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**AN ANALYSIS OF THE INFLUENCE OF HUMAN INDIVIDUAL
DIFFERENCES ON WEB SEARCHING BEHAVIOR AMONG
BLACKS AND WHITES: A CASE OF HEALTH INFORMATION SEARCHING**

A Dissertation in

Information Sciences and Technology

by

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ABSTRACT

While the commercial introduction of the Internet has been a key influence in the concept of access to information, the benefits commonly ascribed to this technology do not appear to be enough to motivate its utilization by all. In 2006, 74% of households in the United States reported having the Internet, according to the Nielsen/NetRatings Enumeration Study. Though the penetration of the Internet among households in the U.S. is rising, there are still a significant number of people who do not have access to this important technology. Thus, in order to understand the gap in participation, it is necessary to enlarge the scope of investigation. I argue that studies in social access and related topics may provide new insight into the disparity of Internet users and non-users. Access is an important issue in terms of the digital divide, so the search for health information was used as an exemplar of social access, to understand how attributes of individual people influence the process. In studying health information searching, the population that was chosen was individuals with diabetes. Diabetes was chosen because it is a chronic disease which requires a high degree of self management. As a result of this high requirement on the part of the patient to monitor his or her condition, the activity of health information seeking becomes critically important. Therefore, this fact provides a potential source of motivation for these individuals to search for health information that is relevant. The purpose of this study was to identify the influence of human variation on people's perspectives about, and approaches to, the activity of information searching, on the topic of health.

This research employed an interpretive epistemological approach which consisted of a three-part mixed method study. The study was comprised of a user search task, an

individual differences questionnaire, and in-depth interviews with fifteen Black and fifteen White participants in central Pennsylvania and southern Maryland. It was found that differences such as race, gender, age, socio economic class, and geographic location all influence searching behavior. However, it was also found that these factors work together, to influence behavior, rather than independently. Therefore, it is suggested that researchers of health information searching behavior look at the intersection of characteristics rather than single attributes of individuals. Also, the Internet was found to augment traditional information resources instead of acting as the central information resource. This finding is supported by factors which were found to be mediators of health information searching such as personal social networks, trust, and frustration. Lastly, stereotypes were challenged as participants in the study exhibited behaviors which were contradictory to research about Internet experience and searching.

This research has made a contribution to theory, to the literature, to methodology, and to practice. The contribution to theory has been developed through the support for and extension of the explanatory power of the Individual Differences Theory of Gender and IT. The findings in this study showed evidence that users of technology have rich and unique experiences, backgrounds and beliefs, which impacted their usage of technology. In addition, the findings in this research project enhance knowledge about health information sources and their importance in the lives of individuals with chronic illnesses. New knowledge was developed about many factors which lessen the motivation to search, and subsequently about how life, health and technology intersect in the existence of thirty individuals all living with diabetes. This research contributed to the knowledge base on methodology as a mixed-methodology study which utilized an

interpretive epistemology. This study utilized a three part research design in which data was collected to better understand user behavior and perceptions for the purpose of integrating information to answer the research questions. Lastly, this research contributed to practice through the development of a research process which can be used as a technique to inform personas. The data collection process used in this research can be used as an effective aid to gather empirical information about a user. The information gathered in this research represents an embodied view of the user, or rather a comprehensive view which provides information about individual demographics, experiences, influences, behaviors, and perceptions of technology use.

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DEDICATION

*Dedicated in loving memory of my Grandma, Alice LeBlanc, and my
Big Brother, David Carson Alston.*

You are both greatly missed.

CHAPTER 1: INTRODUCTION

While the commercial introduction of the Internet in 1984 has been a key influence in the concept of access to information, the benefits commonly ascribed to this technology do not appear to be enough to motivate its utilization by all. In 2006, 74% of households in the United States reported having the Internet, according to the Nielsen/NetRatings Enumeration Study. This percentage has increased significantly since 2000 when only 41.5% of American households were reported to have access to the Internet in the home (NTIA, 2000). Though the penetration of the Internet among households in the U.S. is rising, there are still a significant number of people who do not have access to this important technology.

The disparity in the number of people participating and not participating with the Internet has been labeled the “digital divide.” In addressing the digital divide, Kvasny and Truex (2000) state that as new technology is deployed, classes of users are advantaged while others are disadvantaged. In an effort to address and reduce this additional source of inequality, this digital divide must be fully studied and understood in terms of how to provide access to all people (Cleary et al, 2006). According to DiMaggio and Haggartai (2001):

This concern about inequality, and about the possibility that the new technology might prove to exacerbate inequality rather than ameliorate it, is focused on what analysts have called “the digital divide” between the online and the offline, the information “haves” and “have-nots.” (p. 1)

The current stream of digital divide research has explained the gap in participation in terms of unequal access to technology. This discussion of access is a departure from initial explanations of the divide resulting from unequal levels of computer ownership. With the focus presently on access, two important perspectives have been identified. The first, 'technological access,' refers to the physical availability of appropriate computing equipment or the ability to attain the hardware, software, or connectivity necessary to actually utilize Internet technology. This type of access could be designated as the first step in Internet use because it is concerned with having access to the physical machine. In studying the digital divide, researchers often have focused on this type of access in the home, workplace and in the community. However, according to Hargittai (2002), looking at the digital divide from only a technological access perspective "limits its scope to a binary classification of technology use by only considering whether someone does or does not use the Internet" (p.1). Although technological access has long been the focus of many studies regarding the digital divide, the problem persists. Thus, in order to understand the gap in participation, it is necessary to enlarge the scope of investigation.

The second perspective on the digital divide which examines access from a more complex perspective than the technical is that of social access. Social access is more concerned with the skills, knowledge, and perceived benefits needed to engage with the Internet. Kling (1998) defined social access as the mix of professional knowledge and technical skills that augment professional practices and social life. This type of access takes into account what occurs after a person has the capability and opportunity to use the Internet. Kling concluded that the Internet is a medium that can be used socially by people to accomplish a variety of tasks, including communication and entertainment, as

well as to interact with others. So, in order to make technology valuable to the greater population of users, it is necessary to understand the ways in which information technology can be beneficial to a diversity of users, and the underlying social judgments that people make when using technology. These social judgments include how people choose to utilize the Internet in their daily lives as well as the *extent* to which they participate.

I argue that studies in social access and related topics may provide new insight into the disparity of Internet users and non-users. In the spirit of researching social access to Internet technology and the digital divide, I am interested in researching a particular user skill in relation to technology and how that may reinforce the digital divide. The user skill that will be investigated within the frame of “social access” is that of Web searching. Therefore, as access is an important issue in terms of the digital divide, I will explore the search for health information as an exemplar of social access to understand how attributes of individual people influence the process.

Problem Background

Web searching is defined as the activity of online information seeking. The Internet is now recognized as a critical technology in society, and Web search engines operate as the gatekeepers. According to Introna and Nissenbaum (2000), “search engines constitute a powerful source of access and accessibility within the Web” (p. 3). Although many companies, organizations, and individuals make a concerted effort to publicize their Website addresses or uniform resource locators (URLs), search engines still provide

the primary source of locating content on the Internet. The ability to search successfully has a direct connection to whether or not an individual will be able to locate a Website that contains the information that they seek.

Traditionally, the search for information is a task that has been carried out by people for a variety of reasons, including the search for answers to questions, the building of general knowledge, or the location of people or services. Insofar as it provides a connection to information, content, and people from almost every corner of the world, the Internet in many ways has drastically changed how that search process is completed. Indeed, information searching capabilities have been broadened and transformed through the channel which is the Internet.

Web searching specifically gives a user a flexible means of finding information through the use of keyword queries, which can be entered into a search bar from a number of popular or specific search engines. The Google search engine is a popular choice among many Internet users and has been found to have upwards of 5.9 billion search queries each day (Burns, 2008). So users are able to enter text that represent the ideas, questions, or issues that they wish to have more information about, and within seconds have results from a multitude of pages and Websites that house similar terms or content.

As the societal importance of the Internet increases, Ford et al. (2001) have inquired about which factors are influencing the effectiveness of Internet-based information seeking. This research was conducted with the motivation to draw attention to significant and independent factors that influence Web searching behavior. The identification of the factors influencing information seeking on the Web is important

because it probes into the source of difficulties with searching. Information seeking and use research has been described as a shift in “research emphasis from information *sources* to information *users*” (Tidline, 2005, p. 113). This change in the direction of the research highlights the need to understand the user experience and the environmental factors that influence responses to and behaviors with technology. Understanding user motivations and obstacles to technology use will help to identify influences for use and non-use of the Internet, which can help us to make sense of the digital divide.

Studies indicate that an individual user’s skill and performance with a Web search engine can be motivated or influenced by a number of factors (Ford et al., 2001; Ford et al., 2005; Enochsson, 2005). These factors or individual differences could include race, age, gender, education level, socio-economic status, geographic location, or a myriad of other attributes. In a study conducted by Ford et al. (2001), effective Web retrieval was connected to users who were male with a lower reported cognitive complexity, and an imager cognitive style. Also, according to Aula and Kaki (2005), older users of Web search engines face challenges in overcoming fears about computers, as well as becoming motivated to learn how to use search engines. In addition, the “second-level” digital divide concept describes the participation of the “haves” versus the “have-nots” as a function of differences in level of skills and knowledge. Therefore, it seems clear that a wide range of attributes or factors may play an active role in shaping how people associate themselves with technology and also use search engines. These individual human differences and variations and their connection to a person’s approach to information searching is an important focus of this research study.

Searching for information is an intensely personal activity. The knowledge that an individual possesses, the desire or need for information differs vastly from person to person. Therefore, what may motivate or deter an individual to look for something in his or her environment will likely be influenced by factors from that person's world of experience. As the world is constantly altered by technological innovations, the role that individual autonomy and experiences play on user behavior and interaction with technology will be of increasing importance to those developing information systems. In addition, as information searching continues to be critical to consumers and producers of information, goods, and services, detailed information about human diversity and behavior also will be critical to continued progress.

Users' encounters with search processes likewise are deeply personal. People have different experiences of success and failure with regard to information that they seek on Web search engines. In addition, it is possible that an individual's experience with a search engine may affect his or her overall level of interaction with the technology. For instance, if a user is unable to find the information that he or she seeks when searching; his or her participation could be negatively affected as a result of that experience. Thus, it is important to identify whether individual differences among users affect their performance with Web search engines. An essential aspect of the study of individual differences as expressed by Trauth (2002, et al. 2004) is to take into account that people have "distinct personalities, [and] experienc[e] a range of socio-cultural influences (Quesenberry et al., 2006, p. 6)." Trauth asserts that the evaluation of these factors should take into account demographic differences that influence personality, interests, and values (et al., 2004). By studying individual differences in relation to Web

searching, researchers can begin to identify the implications of such diversity for the design of Web search engines and gain a better understanding of the digital divide.

Current Web search engines are built upon the principles of early information retrieval (IR) systems, such as online catalogs and databases. Much of the functionality of these IR systems is based on a notion that users are able to represent their need for information in the form of text. Web search engines follow in this tradition. Some theorists argue that much of the current complexity in search engines is a result of the size of the Web. Because methods that originate from private collection IR systems are not scalable enough to meet the needs of a collection with the magnitude of the Internet, traditional techniques have had to be adjusted and enhanced to operate effectively with the Web. In addition, Jansen and Pooch (2001) find that information seeking in traditional information environments differs in important ways from Internet-based Web searching. A study by Jansen et al. (2000) showed that the advanced features of search engines are not as beneficial as they are described to be. Also, studies indicate that these advanced search operators are useful only to those who are familiar with the structures and inner-workings of IR systems (Jansen et al., 2000).

Understanding the influence of individual differences on Web searchers is important on a variety of levels for many different populations. On the societal level, Internet technology is increasingly becoming a part of everyday life as well as a requirement for many knowledge economy jobs. Access to the Internet has been studied in various dimensions to determine its effect on people's use of the technology. The effect of income, education, and race as well the influence of different settings such as international, community centers, and rural settings have been investigated (Katz and

Aspden, 1997; Hoffman and Novak, 1998, Norris, 2001; Borgida et al., 2002; Parker, 2000). Although research has shown that physical access can be a barrier to use of the technology, placing the Internet in publicly accessible places such as schools, libraries, and community centers is not enough to close the digital divide (Kvasny & Keil, Forthcoming; Warschauer, 2002; Servon, 2002). Therefore, it is important to continue to research the types of barriers that may be deterring users from utilizing Internet technology. This should be carried out in an effort to determine what measures can be implemented to address the problem. If the Internet or its components, such as search engines, can be improved to be a more inclusive and useable technology, then the resources and benefits of the Internet could have a more far reaching effect. Ideally, the Web is a technology that should serve everyone and not just the privileged in society (Introna and Nissenbaum, 2000).

Statement of the Problem

Use of technology may yield many outcomes for individuals, ranging from successful to problematic. The factors that influence those experiences are of key importance to the design and development of information systems. According to Walsham (2000), the challenge for the IT community is to “design information systems that enable an increased connectivity but also support this inherent diversity” (p.1). Therefore, to enable innovation and progress in the development of systems, it is necessary to understand the characteristics of those for whom the technology is being developed. Thus, the problem is that the Internet is not used by all, and there are many types of users with unique information needs. Therefore, this investigation into the

attributes and behaviors of individual users of search technology can address some of the outstanding issues existing in the areas of use and utility of information technology. Indeed, because the digital divide persists, there is impetus to study variation among the human experience with technology. The digital divide issue of participation with technology highlights that there are important differences among users of computer systems. Thus, in an effort to address the challenge of the digital divide, more detailed knowledge about differences among users as a group/demographic and individual level is needed.

As stated previously, information searching constitutes an essential activity in Internet use. Because web search engines provide users with the opportunity to operationalize inquiries or questions, individuals doing search tasks on the Internet will make subjective judgments about what information they want as a function of the knowledge they already have. These judgments or perceptions represent a very significant area of interest because the decisions made by users are likely developed through factors that include personal differences, characteristics, and experiences. *How* these factors actually play out into information behavior and use of search engines within the domain of health are a focus of this research project.

Significant use of the Internet for health related purposes has been documented in recent years. According to the 2005 Pew Internet and American Life Project, eight out of every ten Internet users have searched for health information online (Fox, 2005). Because the importance and frequency of searching for health related information has been well-documented, it serves as a valuable case study for investigating the relationship between individual characteristics and information searching behavior. This research will bring

together the concepts of information, technology, and people for an interdisciplinary examination of how individuals subjectively approach the task of searching for health information on the Internet.

Purpose of the Study

Due to the differences in user experiences, level of participation with technology, and information searching behavior, documentation of user diversity is both important and useful to information systems design and development. So, the purpose of this study is to investigate the value of user attributes in relation to information searching behavior. More specifically, the research will document diversity of users in information searching behaviors for health related information.

This study will investigate human information behavior within the context of health as an instance of search engine use. The exploration of information searching behavior in correlation with individual difference, identity, and personal influences represents a synthesis of data that could inform the literature, the research community, and society. Indeed, by evaluating diverse human users in their search for health related information, we can gain specific knowledge about how users' behavior, actions, and perceptions collectively affect their interaction with technology and their approach to Web searching.

Technology assessment was originally conceived as a way to identify the desirable first-order, intended effects of technologies as well as the higher-order, unintended social, economic and environmental effects (Brooks and Bowers, 1970). So the "higher order" purpose of this research is to identify whether differential user participation with the Internet is influenced by individual differences, which would

contribute to an explanation of the problem of the digital divide. Issues surrounding user behavior and the digital divide focus on enhancing technology and its use by the larger global community, and not just specific expert user groups. Therefore, this study is also concerned with motivations and barriers to continued use of the Internet.

In conclusion, the purpose of this research is:

To identify the influence of human variation on people's perspectives about, and approaches to, the activity of information searching, on the topic of health.

In an effort to study this influence, individuals with diabetes were selected as the population of interest. There are many attributes of diabetes that make it an appropriate and interesting selection to study health information searching. Primarily, diabetes is a chronic disease which requires a high degree of self management. This management includes adherence to diet, exercise, and medications. Because of the high requirement of the patient to monitor his or her condition, the activity of health information seeking becomes critically important. Therefore, this fact provides a potential source of motivation for these individuals to search for health information that is relevant. The relevance of the health information for these individuals may well be connected to his or her individual diversity or needs as a diabetic.

Scope of the Study

This research project is concerned with the contextual investigation into the factors and influences that different individuals suffering from diabetes bring to the task of information searching for health related content. This study seeks to identify and understand the perceptions and themes which have an impact on how people search for

information using the internet as well as how they perceive the role of technology in their daily lives. This information is being gathered from individuals of different races, ages, genders, socio-economic backgrounds, and experience levels.

This study utilizes the understandings, techniques, and attitudes towards technology of people in their search for health information in an attempt to maintain their own lifestyle and well-being. The topic of health is a relevant search topic in society, and specifically within the community of individuals suffering from diabetes. Those diagnosed with diabetes have some responsibility to maintain their condition with a holistic approach to health, including diet and nutrition, exercise, and medication.

Therefore, this investigation into the users of technology will be conducted at the individual and group levels of analysis. The individual level of analysis will lend itself to the understanding of unique characteristics and interactions that are enacted by different users. The group level of analysis will be employed to look across demographic characteristics in an effort to understand the role that these factors play in information behavior. These levels of analysis together are appropriate for the type of inquiry that was carried out due to the importance placed on individuals' backgrounds and attributes, as well as their actions and ideas.

Description of Dissertation Chapters

This dissertation consists of six chapters. Chapter two presents a review of the literature. In that chapter an overview of the literature in the areas of human information behavior and human variation are documented. Chapter three documents the research design and methodology. In that chapter, the choice of interpretive epistemology and

mixed methodology are described. Also, the data collection and analysis processes are detailed. In chapter four, the findings from the data collection are provided. Chapter five contains a discussion of the findings from the study along with the contributions of the study. The sixth and final chapter of the dissertation presents the conclusion of the research. In that chapter, limitations of the study, future research directions and recommendations are presented.

CHAPTER 2: REVIEW OF THE LITERATURE

Information seeking has been deemed an “interpersonal and an intrapersonal” activity (Case, 2007, p. 12), which suggests that the search for information consists of components that are both internal and external to an individual. In addition, how an individual arrives at his or her chosen input in a search engine can be described as a result of a complex arrangement of knowledge, information, personal understandings, and experiences. Therefore, it can be concluded that to understand searching behavior, both the individual and his or her environment should be taken into consideration.

As web searching is a means by which humans gather and explore information on the Internet, it is imperative to understand how the individuals participating in the process are approaching this task. How an individual searches for health information on the Internet is influenced by his or her own personal characteristics and perception of technology.

The following sections will evaluate two important areas of literature for this research: human information behavior and human variation, both psychological and sociological. In the area of human information behavior, models of information behavior will be discussed in addition to information searching research pre- and post-Internet. The areas of human variation will be explored to review the important nature of the myriad of characteristics that humans possess which makes them unique in their behavior, interaction, and view of the world. The review of these bodies of literature will provide a basis to motivate this research, which is concerned with the value and influence of human differences in the information searching process.

Human Information Behavior

Information behavior has been defined as the “totality of human behavior in relation to sources and channels of information, including both active and passive information seeking and use” (Wilson, 2000, p. 4). The study of people in the process used to acquire and understand information is the foundation of human information behavior research.

Earlier studies in information searching were conducted within the domain of information retrieval where the focus was on online catalogs and databases. Since the inception of the Internet, new focus has been shifted to Web based search engines. These search engines provide a gateway to content and information on the Internet. Though the medium that is being studied in this process has evolved, there are still many fundamental areas of interest which somewhat transcend the medium. For example, models of information behavior continue to be a critical area of study in an effort to develop some understanding of how people view and organize information.

Models of Information Behavior

Models of information behavior describe how and why people engage in their search for information. Case (2007) explains that models in this area “aim to describe and explain circumstances that predict actions by individuals to find information of some kind” (p. 120). Research in this area has helped to develop knowledge about how individuals process information and what motivates different types of searching behaviors. Initial work in this area focused on user information behavior in the context of

online catalogs, while post-Internet research has been concerned with human interaction with Web search engines. Some of these models have been used to develop a rationale for developing technology to support the information search process, and others have explained information processing behavior from an alternative point of view. Although each model seeks to address the information search process from a different perspective, the topic of human differences has been given limited attention.

An important early study by Belkin et al. (1982) discusses an approach to developing information retrieval (IR) systems based on anomalous states of knowledge (ASK). The authors' premise is that the information needs of users cannot be easily specified because they are not facts in of themselves, but rather a means by which to find the resolution to a problem. Traditional IR systems utilize a method known as "best match," through which a system responds to a query based on the text whose representation most closely matches it. However, this technique requires that users be able to coherently express their information need in a simple text form, which may or may not completely represent their understanding of the problem. The authors' hypothesis for the ASK system is that information needs result from anomalies in the "user's state of knowledge regarding a topic or situation" (p. 62). Based on this notion, an IR system should use a process that helps to understand the user's ASK rather than require the user to specify his or her request for information. Though Belkin provides a departure from the "best match" method, there is still a question as to how different users' "states of knowledge" are a function of who the individual is in relation to his or her environment. In addition, because varying "states of knowledge" among users do exist, critical evidence is provided that the level of knowledge and understanding of a

topic is crucial for successful searching. This knowledge undoubtedly is connected to individual experiences and influences. Spink and Cole (2006) have maintained that it is difficult to empirically define ASK or any of the additional stages in the information searching process, but that there is an increased interest in that area.

Saracevic et al. (1988) conducted a study aimed at characterizing the components of information seeking and retrieving in which human decisions and human-system interactions were the most significant factors. The authors emphasized that the “key to the future of information systems and searching processes...lie[s] not in increased sophistication of technology, but in increased understanding of human involvement with information” (p. 162). The study was designed to address four different elements in the context of information seeking. These elements are:

- 1. Problem underlying the question*
- 2. Intent for the use of the information by the user*
- 3. Internal knowledge state of the user in respect to the problem at hand.*
- 4. Public knowledge expectations or estimate by the user.*

These states represent the steps that users may follow in looking for the answer to a question. The problem is defined in terms of an unknown in a situation of a potential information systems user; the intent describes the purpose the users have in mind for the information they seek; the internal knowledge state includes how knowledge is stored, organized, associated, and retrieved; and public knowledge is the amount of information regarding a subject that is recorded publicly. The study indicated that the context of a question is important, which means that the user would be at an advantage to gather more information or understand the problem context in order to formulate the proper queries.

Also, the authors noted that the context of the problem is larger than merely the words expressing it, and that if a search is based only on the words; it is likely to function very poorly. The authors highlight the importance of actually focusing on human behavior and interaction as a means of innovation and progress. In order to develop better search systems, it would be beneficial to have a more *embodied* view of users that includes their personal experiences, understandings, and influences. This notion of an embodied user is the perspective that motivates this research project.

Further research into information seeking began to evaluate how information systems, such as online catalogs and information retrieval systems appeared to constrain user searches rather than allowing the user to specify his or her criteria. Bates' (1989) described a method of "berrypicking" which models the human information searching process in an iterative manner. In addition, this model highlights the difficulty that is encountered by users in trying to specify their information needs. Often, the ability to search for information involves having some knowledge of the topic on which the inquiry is based. Also, this model provides insight into the contextual nature of information and the searching process, since "berrypicking" is a process which occurs through iterations of thought that are unique for each individual. The factors which may influence a person's style of "berrypicking" are as important to the process as is the searching behavior.

The notion of human diversity in the realm of searching was introduced by Wilson (1984) in a discussion of the cognitive approach to information seeking behavior. According to Wilson, this approach is grounded in meaning which draws together the concepts of "human perception, cognition, and structures of knowledge" (p. 197). The

aim of the approach is to situate information seeking behavior and use based upon the frame of reference of a diverse group of individuals. The way in which people relate to information and how decisions are made about information affect an individual's view of the world. In this model the search for information is motivated by some basic personal need. Importantly, Wilson acknowledges that an individual's association with information is indeed very personal and shaped by his or her environment. This view is in line with the rationale for this research in that it acknowledges the importance of human differences in the information search process. More specific detail in this model as to *which* personal factors actually impact an individual's view of information and the world would be helpful in understanding how to better support the search process with technology.

Wilson (1999) later revised his model and maintained that when an information user has a need, this user interacts with formal or informal information sources, which then ends in success or failure to locate useful information. In addition, this newer model accounts for additional people in the process of information seeking or exchange. However, according to Wilson, a limitation of the model he developed is that "it provides no suggestion of causative factors in information behavior" (p. 252). These causative factors are important to the information search process and central to this research project.

An important work which called for a change in the focus of information behavior research through a review of the literature was set forth by Dervin and Nilan (1986). The authors stressed a need for research focusing on information needs and use. They regarded this type of research as more important than the majority of studies that existed

at the time, which utilized a system-focused perspective. The authors argued that theories in this area were insufficient, and that information science research was not influencing practice. They recommended an alternative paradigm in which the concepts of information and information need are defined by the actual user instead of the system. Importantly, the proposed research seeks to both influence design practice as well as support the paradigm of systems development based on user diversity and need rather than technical specifications.

Borgman (1986) provided a discussion of searching in the context of online catalogs. The focus of the study was on the mismatch of the technology with user need. The author maintained that the primary reason for this mismatch was “design that does not incorporate sufficient understanding of searching behavior (p. 493)”. Borgman argued that online catalogs were being designed with skilled workers in mind instead of an “average” end user, and described the searching process as one that occurs over time through a combination of information technologies and resources, where the user works iteratively to explore his or her inquiry. Because searchers have to interpret their information need based on their knowledge of the problem and understanding of the system, this process is very complex.

The perspective of Borgman’s article supports the notion that “information retrieval is a difficult problem because it requires information that [one] does not yet have” (p. 494). The author illustrated three levels of knowledge necessary for online catalog searching that include: conceptual knowledge of the information retrieval process, semantic knowledge of how to implement a query in a given system, and technical skills in executing the query. Borgman was influential in drawing attention to

the role of contextual knowledge in the searching process, in addition to the actual types of knowledge needed. Though there is a comprehensive explanation of how the search processes is constructed, there is little discussion of how it is operationalized by individual users. Critical to understanding the search behavior of users is their view of themselves in relation to the technology and how they view the world. Understanding that the search process is iterative is only the beginning, because getting to the next step in each process is dependent upon the individual. Thus, it is critical to get to the heart of the factors that influence people in information searching on an individual level.

A behavioral model constructed by Ellis (1989) also supported the idea of an iterative nature of searching based upon six activities. These activities include starting, chaining, browsing, differentiating, monitoring, and extracting. The author explained that these activities demonstrate how searching behavior evolves, but that the process does not have to occur sequentially. Ellis describes the information search process as a dynamic one, in which each behavior in the model is contextual and iterative. The model presented by Ellis defined important steps to the information searching process which previously were ambiguous. Again, an important question to mention when discussing the iterative search process is *why* an individual may decide which step to execute next. The proposed research seeks to locate which individual factors may be affecting a person's decision about how to accomplish his or her search for information.

After the time at which the Internet was introduced publicly, Kuhlthau (1991) developed a model of the information search process (ISP). The ISP consists of a six stage process that includes initiation, selection, exploration, formulation, collection, and presentation. The author argued that up until that time, information systems had been

developed under a bibliographic paradigm that used the organization of texts into the system as the basis for designing retrieval. However, the author believed that the paradigm did not accurately represent the way people search for information, which is more often driven by uncertainty and confusion. According to the author, “people actively and constantly construct their view of the world by assimilating and accommodating new information with what they already know or have experienced” (p. 362). This view of searching is important because it integrated what much of prior research regarding searching had identified as significant. It defined steps in the process, pointed out limitations in the design of the system, and recognized information searching as contextual. However, the key element in the search for information, the *searcher*, still was not examined to identify how personal characteristics or influences affect this view of the world. Because what a person has knowledge of could have a great deal to do with how one identifies oneself within the environment, these personal factors are both important and significant in developing effective and useable systems.

