of questions within the instrument. All questions on the instrument were consistently answered in the pilot study. To measure reliability of internal-consistency within the demographic questionnaire, Cronbach's alpha was calculated with SPSS 13.0 statistical package (SPSS, 2004). Cronbach's alpha is a numerical coefficient of reliability. It takes the summated scales of the interrelated items that are designed to measure underlying constructs, and projects the objectivity of eliciting repeated responses to the same questions by the same respondent. It uses an alpha coefficient to provide a range in values from 0 to 1. The higher the score, the more reliable the generated scale. Table 3.4.1. reports Cronbach's alphas from the pilot study and the main study.

In the main study, the Cronbach's alpha for questions measuring the CDEs use of the WWW is 0.83 and the questions concerning the CDEs perceptions of the WWW is 0.93. The demographic questionnaire's overall alpha is 0.76. A score of 0.7 is considered to show an acceptable measurement of reliability.

Table 3.4.1. Reliability of demographic questionnaire

	Reliability of Pilot and Main Study			
			Cronbach's Alpha	
Scale	**No. of Pilot Study Items**	**No. of Main Study Items**	**Pilot Study (n=10)**	**Main Study (n=38)**
Use of the Internet	14	14	.85	.83
Access to Internet	4	4	.67	.53
Skills/Expertise	10	10	.74	.61
Value of Internet	7	7	.93	.93
Overall Instrument	35	35	.62	.76

3.4.2. SPAT questionnaires

Identical assessment tools were used for pre and post test analysis of evaluation methods used with web pages. These questionnaires gathered information to examine how a person looks at a web page when browsing content. By not giving the study participant any direction or task other than to look at two diabetes web pages, their answers on the first questionnaire revealed 'normal' web page browsing behavior. After being introduced to SPAT, and then examining two more diabetes web pages, their responses on the second questionnaire revealed any altered browsing behavior.

To assure content validity in the self-designed web page assessment tools, the questionnaires directly related to the purpose of SPAT and the questions were established

through comparison to existing questions developed by organizations and other researchers (Adelhard & Obst, 1999; Agosto, 2002; Charnock, Shepperd, Needham, & Gann, 1999; Childs, 2004; Chin, 2001; Cline & Haynes, 2001; Eysenbach & Kohler, 2002; Fricke, Fallis, Jones, & Luszko, 2005; Fritch, 2003; HON Foundation, 2005; Humphries, 2000; Ilic, Risbridger, & Green, 2004; Jain & Barbieri, 2005; Kim, Eng, & Deering, 1999; Mitretek Systems, 1999; Munies & Medina, 2003; Pealer & Dorman, 1997; Peterson & Aslani, 2003; Wathen & Burkell, 2002). For example, the Health on the Net Foundation established an evaluation tool called the HON© Code. This tool suggests asking if "The last modification date of the Web site's pages is clearly displayed?" 'yes' or 'no.' (Health on the Net Foundation, 2006). This question is represented in SPAT by the 'T' for timeliness. A second question from the Health on the Net Foundation is, do "All the pages of the Web site display the contact e-mail address of the webmaster or a link to it." The available answers for this question are, 'yes,' 'no, only some of the pages,' 'no, none of the pages,' and 'no, the site only offers a feedback form" (Health on the Net Foundation, 2006). The 'P' in SPAT represents publisher and by looking for the publisher on a web page, the HON© Code's question about the availability of contact information for a webmaster is satisfied.

The Information Quality Tool by Mitrek Systems provides 21 questions as a guide for investigation of 'good' web pages (Mitretek Systems, 1999). Unlike the Health on the Net Foundation, the Information Quality Tool only provides dichotomous "yes/no" answers to the questions. One question they provide is, "From your own knowledge and experience, does this site give good medical information?" Another question is, "Can you determine who has paid for or sponsored this website?" Both of these questions relate to the third component of SPAT – audience.

The questionnaires used in this study were modified from homework assignments given by this investigator in numerous nursing courses at multiple institutions. After minor adjustments in the aesthetics of the questionnaire and the addition of a question, the instruments were pilot tested and no modifications were necessary. See Appendix B for the SPAT questionnaires.

3.4.3 Follow-up questionnaire

The follow-up email thanking the CDE for participating contained three questions related to SPAT. These questions directly demonstrated if they had adopted the web page content assessment tool and if so, at what rate. Two questions were based on a Likert-scale and one question was open-ended (Appendix F) giving them the opportunity to share any insights on or about SPAT. Because the follow-up questionnaire contained only two questions, no reliability testing was statistically possible.

3.5. STUDY DESIGN

A case controlled study was used to test the initial reliability of SPAT with the sample population of Certified Diabetes Educators (CDEs) in the Pittsburgh region. To begin the interview, a closed-question demographic questionnaire gathered data from each research

participant, as well as their perception of their skill level in accessing information from the Web (Appendix A).

To evaluate the effectiveness, and personal usefulness of SPAT, each subject was asked to review two sets of pre-selected diabetes information web pages. The pages resided on the investigator's laptop and cd-roms. This granted flexibility in case the participant preferred to use a personal computer. The entire web site was downloaded through two software programs, i.e. Web Whacker™ and Grab-a-site™ (Blue Squirrel, 2006). Having the site saved assured stable, consistent content for each CDE through the duration of the study. This also assured that any links to pages outside of the study sets were not usable, therefore keeping the study participants in a confined 'Web' area.

After completing the demographic questionnaire, study participants were asked to review the Test Set One diabetes web pages, and then complete a semi-structured questionnaire, querying their assessment process (Appendix A). The questionnaire, developed by the investigator, contains questions that directly relate to the use of SPAT and web page evaluation methods (Adelhard & Obst, 1999; Agosto, 2002; Charnock, Shepperd, Needham, & Gann, 1999; Childs, 2004; Chin, 2001; Cline & Haynes, 2001; Eysenbach & Kohler, 2002; Fricke, Fallis, Jones, & Luszko, 2005; Fritch, 2003; HON Foundation, 2005; Humphries, 2000; Ilic, Risbridger, & Green, 2004; Jain & Barbieri, 2005; Kim, Eng, & Deering, 1999; Mitretek Systems, 1999; Munies & Medina, 2003; Pealer & Dorman, 1997; Peterson & Aslani, 2003; Wathen & Burkell, 2002). By completing the first web page evaluation questionnaire, the research subject provides data on their web page evaluation behavior. Following the completion of initial diabetes web page review and questionnaire, SPAT was verbally introduced and explained by the investigator. A copy of the SPAT introduction script was given to the research subject, thus providing the

CDE an option to read and hear the introduction or to only listen to the introduction. Following the introduction of SPAT, Test Set Two diabetes web pages were then reviewed by the research participant with their new knowledge of SPAT. After reviewing Test Set Two, a second semi-structured questionnaire containing the same questions from the first, was given to them. This second assessment completed the formal interview and assessment of the face validity for the SPAT tool.

To complete the study on the adoption of the web page evaluation tool known as SPAT, a follow-up email was sent to each participating CDE approximately three weeks after the introduction of the SPAT tool. This email contained three questions: "To what extent has SPAT changed the way you review web page content? To what extent have you introduced SPAT to other people?" and "Are there any additional comments on SPAT and its use that you would like to share?" See Appendix F.

3.6. SAMPLE POPULATION

The estimated sample size for this study was calculated using nQuery Advisor 5.0 (Statistical Solutions, 2006). A sample size of 34 provides a power to detect an effect size of 0.500 (d=.5) using a paired t-test with a 0.050 two-sided significance level. A total of 38 CDEs were interviewed successfully for demographic data. Thirty-seven CDEs provide data on web page evaluation and the adoption of SPAT. One questionnaire was deemed unusable due to loss of consistency during data collection.

All CDEs have obtained a degree from a higher education institution and passed a certification exam from the National Certification Board for Diabetes Educators (NCBDE). Any health care professional may sit for the NCBDE's certification exam after meeting the eligibility requirements stated by the NCBDE (National Certification Board for Diabetes Educators). The CDEs who participated in this study consisted of a convenience sample taken from the Pittsburgh, PA metropolitan area. One CDE, with nurse licensure, in this study worked for a corporation and all other CDEs were nurses and dieticians with various credentials working in different hospital environments. After completing data collection, one CDE provided a name of a pharmacist who holds a CDE credential and is a male. While it would have been interesting to have a non-nurse, non-dietician, and a male, participate in the study, due to time constraints this recruitment was not feasible.

The investigator traveled to each CDE's location to introduce and moderate the SPAT study. One interview was in Beaver, PA and one in Aliquippa, PA. Three interviews were in Latrobe, PA, and all other interviews were in the Pittsburgh area.

3.7. DATA COLLECTION

Approval of the study was obtained by the Institutional Review Board (IRB) of the University of Pittsburgh on May 22, 2006 (Appendix H). The study used primarily quantitative data for data collection with two qualitative questions. Data collection began June 28, 2006 and ended September 6, 2006 with a total of 38 CDEs having participated in the study.

To establish an interview date and time with CDEs solicitation worked best via the telephone. Each CDE was informed that the investigator was a student working on a PhD and

that their name was provided by another CDE as someone whom might participate in the study. A few CDEs were contacted without having a recommendation from someone. These names were found via the http://www.wpade.org (Western Pennsylvania Association of Diabetes Educators) web page and the American Association of Diabetes Educators, http://members.aadenet.org, web page. Some CDEs were also contacted via email. The email message consisted of the same recruitment method used with the telephone.

The investigator collected 71 names of CDEs within the Pittsburgh metropolitan area. Two of the 67 people contacted were not CDEs. One named CDE was not attainable due to job relocation. Two of the 67 CDEs refused to participate due to work constraints and one due to medical leave. Four of the 67 CDEs were willing to participate but only after mid September. These four were not needed for the study as data recruitment ended September 6, 2006. The overall response rate for recruitment was 59%. That calculation excludes the two people who were not CDEs and the four CDEs who would help after mid September. Table 3.7.1. shows response rates for study participation.

To begin the interview, the CDE was asked to complete the demographic questionnaire (Appendix A). After completing the demographic questionnaire, the CDE was given verbal instructions on using the provided computer to view, as a professional, only Test Set One web pages. To reinforce 'how' the CDE was to look at web pages, suggestions were made to look at the page as if it could possibly be used with patients, personally, or for a family member. When the CDE notified the investigator that they were done with Test Set One, they were given questionnaire number one (Appendix B). Following completion of questionnaire number one, they were given the SPAT handout (Appendix C) and told that the investigator would read the SPAT handout to them in order to maintain consistency in the study. This permitted the

participant to either read along with the investigator or listen while the investigator read. This method of introducing SPAT enabled the CDE to use the learning style that they know best suits them. Once SPAT had been introduced via the SPAT handout, the CDE was instructed to view Test Set Two web pages. When they completed their review of Test Set Two, the CDEs received questionnaire number two (Appendix B). Completing questionnaire number two completed the in-person interview. Before closing the interview session, the CDE was asked if a follow-up email containing a few questions may be sent to them.

Careful attention was given to writing the SPAT script in an easy-to-read and easy-to-hear format. The Flesch-Kincaid® grade level for the SPAT script was calculated by Microsoft Word™ to be at a sixth grade level. Even though the sample population has a degree of higher education, the sixth grade reading level of the SPAT script should assure comprehension. SPAT was not demonstrated with a web site for the CDE to view its application; they only heard or read the word 'SPAT' and what the acronym means.

Immediately after participating in the study, a hand written 'thank you note' was sent via regular mail to the participant. Approximately three weeks after the interview, an email was sent to the CDE thanking her again for their participation and containing follow-up questions (Appendix E) to measure her personal usage of SPAT and to see if she had introduced SPAT to others. By giving the CDE three weeks before the follow-up questionnaire, it was thought that she would have had time to completely forget about the tool or to personally utilize the tool and perhaps introduce it to their patients or others. All 38 participants received the follow-up questionnaire via email. As shown in Table 3.7.1., of the 38 questionnaires, 29 were returned, establishing the follow-up response rate at 74%.

Table 3.7.1. Response rates for data collection

	Response Rates for Data Collection			
	Contacted	**Interviewed**	**Usable Interviews**	**Follow-up Questionnaires Returned**
Number of CDEs	67	38	37	**29**
Percentage	100	57	97	**76**

3.8. RESULTS AND DATA ANALYSIS

Quantitative data was analyzed with SPSS v.13 statistical software for Windows™. Descriptive data from the demographic questionnaire was calculated in terms of percentages, the means, and the standard deviations. The paired-samples *t* test was used to compute the means and the statistical significance of the difference between the means. Frequencies and mean scores were used to determine the effects of SPAT on the CDE's web page evaluation techniques. The open-ended questions from all three questionnaires were analyzed by the investigator using Excel. The responses were scrutinized for themes and commonalities. Table 3.8.1. presents the research questions and the statistical method used to answer each question.

