THE RELATIONSHIP BETWEEN CULTURE AND ON-LINE SEARCH BEHAVIOR

by

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Abstract

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Internet based information retrieval systems, commonly called search engines such as Google and Yahoo, play a vital role in the Internet searching experience. Regardless of the goal pursued by a user when accessing the Internet, the use of a search engine to complete such a goal is generally unavoidable. The need to use a search engine is independent of task, subject matter, or even the context where such a query is happening.

Culture affects all activities and endeavors of individuals. It influences the frame of reference that people use to evaluate problems and situations, make decisions, and reach conclusions. Consequently, the cultural background of a person affects on-line behavior.

The purpose of this study is to validate the Culture On-Line Search (COLS) model. This model rests on the Unified Theory of Acceptance and Use of Technology (Venkatesh and Morris 2003) and Hofstede's (1980) cultural dimensions as theoretical foundation. These models were integrated to establish a link between the dimensions identified by Hofstede and the use of search engines. Hypotheses were developed to

evaluate how Hofstede's cultural variables moderate the relationships between performance expectancy, effort expectancy, social influence and behavioral intention. Analysis of the model suggests that individuality, power distance, uncertainty avoidance, and time horizon moderate these relationships. These results reveal that the level of uncertainty avoidance and time horizon affect the relationship between effort expectancy and behavioral intention. Furthermore, the level of individuality and power affect the relationships between social influence and behavioral intention.

While similar research exists, the uniqueness of this work lays on the fact that nationality is not used as a proxy for culture. Culture is operationalized by using the Hofstede Survey Value Model and rating participants with respect to different culture dimensions. The novelty of this approach extends the ability to generalize conclusions because results do not link behavior to specific nationality but to dimensions of culture. In addition, the proposed model can be extended, since it can be modified and applied to other information systems. Future research may include re-testing the model with other populations and systems.

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Dedication

This Doctoral Dissertation is dedicated to my mother and my brothers who, through all the years of my life, prepare me with all that was necessary to complete this project. This dissertation is our work.

This work is also dedicated to Claudia, Copete, Fanny, Carlos, Marcela, Sandra, Karina, Fernanda, Gabriela, Sebastian, Juana, Lola, Jeanette, Tomy, Helen and Malena. These are the people with whom I shared some of the best moments of my life.

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Chapter 1.

Introduction

The primary objective of this dissertation research is to investigate the impact of cultural dimensions on the use of search engines. In this chapter we highlight the prevalent position that search engines play in the Internet experience. Following this, we provide a brief definition of culture and justify the important effect that it has in all human endeavors. The remainder of this chapter is devoted to describing the proposed research and research questions.

1.1 Information Retrieval and Search Engines

Internet based information retrieval systems, generally known as search engines such as Google and Yahoo, play a vital role in the Internet searching experience. There is a vast amount of information on-line; information retrieval engines filter the available information based on user provided keywords. Results from the search process are organized by ranking based on relevance and popularity. The importance of these engines is made evident as Google and Yahoo are at the top of the list of the most visited web portals (Alexa.Com 2010) The predominance of these search engines is also manifested by the fact that these tools are leading media for promotion and advertisement. Google's advertising revenue for 2009 is reported to be close to twenty-three billion dollars (Google 2010). Google is not only the biggest advertising company in the world, but also a company with one of the largest revenue streams in any industry.

Many on-line sessions begin with users performing a search to create a subset of information in an area of interest using search engines like Google, Yahoo, or Bing. Additional interaction, by refining queries in the search engine, allows users to further narrow the result set to increase accuracy. In this way, search engine technology reduces information overload and makes the information retrieval process simple.

Search engine utilization has grown at an unprecedented rate with Google having a clear lead. In concert with Google's growth since its inception in 1997, developments in communication and Internet connectivity have resulted in a "smaller world". The speed and reach of these technologies has impacted information dissemination and increased globalization. This is one of the reasons why it has become important to examine culture in the field of information retrieval systems.

1.2 Culture

Current research in Information Systems (IS) has examined the effect of culture in the adoption and use of different technologies. However, research examining the impact of culture on the way users search for information on-line is more limited, albeit increasingly common in recent years. Search engine portals and e-commerce sites are universal internet destinations. Search engines assist in retrieving on-line information, regardless of the location or cultural background of the users. Most search engine technologies were originally developed in the United States, and therefore, intentionally or not, there are design features embedded in these systems that reflect values that are characteristic of American culture.

Culture influences the frame of reference that individuals use to evaluate problems and situations, make decisions, and reach conclusions (Hall 1976). Consequently, the cultural background of an individual affects on-line behavior. Nationality, a proxy for culture, has been reported to affect on-line behavior (Leidner and Kayworth 2006). While the technology is identical everywhere, the way users perceive and use a particular technology varies. Some search engine users may select and emphasize using particular features of the search engine, while others may choose other features. For example, it has been observed that queries placed by users in the United States are likely to contain more operators (include, exclude, wildcard, etc.) than queries placed by users in Europe (Cacheda and Vina 2001; Jansen and Spink 2006).

Furthermore, culture influences the perception that users develop about systems. Such is the case with:

- Search engine user perception of the effort required to use the search engine;
- Performance gain obtained when using a search engine;
- Other's perception of how the system should be utilized and;
- Perception of the individual about the support provided by the surrounding organization/infrastructure to use the search engine.

These are all examples of variables that are influenced by a user's culture. System usage is also influenced by variables which include age, gender, and experience (Venkatesh et al. 2003). Cultural background also influences the use of a system, as evidenced by the literature that examines system use and culture (see Section 2.5). According to (Hofstede 1980), cultural background is composed of different dimensions,

including individualism/collectivism, time orientation, power distance, masculinity/femininity, and uncertainty avoidance. These dimensions are described later in this proposal. This research seeks to understand how the variables identified by Hofstede affect the acceptance and use of search engines.

1.3 The Proposed Research

Because culture affects the endeavors and activities of individuals and organizations, it is important that culture be included in the array of variables that are examined when studying an IT process, system, organization, or artifact.