Another model that supported a cognitive perspective in information searching was presented by Ingwersen (1996). The author argued that within the process of information retrieval, users construct their own models of information needs or goals. Ingwersen believed that while IR systems often were designed as a function of the system designer’s own cognitive model of desired system functionality, it is crucial that IR systems include information objects that are important to the searcher. Basically, the items included in the system should be of relevance to the user. The author argued that the cognitive structures utilized throughout the system should include models developed by the user, the content author, and the system designer. This research suggests that through

partnership with stakeholders, systems can better meet searcher needs. Also, the role of the system designer was identified as a potentially limiting factor in the usability of search systems. As the author points out, users construct models of what they hope to achieve in the search process. These cognitive models are likely not solely about searching for information, but also about value associated with information. That value is likely to be affected by an individual's frame of reference regarding knowledge about the world. Thus, it is important to begin to deconstruct what exactly is important about an individual's world view and how it affects his or her search for information.

As models have continued to be developed in information behavior, small steps towards the recognition and inclusion of human diversity have been made. A primary example is the work of Savolainen (1995), who developed a model of information searching behavior referred to as Everyday Life Information Seeking (ELIS). Core to this model is a notion referred to as "*way of life*, which provides a broad context for investigation of individual and social factors" (Savolainen, 2005, p. 143). In addition, the author introduces another concept which is *mastery of life*. Thus, according to the model, issues such as values, perceptions, and life experiences affect both way and mastery of life. Savolainen states that "equally important is the material, social, and cultural (cognitive) capital owned by the individual providing 'basic equipment' to seek and use information" (2005, p. 146). This model marks significant improvement in integrating the understanding that individual behavior occurs in the context of other significant influences that arise from internal and external stimuli. However, this model still does not expound further on the role of the social or cultural factors which it includes. Thus the

major importance of this model resides in its ability to draw attention to significant concepts in the information search process.

Information searching models constitute an important facet of the research on information behavior. There has been progress in understanding the steps of the search process and increased acknowledgement that searching can be objective or subjective, and that people's perspective on their environment does enter into their search for information. However, as more information is uncovered about how people engage in information searching, there is still a need to delve into how they come to use their perspectives, experiences, and identity as factors which influence searching behavior. Additional works in the information searching literature have investigated some of the individual, social, and environmental factors that affect user behavior with web search engines.

Social Access

Literature on social access to technology constitutes an important aspect of the discourse which deals with the digital divide and computer usage. Social access refers to the mix of professional knowledge, economic resources, and technical skills necessary to effectively use information and communication technologies (Kling, 1999). Social access has been presented as an additional perspective about the factors fueling the digital divide and broadens the explanation beyond physical access to the computer. Therefore, this perspective has provided motivation for investigating the technological skill of Web searching in the context of this dissertation, to better understand how individual differences influence information behavior.

As described by Bucy (2000), on-line information resources require a certain level of Internet literacy or cognitive ability for successful navigation. This idea supports the understanding that the digital divide cannot be completely addressed through providing physical access to the computer alone. Instead, research has shown that technology can be a difficult medium even for users with higher levels of experience; and that when less experienced users encounter problems they are likely to discontinue online use altogether (Hargittai, 2002; Kiesler et al, 1997). As a result, social access has important explanatory power in relation to computer usage and interaction.

The concept of social access also enables us to “critically examin[e] not only *who* has access to computers and the Internet, but *how* these technologies are being used by various people or identity groups (Gorski, 2001).” This perspective then allows for a more complete view of the multidimensional problem of the digital divide which includes educational, social and economic outcomes. Hargittai (2002) supports the social access perspective and asserts that there is a second-level digital divide in which she evaluates online skills as a way of understanding usage. She concludes that there is a high amount of variance in ability to find online content among users and that although “people may have technical access...they may still continue to lack effective access in that they may not know how to extract information for their needs from the Web (Hargattai, 2002, para 39).”

The social access research provides key information and motivation for this dissertation in that there is support for looking beneath the surface at the variation in usage of computers and the Internet which is a function of human variation. Therefore, research that is concerned with demographic, social, and cultural variance among users is

both relevant and necessary to further understanding how to meet user need and encourage use of information and communication technologies.

User Behavior with Web Search Engines

Literature on user behavior with web search engines, specifically the studies that focus on how users perform and interact with the technology, constitutes an important area of the research.. There are many ways that people can choose to do searches, and their level of experience with the technology also may have some bearing on the way they complete their search. Of interest to this research project are the internal experiences and external environmental factors that influence searching. The individual, social, cultural, and environmental contexts surrounding search processes are all significant areas to be considered in human information behavior.

Introna and Nissenbaum (2000) discussed how the structure and politics of Web search engines affect users. The authors argued that Web search engines emphasize certain Websites while making others virtually invisible. In addition, they stated that many of the Websites that have the most visibility are popular and mainstream commercial Websites maintained by economic powers that work to illuminate their own presence to the detriment of other smaller entities. Those neglected Websites are then further alienated due to lack of traffic and eventually completely taken down, which narrows the options and content available to Internet users. The authors further argued that access in its truest sense means a “comprehensive mechanism for finding and being found” (p. 30). They concluded that search engines are politically influenced through technical means such as crawlers, indexers, and ranking algorithms in addition to

“human-mediated prominence for a fee” (p. 169). This work invokes the notion of power in the discussion of information searching. The authors highlight how content on the Web is affected by economic motivations, which in turn also have impact on search engines. This work points out the multi-dimensional challenge of improving search engines to make them more useful. Not only are changes necessary to better reflect user needs and characteristics, but also interventions are needed to help facilitate a fair distribution of the information resource.

According to Reih (2004), the factors of context and situation are receiving more significant attention as essential elements in understanding information searching behavior. This was a major motivating factor in Reih’s study of information searching in the home environment. The author conducted the research to determine the effect that usage in the home may have on search behaviors and activities. The home was deemed to be a place that included a variety attributes that went beyond just the physical setting alone. The author concluded that people conducting information searching in the home engaged in more diverse types of goals for searching compared to those completing searches in the workplace. This study emphasizes the environmental context of information search and use and begins to reveal how individual behavior is affected by perceptions of space and time.

Burton-Jones and Hubona (2005) studied individual differences and usage behavior in a study that reviews findings about the Technology Acceptance Model (TAM). The authors were responding to research set forth by Agarwal and Prasad (1999), which argued that future studies of technology adoption could effectively exclude individual differences of users. Burton-Jones and Hubona, on the other hand, concluded

that individual differences actually do have a direct impact on the volume and frequency of technology use. Importantly, their research proposed that “rather than *ignore* individual differences...results suggest that researchers might be motivated to examine individual differences more closely” (2005, p. 72). This research constitutes a significant finding insofar as it emphasizes the need for inclusion and further inquiry into individual differences. In addition, the relation of individual differences factors to TAM is valuable due to the high visibility of that model within information systems research.

In a study of another contextual factor related to searching behavior, Johnson (2007) investigated the influences of social capital on people’s information needs. The author was interested in the role of social networks and the effect that they may have on the success of individuals’ information searching. The research was conducted in Mongolia where the government structure was recently changed from communist to democratic. The author asserts that “we cannot assume that simply because information is made available that people, particularly those with poor social resources, will know how to access it and that it will be effective in helping them resolve information problems” (2007, p. 893). The study found that social capital factors were indeed influential in searching, specifically in the choice of types of sources used in the search process. This study is vital in that it brings attention to the notion of social influences and access to technology. From this research, it can be concluded that the setting in which people live and their available personal networks work together in shaping perceptions and decisions about technology.

An analysis conducted in the area of individual differences and Internet searching was carried out by Ford, Miller and Moss in 2001. The authors explained that increased

access to the Internet is placing an emphasis on information seeking skills among a more diverse body of users. This study utilized a positivist approach and gathered mainly quantitative statistical data. The authors chose not to use hypothesis testing but instead aimed for data exploration by way of factor and regression analyses to identify relationships between factors of individual differences and retrieval effectiveness. The dimensions of individual differences that were studied were age, gender, cognitive style, levels of prior experience, Internet perceptions, and study approaches. In addition, the authors suggested that individuals search for and process information in very individual ways and make use of a variety of strategies that are often context dependent (Ford and Chen, 2000, Ford, 1985, 1995). These authors have made strides in beginning to evaluate the personal characteristics of users that affect how searching behavior is conducted. But while individual differences were studied in this work, the analysis of the important role these factors played and the description of how they influenced performance or behavior lacked depth.

Ford, Miller and Moss (2005) later produced an additional paper on Web search strategies and individual differences. The authors again emphasized that individual differences do have bearing on search strategy and that they hoped to identify potential relationships through their examination. The major conclusions drawn from the study were:

“A number of patterns of relationships [were found] linking use of Boolean and Best match search strategies with a range of cognitive/demographic individual differences, study approaches, and perceptions/approaches relating to Internet-based information seeking. Also, strategic changes [were found] on the part of

searchers possessing particular combinations of characteristics seemingly in response to increasing task difficulty.” (p. 762)

These findings are important in drawing attention to the landscape of individual differences research in the area of human searching behavior. However, equally important is the admission by the authors that further interpretive and qualitative research in this area is needed in order to “illuminate such relationships in terms of their ecological validity in the real world of information seeking” (p.763).

The study of human information behavior is concerned with how people approach their search for information. A number of models have been developed that provide information about the steps that are used in developing a search strategy. These models illustrate that decision making in information searching is iterative, contextual, and highly individual. Indeed, the investigation of human information behavior reveals that people have a range of strategies that they will rely upon when searching for information. The role played by human individual differences in this process has been included in some analyses, but not with sufficient focus on the influence of such factors. So, there is an opportunity to develop a deeper understanding about why people choose their search strategy in a given way and to what extent personal identity and experience affect the process.

Much of the research in this area has been able to make connections about the organization of the search process. It also has shown that many search systems do not effectively support the iterative nature of human information searching. Of importance to this stream of research is to begin to actually understand how different users carry out these processes as a function of individual identities. Although the actual study of *why*

and *how* a user will navigate the search for information currently is lacking, it is of great importance to progress in the area of searching technology.

Health Information Searching Behavior

Health information searching constitutes an important area of research in the area of human information behavior. There are many health related outlets which exist on the Internet serving many types of inquiry. These include information websites (WebMD, WebHealth), virtual communities (iVillage, TauMed), and institutional-based content (Mayo Clinic, National Institutes of Health, American Medical Association). In 2006, the health related searches conducted most often (64%) were related to information about a specific disease or medical problem, as reported by the Pew Internet Study (Fox, 2005). Also reported in the Pew study was that 66% of health seekers began their search for information at a search engine, with only 27% of users starting at a health website.

Based on this information, it appears that people are often motivated to look for health information online when they have specific health needs. Although conventional methods of information seeking for health-related topics through personal interactions with health professionals and consultation of a variety of literature are still key to baseline health information, the pace at which individuals demand information has changed.

People are participating in online health information research in a number of ways to either maintain or support their health needs. According to Morahan-Martin (2004), some of the benefits to online health searching include being able to access a large body of health and mental health information, being able to access expert information that

would otherwise difficult to obtain, and anonymity and privacy. However, some of the dangers relating to online health searching are misleading information, risk-promoting messages, information overload, and lack of peer review (Cline and Haynes, 2001). Income and gender have been shown to be influences to health seeking behavior in addition to an individual's exposure level to the Internet (Rice, 2006).

Though it is clear that people are searching for health information on the Internet, there is still a question as to why different individuals place different value on information access and use. This research project will investigate how individuals with diabetes approach their search for health information and the role that technology plays within their lives. The research presented about health information searching suggests that people are interested in the available research and knowledge that the Internet can provide. However, more needs to be known about what types of techniques people employ as well as their main influences when deciding how to integrate Internet technology into their health maintenance regimen. Therefore, this research will delve into how human characteristics affect the process of searching for health information.

Human Variation Literature

Difference among individuals, or human variation, encompasses the numerous characteristics, behaviors, or attributes that distinguish human beings on a variety of levels. Differences among individuals may include demographic, psychological, social, biological, cultural, or a host of other kinds of categorizations. All of these types of differences are important to the understanding of human behavior.

Research in individual differences has been carried out largely in order to better understand the behavior of people in organizations or with technical applications. These types of studies are carried out at the individual level of analysis as opposed to the group or organizational levels. By studying the individual and his/her behavior or interaction with different types of technology, researchers can make recommendations for the improvement of systems based on different user characteristics. Many measures of individual differences have been utilized in research, such as personality, cognitive style, cognitive complexity, need for cognition, problem solving ability, demographic differences, self esteem, anxiety, and perceived usefulness. Because of the diversity that exists among people that share common demographic characteristics such as age, gender or race, it is important to analyze these factors at the individual level, In particular, individual differences research has been carried out with respect to gender to better understand the participation of women in the IT workforce.

Individual Differences (ID) Research (Psychological)

The study of individual differences traditionally has been carried out in the field of psychology. Specifically, the area of differential psychology has evaluated factors of individual differences and focused on how and why people differ. This field incorporates the study of personality, cognitive ability, values, behavioral genetics, social attitudes, and expressive behavior.

Much of the individual differences research has been said to evaluate ‘intrapyschic’ characteristics of people. The word intrapyschic denotes those individual attributes that will interact with environmental variables, and thereby produce measurable

behavioral variance among individuals. Some of the examples of intrapsychic behavior that Barrett (1997) cites are “those defining temperament, cognitive ability, motivation and mood,” while environmental variables are “those that are said to exhibit some influence upon an individual’s behavior but which exist independently of an individual’s personal attributes” (p. 2). Examples of environmental variables could be geographic location, or social class.

Barrett goes on to assert that when “generating causal theories in individual differences, the researcher can choose explanatory processes that reside at four levels of explanation: the social, the cognitive, the psychodynamic and the biological” (p. 6). In addition, the social process model can be defined in a constructivist framework which posits an interaction between an individual’s attributes and the environment within which they operate from moment to moment (p. 6). This rich view of individual differences has evolved over time from research based mainly on personality characteristics to research that incorporates environmental and socio-cultural influences.

The inception of individual differences research originated with the investigation of mental testing. Wundt (1897) researched individual differences in relation to learning ability and drew correlations between learning ability and factors such as reaction time, visual acuity, and tactile sensitivity (Dillon, 1996). This research sought to uncover sensory and motor capabilities that could explain advanced learning and other mental tasks. Additionally, Galton (1884) has been credited for his early research into individual differences in which he studied heredity from both a technological and psychological standpoint (Hampson, 1995).

Much of the psychometric description of individual differences in personality has been built upon the concept of the *trait*, first adopted by Allport (1937) and Stagner (1937). Allport believed that traits served as initiating and guiding behaviors, with some traits being identified as motives and others as stylistic descriptions. Stagner maintained that traits were just convenient descriptions of behavior rather than explanatory concepts or motivators (p. 70).

In the area of individual differences, attribution theory plays a key role because it highlights the importance of cognitive elements on human behavior. Attribution theory focuses on how individuals interpret events and how this relates to their thinking and behavior. Heider (1958) proposed a psychological theory of attribution, and Weiner et al. developed a theoretical framework. Attribution theory suggests that people attempt to determine why others behave as they do to attribute one or more causes to their behavior. The three stage process of attribution includes: the observation or perception of the behavior, the belief that the behavior was intentional, and then the decision about whether or not the person was forced to perform the behavior. Weiner's attribution theory focused on achievement and identified ability, effort, task difficulty, and luck as the most important factors affecting attributions of achievement (Weiner, 1974).

It has been shown that an important individual difference is related to the variability among people in terms of their cognitive processing. Hunt (1975; et al., 1978) looked at differences in verbal intelligence in terms of information processing and found that there was a connection between treatment effects and characteristics of subjects as measured by aptitude tests, which brought attention to the importance of recognizing inter-subject differences in studies of cognition.

The cognitive approach used in individual differences research has addressed many different elements. Early research has dealt with information processing speed as well as precision in complex problem solving. Cognitive style can be defined as the fairly stable patterns of processing information that a person displays. In a sense it can be viewed as the cognitive-psychological, or more accurately, information-processing equivalent of personality. The connection between information systems success and individual differences was explained in a framework proposed by Zmud (1979). The measures of individual differences that were studied were cognitive style, personality, and demographic/situational variables which include sex, age, experience, education, professional orientation, and organizational level. The author concluded that individual differences do impact MIS success, but pointed to the need to identify specific connections between individual differences and contextual factors. It has also been shown that successful innovation in information technology depends equally on technical capabilities and the individuals developing the systems.

Individual differences also play a role in determining user performance on information retrieval systems (Borgman, 1987a, 1987b; Chen et al., 2000). Previous studies have examined the impact of various individual factors on information system adoption behavior (Igarria et al., 1995; Jackson et al., 1997; Agarwal & Prasad, 1999). However, given the advances in virtual environments, especially through far-reaching technologies such as the World Wide Web, the effects of individual differences on the use of these newer technologies may not be fully explained by theories and methods developed for earlier generations of information systems (Chen et al., 2000). Therefore,

there is a need for empirical research to examine the effect of individual differences in the new technology environment.

Identity Research (Sociological)

Individual differences research aims to identify relevant personal dimensions that differentiate people. Currently, research into individual differences stands at a crossroads. According to Cooper and Varma (1997), “[t]here is now some agreement that in order to predict behavior it is necessary to consider both characteristics of the situation and internal characteristics of the organism – or individual differences – since these two variables may be assumed to interact in complex ways to determine behavior” (p. ?). Here the authors highlight the importance of investigating the individual within the situated context of the environment in which he or she exists in order to understand behavior. This supports the notion that the study of individual differences is critical in understanding the range of human behaviors.

Two very important measures of individual differences are cognitive complexity and perceived usefulness. Cognitive complexity relates to the degree of differentiation with which an individual views the world (Ford et al., 2001), while perceived usefulness is the degree to which a person believes that using a particular system would enhance the task he or she is trying to complete. Because cognitive complexity is a measure of a user’s perceptual difference or frame of reference to activity, it plays an important role in searching behavior. Users approach the task of searching for information with a world view influenced by factors such as anxiety, cognitive abilities, or previous experience

(Yee, 2004). Perceived usefulness takes into account the value of systems in accomplishing their specific goals.

Identity is critical to understanding how a person defines him or herself in relation to the world, and in this context of technology. The exploration of information searching behavior lacks a level of depth in relation to individual identity and personal influences. There has been tremendous progress in identifying the components of the process of searching for information, but not in uncovering how these elements are enacted uniquely by users. Identity has been defined as “one’s sense of cultural belonging to a given group or society and how people conceive of who they are culturally” (Mathews, 2000, p. 17). Identity can be defined in terms of many factors including gender, race, ethnicity, sexuality, age.

In the discussion of identity and culture, two major viewpoints have gained prominence in the literature. Hall (1996) has defined one view of identity as one shared culture. This type of identity has roots in cultural heritage and tends to generally remain stable over time. Many generations of people will reinforce this type of identity and it will be passed down to other future generations. The other viewpoint is that of identity organized as “two axes or vectors, simultaneously operative: the vector of similarity and continuity, and the vector of difference and rupture,” so that cultural identity is “a matter of ‘becoming’ as well as of ‘being’” that “belongs to the future as much as to the past” (Hall, 1996, p. 113). This description of identity is not of a stagnant or traditional nature, but more a notion that identity constantly changes in time and space. This perspective would consider identity to be an evolving process rather than an unchanging one.

Identity can be defined as how people understand their experience and how they communicate personal systems of meaning to others (Josselson, 1987). The development of identity is a personal process that can occur within an interpersonal and cultural context. As other elements of an individual evolve, often a central collection of attributes remain that make a person identifiable to others. The notion of self is not an isolated phenomenon. Identity is not a singular entity, but instead a combination of beliefs, values, and roles which interact to form the whole. People determine who they are and who they are not by comparing themselves with others. They identify themselves both by comparing with others to see what goals and values are shared and by contrasting with others to see what is unique (Josselson, 1992). Identity is also culturally defined because people see themselves in relation to their degree of adherence to society's shared beliefs, goals, and attitudes.

The theory of social identity was developed by Tajfel (1981) and Tajfel and Turner (1986), and accounts for ethnocentrism in the minimal group paradigm. After being assigned to a group, people appear automatically to think of that group as better for them than any alternative out group. This is because they are motivated to keep a positive self-image. This self-image has two component parts: personal identity and social identity. (Note that the number of social identities one person may have has no theoretical limit.) Any action or cognition which elevates the social identity also will tend to elevate the self-image.

However, the social identity theory does not completely disregard the impact of individual differences. Tajfel asserted that behavior can be represented in terms of a bipolar continuum. At the interpersonal pole behavior is determined by the character and

motivations of the individual as an individual and at the opposite, inter-group pole, behavior is determined by an individual's group memberships. Where individuals place themselves on this continuum depends on the interplay between social and psychological factors.

The psychological factors depend on an individual's belief structures, which are determined by the relevant social structure. In this way, an individual will display interpersonal behavior if they hold *social mobility beliefs* and regard the boundaries between groups within their organizations (e.g., between those of low and high status) as permeable. If, however, the boundaries are perceived as impermeable, individuals will display inter-group behavior and rely on *social change beliefs*.

Additionally, an important concept in the discussion of identity is the notion of “hybridity”. Hall (1996) believes this is enacted on two different levels. The first level is a continuing process of exchange and separation between that which is viewed as central to identity and those factors which are important but somewhat marginal; and the second level is the construction of identity through that process of negotiation between central and non-central elements. “Hybridity” has been used to describe the mixing of cultures as well as the efforts of people to transform identity (Gilroy, 1993). The role of identity in society has been described by Castells (1996):

In a world of global flows of wealth, power, and images, the search for identity, collective or individual, ascribed or constructed, becomes the fundamental source of social meaning. This is not a new trend, since identity, and particularly religious and ethnic identity, have been at the roots of meaning since the dawn of human society. Yet identity is becoming the main, and sometimes the only, source of

meaning in a historical period characterized by widespread destructuring of organizations, delegitimation of institutions, fading away of major social movements, and ephemeral cultural expressions. People increasingly organize their meaning not around what they do but on the basis of what they are. (p. 3)

Castells makes an important point in discussing how people develop their view of the world. His argument is that people are not shaped by primarily by the activities that they engage in, but rather come to understand their world through the lens of their personal identity. This is key to the study of identity in this research and the motivation for developing a better understanding of how it may affect a user's interaction with technology.

A perspective on identity in cyberspace has been provided by Nakamura (1999), who explains how cultural background becomes, whether consciously or unconsciously, an issue in cyberspace. The author describes how a person on the Internet is able to become someone different by changing his or her identity, modifying characteristics such as eye color, height, sex, or race. Nakamura refers specifically to a virtual community called Lambdamoo, in which a virtual citizen is required to create an identity before participating. This identity gives other citizens a character with whom to react. Gender is a necessity in the options from which a person must choose and, in addition to male and female, neuter is an option.

According to Hecht et al., (2005), identities which are group-based and connected to ethnicity and social class are essential aspects of one's identity. This group-based identity has then the potential to be communicatively performed, confirmed, invalidated, or ignored in social interaction (Jackson et al., 2007). As an aspect of social interaction,

searching on the Web is an area where identity will play a role in an individual's interaction with the technology. This is based on the individual choice to view the usefulness of the information as a function of identity, in which a person identifies with content that is found through searching.

Identity is thus a lens through which one may view, understand, and interact with their environment. Identity is shaped by and can be composed of a number of factors. Each person develops their own range of characteristics that complete his or her identity. The value judgments that accompany an established identity are also important individual differences, which are integral to how people approach the search for information and technology.

Trauth's Individual Differences Theory of Gender and IT (IDTOGIT)

In work that has problematized the under representation of women in the Information Technology (IT) workforce, Trauth has constructed a theory of individual differences with respect to gender that seeks to address the underlying reasons for this under representation (Trauth et al., 2004, 2005; Morgan et al., 2004; Quesenberry et al., 2004). Women's participation in IT work has been documented to represent 26.2% of workers in the United States in 2006 (US Department of Labor). This low percentage not only represents a decline in the number of women who work in technical positions, but also fuels the disparity in participation known as the "Gender Gap" in IT work. The problem that presents itself, due to the lack of women and in other accounts minorities, is a shortage of available and knowledgeable employees and a lack of diversity in important and influential technical areas. Therefore, Trauth has developed an empirically-based

theory which attempts to identify factors which are impacting women in their participation with and response to information technology and technical work.

The IDTOGIT focuses on the differences *within* instead of *between* genders and acknowledges that women respond in a variety of ways to external and internal influences. This theory also supports the notion that “both gender and IT are socially constructed at the individual level” and that “women as individuals experience a range of different socio-cultural influences which shape their inclinations to participate in the IT profession in a variety of individual ways” (Trauth et al., 2004, p. 115). This theory draws upon socio-cultural phenomena to explain differences and thus suggests alternative reasons for women’s low participation in technology aside from broad generalizations about gender. Indeed, the Individual Differences Theory of Gender and IT (IDTOGIT) has been developed at a theoretical crossroads between two opposing perspectives on the topic of the under representation of women in the technical workforce. Early discussion of the participation gap with respect to women in technical occupations took a biological stance to explain the situation. This position, referred to as the essentialist perspective, described innate limitations of women to demonstrate technical competence or to effectively adopt technology.

Essentialism is said to be “based on the assertion of fixed, unified, and opposed female and male natures” (Trauth and Quesenberry, 2007, p. 21). The discourse around essentialism supports the notion that women’s “nature” and biological attributes limit them in their abilities to utilize technology. Research adopting this essentialist perspective has drawn conclusions to the effect that men and women are “inherently” different in terms of level of email usage and the adoption of, processing, and decision

making regarding technology (Gefen and Straub, 1997; Venkatesh and Morris, 2000; Venkatesh et al., 2000). These studies do not integrate any additional contextual factors such as cultural or social influences, which may affect an individual's perspective or interaction with technology.

The other theoretical perspective popularized in the discourse about gender and IT is that of social construction. Gender as understood by social construction theory is more “broadly viewed as two separate groups of men and women who are affected by two different sets of sociological influences” (Trauth and Quesenberry, 2007, p. 23). Therefore, in a departure from essentialism, social construction acknowledges environmental, social, and cultural imprints on human beliefs and behavior. However, social construction theory still explains the phenomena from a stance that groups men and women into general categories. For example, studies that have been guided by social construction theory have found that women are men are affected differently by existing negative stereotypes of IT occupations, learning environments, and the presence and ability to obtain role models and mentors (Joshi et al., 2003; Nielsen et al., 2000; Balcita, et al., 2002). Thus, social construction illuminates the variety of social forces which may shape a man or woman's life, but incorporates little insight about how individual agency or experience may affect people's response to those forces.

The two theoretical perspectives in the area of gender and IT, essentialism and social construction, thus can be regarded as describing partial elements of the situation experienced by women in the IT workforce. As Trauth (2006) points out, “current theories about gender and IT do not fully account for the variation in men's and women's relationships to information technology and the IT field” (p. 1759). It is this variation that

Trauth has argued is central to different people's experiences, decisions, and responses in relation to technology.