Table 3.8.1. Research questions with applied statistical analysis

Research Question	Analysis Procedure
At what level do Pittsburgh metropolitan area Certified Diabetes Educators (CDEs) use information from the Web in their professional practice?	Descriptive
What kind of assessment do Pittsburgh metropolitan area CDEs perform on web based diabetes information before recommending the information to patients?	Descriptive
If CDEs perform an assessment of web based diabetes information before recommending the information to patients, what do they do?	Descriptive & Inferential
At what level does the use of the SPAT assessment tool for web based information make a difference in the information CDEs provide to patients?	Descriptive

3.9. LIMITATIONS

Using a convenience sample of experts on diabetes and testing the SPAT web page assessment tool with content from their field of specialty may have placed limitations on this study. Because CDEs have a higher level of knowledge in the area of diabetes, they may not have had to look for citations cited within the text on the page basing their opinion of the text with their existing knowledge. This may have limited the application of the 'A,' 'audience' in the SPAT tool. With the convenience sample having advanced degrees and certification in diabetes, the tool's application was not measured within a population having only a K-12 education or less. Testing the tool with a specialized population could be seen as limiting its functionality with a diverse

population. By using only diabetes information the application of the SPAT also limited its functionality across disciplines.

Only clinical professionals were used to test SPAT. While this population has access to patients, not all CDEs in this study worked with patients, potentially limiting their use of electronic diabetes information and reasons for accessing diabetes information. This in turn could limit their use of the WWW and need to use SPAT.

The convenience sample used in this study also consisted of only females, therefore limiting the measurement of web page content to only the skills of women. The CDEs were also all within the immediate Pittsburgh area, possibly limiting the knowledge base of diabetes information and web based information to what is known within Western Pennsylvania.

Individual web pages used in the test sets may have been recognized or known by the CDEs, possibly biasing their judgment of the page. Recognizing a web page or knowing the page could cause one to not actually read the text on the page or evaluate the components of the page and use their prior knowledge of the page without using SPAT. For this reason, very popular web pages that were likely known to the CDEs, such as the American Diabetes Association web page, were purposively discarded for use in this study.

Validating the abstract web page assessment tool SPAT was challenging; beyond measuring subjective content, there was no existing validated tool of this type for comparison and no gold standard for the degree of accuracy presented within the text of web pages. Thus, only a measure of face validity could be used to analyze if the instrument appears to test what it is intended to test. Using face validity to justify the test is a limitation since the outcomes are based solely on the opinion of the investigator (Portney & Watkins, 2000).

When people act differently in their typical environment because they believe they are being observed, the reactivity is known as the Hawthorne Effect. A final limitation of this study is that there was no possibility of preventing the Hawthorne Effect from occurring. The investigator was present in each interview session and observed the CDEs reviewing the test sets. Because the CDEs were being watched, they may have adjusted their normal behavior to act in a way they felt was more suitable in the presence of an investigator or in accordance to how they believed they should act in a research study.

4. ANALYSIS AND INTERPRETATION OF DATA

This study collected data within three different subject areas: (1) demographic – age and gender, then questions assessing Internet skills and their perception of Internet value; (2) web page evaluation methods; and (3) adoption rate of the SPAT evaluation tool presented during the study. Each area will be presented within its respective section. A final section will summarize data from the demographic questionnaire in relation to the web page evaluation techniques and the adoption and dissemination of SPAT.

4.1. FINDINGS: DEMOGRAPHIC DATA

Findings from the demographic assessment tool will be discussed in the same order presented on the questionnaire (Appendix A).

4.1.1. Gender and age

Thirty-eight women completed the demographic questionnaire with a mean age range of 47-58. Two people did not select an age. Five participants were between the ages 24-34 (13.2%), 13 (34.2%) participants were between the ages 35-46, 16 (42.1%) participants reported being in the age range of 47-58 and two (5.3%) participants were over 59 years of age. See Table 4.1.1.

Table 4.1.1. Demographic data

	Percent % (n=38)			Percent % (n=36)			
	Male	Female		24-34	35-46	47-58	59-over
Gender	0	100	**Age**	13.2	34.2	42.1	5.3

4.1.2. Internet training course

Six of the 38 participants reported taking a formal course on how to use the Internet. Two of the six participants reported that the course introduced the importance of reviewing the reliability of information presented through web pages.

4.1.3. Professional development and personal use of the Internet

Research Question One: At what level do Pittsburgh metropolitan area Certified Diabetes Educators (CDEs) use information from the Web or Internet in their professional practice?

Participants were asked to respond to 14 Likert-type items measuring their perceived level of use of the services within the Internet for professional purposes and then for personal use. The level of use is represented by a mean score based on a 5-point response scale ranging from 5 (very often) to 1 (never). Any tool receiving a high score exemplifies much use.

Table 4.1.3. shows the percentage of professional development use and personal use for each tool. The most frequently used service on the Internet was email for both professional development and personal use. The World Wide Web was the second most used service. For

professional development, the least utilized services were blogs and USENET newsgroups. For personal use, blogs and USENET newsgroups tied for the least used.

Table 4.1.3. Frequency of Internet services

	Percent (%) n=38						
Internet Services	**Never**	**Rarely**	**Sometimes**	**Often**	**Very often**	**Mean**	**S.D.**
E-mail	0	5.3	7.9	18.4	68.4	4.5	.86
The World Wide Web	7.9	0	7.9	31.6	52.6	4.2	1.1
Blogs	84.2	14.8	0	0	0	1.2	.37
USENET newsgroups	75.7	13.2	5.4	5.4	0	1.4	.83
Forums/Listservs™	28.9	28.9	18.4	13.2	10.5	2.5	1.3
Google	5.3	7.9	26.3	18.4	42.1	3.8	1.2
Yahoo	23.7	21.1	31.6	15.8	7.9	2.6	1.2

Frequency of Use for Personal Purposes

	Percent (%) n=38						
Internet Services	**Never**	**Rarely**	**Sometimes**	**Often**	**Very often**	**Mean**	**S.D.**
E-mail	0	0	15.8	21.1	63.2	4.5	.76
The World Wide Web	7.9	2.6	10.5	18.4	60.5	4.2	1.2
Blogs	86.8	5.3	5.3	0	2.6	1.2	.79
USENET newsgroups	86.5	5.4	8.1	0	0	1.2	.58
Forums/Listservs™	65.8	18.4	13.2	2.6	0	1.5	.83
Google	7.9	7.9	23.7	15.8	44.7	3.8	1.3
Yahoo	26.3	15.8	28.9	10.5	18.4	2.8	1.4

4.1.4. Location of Internet tools utilization

Access to the Internet was measured in the demographic questionnaire by asking about the extent of Internet access in different environments: the office, home, Internet café or coffee shop and a

library. The question did not differentiate between accessing the Internet for professional purposes or for non-professional purposes. The question was intended to measure overall access. Table 4.1.4. shows the level of Internet access by the CDEs in the study. The mean score represents the selection made by the CDE from a 5-point Likert-like scale ranging from 0 (Never) to 5 (Very often). An hourly chart provided a guide for the CDE. Selecting 'rarely' was equivalent to 1-5 hours per week. 'Sometime' represented 6-10 hours per week, 'Often' represented 11-20 hours per week and 'Very often' was 21 or more hours per week.

The results from the questionnaire find that the most frequent access to the Internet occurs in the office, with more than 21 hours per week spent on the Internet. The second least likely place for a CDE to access the Internet was in a library and the least likely site was in an Internet café or coffee shop.

Table 4.1.4. Location of Internet access

	Location of Internet access						
	Percent (%) n=38						
Internet Location	**Never**	**Rarely**	**Sometimes**	**Often**	**Very often**	**Mean**	**S.D.**
In your office	0 0	10.5	31.6	21.1	36.8	3.8	1.1
In your home	7.9	13.2	26.3	21.1	31.6	3.6	1.3
In an Internet café or coffee shop	84.2	10.5	5.3	0	0	1.2	.53
In a library	57.9	36.8	2.6	2.6	0	1.5	.69

4.1.5. Perceived skills with Internet services

Ten services provided on the Internet were listed with a Likert-like scale beginning with (1) for 'Beginner' to (5) 'Never use.' Selecting (2) represented 'Intermediate,' (3) 'Advanced,' and (4) 'Expert.' A chart defining each 'level' of user was provided as a guide. A 'Beginner' was defined as someone who is a "less frequent computer and Internet user who can slowly navigate through a computer's operating system in order to open, edit and create files, but does not know how to troubleshoot and solve problems." An 'Expert' is a "daily computer and Internet user who can quickly and easily navigate through a computer's operating system as well as open, edit and create files, and has a solid foundation in almost all computer and Internet applications and has solid expertise in troubleshooting and solving major problems." For further explanation of the categories refer to Appendix A.

Table 4.1.5. represents the findings of CDE self-reported experience levels with Internet services listed on the demographic questionnaire. The summarized mean score for perceived skills with Internet services was 3.2. This reveals that the CDEs consider their skills advanced. As shown in Table 4.1.5., CDEs are most comfortable and confident with using email. Combining 'Advanced' and 'Expert' finds 63% of CDEs use email daily and can quickly open, close and create files in email. By combining 'Advanced' and 'Expert,' finds 47% of the CDEs feeling confident about their skills in browsing the World Wide Web. It is worth noting that while 47% feel confident with browsing the web, only 45% feel that they are 'advanced' or 'expert' in using search engines.

Table 4.1.5. Perceived skills with Internet services

Percent (%) n=38	Perceived skills with Internet services						
Internet services	**Beginner**	**Intermediate**	**Advanced**	**Expert**	**Never Use**	**Mean**	**S.D.**
Receive and send e-mail (with attachments)	10.5	26.3	34.2	28.9	0	2.8	.98
Browse the World Wide Web	18.4	34.2	28.9	18.4	0	2.5	1.0
Use remote login (Telnet) **	24.3	24.3	2.7	5.4	43.2	3.2	1.7
Create a web page on the WWW	34.2	10.2	0	0	55.3	3.3	1.9
Use search engines (e.g. Google, Yahoo)	10.5	39.5	28.9	15.8	5.3	2.7	1.0
Upload/download files to/from the Internet	21.1	34.2	18.4	18.4	7.9	2.6	1.2
Participate in on-line chat rooms	13.2	7.9	2.6	5.3	71.1	4.1	1.5
Use instant messaging (Messenger)	15.8	13.2	2.6	5.3	63.2	3.9	1.6
Participate in on-line forums	34.2	13.2	10.5	0	42.1	3.0	1.8
Participate in or set-up a Blog	23.7	5.3	0	2.6	68.4	3.9	1.8
Totals						3.2	

**Note: One person did not complete the "Use remote login (Telnet)" question. Thus, n=37 for that question.

4.1.6. Perception of Internet use for professional purposes

The last section of the questionnaire asked questions relating to how they, the CDEs, perceived the value of the Internet for professional purposes. By combining 'strongly agree' and 'agree,'

over 92% of the CDEs believe that the Internet increases access to information. Eighty-seven percent believe that the Internet is crucial for their profession and that 84.2% state that their colleagues are using the Internet. Of particular interest is the perception by 50% of the CDEs, that their patients currently use the Internet. This reveals that utilizing the Internet and its various tools may be an effective means of educating about diabetes. Eighty-two percent of the CDEs currently view the Internet as a tool to use for diabetes education. This high percentage is an indicator that the educators may find the tool known as SPAT, relevant, and actually use SPAT in patient care. When combining their perception of the Internet as an effective teaching medium with the 87% that believe diabetes information on the Internet should be evaluated, SPAT could become a significant tool in a CDE's practice.

Almost one fifth, 18.4%, of CDEs feel that their patients do not access the Internet. This perception could relate to the patient's age, severity of illness, and the patient's access to the Internet. A number of CDEs within the study worked with infants, some CDEs were not directly involved in patient care, and a number of CDEs worked with seniors. Another cause that may have resulted in negative responses is the questionnaire itself. While not an apparent factor in the pilot study, the reversal of the headings in the Likert-like scale may have attributed to misrepresented perceptions. To mark one self in 'strong agreement' the selection was number one. To select 'strongly disagree' one selects the number five. This is in reverse to the previous sections.

The overall mean for how CDEs perceive the usefulness of the Internet on the Likert-like scale, (1-strongly agree – 5-strongly disagree) is very high, 1.7. This positive perception of the Internet can be an indicator that, as a mechanism for information, the Internet is vital to success

in one's career and health. It can also show that as the Internet ages, professionals will not be able to practice without having access to the Internet.

Table 4.1.6. Perception of Internet use for professional purposes

Percent (%) n=38	Perception of Internet use for professional purposes						
Perception Statements	**Strongly Agree**	**Agree**	**Indifferent**	**Disagree**	**Strongly Disagree**	**Mean**	**S.D.**
Use of the Internet is crucial for your profession	71.1	15.8	7.9	2.6	2.6	1.5	.95
Use of the Internet increases my job performance	63.2	23.7	5.3	2.6	5.3	1.6	1.1
Use of the Internet increases my access to information	89.5	2.6	0	2.6	5.3	1.3	1.0
A large number of my colleagues currently use the Internet	81.6	2.6	7.9	2.6	5.3	1.5	1.1
A large number of my patients currently use the Internet	23.7	26.3	31.6	18.4	0	2.4	1.1
The Internet offers opportunities for new teaching techniques	42.1	39.5	10.5	2.6	5.3	1.9	1.1
It is important to review diabetes information available on the Internet	68.4	18.4	5.3	2.6	5.3	1.6	1.1
Totals						1.7	

4.2. FINDINGS: SPAT QUESTIONNAIRES

Research Question Two: What kind of assessment do Pittsburgh metropolitan area CDEs perform on web based diabetes information before recommending the information to patients?