A variety of studies have reported on different aspects of search engine usage. In particular, there is a need to understand the factors that influence the effectiveness of search engine usage (Ford and Miller 1996; Ford, Miller et al. 2001). The existing research links on-line and search behavior to cognitive variables, gender, age, and skill (Borgman 1985; Borgman 1999; Choo, Detlor et al. 2000; Cool, Park et al. 1996; Dimitroff 1992; Marchionini 1989; Marchionini 1995; Navarro-Prieto, Scaife et al. 1999; Savage and Knepshield 2000; Savage, Belkin et al. 1997; Slone 2002). Other research has described the particular on-line behavior of individuals from some countries and compared these to the search behavior of individuals from the United States (Tan, Wei et al. 1998). There is, however, limited research connecting cultural dimensions (i.e. individualism/collectivism, time orientation, power distance, masculinity/femininity and uncertainty avoidance) to on-line behavior. Furthermore, the existing research assumes that all individuals from a particular geographic region are characterized by identical cultural traits. This may not be true in the current global environment, where most

metropolitan areas have diverse populations. For such areas, it would be invalid to assume that the population is a homogeneous group.

The proposed research will investigate the potential link between cultural variables and on-line behavior. This research will provide a better understanding of on-line search engine usage and other on-line tools. By uncovering differences in behavior of individuals from various cultures when using any of these systems, it may be possible to improve search engines, their corresponding interfaces, presentation, relevance, and type and quantity of information they provide. Furthermore, the conclusions of this research may also apply to other systems which are used globally. The framework and research method proposed here can help assess how culture influences other systems.

Jansen and Spink (2006) suggest research should be done in information retrieval across global regions, an area that, according to these authors, needs attention. Our research seeks to fill this void. An understanding of the impact of culture on user's search behavior could result in the development of systems that address and satisfy users' needs based on their culture. This would result in more efficient interactions between users and search engines, which may lead to better on-line experiences. Existing research focusing on the adaptation of websites for use in certain countries addresses layout and content (Ahmed et al. 2009; Singh et al. 2004; Singh et al. 2006; Twu 2009). Our research would not only contribute to this area of findings, but also provide a research model to evaluate how culture affects usage of technology.

1.4 Research Questions

The research examines whether individuals from different cultural backgrounds exhibit different on-line behavior when using search engines. The role of culture as a moderator in the relationship between the main constructs of the Unified Theory of Acceptance and Usage of Technology (performance expectancy, effort expectancy, social influence, and facilitating conditions), proposed by Venkatesh et al. (2003) and intention and use behavior are investigated.

Because culture cannot be separated from the individual (Hall 1976; Hofstede 1980; Walker 2002), it is implicitly assumed that behaviors that are innate to a culture are replicated when using search engines. Moreover, while these technologies are the same across geographical areas, users are not. When using search engines, a user may focus on certain features of the search engine in a manner that reflects the user's cultural background. Such is the case, as mentioned previously, of Boolean operators in search engine queries. Research has shown that users in the United States tend to make more use of Boolean operators than their counterparts in Europe (Cacheda et al. 2001; Jansen et al. 2006).

In most of the information systems literature which includes culture as a variable, the focus is on technology adoption and diffusion (Straub, Keil et al. 1997; Straub 1994), Group Decision Support System ("GDSS") (Aiken, Hwang et al. 1993; Tunga and Quaddus 2002), and virtual teams and collaborative environments. Ford et al. (2003) states that the impact of culture on several areas of IS, including development and operations, has rarely been examined. Furthermore, most studies in IS that have used

culture as a factor are limited in focus to the United States and other western cultures (Zhang and Lowry 2008). In fact, for most of the research developed in the United States, the conclusions reached may not directly apply in other cultural settings (Robichaux and Cooper 1998). Recent research on collaborative systems not only emphasized this, but also points out multiple issues with the current research (Zhang et al. 2008)

Straub et al. (1997) performed a study with the intention of validating the Technology Acceptance Model (TAM) in a non U.S. culture. Their conclusion points out that TAM, a well cited model in the IS literature, "may not hold equally well across cultures" (1997) . This is also the case with UTAUT, which has not been validated in non-western cultures (Al-Gahtani, Hubona et al. 2007). The present study seeks to evaluate intention to use a technology, using constructs that have been widely used in IS, while incorporating cultural variables. This model will evaluate behavioral intention while taking into consideration the cultural attributes of the group in question.

A number of recent studies in information systems relating to search engines include culture as a variable (Leidner et al. 2006). In these studies the focus is on the behavior of individuals based on their nationality and how this behavior compares to individuals from the United States (Calhoun, Teng et al. 2002; Jansen et al. 2006; Tan et al. 1998; Watson, Ho et al. 1994). In some cases, students living or studying in a particular country participate in studies; they are categorized as nationals of the country, even though the possibility exists that the students in question are of other nationalities and may have spent limited time in the country. Furthermore, the nationality of an individual does not imply that the individual shares the same cultural patterns that are

generally attributed to the country as an aggregate. Hofstede (1980) warned about falling into this mistake.

Research connecting cultural dimensions (i.e. individualism/collectivism, time orientation, power distance, masculinity/femininity and uncertainty avoidance) to on-line behavior is less common, but also falls into categorizing individuals based on their country of nationality.

In the proposed study, participants completed a modified version of Hofstede's Survey Value Model to determine their ranking on the different cultural dimensions. Following this, participants completed an adapted version of the UTAUT survey. No study of this kind was found in the literature review.

More specifically this research seeks to determine:

- Is there a link between Hofstede's cultural dimensions and the use of search engines?
- Does culture moderate the relationship between the main construct of UTAUT and behavioral intention to use a search engine?
- Can UTAUT be adapted in such a way that culture is factored in when determining the behavioral intention of a system?

Chapter 2.

Review of previous work

Two areas of investigation make up the focus of this research: search engines and culture. Thus, the goal of this chapter is to provide a review of previous work on both of these domains. We also look at the field of information retrieval, which precedes search engine research. The most significant frameworks proposed to explain cultural dimensions are reviewed, along with the seminal research that grounds this field. Information systems research using these well-accepted frameworks is also reviewed. The rest of the chapter is used to present the Unified Theory of Acceptance and Use of Technology, which is used as a theoretical framework for the model presented in this dissertation research.

2.1 Areas of Research in Information Retrieval and Search Engines

Research involving search engine technology and internet information retrieval is relatively new. Articles examining search engine technology and internet information retrieval began to appear in the mid 90s' with the development of search engines such as Altavista, Lycos, and Yahoo. We note that search engine research and internet information retrieval is a subset of information retrieval, a discipline that has been researched in a more extensive manner. In fact, a good portion of the early research completed on search engines cited previous research on information retrieval systems in order to provide a solid theoretical background. Most of the research done in information

retrieval before the development of search engines was evaluated with databases. In many cases library search systems were used (Bates 1979).