With the IDTOGIT Trauth sets forth to make sense of this variation has three major constructs: individual identity, individual influences, and environmental influences. These constructs work together to "explain women's decisions to enter and remain in the IT field" (Trauth, 2006, p. 1156). The individual identity construct contains items that are demographic and professional in nature. These mainly objective factors include race, age, gender, job title, and type of IT work. The individual influences construct consists of factors such as personal influences and characteristics that include education level, personal abilities, experiences with computing, and mentor and role models. The final construct, environmental influences, includes values that represent attitudes about culture and locale on a national, regional, or organizational level such as attitudes about women and attitudes towards IT work in the area. These constructs provide robust and comprehensive attributes by which to examine aspects of an individual's background, lifestyle, behavior, and experiences.

Trauth has demonstrated the impact of the IDTOGIT and the notion of human diversity in a number of settings. In an investigation of how women are affected by and cope with the presence of social networks in the IT profession, Morgan et al. (2004) found that women were presented with different social networking opportunities, with some opportunities appearing to be negotiable, while others were completely inaccessible. The study found that women reacted to the existing network in a variety of ways, which highlighted a number of factors that the different women personally

experienced, such as family responsibilities or attitude towards work, in addition to external or situational elements, such as male-dominated or hidden networks.

In an investigation of the influence of work-life balance and family-related issues, Quesenberry et al. (2004, 2006) utilized the IDTOGIT to delve into the decisions of women in the IT workforce. They acknowledged that issues of work-life balance were significant to women working in IT, and that women exhibited a number of methods for dealing with the societal messages and outstanding issues. The subsequent framework developed in this research provided a vehicle by which to understand the myriad of factors and elements which may impact how women enter and exist in the IT field amidst a number of evolving life and work variables.

When evaluating the importance of the environmental context on women's participation in the IT workforce, Trauth et al. (2005) analyzed some additional relevant issues and influences on women. The study found that economic and cultural factors including household income and attitudes towards women had an impact on women's participation with IT. The study also recommended organizational consideration of these items in addition to context and regional influence when making decisions about human resources. Also, the environmental context aspect of the theory was further developed.

Morgan et al. (2005) conducted a study where the premise was to investigate individual differences in relation to technology use. This research represented one of the initial projects in which the IDTOGIT was extended into an area outside of Gender and IT research. This work was an extension study of attitudes toward search engines originally conducted by Liaw and Huang (2003). The authors of the first study found that individual computer experience, quality of search systems, motivation, and perceptions of

technology acceptance have an effect on the desire of users to utilize search engines. When these findings could not be replicated in the subsequent study, the analysis pointed towards other individual differences of the participants that were not accounted for in the initial research as a likely explanation for the difference in results. This study provided motivation for further detailed research in this area, and hence was a prime impetus for this dissertation research as well as an indication for potential theoretical contribution to information behavior research.

The IDTOGIT represents an important theoretical basis for research and an excellent opportunity for the extension of theory. As previously noted, many existing models of information searching behavior are helpful in identifying many elements of the search process. Literature in information behavior suggests that qualitative and interpretive inquiries into search behavior can assist us in developing a better understanding of information behavior and use. In addition, human differences and socio-cultural factors represent areas for further, more in-depth study in connection to how individuals approach the use of search engines and construct a role for technology in their lives. These factors have collectively aided in the decision of theory choice, in addition to the potential for the advancement of understanding in an area that is key to information sciences and technology. Because the IDTOGIT has great potential for the advancement of understanding in an area that is key to information sciences and technology, it serves as the theoretical starting point for the critical discussion that follows.

Summary of the Review of the Literature

This chapter has presented an overview of the relevant literature in the areas of human information behavior and human variation. The human information behavior

literature was presented to show models of information searching and how diversity was accounted for in these models. The inclusion of the goals, experiences, and background of the user were included in later models of information searching. However, I posed that as more information is identified about the process of information searching, there is an enhanced opportunity to further inquire about individual, social and environmental factors that affect searching behavior. The health information searching behavior literature was included to show the importance of the domain of health and to show the opportunity to continue research on that topic. The human variation literature was provided to describe the origins of individual differences (psychological and sociological) and identity research. This literature was also documented to highlight the importance of the multi-dimensionality of individuals and to account for those differences in research. These bodies of literature helped to motivate this study and to identify the opportunity to contribute to the discourse on the role of individual differences and identity on searching behavior.

CHAPTER 3: RESEARCH DESIGN

In the discussion of information searching behavior and human variation, human individual differences are indeed factors to be considered. However, further inquiry is required into how these differences influence use of technology and searching behavior. Ford et al. (2005) stated that the research on individual differences and searching could benefit from “interpretive perspectives to illuminate such relationships in terms of their ecological validity in the real world of information seeking” (p. 763). In addition, Ybarra and Suman (2008) encourage researchers to “examine the reasons why people turn to the Internet for their health care information needs, their assessments of this experience and the resulting actions spurred by the information found” (p. 512). This study addresses this dearth of research by utilizing an interpretive, mixed methodology research design to inquire into human variation and behavior in searching for health information. This empirically-based, interdisciplinary study will support existing theory and provide data to advocate for the inclusion of factors of human diversity within information systems. Additionally, the results of this study can provide foundation for revisions to practice that integrate an understanding of the global user population and account for individual differences.

The purpose of this study is to *identify the influence of human variation on people’s perspectives about and approaches to the activity of information searching on the topic of health*. In an effort to achieve this purpose, the following research questions are posed:

1. How do the individual differences of users with diabetes influence information searching behavior for health-related information?
2. How do demographic differences and identity orientations of users with diabetes influence information searching behavior for health-related information?
3. How do information sources, online or offline, of users with diabetes influence information searching behavior for health-related information?
4. How do Internet Perceptions of users with diabetes influence information searching behavior for health-related information?
5. How does level of experience with computing influence information searching behavior for health-related information?
6. How does user cognitive complexity influence information searching behavior for health-related information?

In order to understand the way in which personal influences and experiences work to affect individual behavior with Internet technology, in addition to group level differences, I evaluated internet search engine users who had a variety of demographic backgrounds and user types. My motivation for posing these research questions grew from an understanding that “the growth of managed [health] care, coupled with the capabilities and growing popularity of the Internet, creates an ideal opportunity for using telecommuting technology to provide health services to people who suffer from chronic disease” (Street and Piziak, 2001, p. 289).

Recognizing that “social experience and lived realities are multi-dimensional and...understandings are impoverished and may be inadequate if we view these phenomena along a single dimension” (Mason, 2006, p.10), I employed a multiple method research design. The use of mixed methods for this research also served to enable further analysis of the data through triangulation by allowing the development of different perspectives on the phenomena being studied. Data regarding the performance

of the users of search engines is typically collected through quantitative measures in which statistical tests are conducted to understand users' success with their task of information searching. However, data regarding personal influences and individual differences is better represented by qualitative data that acknowledges the dimensions of the individual users, and their personal influences and experiences with Internet search technology. For this reason, both quantitative and qualitative data was sought.

This chapter describes the research design and methodology of the study in greater detail, and opens with a discussion about the theoretical orientation, followed by information on the interpretive epistemology. Following that, the methodology is presented, along with a description of the research setting, sampling strategy, recruitment of the participants, and additional participant information. The next section addresses the data collection methods and includes an overview of the three sections of the research studies: the User Search Experience, the Individual Differences Questionnaire, and the Open-ended Interviews. Following this, the data analysis procedures are provided, and the chapter concludes with a discussion of how the data was triangulated.

Theoretical Orientation

This study and its data collection methods were shaped by three theoretical perspectives: Trauth's Theory of Individual Differences, the work of Ford et al. (2001), and the work of Cheek, Smith and Tropp. The following section will explain how these perspectives have influenced and shaped this study's research design.

Trauth's Individual Differences Theory of Gender and IT

The guiding theoretical perspective for this study was Trauth's Individual Differences Theory of Gender and IT (IDTOGIT). In order to gain an understanding of individuals' perceptions about their own skills and use of technology, it was necessary to use a theory that offered a comprehensive representation of the individuals; The IDTOGIT is therefore an ideal choice.

Since its development, the IDTOGIT has been utilized within the area of IT workforce and computer personnel research to aid in the understanding of the underrepresentation of women in the IT workforce. Some have explained the low participation of women in technical fields by positing that women are either biologically limited (essentialism) or influenced by social messages (social construction) (Trauth, 2002, 2006), but Trauth has suggested that these explanations are insufficient to truly address the complexities of women's technical abilities and interactions. Therefore, instead of grouping together individuals of a particular gender, the IDTOGIT approaches underrepresentation in the IT workforce from the vantage point of individual agency and experience in relation to life choices. Trauth advocates for investigation into influences that draw from socio-cultural themes and the spectrum of differences.

Thus, the IDTOGIT provides recognition to the importance of social influences, while emphasizing that personal characteristics, interests, and abilities are also significant shaping factors. The Individual Differences Theory of Gender and IT has two areas of explanatory focus: 1) "focus on the differences *within* rather than *between* the genders through the understanding of specific influencing factors" and 2) examination of the detail of "the *nature* of the influencing factors" among individuals (Trauth et al. 2008a, p.26). Trauth has been able to demonstrate that women in the IT workforce employ a

number of different patterns of behaviors and react to a variety of stimuli in unique ways. These findings provide evidence contrary to broad generalizations about women in technical fields and suggest that factors of human diversity are fundamental to studies of gender and the IT workforce.

According to the IDTOGIT, the constructs which explain the individual and environmental factors that serve to influence behavior are individual identity, individual influences, and environmental influences, and these constructs can be viewed as interdependent lenses through which to examine the unique responses of individuals to external exposure (Trauth and Quesenberry, 2006). The current study used the existing constructs of individual differences and applied them to human information behavior research, taking the perspective that individuals are socially shaped and influenced to certain behaviors due to their personal influences and environmental experiences (Trauth et al., 2004). The IDTOGIT is particularly relevant to research on human information behavior because Trauth et al. (2008b) suggest that explanations regarding human variation in behavior “can be found in endogenous and exogenous factors that influence an individual’s personal development and subsequent IT career decisions (p. 8)”; although this study does not evaluate IT career decisions, the decisions made by the participants are directly related to behavior and interaction with IT. Trauth (2006) states that the constructs of IDTOGIT “account for the differences among men and women in the ways they experience and respond to characteristics of IT work, the IT workplace and societal messages about women and men in IT” (p. 1156); again, this aspect of Trauth’s theory is extremely relevant to the current study because the factors that can help identify how individuals “experience and respond to” IT are at the center of this investigation.

The setting of the study at the center of this dissertation differs from that of Trauth's work in that this investigation did not look into the IT workforce or at women exclusively. However, regardless of setting or participant gender, Trauth's theory enables the identification and combination of psychological, social, cultural and environmental influences on individuals as a method of obtaining a richer view of a person in relation to technology. The IDTOGIT takes into account "the varied influence of individual background and critical life events that result in a range of responses" (Trauth et al., 2008b, p. 9), and allows for the examination of the individual from the perspective of influences, experiences and responses as an inroad to understanding personal autonomy in behavior and choice. In order to account for these influences, the IDTOGIT was used as the guiding theory for the qualitative data collection method and was also useful in the analysis of the interview data. In addition, because the phenomenon of interest in this study is that of user behavior and web searching, I aim to extend the IDTOGIT in scope to apply to these factors.

Research questions 1 and 3 were derived from this theoretical orientation. As the leading theoretical orientation used in this study, the IDTOGIT provided motivation to evaluate the connection between individual differences and user information behavior. Research question 1 (RQ1) served as the overarching line of inquiry for the study, which was concerned with the individual differences of the users of Web search engines. Research question 3 (RQ3), which is concerned with online and offline health information resources was also derived from this theory. The environmental influences construct which includes differing attitudes about culture motivated the investigation into

how perceptions and usage of different types of information sources subsequently affect user information behavior.

Ford, Miller and Moss' work on Individual Differences and Searching Behavior

The work of Ford et al. (2001) on individual differences and Internet searching also provided a useful theoretical perspective for this research. The measures of individual differences investigated by the authors in their study were cognitive styles, levels of prior experience, Internet perceptions, study approaches, age, and gender. Ford et al. acknowledged that the concepts that they studied were primarily social, and they adopted a positivist stance to their data collection and analysis through use of statistics. The authors developed an Individual Differences questionnaire which contains measures of approaches to study, Internet perceptions, levels of experience with Web searching, and cognitive complexity; an adapted version of the Individual Differences Questionnaire is used in this study. In the work of Ford et al., significant attention has been brought to the study of individual differences in relation to web searching. As a result, some important points were raised in the research of Ford et al. that have influenced the approach taken in this study.

The first point, in relation to epistemology, discusses how future research may employ alternative methods of inquiry:

“The limitations of positivist approaches to human issues are acknowledged. However, we feel it useful where possible to obtain baseline data enabling the strength of evidence to be measured quantitatively. Such evidence by no means

invalidates – indeed arguably provide a more solid base for – complimentary illuminative investigation of the same and related issues (p.1052, 1053).”

The second point also touches on the importance of using mixed methodologies and additional research into human variation and searching:

“Arguably, further investigation could usefully employ qualitative and quantitative approaches in triangulation to illuminate the type of relationships found here.... such triangulation...is highly appropriate to the focus of the present study in that many of the questions raised by the statistical analysis arguably require for their understanding qualitative data relating to the complex and subjective nature of the relationships between search behavior and the personal meaningfulness to each searcher of the activity in which he or she is engaged. It would be useful for such research to take into account aspects of searching including individuals’ expectations, intentions, attitudes, reasoning and emotions (p.1063).”

The authors make the argument that there is a need to acquire “knowledge of more fundamental and enduring factors that can help us improve people’s Internet retrieval in deep and lasting - as opposed to relatively superficial and fleeting ways” (p. 1049). This is an important concept and source of motivation to this study. The work of Ford et al. is useful to the current study as it demonstrates the relevance of the topic under examination. The elements of the Ford et al. study which were been taken into account in the design of this research project making recommendations that encourage the use of mixed methods and inquiry into searching that includes attitudes and expectations which were taken into account in the design of this research project.

The research questions 4, 5, and 6 were derived from the theoretical perspective of Ford et al. (2001). The topics of Internet Perceptions, Level of experience with computing, and Cognitive Complexity were included in the Individual Differences questionnaire, and were therefore specific areas of inquiry in this research. These topics were directed at understanding the skills, experiences and cognitive processing styles of the participants.

Cheek, Smith and Tropp's work on Identity Orientation

The work of Cheek et al. (2002) extends the Individual Differences Questionnaire by focusing on the evaluation of identity orientations. Identity, the “construct which defines who or what a particular person is,” has been noted to have both personal and social aspects (Cheek, 1989: 275). Based on this idea, Cheek et al. have argued that it is “reasonable to expect that there are consequential individual differences in the relative importance or value placed on personal compared to social identity characteristics” (Cheek, 1989: 275). As a result, the authors developed the Aspects of Identity Questionnaire (AIQ); this instrument, which is in its fourth version (AIQ-IV), assesses the importance placed by individuals on different elements of identity characteristics in the construction of their self-definition. The AIQ-IV includes scales for four identity orientations: personal (private beliefs about psychological traits and abilities); relational (how an individual sees him or herself in interpersonal contexts); social (social roles and reputations); and collective (individuals represent their various reference group identities). This AIQ-IV instrument (see Appendix C) was added to this study as a

section of the Individual Differences questionnaire in order to gather further data regarding participants' identities and individual differences.

Research question 2 was derived from the theoretical perspective of Cheek et al. (2002). Questions from the AIQ-IV were included in the Individual differences questionnaire. The intersection of demographics with identity was of importance to understanding individual differences of Web search engine users. Therefore, RQ2 provided an opportunity to investigate the component of identity closely in this research.

The collective use of these three theoretical perspectives influenced and aided in the construction of the theoretical orientation of this research. The work of Trauth in addition to that of Ford et al. and Cheek et al., were used as a basis for the development of the research design. The IDTOIGIT has influenced the research questions, qualitative interviews and analysis. The work of Ford, Miller and Moss provided impetus for this study as well as contributed to the quantitative element of the study in the form of the Individual Differences Questionnaire. The work of Cheek et al, helped to add depth and extend the Individual Differences Questionnaire to evaluate an additional layer of identity orientation.

Epistemology

The epistemology of this study is interpretive, and has its roots in hermeneutics and phenomenology. Interpretive epistemology is “concerned with the approaches to the understanding of reality and asserting that all such knowledge is necessarily a social construction and thus subjective” (Walsham, 1993:5). Because the theoretical

perspective of this study is that the social shaping of individuals occurs through behavior, language, and shared meaning, an interpretative epistemic approach is most appropriate (Klein and Myers, 1999).

Kaplan and Maxwell (1994) discussed the fact that interpretive research focuses on the complexity of human sense-making as situations emerge. Walsham (1993) explained that interpretative research methods seek “an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (p. 4-5). This approach is particularly relevant in the current study, wherein the subjective realities of subjects were explored through searching experiences. Additionally, because the guiding theory in this study, IDTOGIT, incorporates both internal influences and external factors, the choice of an interpretive epistemology is fitting.

Methodology

In the development of a research design for this study, a mixed methodology that included both quantitative and qualitative measures was employed. This methodology focused closely on human characteristics and individual differences and their relationship to Web searching behavior. Careful selection of participants was conducted in order to develop a pool of participants through whom I could best address my research questions. In this section, I describe in greater detail the sampling strategy and participant recruitment, in addition to the research setting, study participants, and the data collection methods.

Description of Research Setting

This study is focused on understanding the influences on health information searching behaviors of individuals with diabetes. The domain of health was picked for a number of reasons. Primarily, while there may be different types of health information that are sought, it is likely that the majority of the population will search for some health-related topic during a given period of Internet use. The Pew Internet Research and American Life project reported that in 2005, 80% of American Internet users searched on topics related to health seeking information on specific diseases, medical treatments or procedures, diet, nutrition, fitness, prescription drugs, health insurance and alternative medicines (Fox, 2005). The Internet provides an invaluable resource for these and other health-related search topics, offering privacy of use, multiple sources of information, and virtually on-demand access to resources. Therefore, the domain of health seems a particularly significant environment in which to investigate information searching behavior.

Individuals with diabetes were chosen as the participant group of interest. Diabetes is a disease in which the body does not produce or properly utilize insulin, and can present in two different ways: type 1 diabetes is experienced due to a failure in the patient's body to produce insulin, while type 2 diabetes occurs when the patient experiences insulin resistance and deficiency. The majority of individuals in the United States that suffer from diabetes are diagnosed with Type 2 (American Diabetes Association, 2007). The American Diabetes Association reports that:

“23.6 million children and adults in the United States, or 7.8% of the population, who have diabetes. While an estimated 17.9 million have been diagnosed with diabetes, unfortunately, 5.7 million people (or nearly one-quarter) are unaware that they have the disease” (2008, para. 2).

The exact cause of diabetes has not yet been identified, but “genetics and environmental factors such as obesity and lack of exercise appear to play roles” (American diabetes Association, 2007). Diabetes is also a chronic disease which is not presently curable. The treatment of chronic illnesses often depends heavily on the patient’s desire for and capacity to develop a healthy way of life, take the appropriate medications, and lessen potential risk factors (Street and Piziak, 2001). Also, the success or failure of the treatment of diabetes has an outcomes that is connected to the acceptance and understanding of the plan of treatment. A successful outcome is “heavily influenced by the patient’s motivation to carry out the treatment plan consistently over time in the face of competing priorities, barriers, and varying levels of practical and emotional support from others” (Welch and Shayne, 2006, p. 130).

Controlling diabetes can be difficult for individuals because lifestyle changes to daily activities, including a specific diet, monitoring blood sugars closely, exercising and injecting insulin, require careful attention and planning. However, improved access to information on disease management as well as problem solving resources provides an opportunity for the reduction of the complications associated with managing diabetes. The Internet provides a significant vehicle through which to locate these types of

resources and content, give its access to information from multiple locations, the variety of types of health information housed on the Internet, and the potential for asynchronous communication and interactions regarding health topics with others about health topics (Street and Piziak, 2001).

Because environmental factors are important to this research individuals with diabetes were selected. The environmental factors include: weather, diet, lifestyle and body weight. Cold weather and viruses have been connected to the triggering of type 1 diabetes, and high fat diets, lack of exercise, obesity, smoking, and high blood pressure or high cholesterol have been linked to type 2 diabetes. Also, people of minority backgrounds, including African Americans, Latinos, Hispanics, Native Americans, Asian Americans, and Pacific Islanders, are more likely to get diabetes (American Diabetes Association, 2007).

Diabetes is a particularly relevant health condition to investigate in conjunction with health searching. As diabetes has increased in prevalence in the United States in recent years, the environmental factors that were previously listed are of significant interest to physicians and individuals alike. I have an additionally important reason to study diabetes and that is because it a chronic disease that requires careful management on the part of the patient. As a result, individuals who suffer from diabetes are likely to have increased motivation to gather information about their health from multiple sources. Also, because these environmental factors are, to some extent, able to be controlled by individuals, they provide an important mechanism for considering diversity.

Sampling Strategy

For this study, it was necessary to recruit individuals who were diagnosed with diabetes, and of different racial backgrounds, age and gender groups. The recruitment of participants for this study was conducted in such a way as to ensure adequate representation of specific demographic characteristics (i.e. individuals of different racial backgrounds, age and gender groups who were diagnosed with diabetes). Recruitment was carried out through two sources: 1) The Pennsylvania State University Diabetes Center¹, and 2) personal contacts. The Pennsylvania State University Diabetes Center is a joint partnership between the University Park campus and the Milton S. Hershey Medical Center campus of the Pennsylvania State University. The Diabetes center works towards development of controls and prevention strategies for diabetes and obesity. Both organizations are located in central Pennsylvania, with the University Park campus being located in University Park, Pennsylvania and the Medical Center being located in Hershey, Pennsylvania.

This study employed organic sampling, a technique used to evolve the sampling process in a way that is specifically related to the emerging shape of the research project (Mason, 2002). This type of sampling is used to produce a context or setting which serves to encapsulate a relevant range of experiences, characteristics, or influences. By developing the sample iteratively, and in conjunction with the needs of the project, the relationship between the sample and the wider context will not be ad hoc, accidental, or purely opportunistic (Mason, 2002). Based on this standpoint, the participant demographics and characteristics were continuously evaluated to ensure a diverse and

¹ In the year 2008, the Pennsylvania State University Diabetes Center was renamed to be the Pennsylvania State Institute for Diabetes and Obesity. In this study, the organization was referred to as the Penn State Diabetes Center, because that is name under which it operated under when the research was conducted.

relevant range of participants were captured in the study. In this research, human variation was an important facet, so factors including race, gender and age were monitored closely. In addition, because the study was carried out with individuals diagnosed with diabetes, the Pennsylvania State diabetes Center was involved in helping me to identify many of the participants for the study. More specific detail about the role of the PSU diabetes center in the recruiting of participants is included in the following section.

Recruitment of Participants

The diabetes Center conducts research on diabetes and sponsors a participant database for individuals who are diagnosed with diabetes and willing to participate in research on diabetes-related topics. The diabetes Center maintains this database and provides researchers who are affiliated with Penn State with access to contact information for these individuals once researchers have received clearance to conduct investigations from the Institutional Review Board (IRB). (It is the responsibility of the researcher to carry out the actual recruiting activities.) After IRB approval was granted, I obtained a database of contact information for 200 individuals, categorized by type of diabetes, either type 1 or type 2. After receiving the database, I send out mailings to selected individuals in order to provide information about this study and to request participation. (The recruiting letter is provided in Appendix A) The mailings included a self-addressed stamped envelope to help facilitate return communication from potential participants. In addition, the mailings were used to introduce potential participants to the research and the

principal investigator, so that if individuals were contacted via telephone, the potential participants would have some background on the study. The majority of the participants in the study responded to the mailing, but there were also some participants who were contacted via email and telephone.

Because both of the sponsoring organizations for the PSU diabetes center are located in central Pennsylvania, the majority of the participants in the database were white; therefore, the database was the primary method through which the white individuals who participated in this study were recruited. Since this study was interested in a variety of racial backgrounds, and because the racial background of individuals in the database was not diverse, I used my extended personal network to recruit additional participants. I invoked the help of family and friends to share information about my dissertation research and to request participation from diabetic individuals. The majority of the participants that were recruited through my personal network were black, and because my family and friends are primarily located in an area of southern Maryland where there is a large population of black individuals, the black participants in this study were largely from this area of the country. Once I received individuals' contact information, I provided them with the mailing that outlined my study goals and procedures. The participants would then follow up with me or with the individual in my personal network to arrange the research session.

Participants/Subjects

There were a total of 30 research participants in this study, consisting of men and women, all over the age of eighteen, that were either African American or Caucasian and

actively diagnosed with either type 1 or type 2 diabetes. The sample size is comparable to many of the recent health information searching studies that evaluate user diversity and utilize mixed methods. (See Table 1 for a list of sample sizes and number of participants).

| Reference | # of Participants |
|------------------------------------|--------------------------|
| Law et al. (2006) | 11 |
| Maloney-Krichmar and Preece (2005) | 20 |
| Sharit et al. (2008) | 40 |
| Sillence et al. (2004) | 15 |
| Sillence et al. (2007) | 15 |
| Slone (2003) | 31 |

Table 1: Sample Sizes of Health Information Searching Studies

According to the American Diabetes Association (2008), the prevalence for diabetes among racial groups is as follows: 15.1% of American Indians and Alaska Natives, 13.3% of Non-Hispanic Blacks, 9.5% of Hispanic/Latinos, and 8.7% of Non-Hispanic Whites. It would have been beneficial to include all of the ethnic groups listed here, and an effort was made to recruit participants from each of the ethnicities. However, due to the limitations of the location of the Pennsylvania State University and my own personal network, American Indians, Alaska natives and Hispanics/Latinos were not included in the study. However, the contrast of African Americans and Caucasians, who have the second highest and the lowest rates of diabetes respectively, provided an interesting opportunity to evaluate individual influences and differences.

The research participants were not compensated, participated voluntarily, and located mainly in one of three geographic areas: State College, Pennsylvania; Harrisburg/Hershey, Pennsylvania and Prince Georges County, Maryland. Both of the locations in central Pennsylvania consisted of mainly Caucasian individuals, while the Maryland locations offered primarily African-American participants. The central

Pennsylvania locations were of interest because of their proximity to the PSU diabetes research center and also because of the mixture of suburban and rural populations. The Maryland locations were of interest because the Pew Internet research group noted the National Capital region to have the largest proportion of African-American Internet users in the country, which reflects the high overall socio-economic profile of African-Americans in the region (2003). The data collection was carried out in a variety of places, including a conference room on the Penn State Campus, coffee shops, and the participants' homes or offices. All of the searching tasks were carried out on my personal laptop and the interviews were digitally audio-recorded.

Data Collection

The data collection methodology utilized in this project is composed of both quantitative and qualitative research techniques including: a search task used to gather participant observation data, an Individual Differences questionnaire, and in-depth structured interviews. The data collection effort began by engaging the participant² in a search "experience" in order to document observations about the task of information searching for health related information. Next, the questionnaire (see Appendix E) probed the participants about their personal perception of their experience and skills with technology, cognitive complexity, and self identity. Lastly, the interview inquired into the participants' personal influences, experiences and interaction with technology.