Research Question Three: If CDEs perform an assessment of web based diabetes information before recommending the information to patients, what do they do?

Research Question Four: At what level does the use of the SPAT assessment tool for web based information make a difference in the information CDEs provide to patients?

Thirty-seven CDEs completed the SPAT questionnaires. With questionnaire one, one person did not answer the question, "When reviewing the web page did you look to see if there was a page created date, a last update date or a copyright date provided?" All subjects completed all questions in questionnaire two.

When looking at a web page, 12(32%) CDEs reported evaluating the URL. Twenty-five (68%) CDEs said they did not evaluate the URL of a web page. Sixteen (43%) CDEs said they looked for an author of a web page and 21(57%) said they did not. Thirty-four (92%) of the CDEs reported critically reviewing the text to assess who the audience was the page was targeting. Three (8%) said they did not review the text to see who the audience was. Out of 36 CDEs, 12(76%) said they looked for a date on the web page and 24(67%) said they did not. From the 37 CDEs, 28(76%) said they reviewed the text for any biases, and 9(24%) said they did not review the text for biases.

For the post-test, questionnaire two was completed. Thirty-six (97%) CDEs said they reviewed the URL of a web page when reviewing. One (3%) person did not review the URL when reviewing a web page. When evaluating a web page for an author, all 37 (100%) CDEs looked for one. All 37 (100%) of the CDEs also reviewed the text of the web page to discern the audience as well as looked for a date on the page. Thirty-four (92%) of the CDEs evaluated the text of the web page for biases and three (8%) did not. Table 4.2.1 displays the findings from the two SPAT questionnaires.

Table 4.2.1. Results from SPAT questionnaires

Percent (%)

SPAT Questionnaire Questions	**Pre-test (SPAT Questionnaire 1) Yes**	**Pro-test (SPAT Questionnaire 1) No**	**Post-test (SPAT Questionnaire 2) Yes**	**Post-test (SPAT Questionnaire 2) No**
S=site (url) (n=37)	32	68	97	3
P=publisher (author) (n=37)	43	57	100	0
A=audience (n=37)	92	8	100	0
T=timeliness (date) (n=36*)(n=37)	33*	67*	100	0
Text (n=37)	76	24	92	8

The data from the SPAT questions were calculated using the paired sample *t* test to determine the effects of using SPAT when evaluating web pages. The pre-test (SPAT Questionnaire One) was compared to the post-test (SPAT Questionnaire Two). The testing measurements were treated as dependent variables, and the paired sample *t* testing methodology was used to analyze pre- and post-test means and standard deviations. This test measured the

pre- and post-test means, standard deviation, and significance of the differences between the before and after measurements. As the two measurements were made on a before-and-after-basis, these observations cannot be treated as independent samples. With n=37 for questions 1-4 and n=36 for question 5 of the questionnaire, the mean score for the pre-test was 1.46, and 1.02 for the post-test. Table 4.2.1 shows the analysis with n=37 for questions 1-4, and n=36 for question 5 of the questionnaire. The mean score for the pre-test measurements results was 1.46, with a corresponding 1.02 mean score for the post-test results.

Using a confidence interval of 99%, a calculated "*p*" value equal or larger than the calculated *t* value would indicate any difference between the pre- and post- results could be due to chance. Table 4.2.1.1. shows the *p* value is less than the *t* value for each aspect of SPAT. Therefore, the differences between questionnaire 1 and questionnaire 2 indicate a statistically significant difference not due to chance. If *p* had been equal or larger than *t*, the differences between pre and post testing results could have been due to differences caused by sampling. This is clearly not the case. Three other statistical tests were proposed to analyze the above data. The non-parametric test, Kruskal-Wallis H was proposed but not seen to be appropriate as there must be two or more groups within the study for comparison. This study had only one group. The chi-square test for 'goodness of fit' was another possibility as it sums the squares of independent, normally distributed variables with zero means and unit variances. To use the chi-square test, the data must meet four conditions before a valid analysis can be functional. The first is that, "The sample of observations should be independent of one another and drawn from the target population" (Clark & Schkade, 1979). This study does meet that requirement. The second requirement is, "The data are usually of nominal measurement but may be higher for some kinds of tests" (Clark & Schkade, 1979). The data obtained by the questionnaires can be

treated as nominal data therefore the first two requirements for the chi-square test have been made. The third requirement for the chi-square test was not satisfied by this study. The third requirement states that there must be at least 50 observations. This study had only 38 observations. The fourth requirement, "There should be no fewer than five observations in any expected cell" (Clark & Schkade, 1979) was only barely met but since there were not enough observations in the study, the chi-square test was not a suitable analysis for this study.

The second nonparametric test was the McNemar's test for change in a before and after intervention. The McNemar's test is an adaptation of the chi-square test for repeated measures with dichotomous measures on the same subjects (Munro, 2001). This test was calculated using the Crosstab function within the SPSS software and presented the data in percentiles. The results from the McNemar's test and the paired sample *t* test to determine the effects of the tool, were exactly the same. This was not surprising as the McNemar's test is analogous to the paired sample *t* test.

While there was no statistical difference found in the CDEs' evaluation of the URL, author, and date, for a web page before and after the introduction of SPAT, there was statistical significance for evaluating a web page's text and intended audience. While the differences in mean scores between the pre- and post-test is narrow, the near perfect effectiveness of SPAT manipulation is notable as proof that if one knows of the SPAT tool, and uses it, they are evaluating a web page.

Table 4.2.1.1. Paired sample *t* test results for SPAT questionnaire

Questions	**Pre-test (SPAT Questionnaire 1) Mean**	**Post-test (SPAT Questionnaire 2) Mean**	***t***	***P***
S=site (url) (n=37)	1.7	1.0	8.2	.00
P=publisher (author) (n=37)	1.6	1.0	6.9	.00
A=audience (n=37)	1.1	1.0	1.8	.083
T=timeliness (date) (n=36)	1.7	1.0	8.4	.00
Text (n=37)	1.2	1.1	2.6	.012
Totals	1.46	1.02		

P<.01

4.2.2. Anecdotal evidence of open-ended responses in the SPAT questionnaires

While the SPAT questionnaire's asked pointed questions concerning specific aspects of a web page, there are other factors that people may use when evaluating web pages. To provide the CDEs an opportunity to share their personal methods of evaluation they were asked, "What additional aspects of the diabetes information web page did you judge when examining the page?" (See Appendix B).

From the 37 participants completing the SPAT questionnaires, five did not add any further information on SPAT Questionnaire One, and nearly the same five did not add any further information on SPAT Questionnaire Two. Overall, this makes a 74% return rate on the open-ended question. Most responses were in the form of short phrases or a single list. Other comments identified the purpose of the page. For instance if the page sold books, it was noted

that, “it seemed more like a sale catalogue than diabetes care information.” From both questionnaires, the responses were compiled and analyzed for themes. Two general themes emerged – usability and aesthetics. Usability means making products and systems easier to use, and matching them more closely to user needs and requirements (UsabilityNet, 2006). In the case of web pages, usability relates to the presentation of links and if the links are underlined or presented as rollovers. Another aspect is if the links open content in a new browser window or if all content stays within the existing browser window. Presenting the information in an understandable format, i.e. paragraphs, bulleted points, pictures, etc…, and having the information in the place the user wants it, are usability issues.

Some aspects of web pages fall into both the usability and aesthetics categories. For instance, font size and font color are important for usability and the general appearance of the web page. The use of graphics, images and overall layout of a page are all features for visual presentation of the web page. Comments from the CDEs that showed support for ‘usability’ or ‘aesthetics’ are listed below.

Open-ended response theme A: Usability

Included responses were the following:

- “The use was easy and the connections were efficient”
- “were there hyperlinks”
- “Ease of navigation”
- “how quick the links took to open”
- “Organization of information”
- “Time needed to find info that was beneficial”

- “Size”
- “Backarrow”
- “Ease of use – format/design”
- “Ease of moving back, forth”

Open-ended response theme B: Aesthetics

Included responses were the following:

- “A lot of information on one page”
- “Small print”
- “Format of page – easy to navigate, organized pictures/standard text”
- “Not too many advertisements in margin to distract from main”
- “I do not like moving things when review a web page”
- “Pages that appear too wordy maybe intimidating to some patients”
- “Color – pictures – font size”
- “Advertising – format/content of site”

Most remarks stated the opinion of the CDE with reference to the specific web pages. Often they noted that topics covered within the web pages, such as “carb counting,’ ‘the variety of books for sale,’ and ‘I looked at specific books approved on the site and who was sending the information.” These notations do not reveal an ‘aspect’ of a web page for evaluation, but they do share the specifics of what the person may have used as criteria to decide if the page was ‘good’ or ‘not good.’

In the SPAT Questionnaire Two, the CDEs often wrote that they looked for the SPAT criteria. This is shown by the following responses:

- "I looked for SPAT"
- "Accuracy of info"
- "Readability"
- "Content – was the website of interest to a lot of patients? Or very specific – were there links to other known and respected diabetes websites"
- "Who wrote the info- what are their credentials"

The differences between the answers to the question, "What additional aspects of the diabetes information web page did you judge when examining the page?" in SPAT Questionnaire One and Two, reveal that the CDEs did change their method of web page evaluation once they had knowledge of SPAT.

4.2.3. Synthesis of informal discussion

When the CDE submitted the SPAT Questionnaire Two, the formal study was concluded. The investigator tried to conclude the session by asking the CDE if they had seen any of the selected web pages prior to the study. The CDE would then usually proceed to ask questions about the pages and then remark that they usually use only the ADA (American Diabetes Association) site or the web sites that the ADA suggests. Some CDEs remarked that they try to guide their patients to only using the ADA sites and will sometimes provide them a paper list of recommended web pages. Comments from this discussion were immediately documented in a

Microsoft Word document after leaving the interview. Out of the four web sites, only a few had seen the Diabetes Mall page and the Insulin Pumpers page.

In regards to remarks that were made about SPAT, they were all favorable. One person stated, "I think you are on to something with this. Will you send me your final thesis?" Another said, "This is great. I can use this with my insulin patients." Others asked if they could use SPAT and if they could keep the SPAT information sheet. One person asked if they could place the SPAT information sheet in the patients' waiting room.

The summary of these responses, and the responses from the formal data collection instruments, demonstrates that the CDEs did not have a standardized method of evaluating web pages. These data supports the need for an easy to use standardized tool such as SPAT.

4.2.4. Follow-up Questionnaire Analysis

The follow-up questionnaire asked three questions, (1) To what extent has SPAT changed the way you review web page content? (2) To what extent have you introduced SPAT to other people? and (3) Are there any additional comments on SPAT and its use that you would like to share? The first two questions provided a Likert-like scale beginning with (5) for 'No at all' to (1) 'Extensively.' Selecting (4) represented 'Slightly,' (3) 'Somewhat,' and (2) 'Substantially.' As shown in Table 4.2.3. 45% of the 29 CDEs reported that SPAT has changed the way they review web pages and 35% said that SPAT has substantially changed their review methods. While only 7% report an extensive change in web page reviewing methodology by SPAT it is most notable that everyone responding with the follow-up questionnaire said it had changed their process in some way. No one reported that she was not using SPAT since learning of the tool.

In response to question two, “To what extent have you introduced SPAT to other people?” 38% report ‘somewhat’ and 28% expressed ‘slightly.’ While 21% report not introducing SPAT to their patients or any others, this could be accounted for by not having direct patient contact. Prior to participation, some CDEs informed the investigator that they did not have contact with patients. This was presented as a question for participation in the study. Direct patient access was not a requirement for participation.

Table 4.2.4. Analysis of SPAT follow-up questionnaire

	Percent (%) n=29					
Statements	**Extensively**	**Substantially**	**Somewhat**	**Slightly**	**Not at All**	**Mean**
SPAT changed reviewing method	6.9	34.5	44.8	13.8	0	2.7
Introduced SPAT to others	6.9	6.9	37.9	27.6	20.7	3.5

For the final question on the questionnaire, the participants were asked if there were any additional comments on SPAT and its use that they would like to share. Sixteen people provided comments. There were no negative comments towards SPAT, and three people explained that they haven’t had any contact with patients so there had not been any opportunity to share SPAT. Responses to the, “Are there any additional comments on SPAT and its use that you would like to share?” question from the follow-up questionnaire are the following:

- "I shared the info with my class I teach at Seton Hill University"
- "Thank you for the information"

- "But interestingly enough, I have to review a website on eating disorders for my graduate class and the critique she gave us to use was similar to SPAT. So I was already familiar with the content! Thanks again!"
- "I have talked with a number of people about the concept and it is a valuable lesson I have learned from you."
- "It is helpful and easy to remember"
- "Would also be helpful for consumers/patients. I plan to teach these guidelines to patients who use the Internet[sic] for health info -- a handout or brochure on this would be helpful for patients."
- "SPAT helps to quickly and consistently evaluate a web site."
- "I think that it has helped me to be more objective when reading web sites."
- "May be good to post next to Internet[sic] terminals in libraries. Also, include a short tutorial (similar to what you had study participants do) on those terminals."
- “I haven't introduced it yet, but I plan to as the need arises."
- "I thought that SPAT was a very useful tool for anyone. It was easy for people to understand & helps to identify a credible site."
- "Good Tool. I will include it in my presentation at the ADA expo on Saturday."
- "I shared the SPAT with my co workers and with my family members. My nephews are students at local colleges and universities and my 2 brothers and sister are all professionals and were very impressed. I think they shared with their coworkers."
- "It is good information that I will retain and keep in mind whenever I am looking at a website."
- “Good Tool.”