Research in search engine technology and information retrieval on the Internet has rapidly expanded due to both the significant role that search engines have gained in popular use and the increasingly complex and sophisticated algorithms used. To illustrate this rapid growth and interest from information systems researchers, we point out that the first commercial search engine companies (Altavista, Lycos, and Yahoo,) were founded between 1994 and 1995. Just two years later, in 1997, the Board of Directors of the Journal of Documentation identified multiple areas of research within information retrieval that are closely tied to search engine research. Research in this area grew rapidly and resulted in the publication of literature reviews as early as 1999 (Chowdhury 1999). In fact, one of the contributions of Chowdhury (1999) in this early work was the promulgation of ten areas of research within the discipline of on-line information retrieval:

- search engines;
- retrieval evaluation;
- reliability of information on the web;
- user interface;
- user studies;
- organization of information on the web;
- vocabulary control;
- search output from the web;

- intelligent search agents; and
- web vs. traditional databases (online and CD-ROM).

This set of areas of research attempted to categorize the growing number of publications produced before the end of the century in a field that, at the time, was only in existence for a mere six years. Since then, the areas of research within on-line information retrieval and search engines have evolved, and the quantity of published articles has grown exponentially. In our literature review of search engines we attempt to provide some historical context for this field of research by highlighting significant milestones. In addition, we provide a brief description of the current state of search engine research. A summary of the research reviewed is presented in Table 1, at the end of the end of the section.

2.2 Past and Current Research in Information Retrieval and Search Engines

Early research in information retrieval modes was performed by Bates (1979), who explored search tactics in library databases. This research examined searching on line database records from four different aspects: term strategy, database file structure strategy, interaction strategy, and search formulation strategy. Bates was able to identify a total of twenty-nine search "tactics" that are applicable to on-line systems. While this early work was based on library databases, it applies to information retrieval using search engines because users still select and employ the strategies described by Bates. Based on Bates' work, Cool et al. (1996) examined search strategies among different subjects and analyzed content by identifying synonyms, controlled vocabulary, interaction with a

thesaurus, and the structure of queries. While the strategies examined follow those proposed by Bates, Cool et al. (1996) also explored different variables associated with the actual content of queries. Based on the literature review, this is the first research in which variables which evaluate query content are analyzed. At present, the analysis of query composition is a well defined area of research when examining search engine behavior.

Cool et al. (1996) also linked users' previous familiarity and knowledge with information retrieval systems and their performance. In their research, the performance of users who had experience with information retrieval systems where compared to users who had limited or no experience with information retrieval systems. This type of research is receiving some attention today with work investigating the impact of the use of operators within queries on performance (Cacheda et al. 2001; Jansen, Spink et al. 2000).

Other research in information retrieval mode, behavior, and strategy concentrated on search engines. Marchionini's (1995) work was one of the first that actually included tasks requiring searching the Internet. He proposed that there are three searching modes: directed, semi directed and undirected. Directed browsing is a systematic and focused browsing approach with a defined goal. Undirected is non-systematic and open ended with no precise goal. This is the equivalent to browsing a newspaper for articles that may capture someone's attention. Semi directed browsing exists between these two.

Further research in this area investigated search techniques using an Internet browser. Building on previous work, Slone (2002) identified five distinct approaches to internet searching:

- linking;
- searching the Internet by URLs;
- searching the Internet using search engines;
- searching within a specific Website domain; and
- searching a Web on-line catalog.

In this research, search performance was evaluated by looking at number of pages visited and amount of time spent per page. Slone concluded that several factors impacted search performance, including experience, motivation, goals, and user background.

The above-mentioned approaches can be used to describe search behavior. However, these are not enough to provide a complete picture of the mode, strategy, rationale, and behavior used by users when performing a search. In their research, Jansen et al. (2006) expanded these variables by including trends and differences in the session length, query length, query complexity, filters, and results viewed. These additional variables provide a better representation of search mode and behavior.

Other variables that have been reported are fixation time and position of the bottom (or last) result examined in a search engine results page (Lorigo, Pan et al. 2006). These variables were used in combination with an experiment that differentiated between informational and navigational tasks. A navigational task requires a user to find a page belonging to a topic, business, or person, or to find a page that contains a specific piece of information. An informational task will require a user to answer information on a topic by searching for information on line, with no indication of what URLs are required (Lorigo et al. 2006).

The use of operators within a query is also examined in search engine research (Cacheda et al. 2001; Jansen et al. 2006). Operators and Boolean expression allow users to require/ignore documents which contain (or do not) a particular set of term(s). The use of operators has increased as users become more comfortable with the technology. Based on web-log analysis (described later), Jansen et al. (2006) found that searches that originated in the United States contain more operators than searches that originate in Europe.

The impact of gender on search behavior has also been examined. In a study with middle school students, differences were found in the search strategy based on the gender of participants (Roy and Chi 2003). Male participants showed an inclination to move back and forth between submitting searches and scanning the document summaries. Female participants, on the other hand, were more inclined to open and browse entire documents without going through the preliminary scan process that male participants engaged in. Roy et al. (2003) characterized the search patterns or male and female participants as horizontal search and vertical search respectively. These results further strengthen those of Large et al. (2002) who performed similar research with middle school students in a collaborative search environment. Large et al. (2002) concluded that male participants are more active in search behavior, submitting more queries and clicking on links more often. Conversely, female participants spend more time reading content of documents. These two studies showed markedly different search behaviors between males and female users of search engines. Roy et al. (2003) concluded that the difference in search behavior played a role in performance while, Large et al. (2002),

were not able to relate search success with search behavior. Nonetheless, both authors were able to find different patterns of behavior between male and female search engine users.

Other research focused on comparing performance, search mechanism, and database size of the available search engines (Dong and S 1997). This research proved to be useful at the earlier stages of the development of search engines, since the size of a database and its performance, combined with slow internet connectivity, played a significant role in the information retrieval experience. At the present time database size, search mechanism, and response time are variables that, while still significant, are not essential in the search experience of most users. We note that research in search engine algorithm design and optimization is an important technical research discipline within computer science.