This study investigated two major themes: 1) how human variation influences information searching behavior for health information, and 2) how the perceived role of

²Permission to collect data from each participant in the study was received through the use of informed consent forms.

the technology influences the use of health information seeking in maintaining good health. Human variation in this context includes differences among users in respect to race, age, gender, cognitive style, experience level, Internet perceptions, and study approaches (Ford et al., 2001). The concept of human variation is important because it denotes important differences that represent the uniqueness and agency of individuals, and their control over their situations based on multiple factors.

The research questions are important to study for a number of reasons. First, search engines are important technologies that can have an impact on individuals' search success and, possibly, their perceptions of technology. If a societal goal is to address, and thereby lessen, the digital divide, it is important to understand the obstacles and hindrances that exist to participation with technology, from both a physical and social standpoint. To understand the problem further, I conducted a study of people from different backgrounds, ethnicities, cognitive styles, and ages, etc. This diverse population of people helped to provide an appropriate sample of Web users. Utilizing a mixed-method study to evaluate the research questions provides sound empirical results which provide a comprehensive view of the user as a person in addition to their information searching behavior. Triangulation of the quantitative data collected with the qualitative data provides an opportunity for better explanation of the quantitative findings by providing insight into reasons why some patterns found in the data analysis exist and possibly why some are not identified.

User Search Experience

The user search experience was conducted at the beginning of each research session. The participants were provided with a computer furnished with Internet access and a screen that showed the Google web search engine. The participants were asked to perform a search for information that is related to a personal question, concern, or inquiry related to health/nutrition-based information. (The introduction and scenario that were provided to each participant is included in Appendix B) During the process, users were asked to use the ‘think aloud’ method by describing the processes and decision making being utilized during the search. I acted as a participant observer and, in addition, asked questions related to information, motivation, and behavior during, and after the completion of the search task. This search experience allowed the users to consider how and why they carry out search behavior related to health information. Further, the user search experience was employed as a “critical incident” to stimulate participants’ thinking about their own health information search behavior. Participants searched for information on the topics provided and discussed topics of importance to them related to health information and diabetes.

Individual Differences Questionnaire

The Individual Differences questionnaire was administered after the completion of the user search experience during each session. The paper-based questionnaire contained 57 items with a five-point Likert scale (Appendix E) to evaluate individual differences in regard to Internet perceptions, levels of experience using a Web search engine, cognitive complexity, and identity orientations. The participants were instructed to read each question and provide answers about their experiences on the sheet. The

purpose of the questionnaire was to gather the participants' thoughts about their own searching behaviors, skills, and experiences on the Internet as well as their beliefs about their personal identities. This questionnaire is based on the Individual Differences questionnaire created by Ford et al. (2001) and the Aspects of Identity Questionnaire (See appendix C) created by Cheek et al. (2002). This method was employed to acquire objective data about individual differences regarding Internet perceptions, cognitive complexity, level of experience, and identity.

In-Depth Interviews

The in-depth interviews were the final part of each research session. The participants were asked open-ended questions about health information, searching behaviors, and the role and purpose of technology in their lives. The purpose of the interview was to understand the factors that influence people's interaction with and association to technology in their lives. In addition, the interviews gathered in-depth information about how the participants approach technology in their search for health information. The themes of the questions asked were based up constructs created by Trauth (et al. 2004, 2006). Those constructs represent information about individual identity, individual influences and environmental influences. (See Appendix D for the interview guide that was used.) Questions about individual identity were asked about the participants' personal backgrounds and demographic characteristics. Questions based on the individual influence construct evaluated individuals' influences or experiences in life and with technology. Lastly, environmental influences probed the participants' beliefs about and interaction with the environment in which they live and work.

Data Analysis

A data analysis matrix was used to organize the large, rich and mixed data set that resulted from this study. The matrix contained information about each of the participants and their demographics, and was categorized based upon each of the three portions of the study – search task, questionnaire, and interviews.

The search task was a critical incident technique that provided a combination of participant observation and open-ended probing designed to encourage individuals to think and reflect on their health information searching experiences. The data collected in this portion of the study consisted of participant-researcher observations about the individuals' behaviors and Web searching, as well as the participants' discussion of perceptions about searching and health information. Critical incident technique (CIT) was initially developed by Flanagan (1954). The method was developed in an effort to examine behaviors that were exhibited by flight crews in World War II, in connection to the success and failure of missions. The CIT was created as an intense interviewing method aimed at pinpointing facts and identifying critical behaviors (Kemppainen, 2000). A goal of CIT is to help participants specifically describe events and behaviors with all relevant details. Therefore, “when a clear description of the events leading up to an incident is provided by a study participant, an understanding is created of why certain actions were or were not taken” (Kemppainen, 2000: 1265). According to Urquhart et al., (2003) the critical incident technique has been used often in the health sector in studies which investigate the “motivations for information seeking, urgency of the request, type of information required, sources used, and reasons for selecting those

sources” (p. 70). CIT has also been used in other IT related research by Heng et al. (1999) as a vehicle to invoke thought and discussion by participants about the introduction of IT innovation into organizations. The technique was used in a similar fashion in this study through the user search experience to act as a catalyst to discussion about participants’ health searching behavior. This study also followed the course of other “CIT studies of information behavior [which] focus on the individual user as a free agent with choices on whether to use an information service or not.” (Urquhart, 2003: 71).

To analyze the data that was collected from the user experience and the open-ended interviews, thematic qualitative analyses were conducted. In the case of the user search experience, I took detailed notes about the participant’s discussions, to include my observations during the actual search task. My notes from the user search experience consisted of my observations of the search task (which detailed the participants searching behaviors), the searching keywords used during the scenarios, and the discussions that occurred about health information and searching. The open-ended interviews were digitally audio recorded and detailed notes were also taken. The user search experience and the open-ended interviews differed in that the user search experience was mainly used as a critical incident to stimulate thought in the participants and to provide an opportunity for participant observation, while the interviews were conducted to gather participants’ personal thoughts and perceptions of health information searching. Although these two sections of the research session differed in purpose, each provided an important opportunity for data collection.

The purpose for conducting a thematic analysis of the user search experience documentation and open-ended interviews was to organize and uncover the perceptions and the beliefs of the participants in the study. The thematic analysis was also conducted to bring voice to the participants, in order to juxtapose their experiences to those published in the literature regarding health information searching. It was my goal to understand the participants' searching behaviors within the framework of their individual circumstances. There is a significant research stream that looks at information searching, and additional insight is now being developed on health information searching. While this research seeks to contribute to the community of works on that topic, the current study is unique in that it is concerned with how participants use and identify technology within their daily lives. By recruiting participants diagnosed with diabetes, there was an expected existing motivation that the participants might desire to understand and manage their personal health. Therefore, the qualitative analysis looked to uncover how technology, diabetes and information interacted and influenced the behavior of the participants in this study.

Thematic analysis is a “method for identifying, analyzing, and reporting patterns [themes] within data” (Braun and Clarke, 2006, p. 79), and is used as a method to understand and organize data through the encoding of qualitative information through the identification of themes in the data. These themes can be “identified at the manifest level (directly observable in the information) or at the latent level (underlying the phenomenon)” (Boyatzis, 199, p. 4). The reporting of the thematic analysis differed for the two methods. I examined the data at the manifest level for themes in the user search experience, and at the latent level for themes in the interview data. Thematic analysis is a

widely used form of analysis for qualitative data and is used in many fields to report in rich detail on a data set. The thematic analysis of this data was theoretically driven based on the Individual Differences Theory of Gender and IT.

The qualitative data analysis technique used in this dissertation was based on the analysis model of research utilized by Trauth (2004) in her research on women and their participation in the information technology workforce. Trauth analyzed open-ended interviews with 123 women using a detailed coding scheme that was developed based upon themes selected from relevant literature and her first-hand experience with the phenomena. The themes of information that were utilized by Trauth are as previously discussed: individual identity, individual influences, and environmental influences. Each interview transcript in Trauth's studies were read thoroughly and interpreted for evidence of codes related to each of the three themes. Trauth has been able to report on these themes and additional sub-themes by both searching the data for the a priori themes, as well conducting open coding for new themes that emerge from the participants' interaction and discussion in the interview process (Trauth et al., 2008a). The analyzed themes represent instances of the main research stream: to understand the factors which influence the under representation of women in technical work³. In addition, the analysis has produced additional sub-themes which have resulted from the careful coding and analysis of the data (Quesenberry and Trauth, 2007).

³ Examples of analysis work that I have completed along with Trauth have been published under the themes of social networking (Morgan et al., 2004; Morgan and Trauth, 2006; Trauth et al., 2004), work-life balance (Quesenberry et al., 2004, 2006), and race (Kvasny et al., forthcoming). These research opportunities provided me with the background and familiarity to conduct analysis on my qualitative data.

To analyze the data that was collected from the user search experience, a thematic analysis was carried out on the documentation of the participant's discussions and search behaviors. The documentation of the participant's discussions consisted of notes that were taken during my observation of the search task, which detailed the participants searching behaviors, searching keywords used, and researcher/participant discussions about health and searching. For the user search experience, participants were asked to search for information on nutrition and medication. As I read and re-read the notes from that section, I began to recognize the information patterns in the specific topics of nutrition and medication (keywords), and in the source of baseline health information, strategies, motivations, and barriers to searching. The nutrition and medication keywords were examples of what the participants actually typed into the computer when conducting the searches for health information. Once the analysis of the user search experience was completed, key information was entered into the analysis matrix.

The analysis of the open-ended interviews was carried out systematically and was also documented in the analysis matrix. An initial coding scheme was developed based upon the constructs developed by Trauth for the Individual Differences Theory of Gender and IT. Some additional codes were added or deleted based upon the research questions and the type of research being conducted. Next, each digital recording of the participant interviews was listened to and documented for themes and other information that was of interest into the Excel-based analysis matrix. In listening to the interviews, I made note of areas where the participants discussed their perceptions of technology, health information searching, and their individual differences or identity characteristics. I assigned relevant codes to different areas of the interview and noted them down in the

analysis matrix, and I noted where on the digital recording different coding occurred to be able to return to a specific part of a discussion if needed. If an area of the interview did not fit into a defined code, then it was placed into an unassigned category for later categorization. I repeated this process on each interview 3 times until I reached the point where no new additional information was being captured by the coding. After completing the selective coding process, the interviews were then read for open coding, in order to develop categories for information that did not fit into the existing coding scheme. Open Coding is a process which is a part of the grounded theory approach which was developed by Glaser and Strauss (1967). Doing the open coding portion of the analysis required a change in thought and analysis from the more structured selective coding which took place first. It was necessary during the open coding to begin anew with the data and approach the information with a clear mind. By doing so, I was able to read the data without a preconceived idea of what categories or themes would emerge. This process was carried out iteratively, and as new categories were developed they were subsequently included into the coding scheme.

In the process of doing the data analysis, my interpretation of the data was done on multiple levels. I examined the data for meaning through a process where I sought to understand, integrate and connect the information provided to me from the participants in the study. I wanted to approach the interpretation of the data, understanding my own lens and voice as a researcher. I reflected on my own background and values, and how that would shape my interpretation of the data. My background began in the suburb of Fort Washington, Maryland. This area, which is located approximately 20 minutes outside of the District of Columbia, is part of Prince George's County, Maryland. The county has

been regarded as the wealthiest, majority-African American county in the United States. Growing up in this community allowed me to have access to pursue my major interest of technology. The community influenced me to believe that Black people had educational and career options that were within reach.

Reflecting on this part of my upbringing was particularly important, as the region in Maryland where the interviews were conducted was also my hometown. This was an important element as I wanted to ensure that doing interviews in this setting would not overly bias my interpretation of the information. Rather, in conducting the interviews, I used my knowledge of the area in Maryland, and additionally my knowledge of Pennsylvania, as a way to establish rapport and connect with the participants. During the interpretation specifically, I approached the data by first clearing my mind of the subject matter. I used a process where the interpretation of the data was conducted on three levels. The process that I followed was based on the interpretive technique described by Trauth (2000) in her analysis of data collected in Ireland on the culture of an information economy.

The process that was used for interpretation of the data was iterative, which was done through movement between concept and data. First, I organized my analysis by looking at the level of the comment. By listening to each comment, I made notes about where information from the participant would fit. If there was no initial code that was appropriate, then I also made note of that. After listening to each interview, I would look at notes from the participants, and add any additional insights that I gained.

After that was completed, I would look across the questions for each participant's responses and derive themes from the discussed topics. Often, there were threads of

information that would be interesting but required further investigation. For example, ‘marital status’ was a category that was coded during the selective coding portion. When I moved into the open coding portion, and looked across responses on the question asked about health information searching. At that time it began to emerge that some individual’s searching frequencies were partially dependent upon the role of their spouse or significant other in being a health information resource. At this stage, I looked for deeper understanding of the themes and patterns that were found in the data.

The third part of the process was to look at the comments for demographic patterns and intersectionality. I looked at the data to see where common themes or patterns of responses fit within demographic categories of race, age, gender, socio-economic status, geographic locations, education level and diabetes type. Further, after looking at those categories, I would cluster the demographics. For example, I would look at ‘race’ and ‘age’ together, and then I would look at “race’ and ‘gender’, etc. This was done for all categories until no new patterns were found. This portion of the process was actually the most revealing in terms of understanding individual differences in connection to health information searching. It was while looking at the intersectionality of the participants’ demographics that it became clear that explanations about information behavior from the perspective of one factor (race, age, etc.) was rarely enough to explain the variance in influences, behaviors, and perceptions to Web information searching for health information.

The Individual Differences Questionnaire was a paper-based questionnaire in which individuals answered questions from four different topics: Internet perceptions, cognitive complexity, experience, and identity orientations. The participants were asked

to respond to questions using a five-point Likert scale. Different analysis methods were used for each part of the questionnaire. For Internet perceptions, there were twelve questions that measured intrinsic versus extrinsic motivations: eight items correlated with the extrinsic motivations and four items correlated with intrinsic motivations. An average for each category of items, extrinsic and intrinsic, was calculated for each participant. The average was calculated by adding together the total number of the responses in each category, extrinsic and intrinsic, and then calculating an average using the highest possible score in each category. Extrinsic motivations were reflected in eight items; therefore, the highest possible response could be forty. There were four questions that pertained to intrinsic motivations, so the highest possible response could be twenty. The type of motivation that yielded the higher percentage was the determinant for the participant's category in this section (See Appendix E).

For the cognitive complexity portion, there were two questions that were associated with relativistic or complex processing, and two questions which related to dualistic or simple processing. Due to there being only two questions per category, the highest possible score a participant could respond with was ten. For each category of questions, relativistic and dualistic, the score was summed. The scores were then compared and the higher score became the determinant of the participant's category in this section.

In the experience portion of the study, each participant was asked to rate their level of experience in different aspects of Internet use, Web searching, advanced searching, and computer use. There were six items in this category, so the highest possible score for this section was thirty. A simple average was conducted on the

responses of each participant in this section and the resulting number was the determining number for their experience level. In this portion, one represented very little experience with technology, and five represented a high level of experience with technology.

In the identity orientations portion of the questionnaire, there were four types of orientations that could be identified for each participant: personal, relational, social and collective. Additionally, there were specific items which correlated to each type of identity orientation: ten items correlated with personal, ten items related to the relational orientation, seven items attributed to the social orientation, and eight to the collective orientation. Therefore, I conducted weighted average on this portion of the data based on the highest possible score for each category, and the category with the highest average for each participant became the determinant of the identity orientation for the individual.

After all of the data analysis was concluded, the data was inputted into the analysis matrix spreadsheet. Compiling all of the information into this format made the interpretation, sorting, and analysis of the data very robust. There were a number of ways to display and rearrange the data based upon the individual difference of category of interest. In this way, I was able to look at different groupings of the data by race, gender, age and other characteristics. This allowed for a helpful way to explore patterns and clusters of interest in the data.

Summary of the Research Design

In this chapter, the research design and methodology used to conduct this research was presented. The research questions that were posed in this research were identified in an effort to understand the influence of people's perspectives about and approaches to the

activity of health information searching. The theoretical orientation used in the study was based on the Individual Differences Theory of Gender and IT by Trauth, the work of Ford et al., and Cheek et al. These perspectives were used to guide and develop a research methodology which utilized a mixed methodology. The epistemology selected for the research was interpretive focus chosen in an effort to understand the subjective realities of the participants. In this study, thirty individuals with diabetes were selected for participation in the study. The participants were selected to represent a variety of demographic characteristics for the study and were located in central Pennsylvania or Suburban Maryland. The methods that were chosen for the data collection include administration of a search task, administration of the individual differences questionnaire and in-depth interviews. The quantitative analysis of the findings was performed using averages and the qualitative analysis was conducted using the process of thematic analysis.

CHAPTER 4: RESEARCH FINDINGS

“Regardless of the type of library or information service, the first commandment seems to be, pay attention to the user.”

-Jana Varlejs (1987, p. 67)

This chapter will present information on the variety of characteristics, perceptions, and behaviors exemplified by a population of diabetic individuals in their Web search for health information. In this chapter, the findings from each of the different parts of the data collection processes are presented. The chapter opens with an overview of the demographic characteristics of the participants in the study and provides a table that summarizes the key participant demographics. Following that overview, the findings from the User Search Experience are presented first, followed by the Individual Differences Questionnaire, and lastly the open ended interviews. During the search task, participant observations were gathered, quantitative data was reported from the questionnaire, and qualitative data was gathered from the interviews. The data collection efforts were carried out in exploration of the research questions that were presented in the previous chapter.

Participant Demographics

The diversity of users of technology was the focus of this research and thus, an overview of the demographics of the participants in the study is provided and summarized in Table 2. The total number of individuals that participated in the study was 30. Through the use of organic sampling, the participants were carefully picked to represent a variety of characteristics that provided an interesting and representatively

diverse group. The age range for the participants was from 23 to 76 with an average age of 54. Racially, the participants were represented equally with 15 Black/African-Americans and 15 White/Caucasians. There were a total of 16 females and 14 males. The majority of the participants were type 2 diabetics as reported by 25 individuals, while five were type one diabetics. There were 22 individuals who were married, five who were single, and three who were divorced (and not remarried). The highest achieved education level of the participants varied, as some individuals did not complete high school while others held professional graduate degrees.

In the category of socio-economic status, five individuals classified themselves as working class, while 14 identified as middle class, and 11 participants reported being in the upper middle class. Social class in this study was an open ended item which the participants were allowed to choose for themselves. The reason for allowing the participants to select their own socio-economic class was that two different geographical locations were used in the study. Thus, the development of an income range that specified social class may have provided an unfair classification due to differences in cost-of-living in the two areas. The central Pennsylvania locations had a lower on average cost of the living than the Maryland locations, which are suburban to the District of Columbia. Therefore, because a person who could be classified as middle class in central Pennsylvania could potentially be identified as working class in the Maryland regions, it seemed appropriate to allow the individuals to define their own socio-economic class. In addition, participants included administrative assistants, communications specialists, consultants, architects, managers, and a number of retired individuals. The demographics of the participants will be referred to again throughout the chapter specifically in terms of

age, race and gender. Aliases for participants will be used in this document to protect their confidentiality,

Table 2: Participant Demographic Backgrounds and Characteristics

| | Total |
|---|--------------|
| # of Participants | 30 |
| Demographic Information | |
| Age | |
| 20-29 | 3 |
| 30-39 | 2 |
| 40-49 | 6 |
| 50-59 | 7 |
| 60-69 | 8 |
| 70-79 | 4 |
| Average Age | 54 |
| Racial/Ethnic Background | |
| White/Caucasian | 15 |
| Black/African-American | 15 |
| Gender | |
| Female | 16 |
| Male | 14 |
| diabetes Type | |
| Type 1 | 5 |
| Type 2 | 25 |
| Relationship Status | |
| Single | 5 |
| Married | 22 |
| Divorced (Not Remarried) | 3 |
| Highest Education Level | |
| Some High School | 2 |
| High School Diploma | 4 |
| Some College | 4 |
| Trade School (Post- High School) | 1 |
| Associates Degree | 2 |
| Bachelor's Degree | 9 |
| Masters Degree (MBA, MS) | 5 |
| Professional Degree (PhD, DBA, M.D) | 3 |
| Geographic Location | |
| Suburban | 22 |
| Rural | 8 |
| Socio-Economic Status | |
| Working | 5 |
| Middle | 14 |
| Upper Middle | 11 |
| Occupation | |
| Retired | 12 |
| Administrative (Admin. Asst, Secretary) | 8 |
| Architect | 2 |
| Manager | 2 |

| | |
|---------------------|---|
| Education Provider | 2 |
| Physician | 1 |
| Consultant | 1 |
| Handwriting Analyst | 1 |
| Postal worker | 1 |

Findings

Part 1: User Search Experience

The purpose of the user search experience was twofold: first, it provided a critical incident to facilitate study participants' reflection upon their health information perceptions and searching behaviors; and second, it was used to provide an opportunity to observe participant behavior and interactions with Web searching for health information. The scenario that was provided to the participants, which was discussed in Chapter 3, prompted them to consider an interaction with a physician in which an information session about their diabetes took place. Participants subsequently were asked to search on the Internet for information on the topics of nutrition and medication related to their own health maintenance. The participant observations and the topics that the participants discussed have been organized into the following themes: 1) sources of baseline health information, and 2) strategies, motivations, and factors affecting motivation for searching. In addition, for the search topics of nutrition and medication, data was collected about the participants' online keyword searches and topics of interest.

Sources of Baseline Health Information

In this study, baseline health information related to how individuals acquired working knowledge about health topics and diabetes. The participants were prompted to discuss the resources that they used to develop a knowledge base about health related

information. Prior research has consistently noted the importance of health practitioners and family members in assisting individuals who are seeking health information (Hart et al., 2004; Rokade et al., 2002; Johnson & Meischke, 1992). Research also supports the importance of media outlets in the gathering of health information, including television, newspapers, and magazines (Dolan et al., 2004; Cotten & Gupta, 2004). The responses from the participants reflected the importance of these resources and others as detailed below.

The source of baseline health information that was identified most often was from a doctor, as reported from 11 of the 30 participants. This is consistent with findings from a study which evaluated patient-practitioner relationships, in which there was an agreement among both men and women that the family doctor was the most important source of health information, followed by family members as second most important (Hart et al., 2004). The majority of the Black participants, nine of 15, agreed that they received their baseline health information from a doctor. While the responses from the White participants were more varied, five of 15 participants reported that their primary source of information was their doctor. Among the women, six of the 17 stated that they received their baseline health information from a doctor, while five men reported gaining this information from a doctor, and another three reported that their main resource was books. Other sources of baseline health information that were mentioned were family members, magazines, WebMD, a nutritionist, or a health course. This information is summarized in Tables 2 and 3.

Findings from this study that identify a doctor or physician to be the primary source of health information fall in line with other studies that have investigated patient

sources of information (Hesse et al., 2005; Dutta-Bergman, 2003). Other studies, however, have found that people increasingly are turning to the Internet more frequently to gather health information (Burst Media, 2007). Although the majority of people in this study did utilize the Internet for health information, only one person identified a Web site, WebMD, to be a source of baseline health information. This finding may point to the importance of the Internet as a supporting tool for the individuals in this study versus being the primary resource for finding health information. This idea has been captured effectively by Dutta-Bergman (2003) in the following statement:

“In spite of the increasing consumer autonomy with the advent of the Internet, the personal doctor remains one of the most trusted sources of health information in the new-media environment, suggesting that more and more doctors need to explore the Internet as a viable medium for communicating with their patients (Section 4, para. 2)”.

This quote points to the opportunity for doctors to be catalysts to their patients in use of the Internet as a health information resource and reveals the role that physicians might play in mediating the health information searching process for their patients.

Overall, some participants discussed feeling well educated by their physicians and described a relationship where open dialogue was encouraged. Frank, a white male, talked about how he was able to converse with his doctor about a range of medical issues and noted the high level of trust that he had in his doctor. Other participants, Tera and Wayne, described their doctors’ websites and email communication as a source of information and a direct way of getting their questions answered. Participants also reported that books were a helpful reference, especially after diagnosis, and more

generally as a resource to consult at various times. Although a number of health information resources exist, this evidence presented here shows that doctors were the resources most often utilized.

Table 3: Participant’s Baseline Health Information Source

| Source of Baseline Health Information | # of Participants |
|---------------------------------------|-------------------|
| Books | 8 |
| Course | 3 |
| Doctor | 11 |
| Family Member | 3 |
| Nutritionist | 2 |
| Pharmacist | 1 |
| WebMD | 1 |
| Magazines | 1 |

Figure 1: Participant’s Baseline Health Information Source

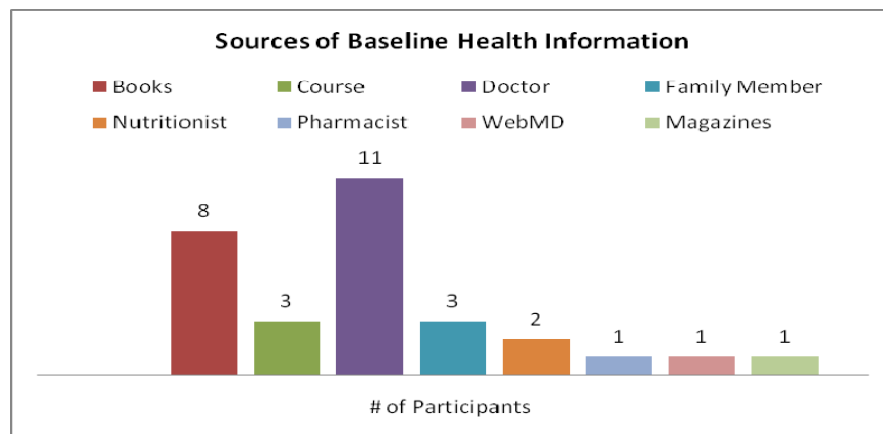


Table 4: Participant’s Baseline Health Information Source by Race and Gender

| Source of Baseline Health Information | # of Participants by Race - White | # of Participants by Race - Black | # of Participants by Gender - Male | # of Participants by Gender - Female |
|---------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
| Books | 4 | 4 | 3 | 5 |
| Course | 2 | 1 | 2 | 1 |
| Doctor | 5 | 6 | 5 | 6 |
| Family Member | 1 | 2 | 1 | 2 |
| Nutritionist | 1 | 1 | 1 | 1 |
| Pharmacist | 1 | 0 | 1 | 0 |
| WebMD | 0 | 1 | 0 | 1 |
| Magazines | 1 | 0 | 1 | 0 |

Figure 2: Participant’s Baseline Health Information Source by Race and Gender

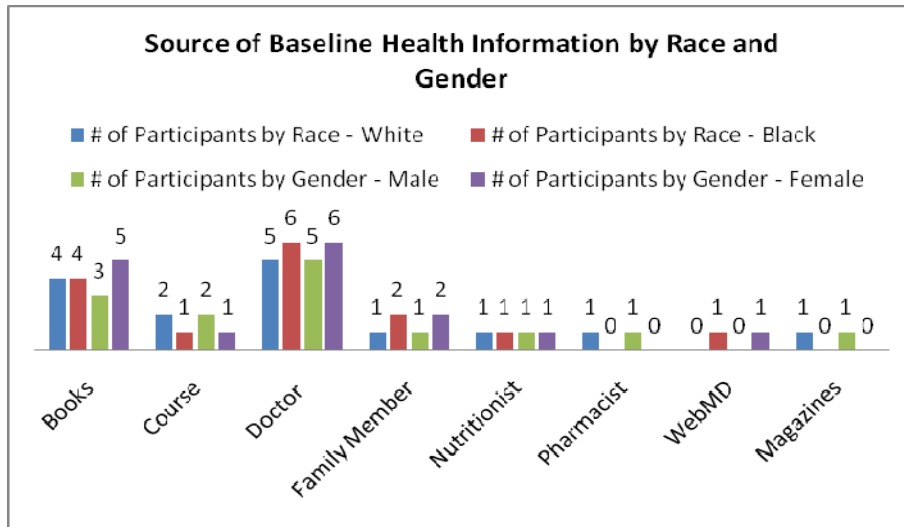
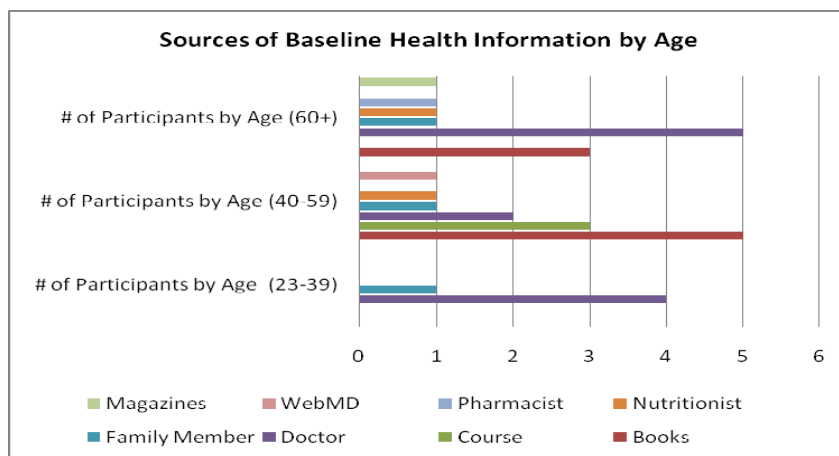


Table 5: Participant’s Baseline Health Information Source by Age

| Source of Baseline Health Information | # of Participants by Age (23-39) | # of Participants by Age (40-59) | # of Participants by Age (60+) |
|---------------------------------------|----------------------------------|----------------------------------|--------------------------------|
| Books | 0 | 5 | 3 |
| Course | 0 | 3 | 0 |
| Doctor | 4 | 2 | 5 |
| Family Member | 1 | 1 | 1 |
| Nutritionist | 0 | 1 | 1 |
| Pharmacist | 0 | 0 | 1 |
| WebMD | 0 | 1 | 0 |
| Magazines | 0 | 0 | 1 |

Figure 3: Participant’s Baseline Health Information Source by Age



A comparison of Black and White participants did not reveal a major difference in terms of reported baseline information source. There were small differences in less populated categories, where only one White participant pointed to gaining information from either a pharmacist or a magazine, while no Black participants identified either as a source. In addition, only one Black participant identified WebMD as a primary health information source, while there was no report of this or any other Web site from the White participants. Similarly, no large differences in responses were identified among male and females. One male identified a pharmacist and one identified a magazine, while only one female reported WebMD as her main information source. According to Cotton and Gupta (2004), men are more likely than women to let information on the Internet affect subsequent searches and are not as concerned as women are about the credibility of information about health found online. The evaluation of responses by age, however, did yield some differences. No participants under the age of 40 identified books to be their main source of health information, while the highest report of this source came from the 40-59 year old age group. The only individuals that reported a course as their source of baseline information were in the 40-59 year old age group. The participants in the youngest age group, 23-39, only reported their baseline health information from one of two sources, either a doctor or family member. So, doctors appear to play an important role for all demographic groups, while more traditional sources such as books are utilized less by younger individuals who tend to interact with a doctor or family member.