5. SUMMARY, RECOMMENDATIONS, AND CONCLUSION

The summary and conclusion to this dissertation presents the summary of contributions made by the study. It also provides a final statement on the results and points toward future work.

5.1. SUMMARY

The Internet has become a vital information source for all professionals and non-professionals. People use the Internet for professional purposes and for lay purposes, in the work environment and outside of the work environment. Without any judicial force reviewing the information placed on the WWW tool available from the Internet, and as dependent on it as humans have become, there needs to be a tool for people to use to evaluate web pages. The purpose of this study was to evaluate the mechanism and adoption of such a tool. To measure the 'need' for such a tool and the adoption rate of a tool, Certified Diabetes Educators within the Pittsburgh metropolitan region were interviewed and introduced to the web page evaluation tool SPAT. SPAT is an acronym, developed by this investigator that cues the user to look for specific content on a web page. SPAT stands for (S)ite, (P)ublisher, (A)audience and (T)imeliness. If

SPAT is used to remind a web surfer to look for the four elements of, site, publisher, audience and timeliness, then a critical appraisal of the web page will take place.

A case-controlled research design was used to collect data from a convenience sample of 38 CDEs. Data was collected using four survey instruments of dichotomous and Likert-type scale questions. Three open-ended questions on the survey instruments added qualitative research data to the study. The qualitative data was vital to the study to uncover aspects of current methodology used by CDEs to evaluate web pages and gather opinions on the tool, SPAT. One interview was held with each participating CDE. During the interview, the participant was introduced to the web page evaluation instrument known as SPAT, and completed a pre- and post-test questionnaire. A follow-up questionnaire revealed if SPAT was being utilized, hence being 'adopted.'

Interpretation of the data from the study was based on the accumulated information from the demographic questionnaire, pre- and post-test questionnaires and the follow-up questionnaire. These three questionnaires were used to answer the four research questions: (1) At what level do Pittsburgh metropolitan area Certified Diabetes Educators (CDEs) use information from the Web in their professional practice? (2) What kind of assessment do Pittsburgh metropolitan area CDEs perform on web based diabetes information before recommending the information to patients? (3) If CDEs perform an assessment of web based diabetes information before recommending the information to patients, what do they do? (4) At what level does the use of the SPAT assessment tool for web based information make a difference in the information CDEs provide to patients?

The demographic questionnaire provided data to answer the question, "At what level do Pittsburgh metropolitan area Certified Diabetes Educators (CDEs) use information from the Web

in their professional practice?" Considering that only six of the 38 CDEs reported having ever received formal training on how to use the WWW, it is impressive how they have apparently adopted the tool. As was demonstrated in the data table 4.1.6., in the data analysis chapter, Figure 5.1.1. shows that over 92% of the CDEs report using the World Wide Web for professional purposes thus making it their second most frequently used service. Only email is used more. Over 50% of the CDEs marked using the WWW 'very often,' and over 30% selected 'often.' Only one person stated that she did not use the World Wide Web for professional purposes.

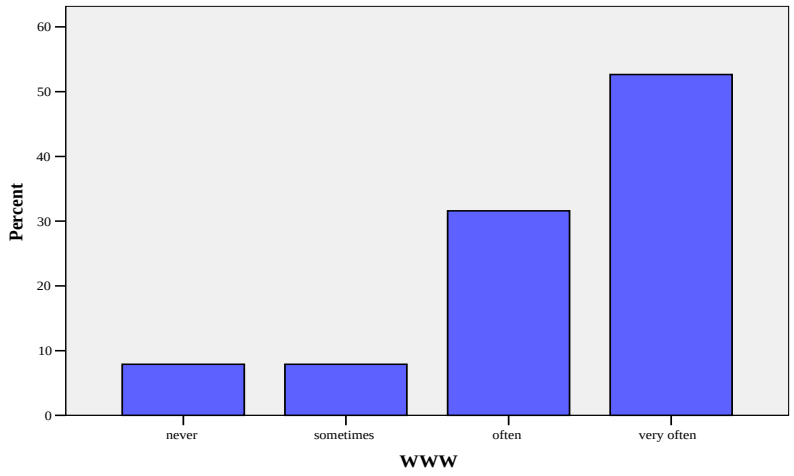
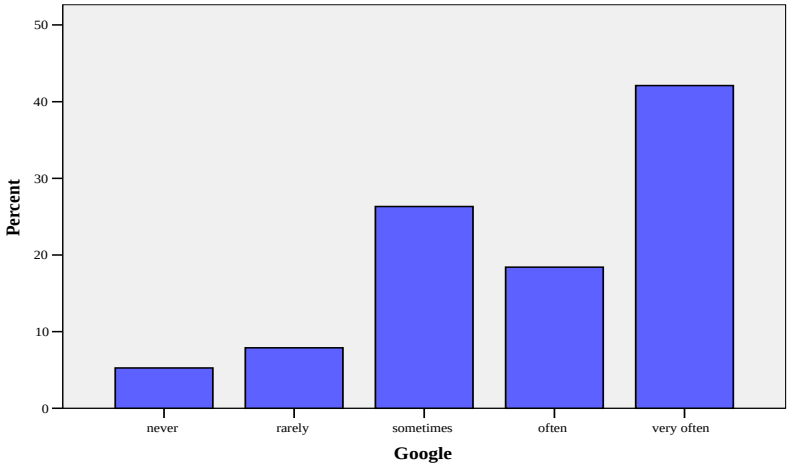


Figure 5.1.1. CDEs use of the WWW for professional purposes (n=38)

Because a high rate of positive responses was expected when querying about the use of the WWW, questions were posed concerning the use of the search engines Yahoo™ and Google™. When noting the Searchengine's Report (Searchenginewatch, 2006) of search engine queries, it is not surprising that the CDEs' selection of a search engine follows the findings from

the company Searchenginewatch™. This company, Searchenginewatch.com, finds Google™ and Yahoo™ to be the two most utilized Web search engines (Searchenginewatch, 2006). Figure 5.1.2. presents data displayed earlier in the data chapter Table 4.1.3., and illustrates that the CDEs in the Pittsburgh metropolitan area report for using Google™ 95% and Yahoo™ 76% of the time when searching the WWW.

Nearly 45% of the CDEs selected Google.com 'very often' and 20% reported using Google.com 'often,' while nearly 30% said 'sometimes.' Only 5% of the CDEs report never using Google™.



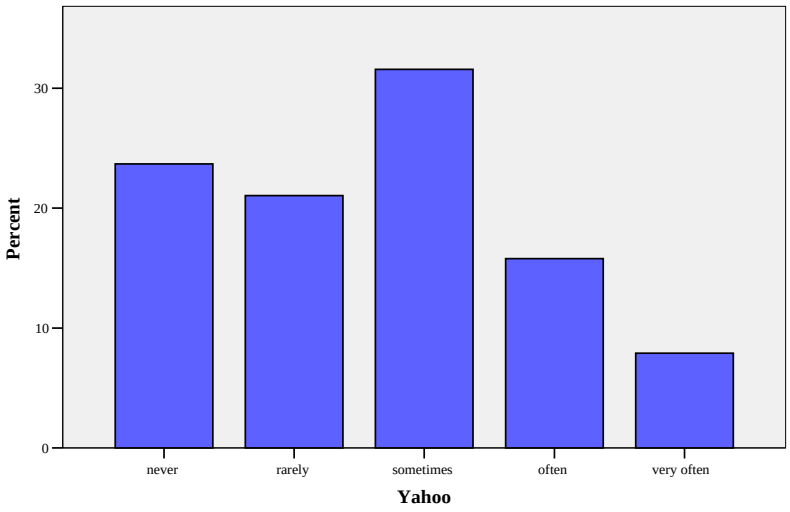


Figure 5.1.2. CDEs selection of search engines (n=38)

The second most popular service used on the Internet is email. Using data from Table 4.1.3. in the data chapter, Figure 5.1.3. illustrates the CDEs opinions on use of email for professional purposes. All CDEs interviewed reported using email. Over half of the CDEs, 68%, report using email ‘very often’ and nearly 20% using it ‘often.’

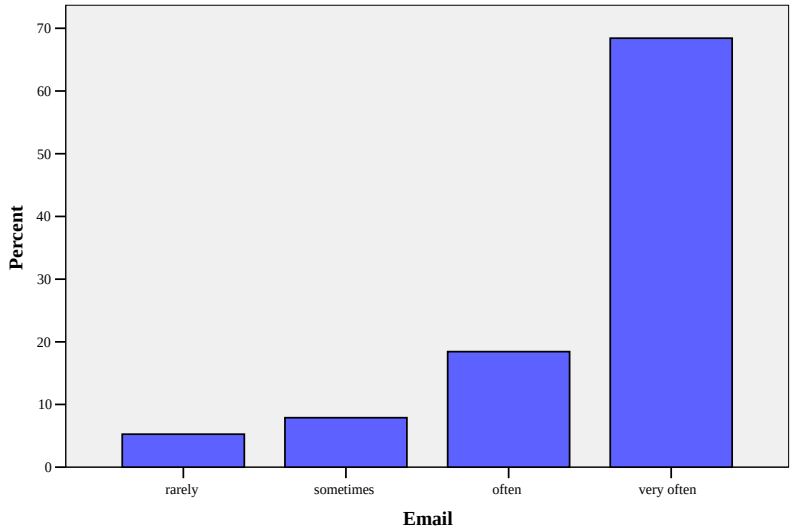


Figure 5.1.3. CDEs use of email for professional purposes (n=38)

Blogs were the least used service as a total of 100% reporting ‘never’ or ‘rarely’ using them. This may be likely because of the relative newness of this communication service. Blogs did not become mainstream until 2004 (Gomes, 2004), and while easy to use, it takes time to set them up. Reading blogs is also a time commitment. Perhaps all of these reasons contribute to the low number of CDEs using blogs. CDEs within their work environments are, apparently pressed for time, so finding and then reading a blog would require a considerable amount time which the CDEs do not have. Figure 5.1.4. presents data from data chapter Table 4.1.3 to demonstrate the two findings from the demographic questionnaire on the CDE’s use of blogs.

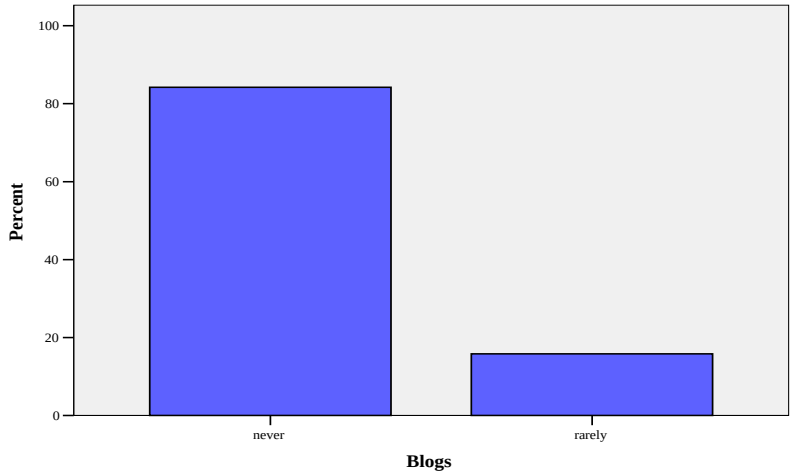


Figure 5.1.4. CDEs use of blogs for professional purposes (n=38)

While USENET newsgroups and listservs™ are a relatively 'old' service within the Internet and not discussed as often in research and lay literature, some CDEs still utilize information by accessing them. As was shown in the data chapter Table 4.1.3., and now Figure 5.1.5., 24% of the CDEs access USENET newsgroups and 71% access listservs™. Because many services within the Internet are reformatted and renamed, there may have not been an understanding of what the two services are. This was perhaps the reason many CDEs inquired what USENET newsgroups and listservs™ were when completing the demographic questionnaire. After the service was described orally, the CDEs then were able to make their utilization decision.