A relatively new branch of research on search engines focuses on the examination of web server logs (Cacheda et al. 2001; Jansen et al. 2006; Jansen and Pooch 2001). These studies analyze length, frequency and complexity of terms and queries used, time spent on web pages, and navigation patterns between web pages. When analyzing the research done in this branch of search engine research, two distinct areas of log analysis are noticeable. One area of the research has been able to reach aggregate conclusions which categorize users based on gender, age, and nationality based on navigation patterns. Another area of the research examined the queries for complexity, length, use of operators, and repetition of terms. The first area is concerned with content and requires some semantic analysis, while the second area uses statistical analysis.

There are a number of new and rapidly developing areas in search engine research. These areas include the use of clustering technologies, which permit search results to create groups based on content. While research in this area existed for many years (Croft and Harper 1979; Croft 1980), research specifically related to search engines and clustering technology has recently become more prominent (Zamir and Etzioni 1999; Zeng, He et al. 2004). Another developing area is cross language information retrieval, which attempts to retrieve documents in real time that may exist in different languages (Oard and Diekema 1998). This type of research faces the challenge of being able to process and translate language, which requires semantic understanding (Littman, Dumais et al. 1997).

Research on search engines also includes collaborative filtering, content based filtering, and knowledge based filtering. All these approaches are based on finding analogies with other users. Similarities between users with respect to behavior, previous queries, query content, and other variables are taken into consideration when computing a set of results. The implementation of any of these systems requires the use of data mining and strong statistical analysis. Consequently, such systems can only provide reliable results if there exists sufficient data (Grouplens 2010).

Table 1. Variables examined in search engine research			
Area of Research	Description	Environment	
Strategy and retrieval mode	Term strategy, database file structure strategy, interaction strategy, and search formulation strategy	Library Databases	(Bates 1979)
	Use of synonyms, controlled vocabulary, interaction with thesaurus, and structured query.	Library Databases	(Cool et al. 1996)
Familiarity with information retrieval systems	Previous familiarity and knowledge with information retrieval and their performance	Library Databases	(Cool et al. 1996)
On-line search modes and task type	Identified three modes of browsing: directed, semi directed, and undirected, where browsing can be a systematic activity or a open ended activity	Internet	(Marchionini 1995)
Search approach and technique using a browser	Five distinct approaches: linking, using URLs, using search engines, searching within site, searching using on-line catalog	Internet and search engines	(Slone 2002)
Session length, query length, query complexity, filters, and results viewed.	Examined trends and differences in these variables. These variables are unique to search engines	Search engines	(Jansen et al. 2006) (Jansen et al. 2001) (Cacheda et al. 2001)
Fixation time, position of the bottom results, examined.	Examined time a user stays within a page and the position of the last link examined by the user while controlling whether the task provides URL information or not.	Search engines	(Lorigo et al. 2006)
Informational and navigational tasks			(Cacheda et al. 2001)
Scanning and browsing and	Differences in browsing based on gender. Males tend	Search engines	(Roy et al. 2003)

gender	to scan through an entire page before opening a document while Females did the opposite.		
Activity level/number of queries	Differences in browsing based on gender. Males tend to submit more queries and click more on links than females, who spend more time reading.	Search engines	(Large et al. 2002)
Web Server performance, size of database, and response	Comparison between current search engines and their performance, and result composition	Search engines	(Dong et al. 1997)

2.3 Definition and use of culture in Information systems Studies

An awareness of culture and its impact on information systems is valuable to the understanding of how information systems are used at the national, organizational, and group level and can have an effect in the implementation and use of information technology (Leidner et al. 2006). Finding an objective definition of culture has been an elusive task. In their ample review of culture, Leidner et al. (2006) note that there exist countless definitions, which relate to ideologies, beliefs, assumptions, shared values, collective will, norms, practices, symbols, language, rituals, myths, and other elements. Definitions come from multiple disciplines including psychology, sociology, anthropology, communication, linguistics, business, and others.

While these myriad of definitions exist, several authors agree that culture manifests itself at different levels. Hofstede (1980) affirms that in every individual, at a core level, there is a set of values or guiding principles. Schein (1992) states that at the core level there exists a set of cognitive assumptions. Trompenaars (1997) calls this set of

assumptions implicit culture. These authors agree that these values and assumptions form over time and are deeply embedded in individuals. In fact, these sets of values are acquired early on in life and generally transmitted by those surrounding an individual since infancy. Furthermore, these values and assumptions form a belief system that defines how individuals perceive and relate to each other and to the physical world, and how schemes and strategies are realized. While external circumstances may change during the life of an individual, this belief systems is deeply rooted and likely to remain unchanged. In fact, this system is highly internalized by individuals, and it unconsciously influences all activities.

Apart from the core level described above, culture also manifests itself at an external level, where symbols and other observable artifacts and actions are displayed (Hofstede 1980). At this surface level it may be easy to identify these artifacts and actions, but not necessarily comprehend the underlying cultural assumptions from which they originate. This external level is called explicit culture (Trompenaars et al. 1997). The use of information technology is an observable action where culture manifests itself. Leidner et al. (2006) note that information technology is not culturally neutral and "may come to symbolize a host of different values driven by underlying assumptions and their meaning, use, and consequences". In that sense, this study seeks to analyze observable actions and relate these to deeply rooted cultural traits.

Several definitions of culture have been used in cross-cultural studies in the information systems literature. Four influential frameworks, those of Hofstede (1980), Trompenaars et al. (1997), Hall (1976), and Gudykunst et al. (1988) are cited repeatedly

in information systems studies dealing with culture. Based on the strong empirical evidence provided, Hofstede's work went on to become ubiquitous within the information systems discipline. (A section of this research is devoted to Hofstede's work in the next chapter.)

Trompenaars et al. (1997) proposed seven dimensions of culture; some of which overlap with those proposed by Hofstede (Walker 2002). The other dimensions proposed dealt with variables not considered in Hofstede's (1980) research, such as how individuals from different cultures perceive the world and their surroundings, how individuals from different cultures employ different strategies when thinking and deciding, and how rules and status impact relationships. Table 2 provides a short summary of Trompenaars el al. (1997) conceptualization of culture.