Based on the information received from the participants in this portion of the study, it is apparent that there is an opportunity to reach people searching for health information on the Internet through the use of the technology as a supporting tool. If

individuals are gaining adequate information from other sources, health information Web sites could include content that help to satisfy people's health information needs by providing more in-depth coverage of various health topics. Also, because the participants in this study identified doctors most often as the source of baseline health information, doctors could be influential in the frequency with which an individual searches for health information. This could be achieved by doctors either through the contribution of content to Web sites or about the recommendation of Internet sites to their patients. In this way, the Web might be used interdependently with other traditional information outlets to locate health information (Rains, 2007).

Strategies, Motivations and Factors Affecting Motivation in Searching

Participants' conceptualizations about a variety of topics and factors in searching played a role during the search experience. The participants identified both facilitators and inhibitors of their Web searching along with some additional details about strategies that they used to find health information. Participants displayed or discussed a range of search strategies during this portion of the research sessions and showed evidence of utilizing a range of techniques to manage their information searching.

Individuals described how they paid close attention to the source of the information, either the type of source (journal article, organizational testimonials, product advertisements), or the authorship (American Diabetes Association, NIH, Mayo Clinic, personal blog). Likewise, in a 2002 study on patients' perception of Internet health resources, it was found that 72% of participants believed that a reliable health information site was one that was sponsored by a medical society (Diaz et al., 2002).

Another study suggested that the presumed source of a Web page is used as a central indicator to determine information credibility when searching for health information (Eastin, 2001). The participants in this study perceived that this information helped them to make judgments about the information that was found after searching, as well as how to proceed with that information. Often, those who saw that the information was being provided by a familiar organization, such as the American Diabetes Association, expressed feeling more comfortable with the information that they saw. When a Web site appeared to not be connected to a familiar organization or name, individuals either chose not to look at the site or skimmed it very briefly. The perceived credibility of the source of the information appeared to be directly connected with the individual's judgment of the trustworthiness of the Web site and its content. Many also reported that the trustworthiness of the information was highly important when searching for health information due to the abundance of perspectives available on a variety of health-related topics. Participants recognized that incorrect or inaccurate health information could lead to worsen or further complicate existing conditions.

Having an Internet strategy for finding health information appeared to be more prevalent among the younger participants who are under age 40. Three of the five working class participants, as well as six of the 14 middle class participants reported having a strategy. These strategies included having preferred websites to visit frequently as well as searching for depth of information on topics of importance to their health conditions. Among women, two of the participants reported doing searches for information to support what they already knew. Another strategy that emerged in the search task was the use of the website WebMD. A number of participants talked about

the role that WebMD played and during the search task many of these individuals went to WebMD as a starting point (instead of using the Google search engine). Specifically, three of the four participants in their 40's who live in suburban areas utilize WebMD as a health information resource, while both of the two working class White participants and both of the White individuals that have associates degrees discussed visiting this Site as a primary way to get health information. In research published on the retrieval and use of health information on the Internet, it was found that WebMD is the most frequently referenced Web site among physicians who encourage patients to supplement health information using the Internet (Morahan-Martin, 2004). Based on this information, the opportunity that doctors are provided to influence the health information searching process is being exercised through the referral of WebMD, which many participants in this study utilized.

In the context of this study, the Web site WebMD appeared to be useful for younger individuals with lower education levels. This could be attributed to WebMD being a well advertised Web site that appears often on television and on the Internet and is recommended frequently by doctors. WebMD also contains medical information on a variety of health topics which could be useful to the individual and for the extended purpose of researching medical information for family members.

One individual, Tera, discussed building self-compiled lists of websites that she had come across while searching to maintain a knowledge base about diabetes and other health topics. Another participant, Lily, mentioned that she developed a repository by printing out interesting items that were found on the Internet and keeping them in a file to be followed up on later. During the search task, individuals scanned through results of

keyword searches until they found relevant information. Participants would often look through two to three pages of results. If what they were looking for was not located within the first few pages of results, then the keywords were changed or rearranged to yield different content. As the participants scanned the search results, they made different judgments about which links were of interest to them. Many participants had completed searches for health information in the past, and recalled links that had brought them information previously, or talked about Web sites that they were currently visiting to obtain health information.

Discussions surrounding individual motivations to search for health information often centered on the usefulness of the Internet to support health information that one already has or to verify information provided by one's doctor. For example, two participants, Colleen and Luke, both discussed searching to find additional information about medication that they received at their pharmacies. In addition, a 27 year old Black female, Amber, talked about how she did not feel that she did much searching for health information, but that when she did it was often to supplement information that was provided to her by her doctor or that she read in books. Largely, the opportunity that the Internet provides to clarify health information was a major motivator to search for information on the Web. One woman in the study, Ebony, discussed how she now relies heavily on searching the Internet for health information because she recently relocated to another state, where she is far from her primary physician and medical services are scarce.

There were a number of factors affecting motivation that were also cited by the participants while using the Internet to search for health information. One issue in

particular included the role of a significant knowledgeable person or people in the immediate network of the individual. For example, Wayne, a participant whose wife is a physician, relies on her as his main resource for all health-related things and describes her as the primary information searcher in the home. There was a very similar situation for another participant named Winston, whose wife has a Doctorate in the biomedical sciences. According to him, she answers the majority of his health related questions and does the majority of the searching in an effort to help him maintain his health. William, who is a practicing physician, relies heavily on his own medical training and information from colleagues for health information. He reported rarely needing to search for health information on the Internet because of the numerous valuable resources available to him.

The fact that people rely on significant others in the search process was an important theme, which highlights the role of networks and support in the process of searching. This outcome shows that the frequency of someone's searching could be influenced by one's social connections to a knowledgeable person. In this setting, the knowledgeable person who had in-depth medical information and took a central role in answering health related questions and sharing health information was a spouse, or sometimes participants themselves. In addition, the participants who described having these resources were middle or upper middle class participants. The working class participants did not discuss having individuals available to them in their social network or relying on their own knowledge for health information. Therefore, social class also had some influence in the availability of a knowledgeable people to assist in health information sharing. However, the working class participants did have the highest average level of Internet experience. Therefore, the less accessibility to personal

resources in an individuals' network, may likely influence him or her to rely more heavily on use of the Internet for information.

A factor which reduced the motivation for searching could be described as "computer overload," which often causes individuals who utilize a computer for work to feel less inclined to use it for personal reasons on their own time. That was the case for a man in the study, Reynold, who worked with computers for 17 years prior to his retirement. Though this overload was discussed in connection to working with computers, age also appeared to play a role in Reynolds' decision not to use the computer very often. At the age of 59, Reynold did not feel the need to sit for long periods at the computer, and also reported that he did not always trust the information regarding health that he found when searching. Age also came into focus when it was found that the five oldest married participants (ages 68 to 76) do little to no searching for health information on the Internet. In a study conducted by Hesse et al. (2005), age and level of education influenced participants' trust of health information on the Internet. They found that adults aged 18 to 34 were ten times more likely to trust information on the Internet than those 65 or older. Also those with higher levels of education were more trusting of the Internet than individuals with an education level less than high school.

Frustration with searching as well as other physical limitations among older participants served to lower perceived searching opportunities. The three oldest Black participants described not being able to use the Internet due to vision and motor problems. Heather, 70, had very poor vision, and despite a desire to use the Internet, she described straining to be able to see content on a computer. Carl, 76, cited severe back pain that prevented him from being able to sit at a computer for even short periods of

time, as well as his unfamiliarity with the Internet, as reasons hindering him from going online. Sherry, 72, reported that the severe arthritis in her hand prevented her from being able to type on the computer keyboard. This information shows that the power of the Internet to provide information can be diminished when physical limitations prevent interaction with the Internet. Therefore, additional work to harness the capability of the Internet for many types of individuals, skill levels, and physical conditions can be still viewed as a priority for developers of Internet content and search engines.

The issue of trust was also a significant factor for the participants in this study. For some, trusting the Internet served as a positive influence, while lack of trust served as a hindrance to others. White participants, who more often cited trust as a motivating factor, suggested that trusting information from a particular website or institution increased their interest in and likelihood to consult and search for health information on the Internet. Rachel, a White female, talked about visiting sites that she trusts regularly to view new innovations and headlines related to health at the Harvard School of Public Health Web site. Tera, who is also a White female, said that she trusts her physician's Web site, that provides links to an assortment of health topics and that she visits frequently. Negative feelings of distrust, which were more frequently reported by Black participants, appeared to have a negative impact on individuals' perceptions of the value or reliability of information, as well the security of their own personal information. For example, Tina, a Black female, found the wealth of health information on the Internet sometimes distracting as she felt unsure about the accuracy of the content on many health Web sites. She was vocal about the overwhelming process of sorting through the vast amount of health information on the Internet as a deterrent to searching:

“I feel like health information searching is irritating. There is a lot to surf through, and a lot of good and bad information. I end up asking a lot of questions like, how does this apply to me? I prefer to just ask my doctor.”[Tina]

Wayne, a Black male, felt less than eager to search for health information because he did not know which Web sites he could trust or which he could not. Wayne reflects on the difficulty that he experienced searching for health information:

“When you are searching it is hard to tell which sites are reliable out there, so it makes me not want to do very much searching for health stuff.” [Wayne]

In a similar discussion, Brodie et al. (2000) showed that African Americans were more distrustful of Internet data and more concerned with privacy than non-Hispanic Whites, which was supported also by this study.

Lastly, some of the participants talked about different factors that contributed to their not performing searches for health information on the Internet on a frequent basis. Specifically, two of the three participants with Doctoral degrees did not do very much Web searching for health information. One of them was a White, suburban male participant, Frank, who reported that he did not do a lot of health information searching and instead looked to his wife to take care of him. He also suggested that because he has great confidence in his physician, he did not feel a major need to look for additional information. Frank found that he had many available resources in his search for health information. His wife helped him in his daily maintenance, and his doctor was vital to his overall health care and to answering questions. Together, these factors contributed to Frank’s decreased reliance on the Internet for health information. This situation is an

example of a scenario in which perceived resources lowered the frequency of searching for information.

Nutrition and Medication Searching

When the participants carried out the requested search tasks for the topics of nutrition and medication, they used keyword searches in search engines and at different websites, and they also provided additional details on topics of interest on each subject. The keywords in searching for nutrition topics centered on a few key areas, including:

- *diabetes; diabetes and Nutrition*
- *Nutrition; Nutrition for type 2 diabetes,; Nutrition and glucose*
- *Glycemic Index; Cooking with diabetes*

These keywords returned a variety of results, and the majority of participants used the Google search engine to search for information. Some of the participants commented that they had actually performed these types of searches in the past, while others actually gathered new information and resources in the process of carrying out the searches in the research session. Additional topics of interest to the participants on the topic of nutrition were the food pyramid, healthy cooking and recipes, nutrition while traveling and eating out at restaurants, dealing with feelings about diabetes, and also pregnancy with diabetes. During the nutrition searching portion of the session, participants commented that cooking and eating healthy were central to overall health with diabetes.

Some of the married participants discussed the central role of their husbands or wives in following a diabetic diet and watching sugar and carbohydrate intake, which was viewed as very important. A single White male, Mark, who has limited cooking abilities, reported that he frequently needed nutrition information from restaurants and

microwavable dinners. A Black woman, Gayle, described how she had grown up hearing the condition diabetes referred to as “sugars,” and reported having to learn about how to care for her diabetes beyond avoiding sweets. Lastly, a White woman, Colleen, discussed her faith as a major element of mental health in relation to her diabetes, and reported reading a book called *daily devotionals for diabetics* regularly.

Also during the nutrition portion of the search task, all of the women except one in their 40’s searched for or discussed healthy eating, diet, or meal planning. Specifically, seven of the 17 women looked for recipes and healthy cooking information during the nutrition search task. Men did not look for recipes as often, but there were some who talked about viewing recipes on Web sites or materials where they get health information. More Black participants talked about or searched specifically for recipes than White participants. Often, the pattern in the nutrition searches was that for the Black participants, nutrition was connected closely to food, while for White participants, nutrition was more broadly associated with healthy living.

In the discussion of medications, the keyword searches that were carried out by the participants included some of the following terms:

- *Medication for diabetes, Medication managing diabetes*
- *diabetes Drugs*
- *Medication warnings and recalls, side effects*
- *Glucophage, Humaloid, Metphormin, Insulin*

The searching carried out by the participants on the topic of medication appeared more focused than the nutrition searching, mainly because the participants were often interested in medications that they had already been prescribed. Among the most popular

topics of interest relating to medication were side effects and complications. Though many individuals stated that they had actively read the information packets provided to them from the pharmacy where they received their medicine, Web searching was viewed as a way to obtain supplemental information. Effectiveness of different medications and how they work within the body were also reported as important topics. Other participants described searching for new medications for diabetes and other health conditions as a means of being proactive and informed about their personal health. On the topic of medication, it was found that when participants in the study searched for medications, they also searched for similar information for family members. This was especially prevalent among the individuals who reported using WebMD as their main health information resource.

This portion of the research sessions served to assist in documenting the types of participants who were included in the study, the areas of health information that were of interest to them, and the topics which were important health concerns and issues. The user search experience helped to illuminate some important differences and influences in the participant group.

Part 2: Individual Differences Questionnaire

The purpose of conducting the Individual Differences questionnaire was to collect information about the participants' perceptions of their usage, skills, experience and identity. The Individual Differences Questionnaire consisted of questions adapted from two data collection instruments: (1) the Individual Differences Questionnaire by Ford et al. (2001) and (2) the Aspects of Identity Questionnaire by Cheek et al. (2002). These

questions were provided to establish the participants' perceptions of four factors. The first factor was Internet Perceptions, which would describe an individual in terms of being motivated by intrinsic (deep) or extrinsic (surface) factors. Cognitive Complexity referred to an individual's preference for dualistic (black or white) versus relativistic (contextual) cognitive processing. The Levels of Experience factor was used to identify how much experience a participant has had with the computer and the Internet. Lastly, Identity Orientations established the types of identity attributes an individual values most highly (among personal, social, collective, or relational identity). Included in Appendix F is a data definitions table for the Individual Differences Questionnaire that provides more information on the type of responses collected. The participants in the study were given the opportunity to respond to the questionnaire on a 5-point Likert scale.

Internet Perceptions

Internet Perceptions in this study were evaluated as part of the Individual differences questionnaire. The questions that were provided to the participants were based upon an instrument developed by Ford, et al. (2001). The Internet perceptions questions were 12 items that measured the participants' perceptions about various aspects of Internet use. The resulting responses fell into two categorizations: Intrinsic motivations and Extrinsic motivations. Four of the questions determined intrinsic motivation, while eight questions determined extrinsic motivations. These questions can be viewed in Appendix E. An individual who had Intrinsic or deep motivations believed that his or her use of the Internet was influenced by perceptions about persistence to find information, a preference for depth of information, and a willingness to browse through information.

Extrinsic or surface motivations are characterized by perceptions that there is not enough structure or of being lost on the Internet, feelings of a lack of control, and a preference for visual rather than verbal representations on the Web. The study found that the majority of the participants (23) were motivated by intrinsic motivations. Four individuals exemplified evidence of extrinsic or surface motivations, and three individuals in the study did not use the Internet so they did not provide answers to these questions in the questionnaire. Of the four participants who reported being motivated by extrinsic (surface) type rewards, three are among the youngest in the study (ages 27, 28, and 32) and the fourth participant is one of the oldest (age 71). Three of the four people who were found to be motivated by extrinsic (surface) factors with use of the Internet were Black. Finally, three of the four people who were found to be motivated by extrinsic (surface) factors with use of the Internet were males. This information is summarized in tables 4, 5, and 6.

The majority of participants in the study were motivated by intrinsic rewards, which highlights the fact that many individuals in the study were willing to browse and invest in the search for information. Based on the analysis, men, younger adults (under 40), as well as Black participants were more likely to be motivated by extrinsic rewards. Because these extrinsic rewards may lead these individuals to set basic goals in searching for health information, their efforts to locate information on the Internet may not involve searching for longer time periods or through multiple Web sites. Instead, the extrinsic rewards may be characteristic of lower motivation to engage fully in the information searching process.

Table 6: Participant’s Internet Perceptions

| Internet Perceptions | # of Participants |
|--|-------------------|
| Motivated by Intrinsic (Deep) Rewards | 26 |
| Motivated by Extrinsic (Surface) Rewards | 4 |

Figure 3: Participant’s Internet Perceptions

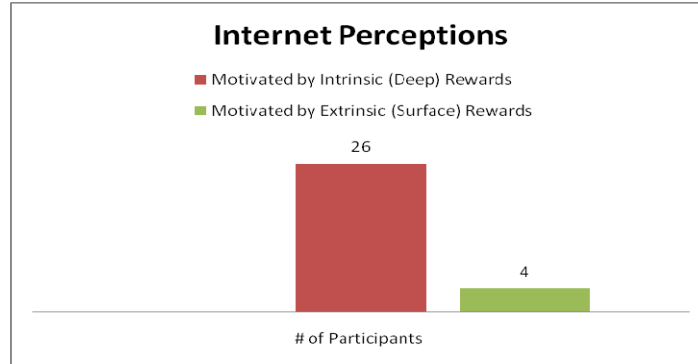


Table 7: Participant’s Internet Perceptions by Race and Gender

| Internet Perceptions | # of Participants by Race - White | # of Participants by Race - Black | # of Participants by Gender - Male | # of Participants by Gender – Female |
|--|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
| Motivated by Intrinsic (Deep) Rewards | 14 | 9 | 9 | 14 |
| Motivated by Extrinsic (Surface) Rewards | 1 | 3 | 3 | 1 |
| No Internet Experience | 0 | 3 | 1 | 2 |

Figure 4: Participant’s Internet Perceptions by Race and Gender

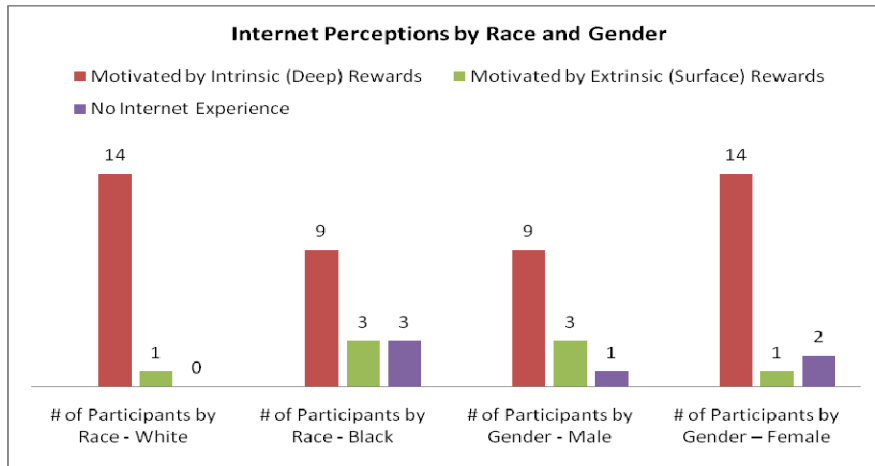
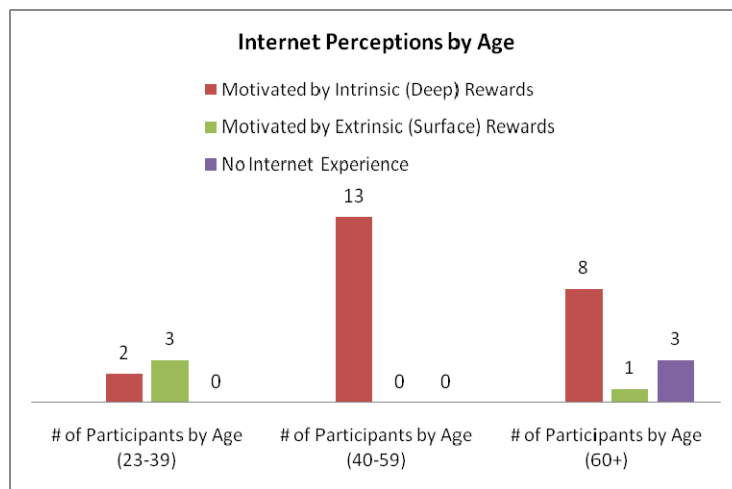


Table 8: Participant’s Internet Perceptions by Age

| Internet Perceptions | # of Participants by Age (23-39) | # of Participants by Age (40-59) | # of Participants by Age (60+) |
|--|----------------------------------|----------------------------------|--------------------------------|
| Motivated by Intrinsic (Deep) Rewards | 2 | 13 | 8 |
| Motivated by Extrinsic (Surface) Rewards | 3 | 0 | 1 |
| No Internet Experience | 0 | 0 | 3 |

Figure 5: Participant’s Internet Perceptions by Age



Internet Experiences

Questions about Internet Experiences, adapted from the Ford et al. (2001) study, were also a component of the Individual Differences questionnaire. These questions were used to help establish an understanding of the level of experience each participant had with using the Internet, using a Web search engine, and searching for health information, as well as their overall computer skills and degree of use. The average level of experience was calculated for each of the participants on a scale of one to five, with five being the highest. In the study there were three participants who were not actively using the Internet at the time, so their level of experience with the Internet was zero. Among the participants in this study, the average level of experience with the Internet was higher for Whites (4.20) than Blacks (3.47). White females displayed the highest average Internet experience (4.22), followed by White men (4.16), Black women (3.5), and then Black men (3.42). Lastly, the working class individuals had the highest level of Internet experience on average (4.2), followed by the upper middle class individuals (3.81), and then the middle class participants (3.71). The average level of experience was higher for individuals under 50 at 4.4 and lower for individuals over 50 at an average of 3.5. The average level of experience was higher for Women (3.88) than Men (3.76) but not considerably different. This information is summarized in tables 8, 9 and 10.

Looking at the intersection of race and class, the group with the highest average level of experience were working class Black participants. That group had an average 5.0 level of experience out of five, which is contrary to other findings about Internet experience that have placed African Americans in lower socio-economic classes at the

bottom in terms of Internet use (Lenhart, 2003). Also contrary to those findings, the upper middle class Black participants had the lowest level of Internet experience. This finding may have occurred because the participants who fell into this category were also older individuals aged 59 to 76 years. Among White participants, middle class individuals displayed the highest level of Internet experience (4.6), followed by upper middle class Whites (4.25), and working class Whites (3.0). It is interesting to note that in the context of this study, the average level of Internet experience for upper middle class participants in either racial group was not the highest. This information indicates that income or class level does not always predict Internet use or experience in the ways commonly thought.