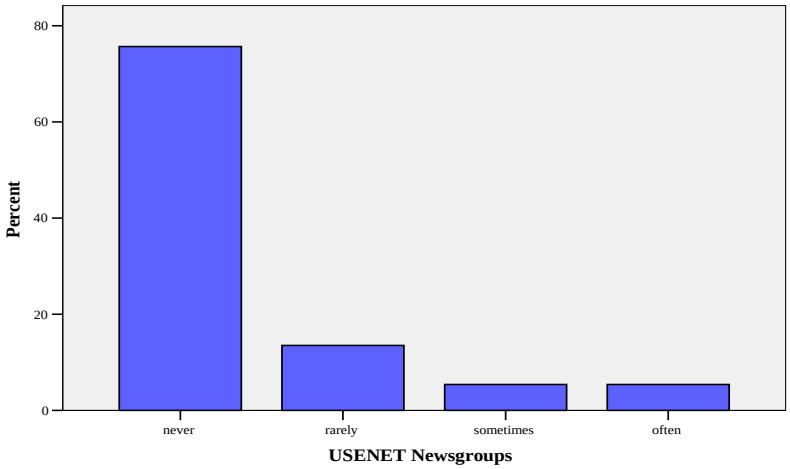
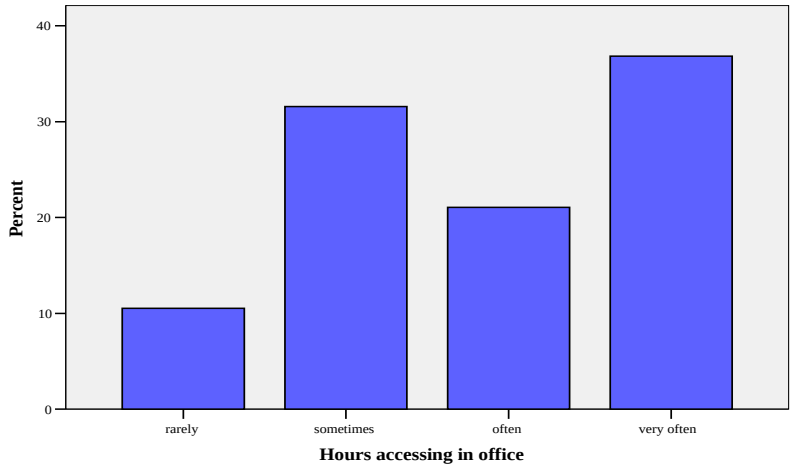


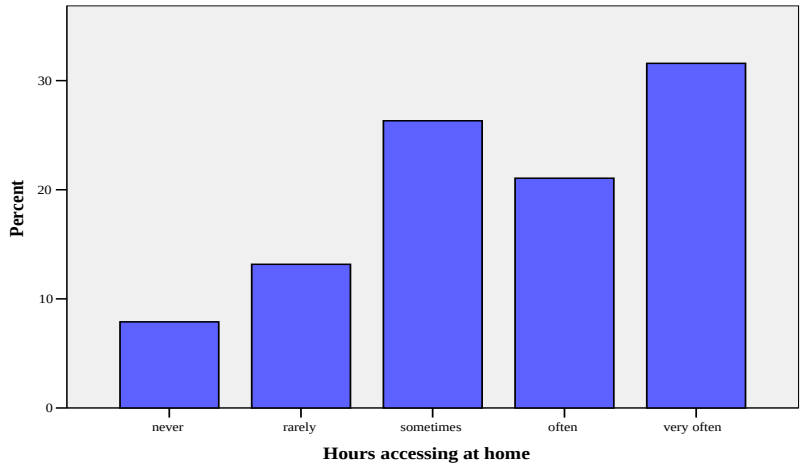
Figure 5.1.5. CDEs utilization of USENET Newsgroups and Listservs™ (n=*37/38)
One person did not complete the USENET Newsgroup question

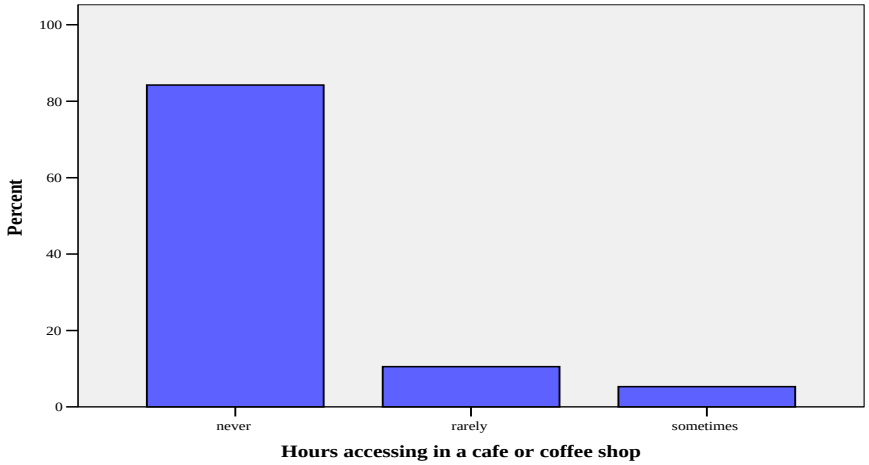
Because of the interest in the utilization of the Internet services, an inquiry was made concerning the location of access to these tools. While not correlated with purpose of access, i.e. professional or non-professional, Figure 5.1.6. and the data in Table 4.1.4. in the data chapter, illustrates that 100% of the CDEs use the Internet in the work environment and 92.2% access the Internet from home. When at the office, 37% of the CDEs claimed to access the Internet for 21 or more hours per week. At home, 32% reported accessing the Internet for 21 or more hours a week. Accessing the Internet in an Internet café or coffee shop was less likely than accessing the Internet in a library. While both environments had minimal use, 16 people reported using a library to access the Internet and six had accessed the Internet from a café or coffee shop. Within a library, one person accessed the Internet for 11-20 hours a week and one person accessed it for 6-10 hours a week. Fourteen of the participants used the Internet in a library for 1-5 hours a week. In summary, the work environment provides the most access to Internet

services followed by home. Accessing the Internet services was more common in a library than in an Internet café or coffee shop.

Never = zero hours per week	**Often = 11-20 hours per week**
Rarely = 1-5 hours per week	**Very often = 21 or more hours per week**
Sometime = 6-10 hours per week	







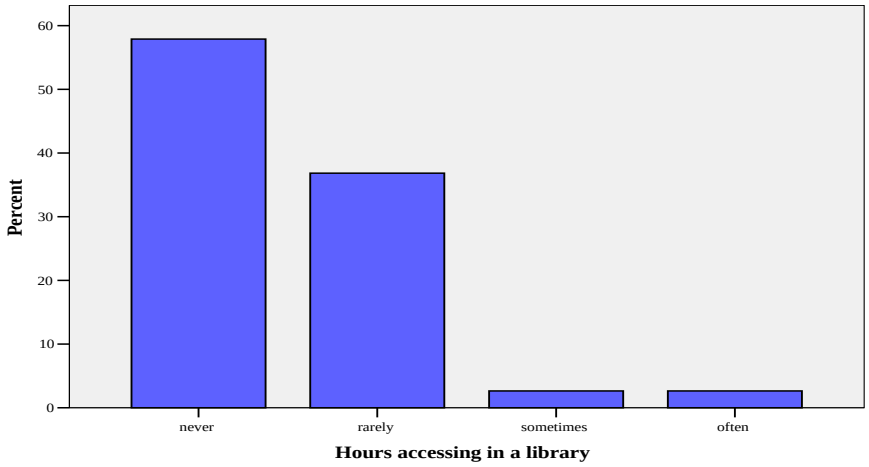
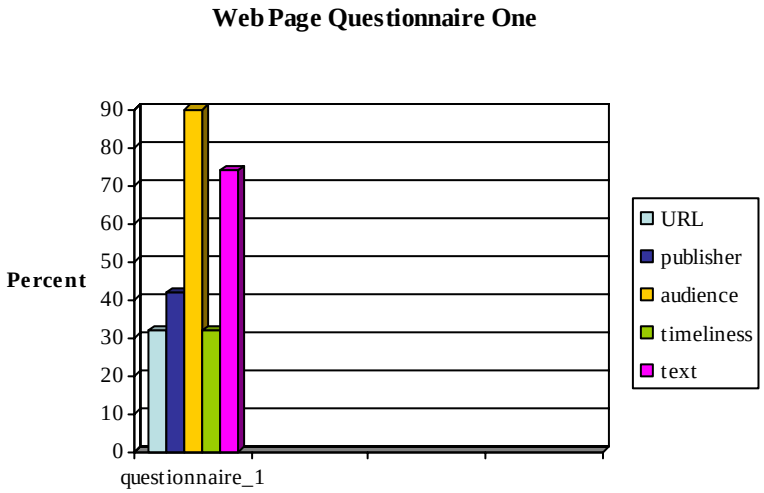
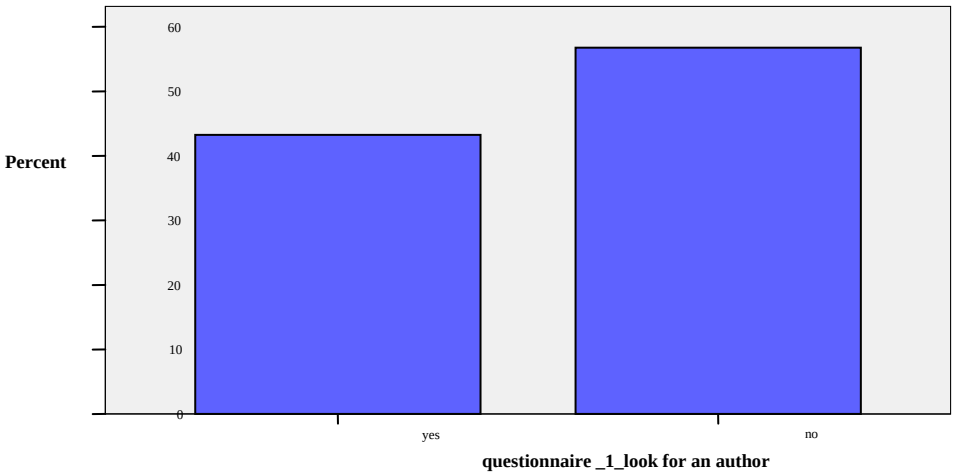


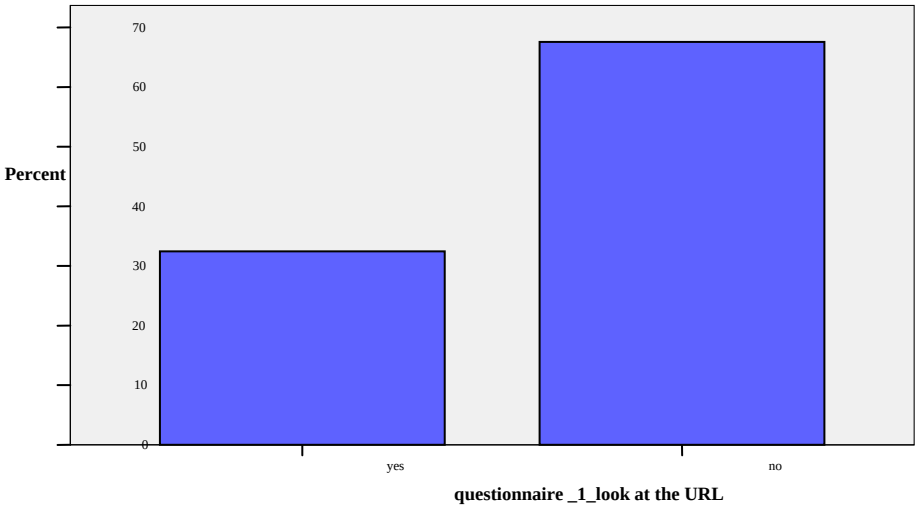
Figure 5.1.6. CDEs' location and hours of access to the Internet (n=38)

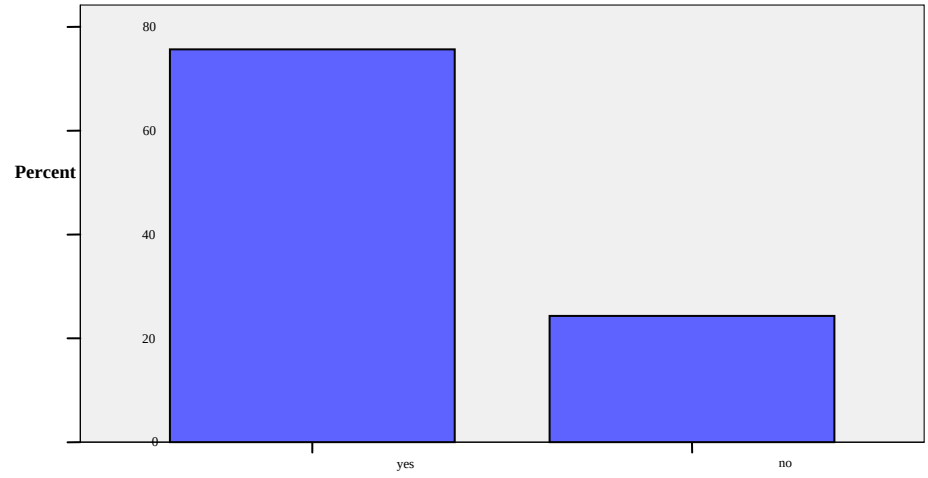
The web page content questionnaire one provided information to answer two questions, "What kind of assessment do Pittsburgh metropolitan area CDEs perform on web based diabetes information before recommending the information to patients? And 'If CDEs perform an

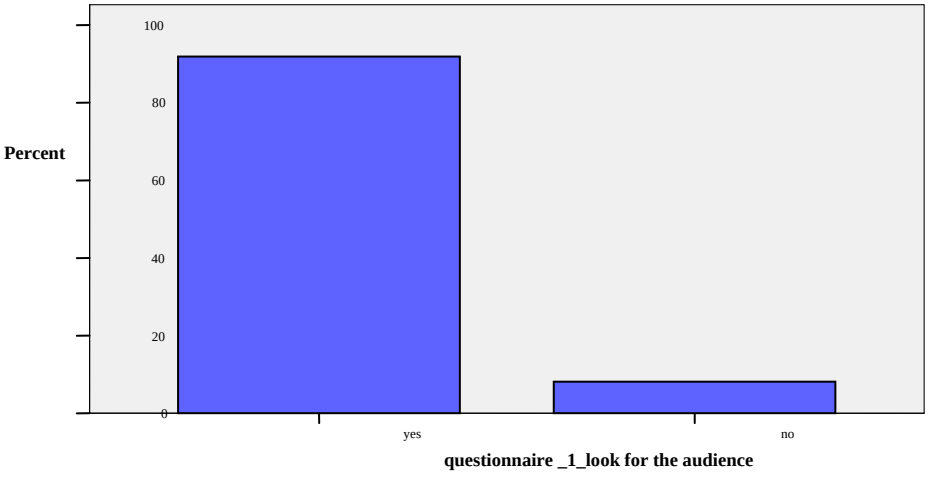
assessment of web based diabetes information before recommending the information to patients, what do they do?" In this sample population of 37 CDEs, as reported in data section Table 4.2.1., 92% evaluated the text of the web page for the audience and 76% reported examining the text itself. All other aspects of the page were examined less than 50% of the time. When asked if they looked for an author, only 43% report doing so. Thirty-three percent report evaluating the URL and looking for a date on the page when reviewing web pages. Figure 5.1.7. displays the data presented in Table 4.2.1. and illustrates the conclusion that there does not appear to be consistency in evaluation criteria or methods used by the CDEs. The findings from the qualitative data reveal that CDEs look at the color and font size of the text on a web page, the number of advertisements and the accuracy of the information.