Table 2. Trompenaars et al. (1987) dimensions of culture (adapted)	
Dimension	Definition
Universalism vs. particularism	The extent to which rules and norms apply to everyone equally and the ability to make exceptions for some. Individuals in a society may apply rules and norms equally among all members, regardless of their position, status, or relationship, or may make special exclusions and adjustments for specific cases.
Analyzing vs. integrating	Starting with the whole and decomposing into parts, or integrating the parts into the whole Societies may tackle problems by taking a top down, or bottom up approach.
Individualism vs. communitarianism	The rights and desires of the individual versus the rights and desires of the group Individuals in a society may be willing (or not) to sacrifice personal goals for the goals of the group.
Inner-directed vs. outer-directed	The search for answers using thinking, intuition, and personal judgment, or to seek data in the outside world. In solving problems, a group may resort to their own insights, or to the physical world and empirical data.
Time as sequence vs. time as synchronization	Events happen in different time periods in a sequential fashion, or events may overlap and occur in parallel. In a society, every event and action is a individual unit that requires exclusive attention, or a individual or group could focus on many events and actions.
Achieved status vs. ascribed status	Gaining status and recognition based on effort and performance, or by right Rank and standing is the result of either effort or performance, or it is inherited.
Equality vs. hierarchy	Equality among all members of the group, or ranks that distribute power. The distribution of power is a society may vary by concentrating authority on certain groups or distributing it among members.

In reviewing how culture is defined, Hall's (1976) conceptualization is important because some of the cultural factors he defined are often cited in Information Systems literature. Hall (1976) identified three key cultural factors. These factors have been

associated with some of Hofstede's (1980) and Trompenaars' et al. (1987) dimensions; however it must be noted that this association does not imply an overlap; Hall's (1976) cultural factors describe different variables than the dimensions identified by Hofstede or Trompenaars. For example, Hall (1976) defined "high and low context" cultures, and this has been associated with individualism and collectivism (Gudykunst and Ting-Toomey 1988) where high context cultures are generally considered collectivist cultures, and low context cultures are generally associated with individualism. Table 3 describes the key cultural factors defined by Hall(1976).

Table 3. Hall's (1976) Dimensions of culture

Dimension	Definition
Context	The amount of communication that is transmitted verbally or encoded in other media, such a signals, gestures and codes. High context societies encode messages in a combination of verbal messages with signal, gestures, and other implicit media. An outsider may not understand messages, or may find messages incomplete. Clear differences will arise between insiders and outsiders. Low context societies mostly encode messages verbally and explicitly. Messages are easy to understand, with no hidden meaning.
Time	The perception of time, and how tasks are to be spread within a given period. Monochromic action oriented individuals tend to focus on one task at a time, and cannot be distracted from it. Polychromic action oriented individuals will tend to multitask more, and be open to inconsistent schedules.
Space	The perception of space, personal space, and the space that an individual is entitled to. Different cultures have different perception of what each individual's personal space should be. One individual may be comfortable with limited personal space while another may be uncomfortable.

Kluckhohn el al. (1961) suggest that certain biological traits may contribute to the development of culture. These biological traits are shared by groups which identify with particular beliefs and practices. This conceptualization is significantly different from the ones mentioned before because it's based on the idea that culture is grounded in biological traits in addition to experiences acquired at early stages in life. The basis of Kluckhohn's et al. (1961) values model is the idea that all societies are faced with a finite number of problems, which are universal. These problems may vary from one geographical location to another and in time period, but in essence, they are the same and need to be addressed. In addressing these problems, all societies can also apply a finite number of solutions. However, Kluckhohn el al. (1961) argued that there are specific solutions that are preferred, based on values. These values, or dimensions, are time, relating to the environment, relation to others, and behavior. A summary of these dimensions is shown in Table 4.

Table 4. Kluckhohn el al. (1961) culture factors (adapted)	
Dimension	Definition
Time	In addressing a problem do societies look at the past, present, or future? Past: When addressing a problem, a society must ensure that historical continuity is maintained. Traditions and ritual must be maintained, and a solution must not interfere with this. • Present: In addressing a problem a society must deal with the current situation and accommodate present beliefs to solve the issue at hand. • Future: The focus of a society is to look into the future to address issues by making changes in the present and replacing the old.
Environment	In addressing a problem, how does a society relate to the environment? Mastery: A society can control natural forces. Technology can master all conditions. • Harmony: A society can be part of the environment and live in harmony with it. The goal is to be in balance with all elements of the environment. • Submissive: A society is subject to the elements of the environment and must live with these forces. There is no control or power over the environment.
Behavior	What is the motivation for being and acting? • Being: Motivation is internal, the value obtained from acting is a personal gain, and the group may not see a benefit. • Becoming: The drive of an individual is to increase his or her own abilities. • Achievement: Motivations are external to the individual and are recognized by the group.
Relationships	In addressing a problem, how does each member of the groups see the other? • Hierarchical: In a society, members have varying power. Authority is set by those with power. • Collateral: Consensus among the group is important to preserve harmony and balance. • Individualistic: In a society, decisions are made by each nuclear unit independently of what other groups do.

The three conceptualizations of culture described above, together with Hofstede's, are the most prominent works in the cross culture research discipline. Most information systems research dealing with culture will employ one of these frameworks, with Hofstede's dimensions of culture being the most prevalent (Leidner et al. 2006). Hofstede's dimensions of culture, as the most dominant framework, will be described in the next section.

2.4 Current status of research in information systems involving culture

Current organizational practices, including outsourcing, cross cultural virtual and non virtual teams, and the introduction of software products into foreign cultures has prompted the use of an information systems perspective in the study of cross-cultural behavior in organizations. This type of research, however, is not as extensive as in other research disciplines. For example, earlier work in technology adoption states that culture as a factor in IT research has been seldom studied (Straub 1994). Other research disciplines have been examining culture for many decades. Based on Straub's comment (and the time when the comment was made), it appears as if culture has been recently integrated into IS research. This position is strengthened by the review presented by Ford et al. (2003), which points to the limited number of articles that have been published in IS research, including those using Hoftede's variables, in comparison to other disciplines. In their extensive literature review, Leidner et al. (2006) identified 82 articles in information systems which include culture as a variable. Considering globalization, outsourcing trends, global virtual teams, and decision support systems utilization; it appears that limited attention has been given to the impact of culture in information systems.