Table 9: Participant’s Average Level of Internet Experience

| Category | Average Level of Internet Experience |
|----------------------|--------------------------------------|
| Overall Participants | 3.83 |
| Men | 3.77 |
| Women | 3.88 |
| Blacks | 3.47 |
| Whites | 4.20 |
| Under the age of 50 | 4.45 |
| Over the age of 50 | 3.47 |
| Working Class | 4.20 |
| Middle Class | 3.71 |
| Upper Middle Class | 3.82 |

Figure 6: Participant’s Average Level of Internet Experience

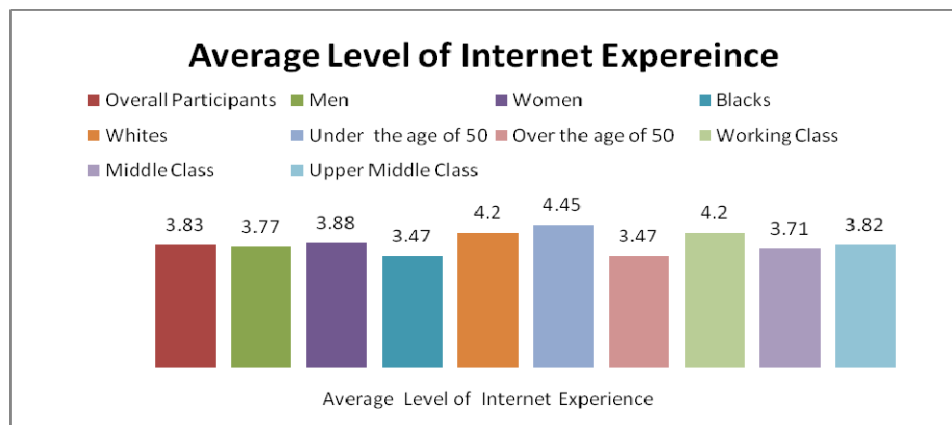


Table 10: Participant’s Average Level of Internet Experience by Race and Gender

| Category | Average Level of Internet Experience |
|---------------------------|--------------------------------------|
| White Women | 4.22 |
| Black Women | 3.50 |
| White Men | 4.17 |
| Black Men | 3.43 |
| Women Over the age of 50 | 3.33 |
| Men Over the age of 50 | 3.60 |
| Women Under the age of 50 | 4.50 |
| Men Under the age of 50 | 4.33 |

Figure 7: Participant’s Average Level of Internet Experience by Race and Gender

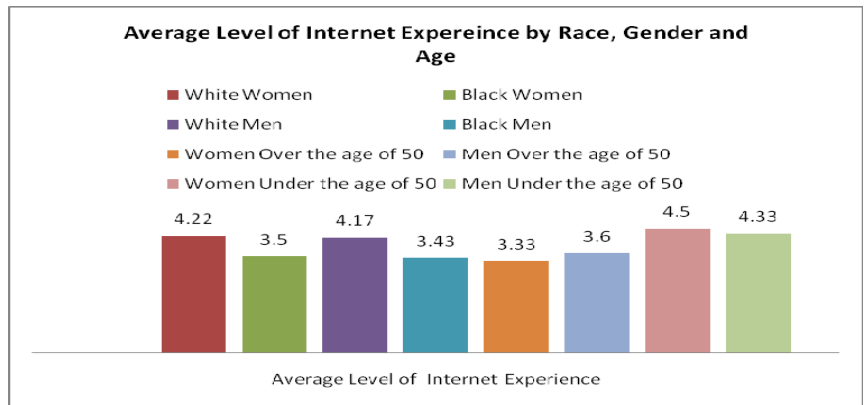
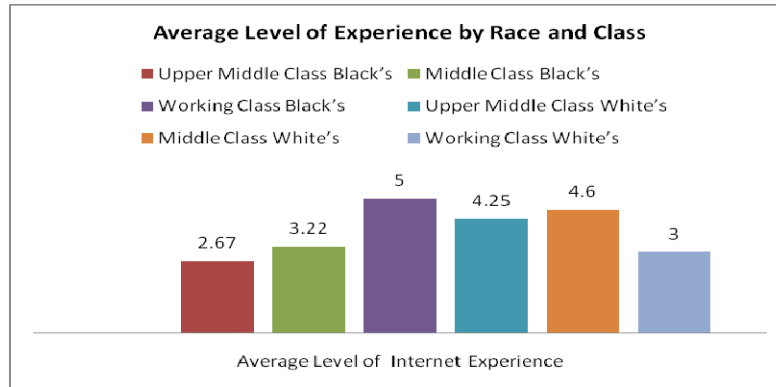


Table 11: Participant’s Average Level of Internet Experience by Race and Class

| Category | Average Level of Internet Experience |
|----------------------------|--------------------------------------|
| Upper Middle Class Black’s | 2.67 |
| Middle Class Black’s | 3.22 |
| Working Class Black’s | 5.0 |
| Upper Middle Class White’s | 4.25 |
| Middle Class White’s | 4.60 |
| Working Class White’s | 3.0 |

Figure 8: Participant's Level of Internet Experience by Race and Class



Cognitive Complexity

Cognitive complexity was the third component of the questionnaire that was based upon research conducted by Ford et al (2001). Cognitive complexity related to “the degree of differentiation with which an individual views the world” (Ford et al. 2001, p. 1050). The questions that the participants were given asked them to provide their perceptions about preferences in decision making and cognitive processing. The two types of resulting cognitive complexity were termed relativistic or dualistic. Relativistic thinking, in which individuals’ thought processes are more complex, is characterized by engaging in the process of weighing contrasting views and scenarios in decision making. Dualistic thinking, which is characteristic of simple cognitive processing, is when decision making is limited to a scope of right versus wrong and/or “black” versus “white” possibilities. In this study the majority of the participants were found to be relativistic in their cognitive processing, with 28 participants falling into this category. While there

were no participants who were discovered to be completely dualistic in their processing, there were two participants who displayed an “even” preference to the two types of cognitive processing. These two participants were deemed “even” because they displayed no preference for either style of processing, but instead provided an equivalent response to all of the questions intended to determine a subject’s preferred cognitive type. The two participants that this study found to be “even” in terms of their cognitive processing were both women. All of the male participants were found to be relativistic in their cognitive processing. This information is summarized in tables 11, 12, and 13.

Cognitive complexity was used to determine if the participants in the study would exhibit a preference for a style of information processing. The majority of the individuals reported that they viewed their cognitive processes to be contextual and based on information in a situation, which is exemplary of the relativistic category. The two participants who exhibited an “even” preference for cognitive processing were an unexpected outcome in the analysis. This type of response could be attributed to an individual who utilized different styles of information processing under different circumstances. This finding also could highlight the potential for a more fluid information processing style closer to that evidenced by the “even” participants, who were Black females.

Table 12: Participant’s Cognitive Complexity

| Cognitive Complexity | # of Participants |
|----------------------|-------------------|
| Dualistic | 0 |
| Relativistic | 28 |
| Even | 2 |

Figure 9: Participant's Cognitive Complexity

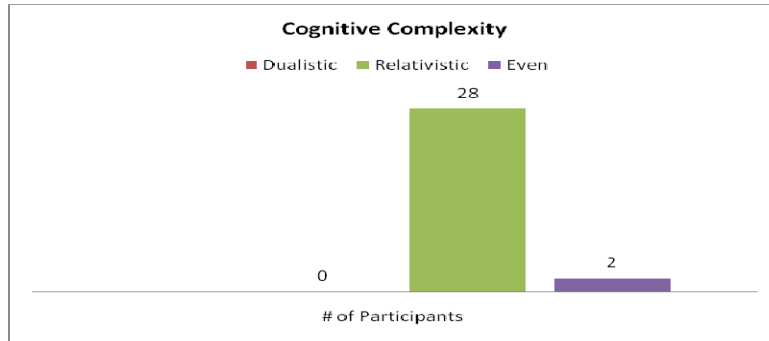


Table 13: Participant's Cognitive Complexity by Race and Gender

| Cognitive Complexity | # of Participants by Race - White | # of Participants by Race - Black | # of Participants by Gender - Male | # of Participants by Gender - Female |
|----------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
| Dualistic | 0 | 0 | 0 | 0 |
| Relativistic | 15 | 13 | 13 | 15 |
| Even | 0 | 2 | 0 | 2 |

Figure 10: Participant's Cognitive Complexity by Race and Gender

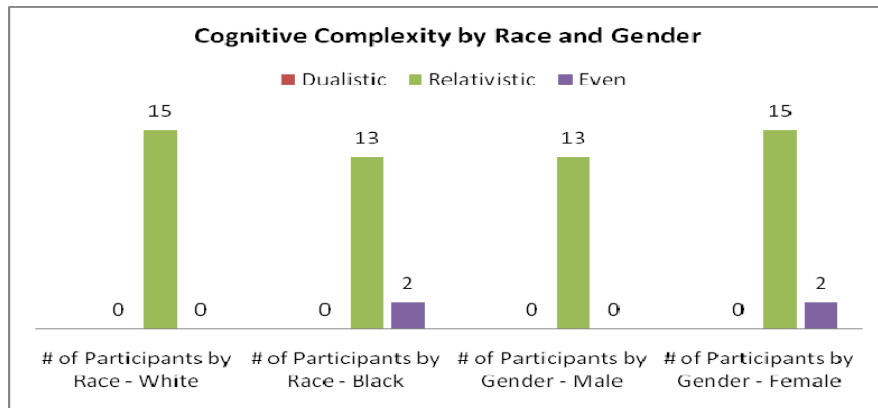
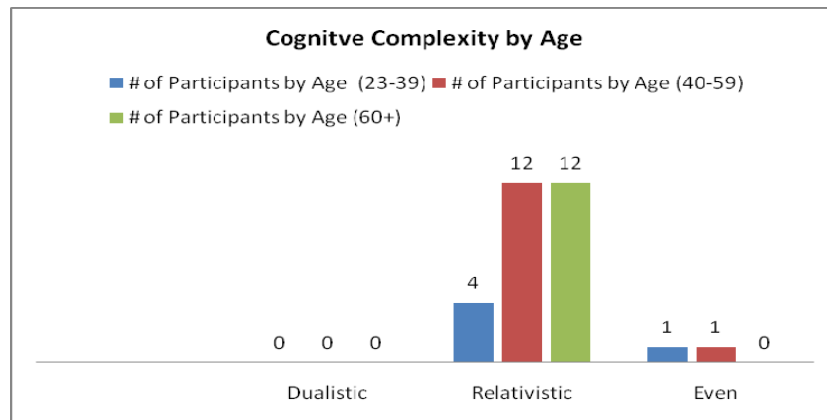


Table 14: Participant's Cognitive Complexity by Age

| Cognitive Complexity | # of Participants by Age (23-39) | # of Participants by Age (40-59) | # of Participants by Age (60+) |
|----------------------|----------------------------------|----------------------------------|--------------------------------|
| Dualistic | 0 | 0 | 0 |
| Relativistic | 4 | 12 | 12 |
| Even | 1 | 1 | 0 |

Figure 11: Participant's Cognitive Complexity by Age



Identity Orientation

Identity orientation was the fourth and final component of the questionnaire, which was based upon the work of Cheek et al. (2002). The Identity orientation scale was used to determine the relative importance that individuals placed on different types of identity attributes or characteristics in the definition of self. The Identity orientation scale that was adapted for this study characterizes individuals into four categories. Based on the questions provided, an individual could have been associated with the personal, social, collective, or relative identity orientation. Personal Identity (PI) related to a private orientation where the basis of identity was on personal aspirations and standards. Relational identity (RI) was an intimate orientation based upon validation in close personal relationships. Social identity (SI) was an interpersonal orientation which was associated with social roles and reputations. Collective identity (CI) was an orientation that reflected communal ideas based upon an individual's pride in his or her own ethnic and social groups. This information is summarized in Table 15.

Table 15: Overview of Identity Orientations

| Identity Orientation | Orientation | Description | Focus |
|---------------------------------|--------------------|---|--|
| Personal Identity (PI) | Private | Basis of identity was on personal aspirations and standards. | Traits, values, and abilities |
| Relational Identity (RI) | Interpersonal | Based upon mutual regard; Pride in and validation in close personal relationships. | Other people with whom we have direct personal contact |
| Social Identity (SI) | Intimate | Associated with public recognition; Praise from others. | Social roles and reputations |
| Collective Identity (CI) | Communal | Reflected communal ideas based upon an individual's pride in their own ethnic and social groups | Ethnic pride; Pride in one's social groups |

According to Cheek et al. (2002), “self-definition undoubtedly involves both personal and social identity attributes, but there may be marked individual differences in the relative importance of personal compared to social aspects of identity” (p. 1). Therefore, the questionnaire provided an opportunity for the participants to determine which elements of identity they valued most highly. One participant in the study reported that CI was their most valued characteristic, five participants reported that they highly valued PI, six participants reported that they valued PI and RI evenly, sixteen participants valued RI most highly, and one participant valued RI and CI evenly). The one participant who reported that collective identity (CI) was his most prevalent identity characteristic was the oldest participant in the study, a 76 year old Black male. Among White participants, the most strongly reported identity factor was relational identity (RI), which was reported from eleven of the fifteen participants. The single RI/CI participant was a 44 year-old, Black female. This information is summarized in tables 14, 15, and 16. Although variation among responses from the Black participants was found, six of the fifteen participants reported that relational identity was most important. None of the working class participants regarded personal identity as their highest identity

characteristic. Relational identity was emphasized most frequently among the upper middle and middle class individuals.

In the analysis of identity orientations, relational identity was the orientation found most often among the participants. Many of the individuals in the study viewed close relationships with others as influential in the formation of their concept of identity. This holds true also for women, men, Whites, and Blacks, all of whom emphasized relational identity in their reports. However, when the findings were evaluated based on age, the younger participants, aged 23-39, reported the importance of personal identity most often. In both of the older age groups, the personal identity orientation was only reported once. Therefore, with age, the personal identity orientation decreased, while the relational identity orientation became more prominent. This finding indicates that the individuals in the study highly valued interpersonal relationships, and that much of the variety in identity orientation was correlated with age.

Table 16: Participant’s Identity Orientations

| Identity Orientations | # of Participants |
|---|--------------------------|
| PI (Personal Identity) | 5 |
| RI (Relational Identity) | 17 |
| SI (Social Identity) | 0 |
| CI (Collective Identity) | 1 |
| PI/RI (Personal Identity/Relational Identity) | 6 |
| RI/CI (Relational Identity/Collective Identity) | 1 |

Figure 12: Participant's Identity Orientations

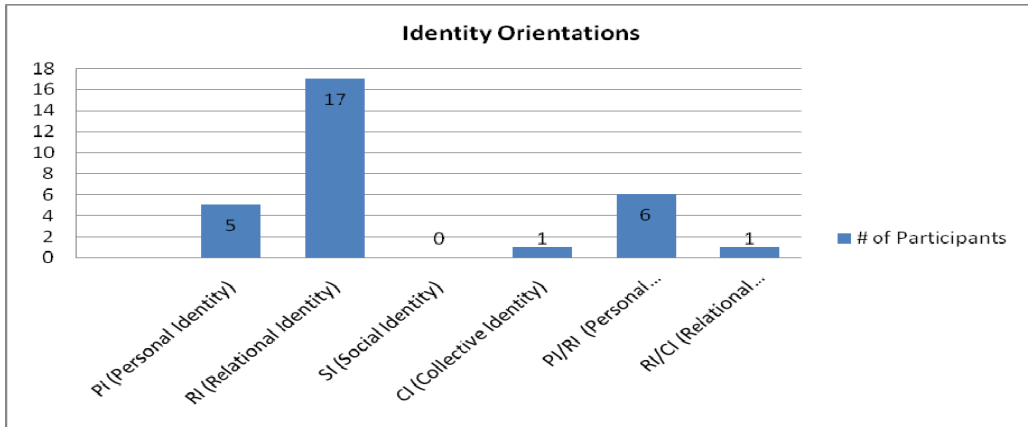


Table 17: Participant's Identity Orientations by Race and Gender

| Identity Orientations | # of Participants by Race - White | # of Participants by Race - Black | # of Participants by Gender - Male | # of Participants by Gender - Female |
|---|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
| PI (Personal Identity) | 1 | 4 | 2 | 3 |
| RI (Relational Identity) | 11 | 6 | 7 | 10 |
| SI (Social Identity) | 0 | 0 | 0 | 0 |
| CI (Collective Identity) | 0 | 1 | 1 | 0 |
| PI/RI (Personal Identity/Relational Identity) | 3 | 3 | 3 | 3 |
| RI/CI (Relational Identity/Collective Identity) | 0 | 1 | 0 | 1 |

Figure 13: Participant's Identity Orientations by Race and Gender

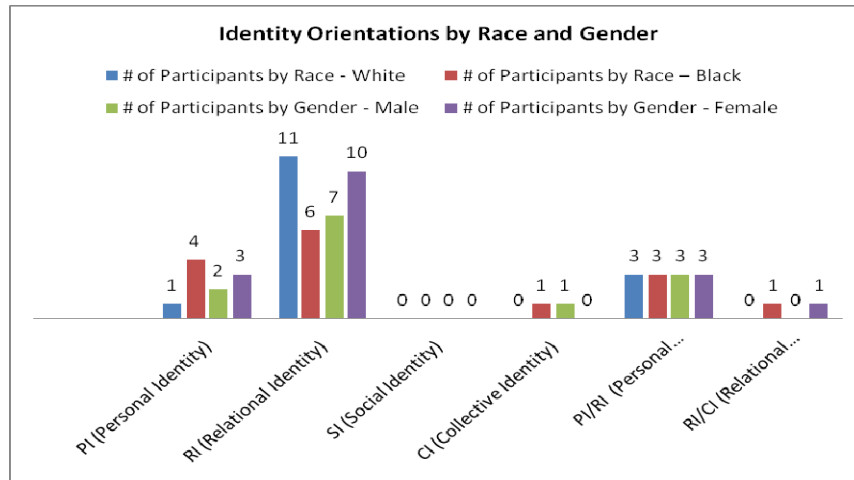
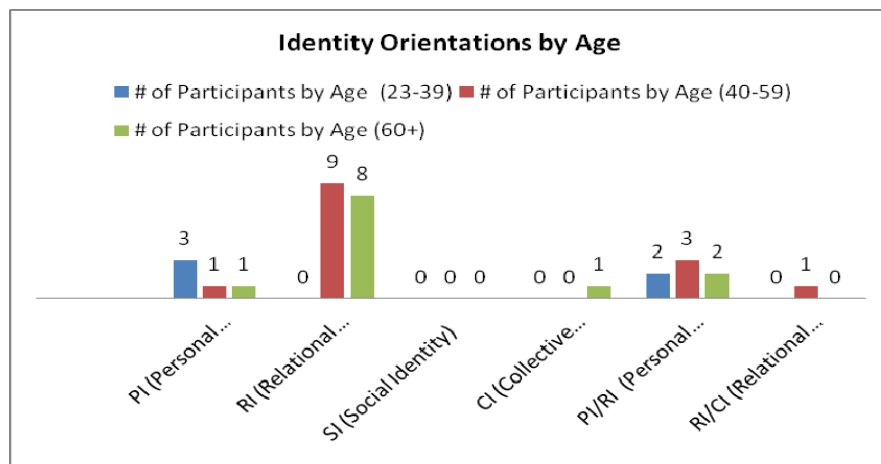


Table 18: Participant’s Identity Orientations by Age

| Identity Orientations | # of Participants by Age (23-39) | # of Participants by Age (40-59) | # of Participants by Age (60+) |
|---|----------------------------------|----------------------------------|--------------------------------|
| PI (Personal Identity) | 3 | 1 | 1 |
| RI (Relational Identity) | 0 | 9 | 8 |
| SI (Social Identity) | 0 | 0 | 0 |
| CI (Collective Identity) | 0 | 0 | 1 |
| PI/RI (Personal Identity/Relational Identity) | 2 | 3 | 2 |
| RI/CI (Relational Identity/Collective Identity) | 0 | 1 | 0 |

Figure 14: Participant’s Identity Orientations by Age



Part 3: Open-ended Interview

The purpose of the open ended interview was to gather additional information about the participants’ personal backgrounds, experiences, and perceptions of their Internet use, the role of technology, and health information searching. This was done to contrast findings from the user search experience and the Individual differences questionnaire in order help explain patterns that were identified, and to gather additional

contextual perspectives from the participants. Also, because this study was conducted using individuals with diabetes, the interview was meant to probe the participants about the impact of that condition on their search processes.

The participants answered questions about their demographic attributes, searching experiences, and perceptions of the Internet. In addition, participants were asked about which individuals helped them to gain technical skills, where they used technology most often, and what sorts of identity related experiences they might have encountered. The participants were also encouraged to provide information about their diabetic condition and the effect that it had on their lifestyles, Internet use, and health information searching.

Overall Internet Experiences

The participants were questioned initially about their overall Internet experiences. The participants described a variety of situations and experiences ranging from how they felt about using the Internet to how easy or useful they believed it to be. An overall positive experience with the Internet was described most often by both men (5 of 13) and women (8 of 17) as the factor that lead to increased use of the Internet. While evaluating the participants by gender, it was found that occasionally men and women differed in how they perceived their usage of the Internet over time. More men reported that their Internet use had not changed over time (4 of 13), while more women reported that their searching experiences had positively increased the frequency with which they used the Internet (4 of 17).

The positive perception that was described regarding Internet use was varied among participants by age. Participants aged 60 and under talked most frequently about overall experience with the Internet as being linked to its usefulness as a source of information. Lily, a White female, talks about the dual nature of the Internet to help or hurt, but describes her positive view of the technology:

“You can be sick and find it [the Internet] as a tool to hurt people; but there is so much information; they do need to have some controls for stuff like that, but there is so much information out there, I think it is just fantastic”. [Lily]

Individuals over the age of 60 reported that research or communication more often motivated them to increase their usage of the Internet. The participants who described carrying out less (and those who did not do any) searching for health information were older individuals, aged 68 and older.

Differences in race were found among participants who described themselves as early adopters of the Internet as well as those who did not use the Internet at all. The label of early adopter was used by three participants, all of whom were White. It is interesting that Brad, who was one of the early adopters, was the only individual to describe his online experience as exciting.

“So how would you describe you overall experience [with the Internet]?”
[Allison]

“Never frustrating. My goal is to learn every day...exciting!” [Brad]

Three participants who were not Internet users at the time of the study were all Black, and two of them were female. In this finding, there appeared to be a spectrum of use observed. Although the individuals who were actively seeking to utilize technology early on were White, the participants who were unable to use the Internet were Black.

Many participants reported feelings of frustration when describing their overall experiences with the Internet. The frustration that the participants' discussed fell into two categories: frustration with searching skills, and frustration with information. The discussion of frustration with searching skills was more frequently reported and included feelings that the search process was taking too long as a result of inexperience with the Internet. The discussion of frustration with information included descriptions of dissatisfaction with the large amount of health-related content available on the Internet and with information which was of questionable quality. Nina talks about her experience in learning to use the Internet and how she has been frustrated:

I guess well it's gotten easier for me over the last couple years, and I have had to have my kids help sometimes though because they do a lot of stuff in school that we didn't do. In school we didn't do a lot of....I mean they were just coming out with home computers, I think, when I graduated so....when I have looked up things, I usually find what I am looking for, it's just that sometimes it takes me a little bit longer than, say, my son who is 14." [Nina]

"Is it [the Internet] still new for you, are you still learning it?" [Allison]

"I just don't have time, a lot of times, to devote to working on the computer."

[Nina]

"So how would you describe your experience with the Internet?" [Allison]

“Kind of in between positive and frustrating. At times I have looked up a subject and it’ll say 1, 250 entries and you’re like, okay, which one do I go to.” [Nina]

Ten of the participants described their searching experiences as frustrating, with Whites and women reporting that feeling most frequently. Six White participants and seven women described being frustrated at some point during the search process. This pattern was unexpected given that Whites on average reported a higher average level of Internet experience on the Individual differences questionnaire. Rachel, a White woman describes her searching experience:

It has been very rewarding overall. It has also been frustrating. Some of the sites are terribly unfriendly to users. Terribly so, and I think perhaps that might be because designers do not write for, or construct from a beginner mind. And I know that is very difficult once you have expertise to go back to beginner mind and yet that is what it needs to be helpful. [Rachel]

The experience of being frustrated was discussed more often by younger participants than by older participants. Among the participants aged 20-39 years of age, 40% (2 of 5) experienced frustration, while 38% (5 of 13) of those aged 40-59 discussed it, and only 25% (3 of 12) of those aged 60 years and older felt frustrated while searching. In the research, older individuals have been found to have more issues with using the Internet and with searching (Aula, 2005; Slone, 2003), but the participants in this study described fewer instances of being frustrated than the younger participants.

Angie, a 63 year old female describes how she has come to be comfortable with searching and working through the process:

I think that I have gotten better over the years....so my searches were not as satisfying before I moved to that [Google], I think that you develop certain sites that you trust, you know, I just think that you learn and you develop respected sites, because there is so much garbage out there. [Angie]

Other studies have found frustration with searching to be correlated with inexperience in Internet use, but that trend was not manifested here (Ratzan, 2000). Also, only two participants who discussed their experiences of frustration were from a rural location, and the majority of individuals who described aspects of searching for information as frustrating were middle class participants. Overall, reports of frustration while doing Internet searches decreased with age.

Health Information Searching Experience

Health information searching for the participants in this study encompassed finding answers to health questions, researching medical conditions, and looking for new or supplemental knowledge about health topics. The themes that emerged in this section reflect the ways in which people made use of the resource of the Internet in health information searching. Overall, many of the participants described their searches as successful or valuable when looking for health information. The discussion of health searching experiences proved to be a catalyst to uncovering individual influences among a number of the participants.

One theme that emerged in the discussion of health information searching was related to the influence and role of spouses or partners in the search process. The two Black males in their 30's, Winston and Wayne, both described not doing a great deal of searching on their own for health information. In this situation, both men attributed the minimal searching behavior to being married to women who work within the health care industry. Wayne's wife is a physician, and Winston's wife has a doctorate in the biological sciences. Both men regarded their wives as their main health information resource, and referred to their partners during when describing how much health searching they actually performed.

To be honest, I really don't do that much searching for health information. I mean, my wife is a doctor. If I need to know something, I will usually ask her, or she do the searching [for the answer] for me." [Wayne]

Wayne expanded on the situation by stating that he was able to inquire about health topics to his wife, and that on occasion, she would actually perform the searches for him. Here, the fact that one has a personal resource for health information seems to have the potential to lower the need for health searching. It is important to point out also that these men have so much trust in the information provided by their wives that this impacts the frequency with which they carry out searches for health information.

Motivation to search for health information was another key theme that was discussed by the participants. Two of the three upper middle class Black individuals discussed Web searching for health information as a way to gain additional information after consulting a doctor. For them, searching was seen as a way to stay on top of their

own health condition, or to not feel obligated to contact the doctor each time they had a question. This finding provided more insight that some participants viewed gathering information about health proactively and saw searching on the Internet as a vehicle to accomplish that.

In looking at the younger participants in the study, both Black females in their 20's, Amber and Tina, reported that their health information searching was not necessarily central to the way in which they gained information. Amber said that she would refer to a book first and then search for supporting information, and Tina was irritated by the vast amount of information available, which required her to identify which information providers were legitimate. Amber identified the Internet as her secondary location to look for health information.

What has your experience been in searching for health related information?

[Allison]

Now [for] that I would probably go to a book...and then use the book as a reference to [do] Internet searches. [Amber]

This showed that there may actually be a difference in the perceived benefit of health searching to deliver reliable information, even amongst the population of users under the age of 50, who are were found to have a high average level of Internet experience.

Additional themes affecting motivation for health information searching were discussed by three of the five Black participants with Bachelor's degrees. One participant, Gracie, said that she just does not do much searching, and another participant, Reynold, said that he relies more heavily on information from the doctor. Although

education has also been shown to be connected with higher levels of Internet usage and experience in the research (NTIA, 2002), there are still occasions when searching can be problematic for individuals looking for health information online.