Percent
60
50
40
30
20
10
0
yes
no
questionnaire _1_look for an author


Percent
70
60
50
40
30
20
10
0
yes
no
questionnaire _1_look at the URL


Percent
80
60
40
20
0
yes
no
questionnaire _1_look at the text


Percent
100
80
60
40
20
0
yes
no
questionnaire _1_look for the audience

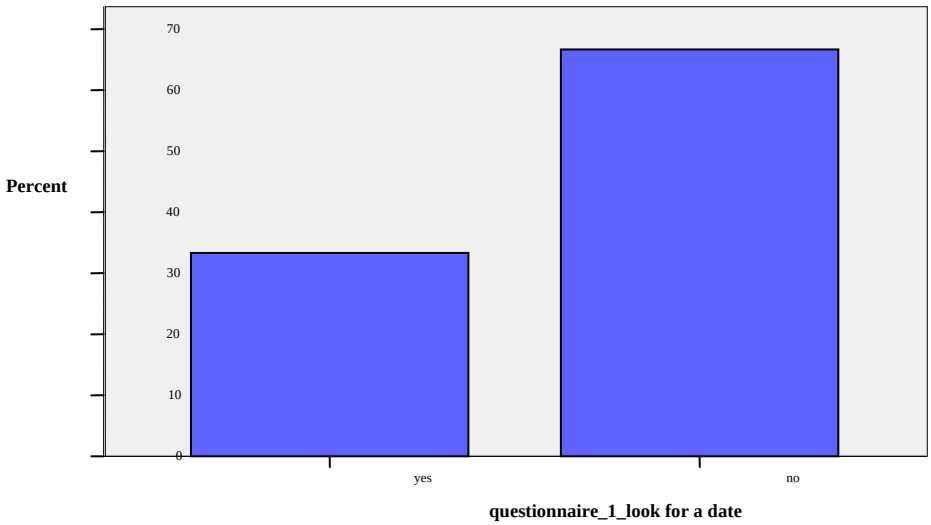


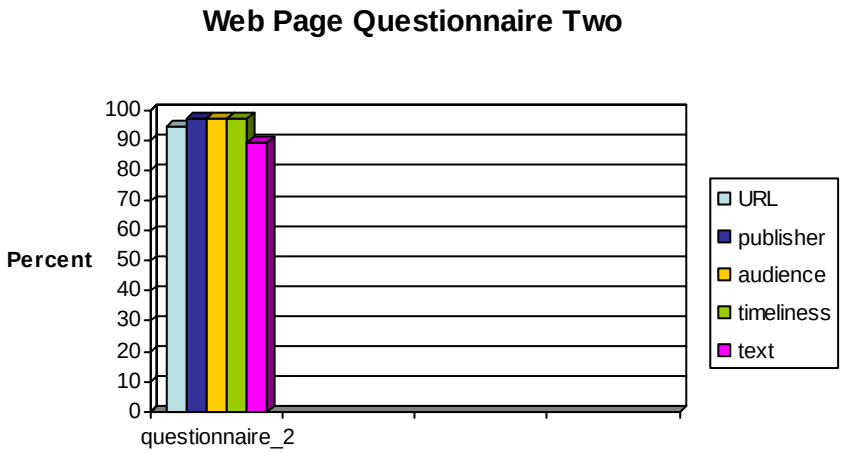
Figure 5.1.7. Results from web page questionnaire one (n=37)

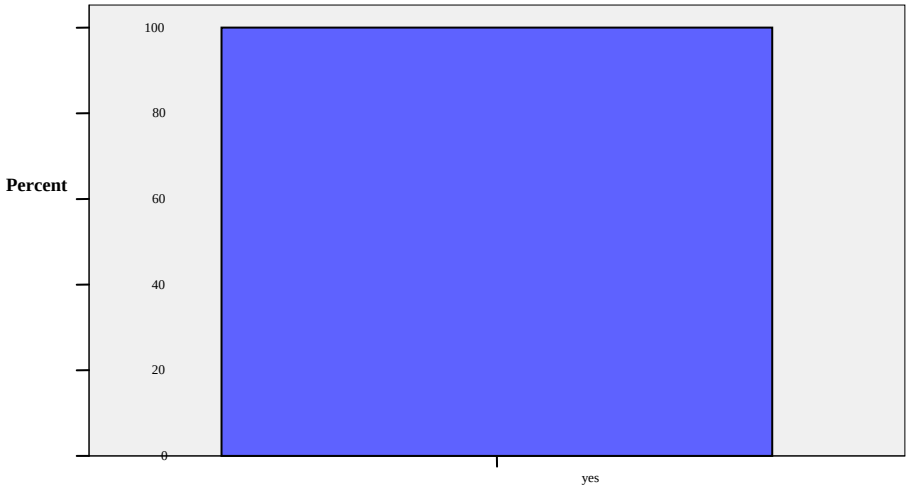
To answer the remaining research question, "At what level does the use of the SPAT assessment tool for web based information make a difference in the information CDEs provide to patients?" the web page questionnaire two and the follow-up questionnaire were used. Using the data presented in data section Table 4.2.1., Figure 5.1.8. displays the results from web page questionnaire two. Data from Table 4.2.4 in the data section presented in Figure 5.1.9. further illustrates the results from the follow-up questionnaire. Thirty-seven people responded to questionnaire two and 29 to the follow-up questionnaire.

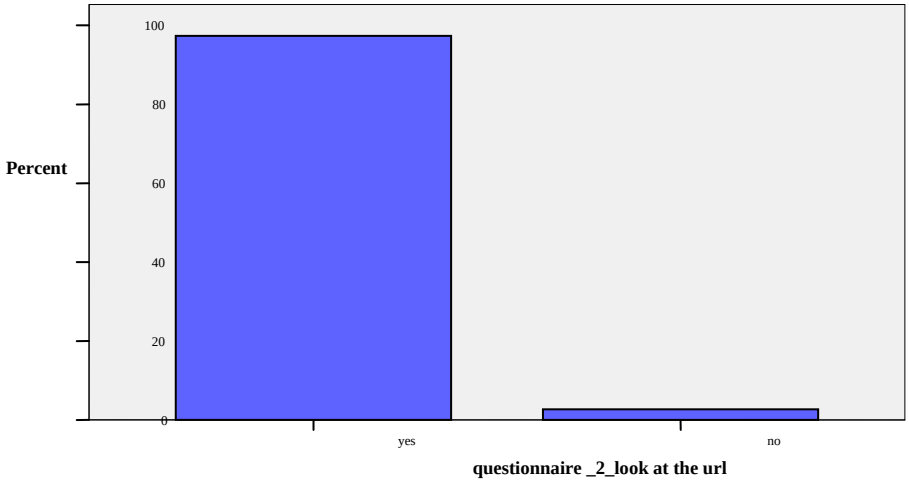
The second web page questionnaire revealed consistency in evaluation criteria and evaluation methods used by the CDEs. There was 100% routine performance in looking for an author, date and thinking about the audience for whom the page is targeting. Ninety percent of the CDEs reported looking at the text of the page. This is nearly a 20% improvement from when the CDEs reviewed at a web page without knowledge of SPAT. Ninety-five percent reported

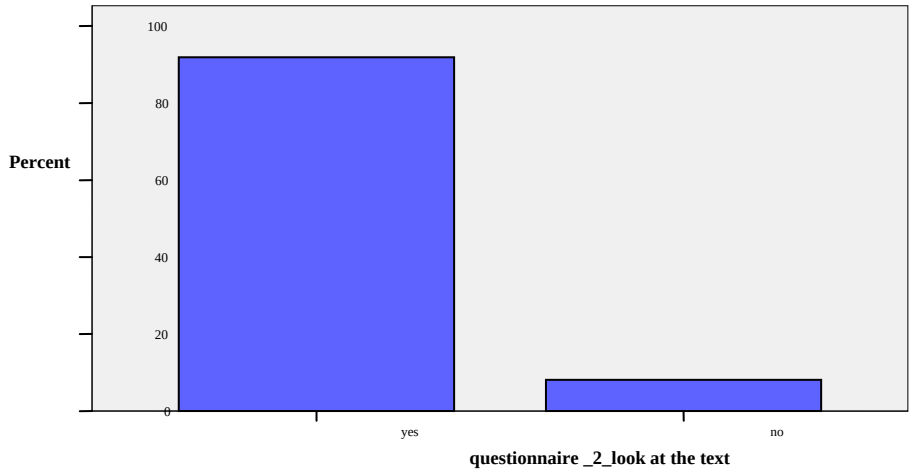
checking the URL for the web page. With the knowledge of SPAT, there was a 62% increase in reviewing the URL of a web page. Why there was not a 100% response for reviewing the text of the page and the URL cannot be generalized without further examination and additional studies. Therefore, finding reasons for not using SPAT is a recommendation for further study.

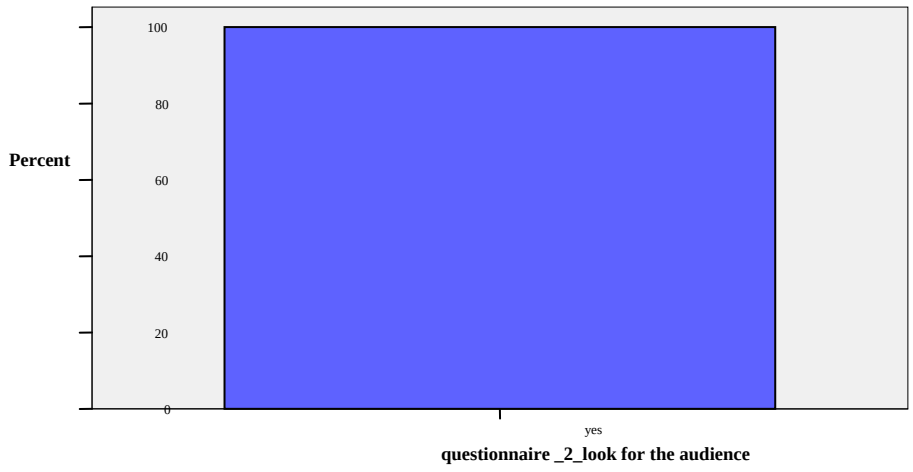
The findings from the qualitative question, "What additional aspects of the diabetes information web page did you judge when examining the page?" data revealed no differences than what was reported in web page evaluation questionnaire one. CDEs continued to look at the color and font size of the text on a web page, the number of advertisements shown and the accuracy of the diabetes and nutrition information.