Furthermore, when considering other areas of information systems research, such as technology adoption and use, the number of publications found by Leidner el al. (2006) appears insignificant.

While information systems operate the same way everywhere, based on the physical and electronic characteristics of the devices, the effect that the cultural background of an individual has in their adoption, use, appropriation, and relationship to IT has not been analyzed in as much detail as the effect of other variables. In this area, Leidner et al. (2006) provide a review of the articles that evaluate these effects. It must be noted that all the articles compare individuals located in different countries, and assume that these individuals are representative of the culture associated with the country in question. For example, Lippert et al. (2007) found differences in technology adoption, perception, and utilization which they directly linked to Hofstede's masculinity dimension. This study observed differences between the United States and Canada, two countries that are generally considered analogous in terms of culture.

From a technical perspective, search engines, which were originally developed in the United States, appear to operate identically everywhere, regardless of cultural context. Some features embedded in these systems (in a conscious or unconscious manner), however, reflect values that are generally associated with American culture (Calhoun et al. 2002). The research of Tan et al. (1998) on Group Decision Support Systems (GDSS), published in the European Journal of Information Systems, supports this position. These researchers state that most of the GDSS literature is concentrated in North America and may not be useful in other countries because theories grounded in the United States may

not apply in other cultures. Following this argument, and considering that most search technology has been developed in the United States, the question that surfaces is whether those values that are generally associated with the American culture such as individualism, short time horizon, competitiveness, low power distance, entrepreneurship, and so forth (Hofstede 1980) are embedded in these technologies. Furthermore, if these values manifest themselves in one way or another, are these in line with the values of cultures where these search engines, filters, and forums are used? Put differently, a search engine developed in the United States has features that reflect values associated with the United States. If this search engine is used in Asia, for example, some features of the search engine would not be congruent with the values that are characteristic of Asian cultures.

There are a number of studies that examine culture and on-line behavior. A large number of the studies reviewed describe how cognitive and psychological characteristics affect search behavior (Borgman 1985; Borgman 1999; Choo et al. 2000; Cool et al. 1996; Dimitroff 1992; Marchionini 1989; Marchionini 1995; Savage et al. 2000; Savage et al. 1997; Slone 2002). Furthermore, some studies examined how users in different countries varied in their use of technology. For example, in the systems development literature, we found that British and Americans tend to concentrate more on efficiency and effectiveness, as oppose to Nordic countries, who favor relationship and the effect of systems at the individual level (Dagwell and Weber 1983). This is in-line with the time-horizon and collectivism dimension proposed by Hofstede (1980). Similar results were obtained in other studies (Leidner et al. 2006), where emphasis is on individualist values

such as punctuality, efficiency, planning, etc. as opposed to collectivist values such as relationships, group goals, etc.

Another set of studies (Keil, Tan et al. 2000; Kim 2008; Srite and Karahann 2006; Wilson 1997)contemplates risk, risk management, and uncertainty avoidance. In this group, multiple studies examine the risk profile of a society and link it to technology adoption, risk management, and project management. We regard the dimension of uncertainty avoidance as one of significant impact in the study of search engine, filters, and forums usage since an individual will try to mitigate the risk of obtaining inaccurate information in different ways based on cultural background. The strategy used to do this varies based on the individual's uncertainty avoidance level.

2.5 Hofstede's Culture Dimensions

There are multiple conceptualizations of culture. In this research we have presented those that are not only relevant, but have been widely used in information systems research. General agreement exists that the most commonly used definition of culture states that culture is "the collective programming of the mind, which distinguishes the members of one category of people from another" (Hofstede 1980). This programming extends from language and symbols to patterns and interactions. Hofstede's conceptualization of culture has been used extensively inside and outside of the field of information systems (Ben Zakour 2004; Leidner et al. 2006)

Hofstede's research involved more than 100,000 respondents from over 70 nationalities and more than 20 languages. The data collected resulted in the development of a model which includes five dimensions which can be used to measure national

culture. Hofstede describes these dimensions as Power Distance (PD), Individualism versus Collectivism (IC), Masculinity versus Femininity (MC), Uncertainty Avoidance (UA), and Time Horizon (TH). These dimensions are summarized in Table 5.

Table 5. Hofstede's (1980) Cultural dimensions (adapted)	
Dimension	Definition
Power distance	The degree to which the less powerful members of a society expect differences in the levels of power [hierarchical (authoritarian) or equalitarian (follower)]. The likelihood that an individual with less power (at a lower point in the hierarchy) can influence decisions made by those with more power (at a higher point in the hierarchy)
Individualism vs. collectivism	The extent to which people are expected to stand up for themselves, or act predominantly as a member of the group or organization. The willingness of an individual to sacrifice their own personal interests for the interests of the group and vice versa.
Masculinity vs. Femininity	The role overlaps that may exist among male and female members of a society. Masculine cultures value competitiveness, assertiveness, ambition, accumulation of wealth, and material possessions. Feminine cultures value relationships, quality of life, commitment, charity, compromise, and relationship building.
Uncertainty avoidance	How societies attempt to cope with anxiety by minimizing uncertainty. The level of risk taking and risk tolerance of a society. The strategies to minimize uncertainty include laws, rules and structures that limit outcomes.
Time Horizon	Describes a society's time horizon and the willingness of individuals to sacrifice long-term goals for short-term goals and vice versa.

The national cultural dimensions presented by (Hofstede 1980) have been used repeatedly in cross-cultural studies in many disciplines, including Information System research (Leidner et al. 2006). Hofstede's (1980) is possibly the most cited and used work in the field of cross cultural research. These variables and dimensions which distinguish cultures are described below. Table 6 contains a summary of the research presented below.

2.5.1 Power Distance.

Cultural differences affect the way decisions are made. While the studies reviewed did not examine the impact of power distance on search engine technology, several studies in information systems have linked power distance and participation in GDSS. Mejias et al. (1996), for example, explored whether the use of a GDSS would attenuate power distance. When using a GDSS, all users are presented at the same hierarchical level (organization-wise). If so, users may feel more comfortable expressing opinions. The effect of a GDSS would therefore be more pronounced in cultures with high power distance.