The use of the Web site WebMD surfaced as an additional technique described by six individuals in the process of health information searching. WebMD was described as a starting point in searching as well as a reference for these participants and their families. The use of the Web site was popular among all three Black participants who had some college experience (not graduates), as well as all of the working class participants, as a resource for finding health information. All of the participants who discussed the use of the Web site were aged 42 to 53 years old and none of them had achieved a college degree. The Web site WebMD was shown to be a reference point among individuals in the working class and those with lower levels of education. This finding indicates that individuals from these groups tend to prefer using an established Web site that provides detailed information in a centralized repository rather than utilizing a search engine to locate health information. In addition, because all of these participants had children, it is possible that the use of WebMD for searching for health information may extend to members of the participants' families as well. Neil described his use of the Website WebMD:

“WebMD... my introduction was through television. I use it for myself to check for the different drugs that are prescribed for me. I use it whenever a family member - my mother, my daughters, my wife, when they are prescribed a medication or something of that nature. The information is very useful and informative.” [Neil]

In the analysis of participants by education level, another unexpected outcome was identified. The discussions of searching topics and behaviors among the three individuals who have doctoral level degrees were limited. One individual, William, is a physician, and so he did not feel the need to do online health searches. Because Mark is divorced, much of his information searching was directed toward finding healthy eating choices in restaurants. Lastly, Frank speaks of being well taken care of by his wife, and does not do much health searching for himself. Frank had an open and reliable interaction with his doctor and was supported daily by his wife in maintaining his health. Because of this support from his wife and physician, Frank described not feeling the need to search often for health information:

“It [searching] has been minimal. As I said earlier, I do have a lot of confidence in my doctor and I take advantage of various research and study opportunities in the community, specifically with Penn State” [Frank]

Diabetes and Searching Behavior

The participants were asked to describe whether they felt that their condition of diabetes affected their Internet use or searching behavior. The majority of participants did feel that having diabetes had in some manner affected their searching behavior, either by changing their actual searching terms or by influencing the types of information that they sought. Ebony describes the change in searching since having diabetes:

“Has having diabetes affected your use of technology or the Internet?” [Allison]

“Yes, it [the Internet] made me look up things more often. If I’m not sure about something I’ll go check the Internet. It’s the fastest source; I guess you could say that I can get my hands on.” [Ebony]

Overall, only eleven of the participants saw no connection between having diabetes and their online searching behavior. Among these individuals who saw no connection with searching and diabetes, seven of the eleven were males, and six of the eleven were Black. Also, three of the four individuals who were found to exhibit extrinsic (surface) motivations in the Internet perceptions portion of the questionnaire were among these respondents. Though no strong pattern emerged here, this finding does show that the perception of being diabetic as exhibited by these participants does not consistently influence individuals’ searching behavior in a systematic way. Steven described not feeling like diabetes affected his searching:

“I don’t think that diabetes has affected my searching or anything else. My diabetes is in check, and has been for many years. I can find anything that I look for; if it’s important I look for it until I find it.” [Steven]

Another individual, Tina, also did not see a change as a result of having diabetes:

“Has diabetes affected your use of technology or the Internet?” [Allison]

“Not really, no. I would use the Internet regardless, so it doesn’t really make a difference.” [Tina]

The participants' perceptions of the effect of diabetes on searching behavior varied by racial group and by gender. Ten of the fifteen White participants along with nine Black participants believed that having diabetes affected their searching behavior by changing the types of information for which they searched. More female than male participants felt that diabetes affected their Web searching behavior. Specifically, half of the Black females and seven of the nine White females agreed that diabetes had affected both their use of Internet technology and their searching behavior. Among Black men, four of the seven believed that diabetes had no affect on their searching behavior, while White men were split down the middle as to whether diabetes had some effect on their Web behavior. Age varied among participants who agreed that having diabetes effected searching behavior and those that did not, and no definite pattern was recognized. Insofar as females in this study were more likely to perceive that diabetes impacted their searching behavior, this research indicates that women more frequently experienced their diabetes as a motivator to search more thoroughly or more frequently on the Web.

Purpose for Using Technology

The participants were requested to describe their beliefs about their main purpose for using Internet technology. This line of inquiry was conducted to reveal which Internet functions or capabilities provided the highest level of utility for the participants. The purposes that were stated by the participants fell into the following categories: time management, communication, education, information (to obtain or search for), personal use, research, and work. The most frequently mentioned purpose was to obtain information, which was stated by eleven participants. Overall, the participants' discussion

of their main purpose for using technology identified factors which became more personal in nature with age. This points to the finding that older individuals reported using technology less frequently for work and more frequently for personal or informational resources.

When investigating the responses by demographic groups, some variation was observed. Four Black participants described their main purpose for using technology to be for information. White participants also acknowledged the purposes of using technology for information and personal use, as discussed by four participants on each topic respectively. Among men in the study, five of the thirteen identified personal reasons that included investing and time management as their primary reason for using technology. Four women identified information or education most often as their main reason for using technology. The most often discussed purpose for using technology among working class participants was for work; for middle class participants it was information; and for upper middle class participants it was for personal use. Both of the White participants with Associates degrees reported that their main purpose for using technology was for education.

The purposes for using technology as described here appear to be influenced by the resources available to the individual as well as the value placed on different functions of the Internet. For example, men described their purpose for using Internet technology most often to be for reasons related to personal goals, such as investing, while women more frequently mentioned the purposes of information and education which may serve to benefit others. As working class individuals have acknowledged the purpose of using Internet technology most often for work, it is worthwhile to point out that this finding

may actually highlight the limited time or ability to search for personal topics including health information.

Role of Technology

The participants were asked to discuss the role that technology played in their daily lives. This question was designed to probe the individuals on their perceptions of the role of technology usage and how the Internet fits into their lifestyle. Overall, thirteen participants believed that technology played a major role in their daily lives and viewed its role as significant. Among these participants, seven were White and six were Black. All of those who believed technology had a major role in their lives were also married and had children, and none of these individuals identified as working class. Eleven participants described the role of technology as either somewhat significant or supporting. Among these participants, seven were White and four were Black, while seven were male and four were female. Lastly, six participants found that Internet technology did not play a major role in their lives. Of these individuals, all were aged 42 years or older. There were five Black participants who reported this way as well as four females and two males. Three of these participants were the ones who did not actively use the Internet at the time of the study.

The responses from six of the fifteen Black participants indicate that Internet technology played a major role in their lives, while White participants reported evenly that technology played either a major or supporting role in their daily lives, with seven participants responding each way. Among females, nine of the seventeen reported that technology played a major role in their daily lives. The majority of males reported that

technology played a supporting or somewhat significant role in their daily lives, with seven of the thirteen responding this way.

In the evaluation of participants by marital status, all three divorced individuals described the major role that the Internet has played as a resource in their healthcare decision making. The three Black single participants discussed the major role that technology plays in their daily lives while neither of the two Single White participants reported that technology played a major role in their daily lives. When the intersection of class and age was investigated, none of the upper middle class males under 60 described technologies as playing a major role in their daily lives. All three working class individuals under the age of 40 believed that technology played a major role in their lives and that their overall positive experiences on the Internet have lead them to use the technology more often.

Differences in the geographical location played out when the majority of rural participants (5 of 8) reported that the Internet to play a major role in their daily lives, while the highest report from suburban participants (9 of 22) was that the Internet played a supporting role in their daily lives. Lastly, all of the three participants who are White and have professional (doctoral level) degrees reported that technology has a supporting role in their lives.

Identity Experiences, Location, Networking and Significant People

The final lines of inquiry to the participants were about the following topics: identity related experiences on the Internet, most frequent location of Internet use, networking behavior with technology, and the role of significant people in the use of

technology. These topics of interest were added to determine if any external or environmental influences would be included by the participants in their explanation of their information searching behavior. The participants' responses to these topics are documented in this section.

The participants were asked to talk about any previous experiences in which they believed their own identity was either an issue or a consideration in their Internet use. This question was asked to probe the individuals to discuss how often they even reflect or notice their own identity in relation to their search for health content on the Web. Overall, there were twelve participants who spoke specifically about experiences that they believed to be related to identity on the Internet. The experiences that were discussed were reflections on a number of topics including: the important role of age in searching, personal characteristics and their connection to diabetes related information on the Internet, the amount of information available on type 2 versus type 1 diabetes, content issues related to individual characteristics and health information, and the level of technical difficulty the Internet sometimes presents. More White individuals (7 of 15) discussed having some experience related to identity on the Internet than Blacks (5 of 15). Ten of the twelve persons who described an identity related experience were women, and six of the twelve identified as being upper middle class.

The participants in the study accessed the Internet at both home and work. Some participants discussed the use of the medium at work due to higher connection speeds, and the comfort of using the technology in the home. Among total participants, seventeen stated that they used the Internet at home most often, ten used it at work most often, and three did not actively use the Internet at all. Of those participants who used the Internet at

home, more were Black (9 of 17) and male (10 of 17). Those participants who used the Internet at work more often were White (7 of 10) and female (8 of 10).

The majority of participants did not take part in any virtual networking activities, with only six people discussing that they participated in such activities. Of those who did participate in virtual networks, they cited using the online community Facebook, instant messaging, and educational chat rooms. None of these participants discussed whether these communities were specifically useful to gaining health information. However, ten participants did discuss the use of email as a method of staying in touch with family and friends. These participants did say that they would exchange health information via email or send links to friends and family members about health topics.

The participants also discussed the role of a significant person in their searching and Internet experiences and identified many individuals as significant for the process of gaining Internet and computing skills. Thirteen individuals described themselves as being self-taught in regards to technology skills. Of these participants, seven were female and six were male. The ages of these participants varied and seven were White, while six were Black. Other individuals that participants cited as playing an influential role in the development of searching skills were co-workers, spouses, children, friends, siblings, and course instructors.

Summary of the Findings

This chapter presented findings from the research. In the data collection process, both qualitative and quantitative methods were used including a search task, a questionnaire, and open ended interview. The findings from this study support that individual differences do influence user behavior and perceptions in health information

searching. First, it was found that the majority of the participants in the study obtain their baseline health information from a doctor. Only one participant stated that she received her baseline health information from a website, WebMD. WebMD was identified later as a resource for finding health information often among working class individuals and those who had not achieved a college degree. Frustration and trust with searching emerged as a topic of interest. Frustration was experienced more often by younger participants and trust was identified to be a negative motivation among the Black participants. In relation to Internet perceptions, all of the participants except for four were motivated by intrinsic rewards. The highest average levels of Internet experience were reported by women, Whites, and working class participants. In the analysis of cognitive complexity, two participants were found to be “even” in terms of their cognitive processing and the relational identity orientation produced the highest report from the participants. Participants’ personal social networks (spouses, friends) were found to lower the motivation for health information searching. Thirteen participants believed that technology played a major role in their lives while eleven found it to be supporting and six felt it did not play a major role. These findings point to the many ways that the participants used and were influenced to search for health information.

CHAPTER 5: DISCUSSION

In an effort to develop a deeper understanding of the users of technology, it is necessary to investigate the backgrounds and experiences of these individuals. Not only it is important to recognize demographic differences, but also social and cultural factors which provide insight into a comprehensive picture of the individual. Web searching is an appropriate focus for research on the influence of human diversity on user information behavior because in searching it is the “individual user who defines for him or herself what is information” (Henefer and Fulton, 2005, p. 226). Therefore, the documentation and exploration of how individuals perceive and react to their search experience provides key knowledge for advocates and producers of search technology. This information is also relevant to Web content providers as they seek to make information useful to target audiences. This research has sought to add to that body of knowledge regarding the role and influence of human variation on information searching behavior.

The principal purpose of this research project was to identify the influence of human variation on individuals’ perspectives about and approaches to the activity of information searching, on the topic of health. A three part research session including a search task, questionnaire and open-ended interview was administered to 30 participants who were all diabetic. The results of this study demonstrated that individual differences do influence behavior and perspectives on health information searching in a variety of ways. Chapter 5 opens with a discussion of the findings and implications for each research question posed. Following that, discussions about the evaluation and contribution of the findings were presented. The chapter concludes with a summary of the research findings.

Research Question 1

The first research question investigated in this study was “How do individual differences of users with diabetes influence information searching behavior for health-related information?” This research project looked at many dimensions of differences as influences, and among them a variety of factors were discovered. Each of the different parts of the research design contributed to the investigation of how differences were manifested among the study participants in their search for health information.

The feeling of frustration was described in the health information searching process by ten participants. This frustration was often discussed as a result of searches not resulting in useful information, the extended time period needed to find information, or the complexity of the searching process on the Internet. Although, the older participants described being less frustrated with searching, it is important to note that many of the participants over age 60 in this study who were Internet users were also retired individuals. It also important to note that the three oldest people in the study did not use the Internet at all, so their perspectives could not included in this description. With retirement, under some circumstances, comes the privilege of time. That may have contributed to a more relaxed or flexible searching experience. Therefore, the connection of age and time for this population resulted in a lowered perception of frustration while searching.

In a study conducted by Bessiere et al. (2002), it was found that people with higher levels of experience with computing were the least often frustrated by the Internet,

and the authors pointed to a need for increased user training. Of the ten participants who described being frustrated in this study, six were found to have the highest possible average level of Internet experience. Therefore, the findings from this study contradict prior studies that suggest that experience or age may uniformly lessen frustration with use of the Internet or searching. However, this finding may highlight a change of outcome in searching behavior with respect to health. While individuals with experience are typically less likely to be frustrated with the Internet or searching in general, the increased personal importance of health searching may diminish previously tolerable challenges with the technology. As a result, individual motivations may be shifted that include an increased need for information to be accurate and trustworthy; which then makes the health information searching process more meaningful and more easily allows for feelings of frustration to enter into the process.

Age was also an important aspect of influence observed with respect to physical access. While searching is only one aspect of Internet use, the three oldest individuals in the study were prevented from using the Internet as a result of physical conditions which prohibited viewing or interacting with the computer. In this sense, access to the technology was limited from a physical perspective and served as a barrier in ability to use the Internet. Milne et al. (2005) described many of the physical barriers to technology experienced by older individuals and advocated that “embracing the dynamic diversity of the human species as exemplified by the older population, rather than designing for homogeneity, will facilitate more inclusive design for all (p.568)”. The findings of this study are in support of that prescription.

Another facet of age was found in motivations about Internet perceptions. Three of the youngest participants in the study made up 75% of the people who were found to be motivated by extrinsic (surface) rewards. Those motivated by extrinsic rewards were characterized by a preference of not wanting to search around on the Internet or to do targeted searches for information as opposed to more open browsing. So, as age was evaluated, a spectrum of difference was observed as the youngest people preferred a direct approach to searching for information, while the oldest participants were physically prevented from doing any searching or even using the Internet. Thus generationally, a difference in searching behavior was observed.

In searching for health information, it emerged that many of the participants searched for and viewed WebMD as a significant health resource. WebMD is a virtual warehouse of health information that contained information on diabetes as well as nearly limitless other health-related topics. The participants who utilized WebMD were most often working class individuals or those who had not completed a college degree. Here, the Web site WebMD represented an open opportunity to search for information on health or diabetes. In addition, because WebMD is a resource for health topics extending to factors of wellness, nutrition and lifestyle, participants who sought to find information for children and other family members were also able to achieve that on the Web page.

In the evaluation of the connection between diabetes and searching behavior participants' perceptions of their condition also varied. Individuals with diabetes have a high health management requirement which includes changes in lifestyle, monitoring of diet, exercise regimen, and adherence to medication schedules. Although these actions are important to one's health condition, motivation to engage in these behaviors is an

individual choice which may not be consistently experienced by all individuals with diabetes. Therefore, investigating the perception of participants' health condition and the effect on searching behavior was an area of interest in this study.

In the discussion of Diabetes, the majority of the individuals believed that their search behavior was in some way affected by having the illness. The types of effects that were identified were: that search topics were changed – to include recipes, Diabetes care, medications, and other health research; or that the illness influenced the increased frequency of the search for health information. More female than male participants described seeing a connection between Diabetes and changes in their searching behavior. In addition to this finding, women were found to have a higher average level of Internet experience. Thus, there is a potential relationship between experience with the Internet and perception of change in searching behavior as a result of diabetes.

The range of differences and perceptions exhibited by these participants supports and extends the explanatory power of the Individual Differences Theory of Gender and IT (IDTOGIT) in that differences were found not only between but within gender, and in this case also among races, age groups and social classes. The influences which were found could not be completely explained by only one dimension of human variation. Rather it was within the connection of demographics, attributes and experiences where understanding was found. So, while many observations were made, it is of importance to note that the personal complexity of the individuals in this study account for their differences in behaviors and perceptions in searching for health information. The study has shown evidence that people who have a common illness will respond to their environments in unique ways depending upon their perceived resources and abilities.

This contextual view of behavior supports the power of the IDTOGIT to apply to reactions observed by both women and men in their personal participation with information technology to support their health maintenance needs.

Research Question 2

The second research question investigated in this study was “How do demographic differences and identity orientations of users with diabetes influence information searching behavior for health-related information?” When discussing search behavior for health information, the topic of trust was often mentioned. In that discussion differences in race were noted as more White participants discussed trust as a motivating factor to searching and more Black participants viewed it as a factor that negatively affected motivation. The patterns that were found as individuals discussed trust were that many of the White participants conceptualized trust of searching and Web sites as a result of the credibility of the content providers. Thus, these participants sought out content from entities which they believed were trustworthy and with which they could continuously return to gather additional information. Black participants often discussed lacking trust in searches for health information because of the complexity of results or concern related to safety of personal information when online. This finding that distrust of the Internet exists among Black individuals has also been echoed in many other studies (Ervin and Gilmore, 1999; Fox, 2000; Brodie et al., 2000).

Attributes of the personal identity orientation include high regard for private values and abilities. Based on these characteristics, individuals who value personal identity highly may have experienced online results which are less than credible in a

deeply personal way. Those who were found to highly value the personal identity orientation also had negative views regarding trust and searching. Thus, identity orientation may have influenced individuals' perceptions of technology in relation to trust when race is considered. Also, Appiah (2003, 2004) argues that Black individuals who have strong ethnic identities are more satisfied with Web sites that are targeted to Blacks. Black individuals who were found to have weak ethnic identities displayed no difference in behavior on sites regardless of the racial targeting of Web page. Thus, if the personal identity orientation described in this study is in any way connected to ethnic identity, Appiah's findings could provide a potential explanation for this phenomenon.

Relational identity was reported most often by the participants in the study. This identity orientation, which was characterized by value in strong interpersonal relationships, was reported by 11 White participants and six Black participants. While four Black participants and only one White participant reported value for the personal identity orientation. The difference in how these identity orientations were reported can be connected to differences uncovered in searching motivations. The identity orientations alone were not found to have any other major influence along with demographic differences in this study. However, the new categories that emerged, -- Personal/Relational Identity (PI/RI) and Relational/Collective Identity (RI/CI), -- showed that as individuals reflected on their own meanings about identity, influences can potentially be drawn from more than one source of value. In addition, identity was able to be expressed in more dimensions than the identity orientations scale was able to capture.

Research Question 3

The third research question investigated in this study was “How do information sources, online or offline, of users with diabetes influence information searching behavior for health-related information?” It was found that many of the participants in the study discussed that doctors provided the primary source of baseline health information, while only one person stated that they received this information from a Web site. This Web site was WebMD. This observation showed that the people in this study are interacting with the Internet and using it to find health information. However, these individuals have not yet identified the technology to be, or utilized the technology in a way that shows the Internet to have a centralized role as a health resource. This was supported by the finding that 13 participants felt that technology played a major role in their daily lives as opposed to 11 who felt that the role was supporting or only somewhat significant. Therefore, the contrast in findings shows that although technology as whole was seen to have a noticeable place in daily life, its role to support health information searching is secondary to other resources for these individuals.

The notion of resources was also important in the participants’ discussion of searching behavior for health information. For instance, two Black men in the study, Winston and Wayne, were married to women highly educated in the health care field. Consequently, they were at leisure to not search for health information because their partners were able to provide this information continuously to them. William, who was a physician, utilized his network of medical colleagues as an immediate resource in conjunction with his own knowledge in place of searching. Therefore the availability,

trust in, and access to additional health resources may serve to influence the frequency with which an individual chooses to search for health information.

During the participants' discussion of the health information searching process, there were many descriptions made of searching as a supporting activity. As evidenced by participants Amber and Tina, who were both under 30 years of age, searching was not central to the way that they gained health information. The Internet was part of a process for searching for health information. However, offline sources, in the form of a physician and a book, were evidenced as primary source to gain information. According to prior research on health information searching, the Internet does not replace traditional sources for health information, including family members (Morey, 2007), which is supported in this research. In addition, other researchers have suggested that health service professionals (physicians) play a major role as consumer health providers to African Americans, which was also found among the participants in this study (Gollop 1997; Spink et al. 1997).

These findings show evidence of how a variety of individual differences worked to influence and affect user behaviors and perceptions in the search for health information. It can be concluded that human variation does influence how users search for health information in a way which does is not homogenous to one race, gender, age group or other category. Health searching was an important aspect of maintaining health especially among a group of individuals with a chronic illness, such as diabetes. However, this condition alone did not provide stable enough motivation to make searching for health information a consistent activity for these individuals. The role of searching for health information was largely to augment more traditional health

information resources with an extended capability for accessing more broad categories of health information, research and tools. In addition, because the factors of trust and frustration were described by so many participants, it is of importance to recognize that the online health information may have attributes which influence use. The decision about whether or not to use online resources could also be a function of the perceived usefulness of the information that the individual needs and the relevance of information that is found.

Research Question 4

The fourth research question investigated in this study was “How do Internet perceptions of users with diabetes influence information searching behavior for health-related information?” In this study internet perceptions were evaluated for evidence of intrinsic and extrinsic motivations. Extrinsic Motivation has also been referred to in the work of Davis et al. where it is referred to as the “performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself. (1992, p. 1112).” Based on this characterization, those who were found to have preference for extrinsic motivations are more likely to seek out health information in a more limited scope versus those who learn in the process of searching.

The majority of participants in the study showed evidence of motivation towards intrinsic (deep) rewards in their perceptions of Internet use, while only four participants were found to be motivated by extrinsic (surface) type rewards. Those motivated by extrinsic rewards were among the youngest in the study (ages 23, 28, and 32); and the

oldest actually utilizing the Internet (age 71). Three of these four individuals who were found to be motivated by extrinsic (surface) factors with use of the Internet were males.

When the rationale of Davis et al. is applied, it illuminates the fact that the youngest individuals in this study, who have grown up with the Internet, may be more accustomed to information provided on-demand. Therefore, the likelihood that they are less willing to search through the infinite amount of search results and resources on the Internet for health information is high, which may provide insight into an extrinsic motivation to searching.

Research Question 5

The fifth research question investigated in this study was “How does level of experience with computing influence information searching behavior for health-related information?” The average levels of experience that were displayed among the participants were varied among each of the demographic groups. A finding of interest was that the women in the study displayed a higher level of experience than the men, and White women displayed the highest overall level of experience. Black women displayed a lower average level of experience than White men. This finding was consistent with the literature that when searching for health information, White women are often the most active consumers. As evidenced by this finding, women as a group do have differing levels of experience which are mediated in this setting by race.

One of the most interesting and important findings in the study was that the working class individuals reported having the highest average level of Internet

experience. More specifically, when race was added in, working class Blacks were found to have the highest level of experience and also all reported having intrinsic (deep) motivations for using the Internet. On the opposite end of the spectrum, upper middle class Black participants reported the lowest levels of Internet experience.

In contrast to explanations where income can be equated to level of usage or experience, a different finding was discovered in this study. The working class Black individuals were located in a suburban area, and none had achieved a college degree. Living in a suburban area for working class Blacks is a phenomenon which is not often observed in many parts of the United States. What it means to be a working class Black person in suburban Maryland also has a very different meaning than to be working class in a rural Pennsylvania. The working class Black participants in this study were employed as assistants – one teacher’s assistant and two administrative assistants. Although the job titles do not differ much from those working class individuals who reside in Pennsylvania, the setting for use of technology in the Maryland region is different. As previously noted, the Prince Georges County in Maryland has one of the highest populations of affluent Black people in the country. Therefore, use of the Internet and the opportunity to learn about and be connected to the technology is great. Also, according to a Pew report on Internet use, individuals in the National Capital region are more likely to go onto the Internet at work, and two of the three working class Black individuals in this region stated that they use the technology most often at work.

The view of Internet searching as a resource to individuals again may have served to increase experiences with technology. Participants with higher socio-economic levels may well have had more options afforded to them in the way of information and access to

health care. Therefore, concluding that socio-economic class alone is a determinant of experience with searching or Internet technology would not account for the impact of attributes such as race, geographic location and personal perception of the role of technology.

In the further evaluation of the geographic location and level of Internet experience, differences were found among the rural and suburban participants. On average the participants who lived in a rural setting had a higher level (4.25) of Internet experience than the participants from the suburban areas (3.68). Rural residents are often included as a population that is affected by the digital divide due to poor technical infrastructures and low awareness of the Internet among residents (Donnermeyer and Hollifield, 2003). However, the rural participants in this study lived and worked in the same town or in very close proximity to a major university where some benefits to their location would have resulted from high demand for technical capabilities.

Research Question 6

The sixth research question investigated in this study was “How does user cognitive complexity influence information searching behavior for health-related information?” Cognitive complexity in this study was an index of the ways that people process and combine information from external sources and organize it internally. The categories of cognitive complexity include relativistic and dualistic processing. In terms of cognitive complexity, the majority of the participants were found to be relativistic in their cognitive processing. Wilson et al. (1992) characterize those who are relativistic or more complex in their information processing to be both sensitive and responsive to

information available in social situations, which speaks to 28 of the 30 participants in the study.

The two participants who were found to be *even* (no preference in cognitive style) in their types of processing were under the age of 50 and Black females. Antonio et al. (2004) evaluated the effects of racial diversity on cognitive complexity and referred to a type of complexity which falls in the middle of the spectrum between relativistic and dualistic. This level is referred to as intermediate integrative complexity (IIC). In this category of complexity, individuals recognize the existence of alternative perspectives, but see these perspectives as independent and unrelated (differentiation but no integration of perspectives). The idea of an intermediate level of complexity provides some explanation about the evidence found in this study of participants who were deemed as “even” in their processing.

The finding in the study some individuals showed an intermediate preference for type of cognitive processing was unexpected because Ford et al. did not present an intermediate level in their work. However, this fact highlights that there are additional individual differences in the types of cognitive abilities that exist. In the case of these two participants, which were Black females, the finding may indicate that their cognitive processing styles change or evolve when searching, instead of having a preference for one style. Parker and ogilvie (2003) speak of the complexity of African American women and describe that they “must bridge multiple realities and manage complex multiple contexts (environmental, social, and cultural) (p.195).” These multiple realities may serve to influence these womens’ perspectives of their own information processing and resulting complexity. With this finding it is again important to point out that there is

potential that the information that is found during the health searching process does not resonate with these Black women. It is possible that the health information that is found does not convey a level of relevance or salience with which these women can identify.

Criteria for Evaluating Quality of the Findings

In conducting this research project, rigor was sought to add to the validity of the results and the ability to replicate the research in other settings. In the discussion of the evaluation of interpretive results, Trauth (2000) describes how a researcher must look for alternatives to methods of validity and reliability. According to her rationale, the achievement of authenticity, “rather than consistency and correctness” is a vehicle by which to ensure the quality of the research (Trauth, 2000: 392). Seven principles for the evaluation of interpretive field studies were designed by Klein and Myers (1999) that were utilized in this study. The first principle of the hermeneutic circle was followed by iterating between the interdependent meaning of parts and the whole that they formed. This principle was followed as I evaluated responses from the individual participants and then iteratively framed those experiences within the larger societal context. The second principle of contextualization was included as the social and historical background of the research setting was an important consideration in the study. The third principle of interaction between the researchers and the subjects was key to this research. During the data analysis, critical reflection on the data collection process caused me to question my assumptions and the role that I assumed in the research. Principle four, which was of abstraction and generalization, was achieved by applying the Individual Differences

Theory of Gender and IT. The meaning that was identified about individual differences and searching behavior was realized through the use of the constructs of the theory. The fifth principle of dialogical reasoning was used as I paid close attention to potential contradictions between the theoretical orientation and the findings of the study. The findings of the study did align with the theoretical stance of the Individual Differences Theory of Gender and IT. Principle six, which was of multiple interpretations, was applied by questioning the participants about their personal experiences, motivations, and behaviors related to searching. By asking about personal interpretations and beliefs, this prevented the inclusion of a single situation that could be viewed differently by different individuals. The seventh principle, which was of suspicion, was utilized as attention was paid to the participants and their perspectives in an effort to understand their perceptions of health information searching. For more detailed examples of how the evaluative criteria were carried out, see Table 19.