Percent
100
80
60
40
20
0
yes
questionnaire_2_look for an author


Percent
100
80
60
40
20
0
yes
no
questionnaire _2_look at the url


Percent
100
80
60
40
20
0
yes
no
questionnaire _2_look at the text


Percent
100
80
60
40
20
0
yes
questionnaire _2_look for the audience

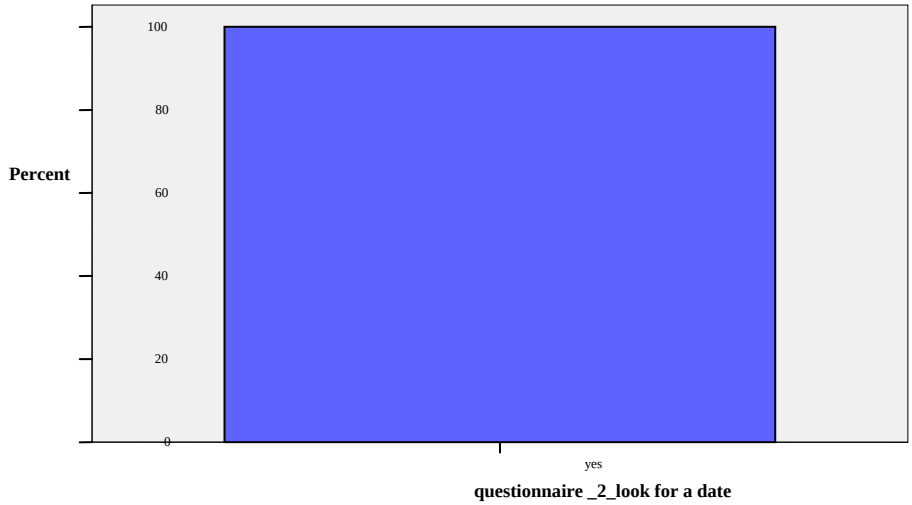


Figure 5.1.8. Results from web page questionnaire two (n=37)

The follow-up questionnaire had a return rate of 76%. There were 29 completed questionnaires returned from the sample population of 38 CDEs. The follow-up questionnaire asked three questions. The first question "To what extent has SPAT changed the way you review web page content?" had positive responses. Some respondents reported a 'slight' change in their reviewing methodology, while most CDEs conveyed that SPAT had changed their evaluation process in one way or another, i.e. 'Somewhat.' 'Substantially' was the second most selected response and a few CDEs said that their web page reviewing method had changed 'extensively.' Overall, SPAT had made an impact on the way CDEs review web based information.

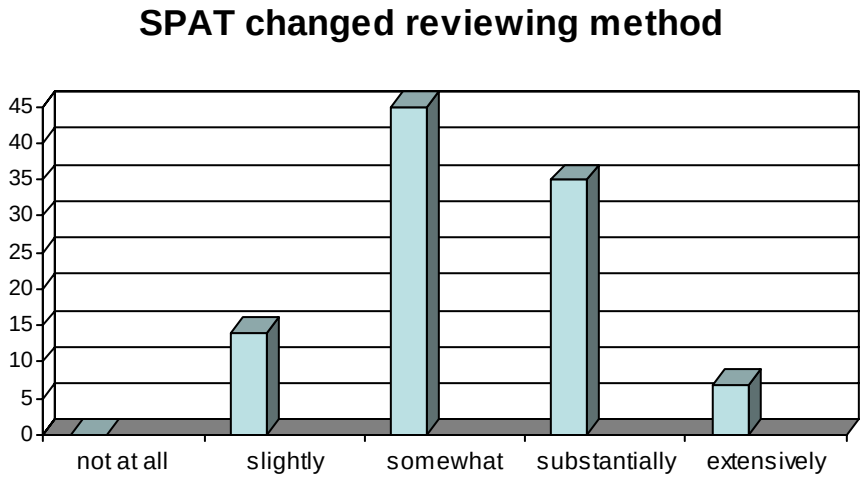


Figure 5.1.9. CDEs report percentage of change SPAT produced on their web page evaluation behavior (n=29)

A second question posed on the follow-up questionnaire was, "To what extent have you introduced SPAT to other people?" Figure 5.1.10., using data from Table 4.2.4. in the data section, displays the results for this question. The numbers of CDEs reporting having introduced SPAT to others was tied at 5% for 'extensively' and 'substantially.' While 'not at all,' was the most frequent response, 29% report sharing SPAT 'somewhat' to others and 21% reported 'slightly' telling others about SPAT. A possible reason for not introducing SPAT to others is that some of the CDEs do not work in patient care. They are researchers or administrators. Some CDEs provided an explanation for not introducing SPAT to others when asked if there are additional comments. As discussed in section 4.2.3., a CDE stated that, "I haven't introduced it yet, but I plan to as the need arises." Perhaps a longer period of time between the study and the follow-up questionnaire would produce more findings. Any other reasons are beyond the scope of this study and may be included in future studies.

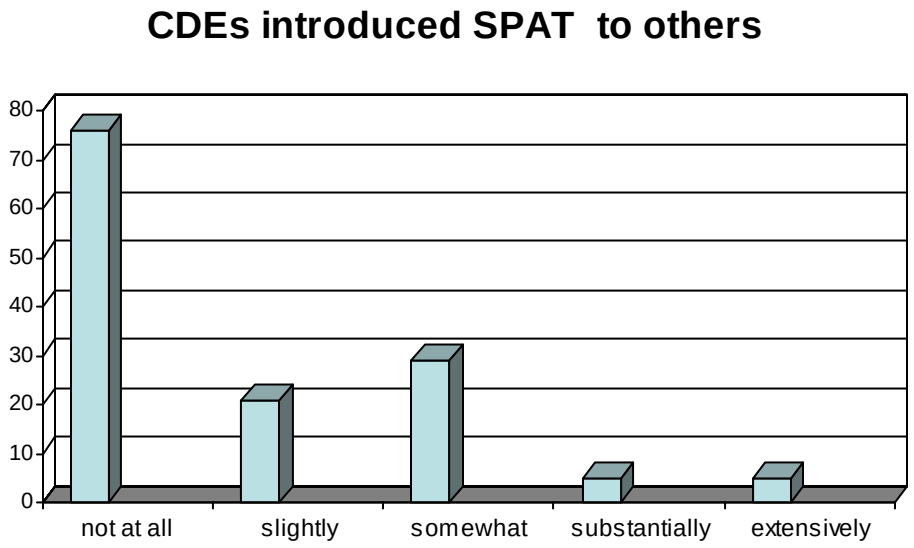


Figure 5.1.10. CDEs report introducing SPAT to others (n=29)

5.2. RECOMMENDATIONS FOR FUTURE STUDY

Results from this study offer important information regarding the face validity and adoption of the SPAT tool to evaluate web pages. This study might have gathered more relevant information if an evaluation form was used after each viewing of a web page instead of after two contrasting pages. Knowing if the CDE was a nutritionist, a dietician, a researcher, or patient educator and if they had contact with patients could have added another dimension for a 'change agent' analysis. Knowing the degree of contact the CDEs had with patients could have been compared to their acceptance of SPAT and thus demonstrated the spread of SPAT to the consumer population by the change agents. Asking the CDEs for their professional opinion on

the credibility of the SPAT tool would have possibly provided a higher degree of analysis. There are avenues for further research to expand the findings on the way people evaluate web pages and to measure the rate of adoption for the tool SPAT.

Recommended topics for future exploration are the following:

1) A cross-sectional study on web page evaluation behaviors and techniques, as well as the adoption of SPAT, by age group and gender of people not employed within healthcare.
2) A cohort study of patients and the patient's professional caregiver's web page evaluation behaviors and techniques, as well as their adoption and utilization of SPAT.
3) Development of a web page for SPAT to introduce a general population to the tool. Once developed, the web page may be analyzed for its utilization.
4) Study the use of SPAT with online surveys.
5) Mimic this study with a population of various health care professionals, such as diabetologists, endocrinologists, internal medicine physicians, dentists, visiting nurses, nurses employed within nursing homes, students studying healthcare and others.
6) Discover 'why' SPAT, or parts of SPAT, have not been adopted.

5.3. CONCLUSION

The diffusion of the WWW as an information source and its impact in information behaviors has been widely studied. Discovering if and how people evaluate information gleaned from the WWW has also been a topic of many research studies. Learning about the information behaviors of certified diabetes educators had not been studied. This study examined the information behaviors of certified diabetes educators, if they evaluated web page content and if so in what way and their adoption of the web page evaluation tool SPAT.

Rogers's theory on Diffusion of Innovation provided a basis for this study. There were two specific constructs within the Theory of Diffusion which were evaluated. They were the 'diffusion of the innovation' and the 'rate of adoption' for the innovation. The results demonstrate that CDEs have adopted and use information technology tools in their work environment and in their personal lives. All CDEs use email for professional communications and most CDEs use the WWW for professional purposes, while only a few certified diabetes educators show some rate of adoption for the 'fringe' technology tools, e.g. instant messaging, chat rooms, and blogs, all know of the tools. The web page evaluation tool, SPAT was introduced to the CDEs and responses from the second web page evaluation questionnaire showed that SPAT was utilized. Data from the follow-up questionnaire reveals that SPAT had been embraced, and that there is a likelihood it will be shared with the larger patient community cared for by the CDEs. Extending the knowledge and awareness of SPAT supports Rogers's Theory of Diffusion where the CDEs now become the 'change agent' for the innovation. The initial change agent was the investigator introducing the SPAT tool to the cohort of CDEs. Findings from the study demonstrated that the CDEs believed in the use of the tool and had

favorable results when using SPAT. Comments from the CDEs stating that they have introduced and shared SPAT with others provided evidence that they themselves have become change agents. This behavior supports Rogers's theory of diffusion by exhibiting adoption of the SPAT tool and taking the role of change agent to continue spreading the knowledge of the innovation.

The findings from this study add to our specific understanding of the diffusion and adoption of information technology by certified diabetes educators and their utilization of the web page evaluation tool SPAT.

APPENDIX A

Demographic Questionnaire

Demographic Questionnaire

1. Please circle your gender. Male Female

2. Please circle your age group. 24-34 35-46
   47-58 59-over

---

3. Have you ever attended a training course for using the Internet? Yes No
4. If yes, did the course talk about evaluating the validity of web page content? Yes No

---

On a scale of 1-5 (with 1 being never and 5 being very often) how often do you use the following Internet services for professional development purposes (e.g., to locate information for work)?

	Never	Rarely	Sometimes	Often	Very often
E-mail	1	2	3	4	5
The World Wide Web (http://www....)	1	2	3	4	5
Blogs	1	2	3	4	5
USENET newsgroups	1	2	3	4	5
Forums/Listservs™	1	2	3	4	5
Google	1	2	3	4	5
Yahoo	1	2	3	4	5
Other (specify) _____	1	2	3	4	5

On a scale of 1-5 (with 1 being never and 5 being often) how often do you use the following Internet services for personal use (e.g., communication or entertainment)?

	Never	Rarely	Sometimes	Often	Very often
E-mail	1	2	3	4	5
The World Wide Web (http://www....)	1	2	3	4	5
Blogs	1	2	3	4	5
USENET newsgroups	1	2	3	4	5

Forums/Listservs™	1	2	3	4	5
Google	1	2	3	4	5
Yahoo	1	2	3	4	5
Other (specify) _____	1	2	3	4	5

Never = zero hours per week	**Often = 11-20 hours per week**
Rarely = 1-5 hours per week	**Very often = 21 or more hours per week**
Sometime = 6-10 hours per week	

On a scale of 1-5 (with 1 being never and 5 being very often) how often do you access the Internet at these places?

	Never	Rarely	Sometimes	Often	Very often
In your office	1	2	3	4	5
In your home	1	2	3	4	5
In an Internet café or coffee shop	1	2	3	4	5
In a library	1	2	3	4	5
Other (specify) _____	1	2	3	4	5

On a scale of 1-5 (with 1 being beginner and 5 being never use) how would you rank your skills with the following:

Beginner = is a less frequent computer and Internet user who can slowly navigate through a computer's operating system in order to open, edit and create files, but does not know how to troubleshoot and solve problems.

Intermediate = is a frequent computer and Internet user who feels at ease with the keyboard and mouse. The intermediate user can quickly and easily navigate through the computer's operating system as well as open, edit and create files, and is willing to explore the use of computer technology and troubleshoot and solve small problems.

Advanced = is a daily computer and Internet user who can quickly and easily navigate through a computer's operating system as well as open edit and create files, and has a fairly good foundation in most computer and Internet applications and has relatively expertise in troubleshooting and solving bigger problems.

Expert = is a daily computer and Internet user who can quickly and easily navigate through a computer's operating system as well as open, edit and create files, and has a solid foundation in almost all computer and Internet applications and has solid expertise in troubleshooting and solving major problems.

Never Use = is one who is not familiar with an application.

	Beginner	Intermediate	Advanced	Expert	Never use
Receive and send e-mail (with attachments)	1	2	3	4	5
Browse the World Wide Web (WWW)	1	2	3	4	5
Use remote login (Telnet)	1	2	3	4	5
Create a web page on the WWW	1	2	3	4	5
Use search engines (e.g. Google, Yahoo)	1	2	3	4	5
Upload/download files to/from the Internet	1	2	3	4	5
Participate in on-line chat rooms	1	2	3	4	5
Use instant messaging (Messenger)	1	2	3	4	5
Participate in on-line forums	1	2	3	4	5
Participate in or set-up a Blog	1	2	3	4	5

On a scale of 1-5 (with 1 being strongly agree and 5 being strongly disagree) how would you rank the following statements?