An empirical cross-culture study conducted by Watson, Ho et al. (1994) found valuable evidence of these effects. While in the United States communication among managers and employees is generally characterized as open and direct, Singaporean employees rarely object to opinions made by managers. The use of GDSS by these two cultures reflects their power distance. However, when the anonymity feature is enabled in these GDSSs, Singaporeans tend to express negative opinions more frequently. Based on the results of this study, the use of GDSS tends to be less effective in countries with a high power distance unless the system is used anonymously. This conclusion, however, is contradicted by the findings of Chung and Adams (1997) who did not report significant differences linked to culture when evaluating the use of GDSS among Koreans, who also possess a high power difference, and Americans, who do not. These cases point out the differences in usage of IS and behavior of users among different cultures.

Power distances may also influence the process for selecting strategies to deal with complex problems and situations. In low power distance environments, assertive and control-oriented strategies take place more frequently (Sinha 1997). In high power distance environments, assertive and control oriented strategies are only taken by those who have a higher hierarchical status. In low power distance environments, any individual can propose strategies and take leadership, since decision making power is equal among members of a group.

2.5.2 Individualism versus Collectivism

Collectivist cultures tend to approach tasks, problems, and solutions as a group, sharing information in order to make decisions. Individuals from individualistic cultures prefer to undertake problems by themselves. Consequently, there is more shared meaning and common knowledge in an organization composed of collectivist members than in an organization composed of individualistic members. Based on this, we expect members of an individualistic culture to rely more on information systems to obtain information to make decisions than those of collectivist cultures, who gather/share information from/with each other (Leidner, Carlsson et al. 1999).

In collectivist cultures, the amount of shared context or knowledge between participants in a dialogue is significantly higher than in individualistic cultures. In high context cultures, meaning is derived from the context of a communication exchange (Gudykunst 1983). For collectivist cultures, where context is high, individuals share a vast array of information which creates shared knowledge (Hall 1976). Low context

communication is predominant in individualistic societies. High-context communication is prevalent in collectivistic cultures (Gudykunst et al. 1988).

Information is shared on a good-to-know basis, as opposed to a need-to-know basis, for individualistic cultures (Hall 1976). In high context cultures, implicit information is shared and the communication process relies on understanding the meaning of the verbal messages as well as interpreting cues such as tone of voice, body language, facial expressions, voice patterns, the use of silence, and past interactions. These cues, when understood, transmit information that would otherwise need to be encoded verbally. Participants of a conversation capture information from reading these cues from each other, which would be unnoticeable to those who do not share the same context.

While collectivist cultures are generally regarded as high context cultures, individualistic cultures can generally be classified as low context cultures. In these, individuals have limited shared knowledge, or assume a limited shared knowledge. Verbal messages are the primary communication medium. Other cues are not as important, and are sometimes blocked. Individuals in low context cultures generally opt for a reduced number of non-verbal cues since non-verbal cues could transmit equivocal messages due to the lack of common context. For these cultures all information needs to be communicated explicitly since there are few shared codes and symbols. When communicating, there is only one literal meaning to a message, and the meaning is not affected by occasional non-verbal cues that may be transmitted simultaneously. Individuals in low context cultures rely on documents and contracts that reinforce

situations and conditions. Contextual information is generally regarded as ineffectual, irrelevant, and superficial. In contrast, individuals in high context cultures regard individuals in low context cultures as too direct and rude because of their lack of interest in what they consider superfluous information (Walker 2002).

The impact of technology adoption is moderated by national culture, and individualism and collectivism have an impact. An empirical study compared the use of Computer Mediated Communication (CMC) by Americans and Singaporeans (Tan et al. 1998). The American's individualist position was well reflected in the use of CMC. Americans tended to be outspoken and expressed opinions more frequently. Singapore's collectivist nature was also well displayed when using CMC. Singaporeans tended to agree with the majority and be less willing to contradict. The example described above emphasizes the effect of national culture in the use of IS.

In teams composed of members from different cultures, where the team is working towards a common goal, individualist members were inclined to trust collectivist members more than collectivist members trusted individualist members (Hall 1976). This can be explained by noting that collectivist members place the group goals ahead of their own, becoming more loyal to the team. Individualist members, on the other hand, try to work independently and show individual initiative. Additionally, collectivist members tend to conform more to the opinion of the majority to create harmony within the group.

Other factors influence behavior of individuals within their groups. In collectivist cultures the individual seeks acceptance from the group, and values the sense of belonging to a group (Bond and Hwang 1986). This is particularly common in Asian

cultures (Hall 1976; Hofstede 1980). Individuals who come from collectivist cultures will provide information and seek approval from the members within their social boundaries, the "in-group", and will discard those who are outside of the social boundaries, the "out-group". Those who come from cultures characterized as individualist will give equal value to those in the in-group as to those in the out-group. Empirical evidence shows that in collaborative information retrieval environments, individuals from collectivist cultures will be more willing to exchange information with members of the "in-group" (Bond et al. 1986).

The previously mentioned behavior has been reported in collaborative search environments, where those who were characterized as collectivist exchanged more information with their in-group. On the other side, those characterized as individualist did not give preference to any group. For collectivist cultures technology usage is perceived as a means to achieve organization among the group, with emphasis on the group. Individualistic cultures see technology as a means to achieve individual efficiency and decision making (Cho and Lee 2008). More specifically to on-line search behavior, members of collectivist cultures would find relevance ratings constructed from other users' opinions more trustworthy than relevance ratings constructed with measures such as number of hits. Therefore, collectivist cultures are likely to value a search engine that presents relevance rating based on other's opinions, and vice versa.

2.5.3 Masculinity versus Femininity

The level of masculinity or femininity of a culture has been linked to behavior in GDSS. Members of masculine cultures value recognition (Hofstede 1980). A GDSS

meeting in which the anonymity feature is enabled will result in reduced participation from participant who reflect values associated with masculinity cultures (Robichaux et al. 1998). Furthermore, such an anonymous GDSS meeting will encourage masculine members to "free-ride", while member who reflect values associated with low masculinity cultures will contribute to ensure the "well-being" of the group. Individuals from feminine cultures will also appreciate anonymity because they fell that this setting creates less conflict. In a different setting, individuals from masculine cultures tended to generate more conflict than individuals from cultures that are classified as low in masculinity. In addition, individuals from masculine cultures propose fewer conflict resolution strategies than other participants. (Tunga et al. 2002).