Table 19: Evaluative Criteria of Interpretive Research

| Principles | Klein and Myers Description | Demonstration in this Study |
|---|---|--|
| 1. The Fundamental Principle of the Hermeneutic Circle | This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. | Iteration in looking at the individual level responses about personal influences and searching behavior; with the larger societal context of geography and demographic differences to understand the greater process of information searching. |
| 2. The Principle of Contextualization | Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. | The data analysis documented the background of the participant's baseline information searching followed by the influence of technology and the Internet on the search process. Thus, the inclusion of technology was documented in the health information search process. |
| 3. The Principle of Interaction Between the Researchers and the Subjects | Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants. | In the discussion of the research results, I describe my reflection on my background as well as how my in-depth knowledge of the two geographic locations where the data collection was carried out served to assist in understanding the research phenomena and |

| | | |
|---|--|--|
| | | connecting with the participants. In addition, throughout the data analysis, I questioned my assumptions about Internet use and demographic characteristics. |
| 4. The Principle of Abstraction and Generalization | Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. | The abstraction and generalization principle was utilized in understanding the results by merging the findings with the multiple theoretical bases, and the information searching, information systems, and digital divide literature to develop a broad understanding of the participants' responses, perspectives and behaviors. |
| 5. The Principle of Dialogical Reasoning | Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision. | The guiding theoretical principles were established in the research design. In the comparison of the findings of the study with the theories, there were no specific contradictions. The findings were aligned with the theoretical underpinnings and provided additional explanatory power the Individual Differences Theory of Gender and IT. |
| 6. The Principle of Multiple Interpretations | Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it. | This principle was established by using a research design that collected information about the phenomena that was based on the differences in the participants' perspectives of their own personal experiences with searching for health information. |
| 7. The Principle of Suspicion | Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants. | In administering the data collection instruments to the participants, I took notes on their perspectives and responses. Throughout the process of gathering information from the participants, I would inquire about areas where I noted conflicts in previous discussions and asked additional questions when responses provided were not completely clear. Thus, every attempt was made to address conflicting items in the research sessions. |

Contributions of the Research

This research has created a contribution to theory, to the literature, to methodology, and to practice. The contribution to theory has been developed through rigorous support for the explanatory power of the Individual Differences Theory of Gender and IT. This theory provided a lens with which to develop the research design

and analyze the data collected. The findings in this study showed evidence that users of technology have rich and unique experiences, backgrounds and beliefs, which impacted their usage of technology. User participation with search technology was shown to yield differences among and within racial, age, gender, socio-economic, and geographical groups in unique ways. The understanding that users are embodied individuals with rich experiences that influence their perceptions in the search for health information is key to the continued development of innovation in search and Internet technology. This finding also provides guidance to those looking to further understand how users relate to the search process for health information and how to develop more useful content.

This research has contributed to the literature and body of knowledge on individual differences in online searching behavior. This journey into the lives of persons living with diabetes and their utilization of technology to support their condition also adds to the discourse on the health information searching. In addition, the findings in this research project enhance knowledge about health information sources and their importance in the lives of individuals with chronic illnesses. Better understanding was developed about the topics of frustration and trust with searching as well as the role of personal social networks. New knowledge was developed about many factors which lessen the motivation to search, and subsequently about how life, health and technology intersect in the existence of 30 individuals all living with Diabetes. All of this information is critical to supporting technology that is relevant and useful, specifically within the domain of health.

This research contributed to the knowledge base on methodology as a mixed-methodology study which utilized an interpretive epistemology. This study utilized a

three part research design in which data was collected to better understand user behavior and perceptions for the purpose of integrating information to answer the research questions. The data matrix which was used to organize the data and develop findings was an approach to analyzing findings from different methods which proved successful. The use of multiple methods as a vehicle to develop a depth of understanding about the participants was also an appropriate way to collect data on human variation and searching behavior. The use of this matrix was innovative in that it allowed for the landscape of many variables, methods and factors to be investigated and compared.

Lastly, this research contributed to practice through the development of a research process which can be used as a technique to inform personas. The personas method is an approach to communicate information about potential users to a systems development team (Grudin and Pruitt, 2002). The development of a persona requires that information is gathered about users' needs, behaviors, and preferences to assemble descriptions about "explicitly fictional individuals (Chapman and Milham, 2006)." The use of personas is effective in communicating goals and keeping the needs of users at the center of the development process. The effectiveness of a persona however, is likely grounded in how closely they actually exemplify the users which they represent. Thus, the data collection process used in this research could be used as an effective aid to gather empirical information about a user. The information gathered in this research represents an embodied view of the user, or rather a comprehensive view which provides information about individual demographics, experiences, influences, behaviors, and perceptions of technology use. Therefore this data collection process could be beneficial to collect data sequentially about different types of users. By first presenting the user with a task,

followed by a broad-based questionnaire, and then an in-depth interview, it is possible to gather information on different levels about the users' world of experience in an organized, yet rich manner.

Summary of the Discussion

The purpose of this research was to evaluate the ways in which individual differences influence user behavior with and perceptions of health information searching. The discussion presented throughout this chapter emphasized the key findings of the research. It was determined that differences such as race, gender, age, socio economic class, and geographic location all influence searching behavior. However, it was found that these factors work together to influence behavior, rather than independently. Therefore, it is suggested that researchers of health information searching behavior looks at the intersection of characteristics rather than single attributes of individuals. Also, the Internet was found to augment traditional information resources instead of being the central information resource. This finding is supported by factors which were found to be mediators of health information searching such as personal social networks, trust, and frustration. Lastly, stereotypes were challenged as participants in the study exhibited behaviors which were contradictory to research about Internet experience and searching. Women were found to have the highest levels of experience with the Internet as well as working class Black individuals. Therefore, the research further supports the Individual Differences Theory of Gender and IT and rejects generalizations about users of technology which search for health information.

CHAPTER 6: CONCLUSION

This dissertation has provided empirical information to support that users of technology are unique individuals who make decisions about the resource of the Internet in the context of their environment. This study documented how a group of individuals from different backgrounds, in different settings, with the chronic illness of diabetes in common, perceived their own information needs regarding health searching on the Internet. This chapter presents a summary of the dissertation research. The chapter begins by presenting recommendations that extend from the research, followed by the limitations experienced and next the areas of future research. The recommendations section describes how the findings from this study are able to be utilized in the areas of practice and research. The limitations section provides an overview of the constraints which were realized in the study. Finally, the future research section provides an explanation of additional areas to be considered for extension of the research program.

Recommendations from the Research

Recommendations drawn from this research are applicable in the areas of practice and research. The inquiry that was carried out in this study sought to identify the human differences which exist among users of search engines. Based on the differences found among the diabetic users in this study, the first recommendation would be that search technology in the domain of health be made customizable by the user. The individuals in this study showed evidence that when searching for health information; differing levels of depth were desired. For those users that have options in terms of resources may require different types of health information. For example, some users

may only search for health information when they recognize a problem or are unable to get in contact with their health care provider. Other users may search following a doctor's visit when new conditions are diagnosed or different medications are prescribed. Other individuals may utilize the Internet as a primary information resource in their search for new and comprehensive health information. Therefore, providing a search that potentially allow users to customize the type of health information they are provided in terms of depth, topic, and background could prove useful.

Another recommendation for practice would be to utilize a variety of types of users in each step of the systems development process. Not only is it important to identify key users of a system, but it is also important to represent user from different demographic backgrounds in the design and testing of a system. One of the key findings from this study is that individuals do utilize technology in different ways as influenced by their environment and perception of technology. Therefore, it is important to integrate this understanding into make searching engines and systems more useful for a broad variety of people.

The final recommendation for practice would be to utilize an embodied view of the user in the development of personas. This embodied view is described as including the users' personal experiences, understandings, and influences in the understanding of their behavior and interactions with technology. This view was advocated for in the previous recommendation by the use of various types of users in the design process. Taken a step further, as technical projects seek to utilize an approach that integrates the needs and styles of a variety of users, personas developed with multi-dimensional information about users can be beneficial.

A recommendation for the research community would be to continue to conduct in-depth research on the intersection of health information searching behavior and human diversity. As technology is on pace to continue the level of growth and importance shown in current times, it is of importance to understand the complexities of the needs that users value. While health has been identified as one of the most searched topics on the Internet, its popularity is likely to grow in coming times. Thus, focus on how to improve the experience for users in addition to understanding the needs of users is an important area of focus for the research to continue.

An additional recommendation for the research community would be to consider the use of multiple methods in the research on user information behavior. The analysis of the data collection methods used in this research allowed for the findings to be integrated and cross referenced; providing depth of understanding of the users in the study. This type of research design would benefit researchers that are interested in gathering data from more than one perspective. The use of multiple methods also was important to the interpretive epistemology in investigating individual differences. The resulting information allows for additional information to be analyzed for future research project beyond this dissertation.

Limitations of the Research

A limitation of this study was the makeup of the research population. Diabetes affects individuals of all races, and specifically, it affects the Hispanic/Latino population at a rate which has been identified to be higher than White individuals. This study was focused on the diversity of users of search engines with Diabetes, and individuals of Hispanic origin were not able to be recruited in the time frame of the study. Therefore,

the perspective from an important group which suffers at a high rate from Diabetes was not able to be included. Further, because this research was interested in human diversity, it would have been ideal to have each ethnic group represented to truly investigate human variation.

An additional limitation was the use of pre-developed questionnaire. The questionnaire that was utilized from Ford et al. (2001) was one of the initial instrument developed that looked at individual differences in relation to web searching behavior. Therefore, it was a natural choice for this research. However, a questionnaire that developed specifically for this research project may have yielded additional information not captured with the existing instrument. A final limitation of the study was that size of the research population. The total number of participants in the study was 30, which was suitable for the qualitative portion of the study, but limiting for the quantitative portion. If the research population could have been increased, additional types of statistical analyses could have been carried out on the quantitative data. That type of analysis may have strengthened the findings from the study.

Future Research

Additional areas in which future research could be carried out have been recognized in the course of completing this research project. The first area of extension of this research would involve investigating searching behaviors of individuals with other illnesses, potentially cancer, HIV/AIDS, or heart disease. By carrying out this research with individuals living with another type of illness, the role of the condition on searching

could continue to be investigated. That would also allow for the findings to be juxtaposed and a deeper understanding of health searching behavior could be achieved.

Another opportunity for future research could be in the development of personas from the data collected in this study. The personas could then be used in testing out health information searches and content. Thereby, developing an understanding of how research methodologies such as the one used in this dissertation can inform personas for health information Web sites. As information is found from the process of using personas, the iterative development could inform organizations on how to create and utilize a persona in systems development and testing.

Lastly, another future research project could be to contact the individuals in this study to revisit their perceptions of technology and searching behaviors over time. In doing so, it could be determined if there is an evolution in either the management of Diabetes or in searching behavior. This longitudinal approach to evaluating searching behavior for health information could also yield information that would assist producers of searching engines in their development of useable technology.

Conclusion

The Individual differences research on health information searching conducted in this study has provided clear evidence that the diversity of users matters and influences how users perceive and interact with technology. This research integrated different literatures and different methodologies to in achieve an interdisciplinary inquiry into the search for health information by individuals with diabetes. The story of these individuals helped to discover findings where observable differences among racial background, age, and gender were found in conjunction with the level of experience with technology. In

addition, the understanding that generalizations about any one demographic group are not sufficient to explain the variation among users is important to those that develop engines. Finally, the extension of the Individual Differences Theory of Gender and IT through these findings has provided a potential guide with which to continue human information behavior research.

APPENDIX A: RECRUITING LETTER

Dear <NAME>:

You are receiving this message because you have been identified as an individual diagnosed and living with diabetes through the Pennsylvania State University diabetes Center Database.

I am conducting a Pennsylvania State University dissertation study that is aimed at the investigation of the influence of human differences on an individual's search for information on the Internet. In particular this study is focused on individuals with diabetes and their search for health related information.

I am asking for your participation in a research session that will consist of a brief Internet search task on a computer, completion of a questionnaire, and a short open ended interview. These activities will help gather information about the strategies and behaviors using with web based search engines for health information. This research session will take approximately 1 hour to complete.

Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to.

If you are willing to participate in this research project, please respond to this message so we can schedule an interview meeting time and place.

If you have any questions, please do not hesitate to contact me. I can be reached by phone at 814-865-8952 or by email at amorgan@ist.psu.edu. I appreciate your assistance.

Thank you,
Allison

Allison Morgan, Ph.D. Candidate
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APPENDIX B: USER SEARCH EXPERIENCE SCENARIO

User Search Experience

The user will be provided with a computer furnished with Internet access and a screen that shows a web search engine. The user will be asked to perform a search for information that is related to a personal question, concern, or inquiry related to health/nutrition based information. During the process, the user was asked to use the 'think aloud' method by describing the processes and decision making being utilized during the search. The investigator will act as a participant observer and in addition, ask questions related to information, motivation, and behavior during and after the completion of the search task. This search experience will allow the user to consider specifics about how and why they carry out search behavior related to health information. The following is the scenario that will be presented to each participant.

Your primary care physician has just informed you that your current medical condition which is diabetes requires that you take your personal health care, nutrition, and medications/treatments very seriously. The doctor provides you with some material about your condition and things to do to improve it. However, he or she very strongly suggests that you go online to get additional information to empower your understanding of your condition and how to best cope with it. He or she suggests 2 important tasks.

- 1. That you search for information on **nutrition***
- 2. That you search for information on your **medication***

Please think about what types of topics you would search for and why. Also think about the keywords you might use as well as the strategy you would employ to look for this information. Next, you will actually perform these two searches. I will ask you to talk me through your thought process and rationale for the choices that you are making. In addition, if anything specific comes to mind in terms of your personal characteristics (race, age, gender, etc.) please be sure to let me know. In addition, I will ask some questions to stimulate your thought on the topic of searching for information.

APPENDIX C: AIQ – IV INSTRUMENT

INSTRUCTIONS: These items describe different aspects of identity. Please read each item carefully and consider how it applies to you. Fill in the blank next to each item by choosing a number from the scale below:

- 1 = Not important to my sense of who I am
- 2 = Slightly important to my sense of who I am
- 3 = Somewhat important to my sense of who I am
- 4 = Very important to my sense of who I am
- 5 = Extremely important to my sense of who I am

- ___ 1. The things I own, my possessions
- ___ 2. My personal values and moral standards
- ___ 3. My popularity with other people
- ___ 4. Being a part of the many generations of my family
- ___ 5. My dreams and imagination
- ___ 6. The ways in which other people react to what I say and do
- ___ 7. My race or ethnic background
- ___ 8. My personal goals and hopes for the future
- ___ 9. My physical appearance: my height, my weight, and the shape of my body
- ___ 10. My religion
- ___ 11. My emotions and feelings
- ___ 12. My reputation, what others think of me
- ___ 13. Places where I live or where I was raised
- ___ 14. My thoughts and ideas
- ___ 15. My attractiveness to other people
- ___ 16. My age, belonging to my age group or being part of my generation
- ___ 17. My gestures and mannerisms, the impression I make on others
- ___ 18. The ways I deal with my fears and anxieties
- ___ 19. My sex, being a male or a female
- ___ 20. My social behavior, such as the way I act when meeting people

- _____ 21. My feeling of being a unique person, being distinct from others
- _____ 22. My relationships with the people I feel close to
- _____ 23. My social class, the economic group I belong to whether lower, middle, or upper class
- _____ 24. My feeling of belonging to my community
- _____ 25. Knowing that I continue to be essentially the same inside even though life involves many external changes
- _____ 26. Being a good friend to those I really care about
- _____ 27. My self-knowledge, my ideas about what kind of person I really am
- _____ 28. My commitment to being a concerned relationship partner
- _____ 29. My feeling of pride in my country, being proud to be a citizen
- _____ 30. My physical abilities, being coordinated and good at athletic activities
- _____ 31. Sharing significant experiences with my close friends
- _____ 32. My personal self-evaluation, the private opinion I have of myself
- _____ 33. Being a sports fan, identifying with a sports team
- _____ 34. Having mutually satisfying personal relationships
- _____ 35. Connecting on an intimate level with another person
- _____ 36. My occupational choice and career plans
- _____ 37. Developing caring relationships with others
- _____ 38. My commitments on political issues or my political activities
- _____ 39. My desire to understand the true thoughts and feelings of my best friend or romantic partner
- _____ 40. My academic ability and performance, such as the grades I earn and comments I get from teachers
- _____ 41. Having close bonds with other people
- _____ 42. My language, such as my regional accent or dialect or a second language that I know
- _____ 43. My feeling of connectedness with those I am close to
- _____ 44. My role of being a student in college
- _____ 45. My sexual orientation, whether heterosexual, homosexual, or bisexual

SCORING FOR AIQ-IV

[version 4, which adds RI to AIQ-IIIx, thus adding 10 new RI items and changing sequence = item # s of some old items] (Summer 2001 for 2002 SPSP Poster)
For details of AIQ-IIIx and its History and Bibliography, see [Identity Orientations](#).

PI = Personal Identity Orientation
RI = Relational Identity Orientation
SI = Social Identity Orientation
CI = Collective Identity Orientation
(SP = Special items [not scored on scales])

Each of the scale scores is the sum of the answers (1-5) given to those items.
For AIQ-IV 45 items, the scoring numbering is:

PI = 2 5 8 11 14 18 21 25 27 32 [sum of answers to 10 items]
RI = 22 26 28 31 34 35 37 39 41 43 ["" 10 items]
SI = 3 6 9 12 15 17 20 ["" 7 items]
CI = 4 7 10 13 24 29 38 42 ["" 8 items]
[SP = 1 16 19 23 30 33 36 40 44 45 (10 items not scored on scales)]**

**Dollinger et al. (1996) created a new AIQ -IIIx scale named "Superficial Identity" by summing 5 items [AIQ-IIIx SP's # 1, 16, & 18 plus SI's # 9 & 15] as "a measure of an emphasis on surface qualities of self immediately visible to others" (M = 17.46, SD = 3.39). Superficial identity orientation correlated .19 with PI, .75 corrected to .61 with the partly overlapping SI, and .36 with CI. (Dollinger, S. J., Preston, L. A., O'Brien, S. P., & DiLalla, D. L. (1996). Individuality and relatedness of the self: An autophotographic study. *Journal of Personality and Social Psychology*, 71, 1268-1278.) ("Superficial" on AIQ-IV = 1 9 15 16 19)

***Additional use of an ad hoc "scale" of SP items and single items: In a set of analyses of additional data from the sample described above, Dollinger created a new AIQ-IIIx scale named "Academic Identity" by summing 3 SP items pertaining to the importance of career plans, academic performance, and the student role [AIQ-IIIx SP's # 30, 32, & 34; M = 11.9, SD = 2.0] to relate to Achievement coding of the autophotography essays (obtained $r = .27$). In addition, the AIQ religion item [CI # 10] correlated .16 with the Religion photo code, and the AIQ-IIIx physical abilities item [AIQ-IIIx SP # 27] correlated .23 with the Athletics code for the autobiographical photo essays. (Dollinger, S. J. (1996). Autophotographic identities of young adults: With special reference to alcohol, athletics, achievement, religion and work. *Journal of Personality Assessment*, 67, 384-398.) ("Academic/college" on AIQ-IV = 36 40 44)

**Note: AIQ-IV #23 ('social class') loaded on both SI and CI in college students (especially on SI at Dartmouth) but we expect it should probably load as a CI item

among non-college adults.

In general, the SP items are intended to provide at least single item assessment of the subjective importance of dimensions that have been included in various theories and measurement models of multidimensional self-esteem (e.g., Briggs, S. R. & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality*, 54, 106-148.)

APPENDIX D: INTERVIEW GUIDE

Introduction

Background information – the purpose of the interview is to understand the factors that influence people’s interaction with and association to technology in their life. Also, the purpose is to gather in-depth information about how they approach technology in their search for health information.

Section One: Personal Data

What is your age?

What is your racial/ethnic background?

What is your family background (e.g. number of children, marital status)?

What is your education background?

What is your current socio-economic background?

What type of geographical community do you currently work in?

What is your education level to date?

Section Two: Shaping and Influencing Factors

What has been your experience with Internet technology?

What has been your experience with searching on Internet technology?

Have these experiences affected/shaped your use of Internet technology?

What events or experiences have influenced your identity in relation to technology or vice versa?

What is your main purpose for using technology?

Are there people who were influential in your understanding or use of technology?

How has diabetes affected your use of technology or the Internet?

What is your experience searching for information on health related information?

Section Three: Environmental Data

Where do you use technology?

What role does technology play in your daily life?

How does your location/environment affect your association to technology?

Do you interact with a network of people through Internet technology?

APPENDIX E: INDIVIDUAL DIFFERENCES QUESTIONNAIRE

| Internet perceptions | | Very Much Agree = 5 | 4 | Not Sure = 3 | 2 | Do Not Agree= 1 |
|---|--|------------------------|---|--------------|---|--------------------|
| I usually only look at things on the Internet that someone has told me about. | | | | | | |
| I manage to find my way around the Internet even though it is sometimes hard. | | | | | | |
| I do not usually find anything I need on the Internet. | | | | | | |
| I usually focus on my interest and avoid other random material when using the Internet. | | | | | | |
| I am ready to look through random material for useful information on the Internet. | | | | | | |
| If I had to choose, I would pick to search using a word instead of looking around on the Internet. | | | | | | |
| The Internet is too random for me. | | | | | | |
| I think the pictures and icons on the World Wide Web make me want to use the Internet more than if there were only words. | | | | | | |
| When I use the Internet I am not as "in control" as I would like. | | | | | | |
| I would tell someone like myself: the best way to learn to use the Internet is to look around at everything to get a feel for things before spending time to learn only one part of the Internet. | | | | | | |
| I often get lost on the Internet. | | | | | | |
| It is better to use the Internet when you know what you need instead of just looking around. | | | | | | |

| Cognitive complexity | | Very Much Agree = 5 | 4 | Not Sure = 3 | 2 | Do Not Agree= 1 |
|--|--|---------------------|---|--------------|---|--------------------|
| I do not like problems where there is no one clear best answer. | | | | | | |
| I am the kind of person who can see both sides to a question. | | | | | | |
| When I have a problem, I will probably look at it from many different sides. | | | | | | |
| I think it is good to think in terms of "black and white," rather than of "shades of gray" | | | | | | |

| Experience | | Very Much Experience =5 | | Some Experience = 3 | | No Experience =1 |
|---|--|-------------------------|--|---------------------|--|------------------|
| How much experience I have searching the World Wide Web for information using a search engine. | | | | | | |
| How much experience I have doing Boolean searches. | | | | | | |
| How much experience I have searching the World Wide Web for health information. | | | | | | |
| How much experience I have finding what I am looking for on the World Wide web using a search engine. | | | | | | |
| How much experience I have with a computer. | | | | | | |
| How much experience I have in trusting my ability with computers. | | | | | | |

| Identity Characteristics | Extremely Important =5 | Somewhat Important = 3 | Not Important =1 |
|---|------------------------|------------------------|------------------|
| The things I own, my possessions | | | |
| My personal values and moral standards | | | |
| My popularity with other people | | | |
| Being a part of the many generations of my family | | | |
| My dreams and imagination | | | |
| The ways in which other people react to what I say and do | | | |
| My race or ethnic background | | | |
| My personal goals and hopes for the future | | | |
| My physical appearance: my height, my weight, and the shape of my body | | | |
| My religion | | | |
| My emotions and feelings | | | |
| My reputation, what others think of me | | | |
| Places where I live or where I was raised | | | |
| My thoughts and ideas | | | |
| My attractiveness to other people | | | |
| My age, belonging to my age group or being part of my generation | | | |
| My gestures and mannerisms, the impression I make on others | | | |
| The ways I deal with my fears and anxieties | | | |
| My sex, being a male or a female | | | |
| My social behavior, such as the way I act when meeting people | | | |
| My feeling of being a unique person, being distinct from others | | | |
| My relationships with the people I feel close to | | | |
| My social class, the economic group I belong to whether lower, middle, or upper class | | | |
| My feeling of belonging to my community | | | |
| Knowing that I continue to be essentially the same inside even though life involves many external changes | | | |
| Being a good friend to those I really care about | | | |
| My self-knowledge, my ideas about what kind of person I really am | | | |
| My commitment to being a concerned relationship partner | | | |
| My feeling of pride in my country, being proud to be a citizen | | | |
| My physical abilities, being coordinated and good at athletic activities | | | |
| Sharing significant experiences with my close friends | | | |
| My personal self-evaluation, the private opinion I have of myself | | | |
| Being a sports fan, identifying with a sports team | | | |
| Having mutually satisfying personal relationships | | | |
| Connecting on an intimate level with another person | | | |
| My occupational choice and career plans | | | |
| Developing caring relationships with others | | | |
| My commitments on political issues or my political activities | | | |
| My desire to understand the true thoughts and feelings of my best friend or romantic partner | | | |
| My academic ability and performance, such as the grades I earn and comments I get from teachers | | | |

| | | | | | |
|---|--|--|--|--|--|
| Having close bonds with other people | | | | | |
| My language, such as my regional accent or dialect or a second language that I know | | | | | |
| My feeling of connectedness with those I am close to | | | | | |
| My role of being a student in college | | | | | |
| My sexual orientation, whether heterosexual, homosexual, or bisexual | | | | | |

APPENDIX F: DATA DEFINITIONS

| Individual Differences Questionnaire (Devised from Ford et al., 2001 & Cheek et al., 2002) | Definition and Classification Process | Types of Responses |
|--|--|---|
| Internet Perceptions (Ford) | This factor consists of 12 items which probe the participant to explore their affective beliefs about the use of and skills with the Internet. The questions are also used to assess the participants study approaches relative to the Internet which can be classified as intrinsic (deep) or extrinsic (surface) reward motivation. | Responses are Intrinsic (deep) motivations or Extrinsic (surface) motivations. |
| Experience (Ford) | This factor consists of 6 items which help to establish the participants' perception about their own experience and skills (self-efficacy) with computers and searching on the Internet. | Responses are a number on a scale of 1 to 5, 5 being the highest level of experience; 1 being the lowest level of experience. A 0 report would indicate no experience. |
| Cognitive Complexity (Ford) | This factor consists of 4 items which probe the participant to explore their perceptions on their preferences in cognitive processing. In this measure participants are able to rate whether they prefer to engage in relativistic (validity of ideas dependent on the context) or dualistic thinking (validity of ideas based on dichotomies, black or white). | Responses show the participant to be either: relativistic (validity of ideas dependent on the context) or dualistic thinking (validity of ideas based on dichotomies, black or white). |
| Identity (Cheek) | This factor consists of 45 items which evaluate identity orientations. The questions assess the importance that individuals place on various identity attributes and characteristics when constructing their self-definitions. The identity types which this scale evaluates are personal, social, collective, and relational identity. Personal identity focuses on the importance of self and beliefs about self; social identity relates to beliefs about belonging to certain demographic or social groups, collective identity refers to group identity as well but more specifically related to family; and relational identity focuses on values related to intimate relationships with close friends or romantic partners. | Responses are the highest reported factor based on percentages. PI – Personal Identity RI – Relational Identity CI – Collective identity SI- Social Identity PI/RI – Personal/Relational Identity (percentages were equal) RI/CI – Relational/Collective Identity- (percentages were equal) |

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SELECTED PUBLICATIONS

Refereed Journal Articles

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