	Strongly agree		indifferent		Strongly disagree
Use of the Internet is crucial for your profession	1	2	3	4	5
Use of the Internet increases my job performance	1	2	3	4	5
Use of the Internet increases my access to information	1	2	3	4	5

A large number of my colleagues currently use the Internet	1	2	3	4	5
A large number of my patients currently use the Internet	1	2	3	4	5
The Internet offer opportunities for new teaching techniques	1	2	3	4	5
It is important to review diabetes information available on the Internet	1	2	3	4	5

THE END
Thank You

APPENDIX B

Web Page Content Questionnaire No. 1

Web Page Content Questionnaire No. 1

1. When reviewing the web page did you look for an author or a supporting organization taking credit for the page?

Yes No

2. When reviewing the web page did you examine the URL (http://www.....) to see where the page was coming from?

Yes No

3. When reviewing the web page did you critically review the text to look for objectivity or bias in the information?

Yes No

4. When reviewing the web page did you critically review the text in regards as to who could use the diabetes information provided?

Yes No

5. When reviewing the web page did you look to see if there was a page created date, a last update date or a copyright date provided?

Yes No

6. What additional aspects of the diabetes information web page did you judge when examining the page?

Web Page Content Questionnaire No. 2

1. When reviewing the web page did you look for an author or a supporting organization taking credit for the page?

Yes No

2. When reviewing the web page did you examine the URL (http://www.....) to see where the page was coming from?

Yes No

3. When reviewing the web page did you critically review the text to look for objectivity or bias in the information?

Yes No

4. When reviewing the web page did you critically review the text in regards as to who could use the diabetes information provided?

Yes No

5. When reviewing the web page did you look to see if there was a page created date, a last update date or a copyright date provided?

Yes No

6. What additional aspects of the diabetes information web page did you judge when examining the page?

APPENDIX C

SPAT Script

SPAT Script

Out-loud Reading Time: 3:00
Silent Reading Time: 1:50

I would like to introduce to you a tool to evaluate web pages. To maintain consistency in the instructional methods for the research study, I will read about the tool – SPAT, and you may read the instructions as well or just listen.

Because there are no rules for information placed on the web, you need to judge if the information you read seems reliable and valid. People need to know that information on the web may not be reliable or correct. There are various ways to judge a page but an easy method is to use the acronym SPAT. By using SPAT you are led through the process of a quick review to evaluate the web page. 'S' stands for site, 'P' stands for publisher, 'A' stands for audience, and 'T' stands for timeliness. So, site, publisher, audience, timeliness – SPAT.

The next section tells you how to use SPAT.

S - site. You need to look at the URL, the address from which the page comes and notice if it is a .org, .gov, .com, .edu, .net or a country code, such as .tw for Taiwan, .ca for Canada, .ru for Russia, etc…. Make sure you know where the information is coming from so you can decide if the source is okay with you. For instance, is it okay to get diabetes information from a .com – commercial site?

P – publisher. The publisher tells you to look and see who is taking ownership of the content on the web page – is there an author? Is there a name listed or is there a company name? Do they give you ways to contact them? Someone should be in charge of the content for the page so make sure there is a name given. There are many web pages with no authors or publishers.

A- audience. For the audience, this reminds you to critically judge the text on the page. See if you find any bias. Check if the text is written at a high level, such as eighth grade or if it is written at a lower level by using simple words and short sentences. Look and see if you can tell by the text who the audience is the page is targeting. Look at it with an eye for your patients – would they understand the information?

Lastly, look for a date on the page to see when it was published, last updated or copyrighted. All information should be dated so you know the time frame in which it was written. This is the 'T' for timeliness.

If you review a web page with SPAT, four parts to show reliability, then you have done an analysis of the page. This should make you feel sure in your choice to use the information.

So, one more time, SPAT a page, S' for site, 'P' for publisher, 'A' for audience, and 'T' for timeliness.
EL 6/06

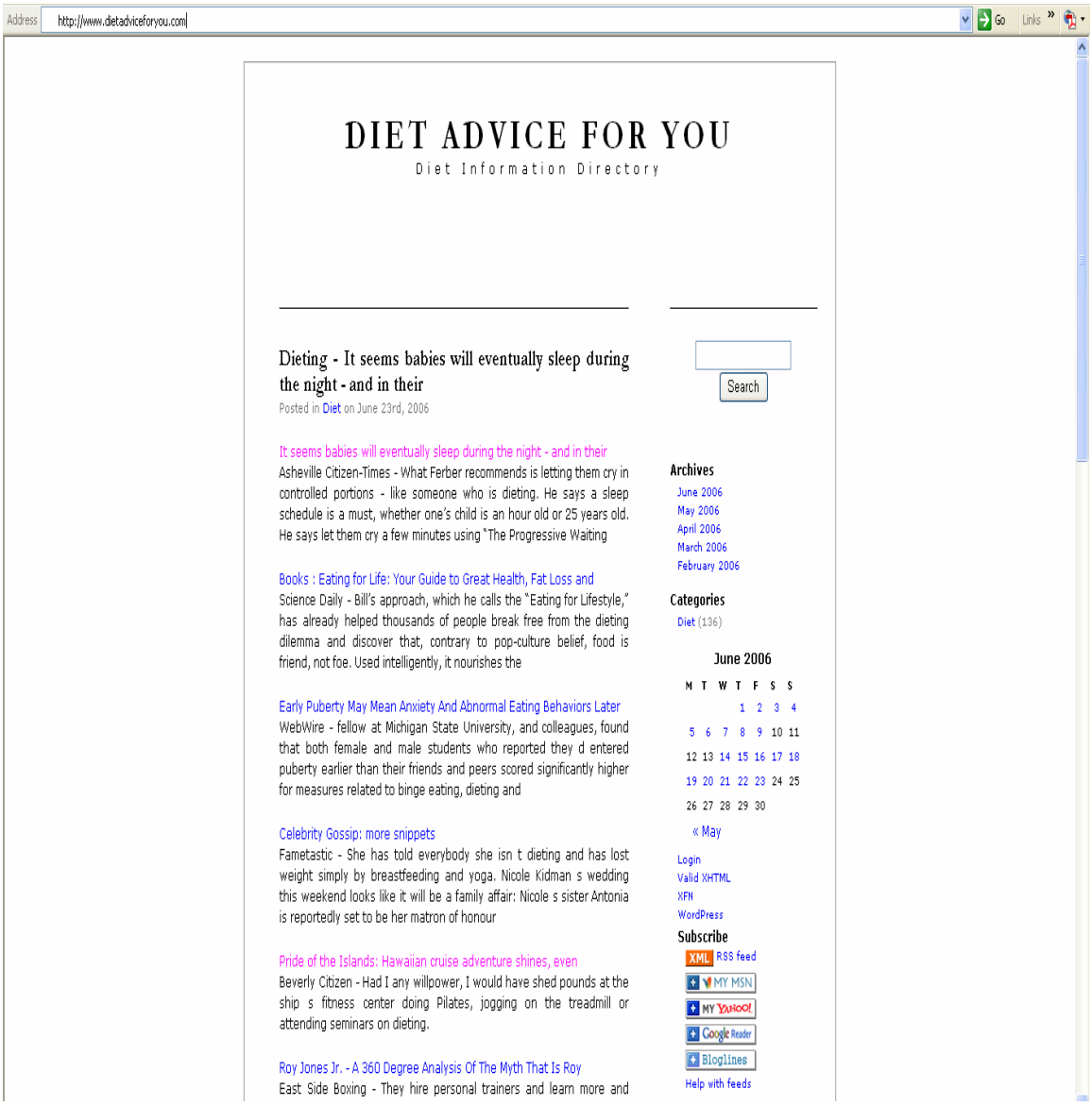
APPENDIX D

Web Pages for Review

Set One

http://www.diabetesnet.com

http://www.dietadviceforyou.com/



Set Two

http://www.beatingdiabetes.org/

http://insulin-pumpers.org/

APPENDIX E

Expert SPAT of Web Pages

Expert SPAT - Set One

Go through each site and write the answers the site provides for SPAT. After you have found all of the information, decide if you would recommend the site to a patient and circle 'Y' for yes, and 'N' for no. Then explain why you would not or why you would recommend the site to a patient in one complete sentence.

http://diabetesnet.com/ The Diabetes Mall

S= .com commercial site

P= Diabetes Services, Inc.

A= anyone with diabetes – acts a diabetes portal – lots and lots of links. Content is at a high literacy level.

T= has 2005 copyright and says been on the Internet since 1994

Would you recommend this site to a patient? (please circle) Y N
Why? Yes, I would but it isn't real easy to navigate.

http://www.dietadviceforyou.com/ Diet Advice

S= .com

P= none given

A= anyone who has time to browse for diabetes info.

T= April 23, 2006

Would you recommend this site to a patient? (please circle) Y N
Why? No, because there is no one responsible content easily found and they provide just a set of links which sends you in circles for a while.

Expert SPAT - Set Two

Go through each site and write the answers the site provides for SPAT. After you have found all of the information, decide if you would recommend the site to a patient and circle 'Y' for yes, and 'N' for no. Then explain why you would not or why you would recommend the site to a patient in one complete sentence.

http://www.beatingdiabetes.org/talk.html Beating Diabetes

S= .org

P= Steve Caswell – although Beating Diabetes.org has the copyright

A= anyone with interest in diabetes management and exercise – it is a sales pitch but provides general interest info.

T= 2005

Would you recommend this site to a patient? (please circle) Y N
Why? Yes. They cite things and there is an author that seems easily available for contact.

http://www.insulin-pumpers.org/ Insulin Pumpers

S= .org

P= a non-profit in California. They seek volunteers and financial donations. In 'history' is says a team of 50 volunteers do the site but there is never a name provided.

A= anyone with questions about insulin

T= no date anywhere

Would you recommend this site to a patient? (please circle) Y N
Why? No, because there is no responsible content easily found on the page.

APPENDIX F

E-mail Follow-up Questionnaire for SPAT

E-mail follow-up questionnaire for SPAT

Dear:_____

Thank you very much for taking the time to meet with me last week and participate in the SPAT study. This is the follow-up email that I mentioned, and it contains a couple more questions for you to answer.

1. To what extent has SPAT changed the way you review web page content?

Not at all	slightly	somewhat	substantially	extensively
5	4	3	2	1

2. To what extent have you introduced SPAT to other people?

Not at all	slightly	somewhat	substantially	extensively
5	4	3	2	1

3. Are there any additional comments on SPAT and its use that you would like to share?

Thank you very much for your time and participation.

Elizabeth LaRue, MLS, AHIP
Academic Coordinator for Nursing Informatics
School of Nursing
University of Pittsburgh
412-624-3801

APPENDIX G

Results of CDE Database Search

Table 1. Results of CDE Database Search (American Association of Diabetes Educators, 2005)

24 in PA with zip 152* (pgh)	9 CDEs
9 in PA with zip 150* (pgh)	8 CDEs
10 in PA with zip 151* (pgh)	9 CDEs
4 in PA with zip 153* (Washington)	4 CDEs
2 in PA with zip 154* (Uniontown)	1 CDEs
3 in PA with zip 156* (Greensburg)	3 CDEs
5 in PA with zip 159* (Johnstown)	4 CDEs
5 in PA with zip 160 (Butler)	4 CDEs
3 in PA with zip 161* (New Castle)	3 CDEs
1 in PA with zip 162* (Kittanning)	1 CDEs
1 in PA with zip 166 (Altoona)*	*1 CDEs*
3 in PA with zip 172 (Chambersburg)*	*2 CDEs*
66 total *70 total*	46 Total CDEs *49 Total CDEs*
3 in WV with zip 260* (Wheeling and up)	3 CDEs
4 in WV with zip 261* (Parkersburg)	1 CDEs
3 in WV with zip 263 (Clarksburg)	2 CDEs
8 in WV with zip 265* (Morgantown)	4 CDEs
3 in WV with zip 263 (Clarksburg)*	*2 CDEs*
18 total *21 total*	10 Total CDEs *12 Total CDEs*
1 in OH with zip 439* (Steubenville)	1 CDEs
3 in OH with zip 444* (Warren)	2 CDEs
5 in OH with zip 445* (Youngstown)	4 CDEs
5 in OH with zip 447* (Canton)	3 CDEs
2 in OH with zip 437 (Zanesville)*	*2 CDEs*
2 in OH with zip 457 (Marietta)*	*2 CDEs*
14 total	9 Total CDEs *11 Total CDEs*

65 total available in driving distance.
72 total with extended driving

APPENDIX H

IRB

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Suite 100
Pittsburgh, PA 15213
Phone: 412.383.1480
Fax: 412.383.1508

Exempt and Expedited Reviews

University of Pittsburgh FWA: 00006790
University of Pittsburgh Medical Center: FWA 00006735
Children's Hospital of Pittsburgh: FWA 00000600

TO: Ms. Elizabeth LaRue

FROM: Sue R. Beers, Ph.D., Vice Chair

DATE: May 22, 2006

PROTOCOL: Web Page Analysis Methods

IRB Number: 0605025

The above-referenced protocol has been reviewed by the University of Pittsburgh Institutional Review Board. Based on the information provided in the IRB protocol, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section 45 CFR 46.101(b)(2).

- If any modifications are made to this project, please submit an 'exempt modification' form to the IRB.

- Please advise the IRB when your project has been completed so that it may be officially terminated in the IRB database.

This research study may be audited by the University of Pittsburgh Research Conduct and Compliance Office.

Approval Date: May 22, 2006

SRB:

NOTES

1. While the Internet and the Web refer to different entities, and should not be used interchangeably, many researchers and authors apparently confuse the terms and use them incorrectly as synonyms

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