Furthermore, it has been reported that in some groups, time dominance, which is the time allocation obtained by contentious techniques such as raising the voice, is decreased since a GDSS system may be unable to transmit these cues (Robichaux et al. 1998). In such environments members of masculine cultures tended to participate less than members of feminine cultures. Electronic communication media, such as email, GDSS and websites, are limited in the number of cues they can convey (Daft and Lengel 1984). Based on the research described above, assertiveness and aggressiveness, which are values associated with masculine cultures, are difficult to convey in these media.

Another study analyzed web sites and their manifestation of masculine and feminine values (Zahedi, Pelt et al. 2006). In this research, several websites were analyzed and masculine and feminine "signifiers" were found. Several masculine cultural values were identified such as strength, challenge performance, dominance, success, and

leadership. The feminine values identified were sympathy for the weak, charity, relationship, commitment, sharing, and concern for life. The study found that those websites that were categorized as masculine generally contained numerical and statistical information and tables to describe events and facts. Masculine cultures tend to rely on factual information (Hofstede 1980). The websites that were categorized as feminine generally resorted to intuition and feelings when describing events and facts (Zahedi et al. 2006).

Sites classified as masculine and feminine also used different tones to communicate, where words may be emphasized by using bold typefaces, and exclamation marks. This is in addition to the use of an assertive tone and challenging, sarcastic, and ironic comments to justify claims. Feminine websites were found to resort to explanation to justify a claim, and deferring explanation to experts, if necessary.

Feminine cultures value relationships (Hofstede 1980). In those websites that were categorized as feminine, the language intended to build a relationship with the reader. Articles such as “you” were used often, as opposed to “one” which was more common in websites that were categorized as masculine. In addition, imperatives, which show power and assertiveness, were more frequent in masculine rated web sites.

The amount of dependence and fixation on technology by a culture is also a result of the level of masculinity/femininity. Masculine cultures tend to be more technology focused (Hasan and Ditsa 1999). Feminine cultures also value technology, but emphasis is placed on users and relationships. Masculine cultures may evaluate a technology by

examining quantitative performance; while feminine cultures evaluate a technology by looking at the impact it has on its users and the workplace.

2.5.4 Uncertainty Avoidance

Uncertainty avoidance has been examined by Information System research. Technology adoption and diffusion has been linked to the uncertainty avoidance level of the culture. The adoption of certain technologies may take longer in some cultures, where users need to have certain assurances about a technology before the technology is widely adopted and standardized.

Wilson (1997) proposed a link between risk aversion and search behavior. This proposition was not examined by any other researchers and suggests further investigation. Uncertainty avoidance, the dimension suggested by (Hofstede 1980), measures the degree to which an individual tolerates ambiguity. (Hofstede 1980) determined that a culture with a high level of uncertainty avoidance generally prefer rules and structure, and enjoy having a higher degree of control. Individuals that are characterized as high in uncertainty avoidance will require a larger number of searches to come to a conclusion (Wilson). Individuals that rate low on the uncertainty avoidance dimension will come to a conclusion with a lower number of search iterations.

In addition, the risk profile of an individual can be weighed against the potential social impact of a decision. Individualistic cultures value risk taking and confrontation which may result in increasing personal benefits while harming the status of other (Ohbushi, Fukushima et al. 1999).

2.5.5 Time Horizon

Culture influences an individual's acceptance of different time horizons or outcome expectations. An individual who comes from a short term oriented culture places more value on immediate results which are tangible. A higher value is given to any method or strategy that will provide immediate results. Efficiency is a key aspect of a process, and it is as important as the final result (Hall 1976; Hofstede 1980). Cultures that exhibit values of long term orientation uphold that perseverance, persistence, and thrift are necessary to achieve goals. Immediate satisfaction is not seen positively, since all future rewards should be the result of present effort. In contrast with short term oriented cultures, shortcuts are not acceptable, and may be considered dishonest.

In short term oriented cultures, the criteria used by an individual to evaluate the quality of a method, process, or service received will place more weight on delivery time. On the other hand, an individual who belongs to a long term oriented culture will not be concern with the time period required to complete a process or service, as long as the end result is what is desired.

An individual's time horizon has been evaluated in the context of on-line shopping, within the context of TAM, where a user's degree of time orientation moderated the relationship between trust and intention to use (Yoon 2009). These results are significant because they suggest that in cultures that are long term oriented, trust is more important than perceived ease of use and perceived usefulness, within the TAM framework.

Time orientation has also been researched in the context of computer security. Long term horizon societies tend to have a different disposition and awareness in regards to potential threats to computer systems. Research has shown that in Asian cultures, which rate as long term oriented cultures, it would be more effective to describe long term benefits of an adequate computer security policy, than the immediate benefits (Schmidt, Johnston et al. 2008).

In terms of organization and strategy, a short term oriented culture may place more value on immediate results, and therefore action that is implemented immediately, or long term goals, which require the adoption of broader strategies are generally adopted. Asian and American cultures have different time horizons, regardless of specific context, such as for IT (Peterson, Kim et al. 2003) or in a more general organizational context (Walker 2002). A more complex scenario exists when organizations transact across geographical boundaries. In the context of global supply chain management, the difference in the time horizons of organizations with different time orientations can impact the efficiency of the supply chain (Shore 2001).

Table 6. Summary of studies in IS that used Hofstede's Cultural dimensions

Dimension	Study	Context	Description
Power distance	(Mejias et al. 1996)	GDSS	Use of GDSS in multi-cultural environments attenuated the effect of power distance.
Power distance	(Watson et al. 1994)	GDSS	Evaluates the effect of anonymity on power distance, in settings with participants of diverse cultural backgrounds, using GDSS.
Power distance	(Chung et al. 1997)	GDSS	Use of GDSS among Americans and Koreans.
Power distance	(Sinha 1997)	Strategy	Power Distance and hierarchy in selecting strategy among different

			cultural groups.
Individualism	(Tan et al. 1998)	CMC	Tendency to agree with the majority and level of individualism in settings where cultural diversity exists.
Individualism	(Bond et al. 1986)	Collaborative information retrieval system	Willingness to share information with the majority in diverse settings.
Individualism	(Cho et al. 2008)	Decision making strategy	Factors that affect efficient decision making.
Individualism	(Ahmed, Mouratidis et al. 2009)	Internet Communication	Effective transmission using symbols, images, animations, and other high context communication elements.
Individualism	(Twu 2009)	Internet Communication	Challenge faced by high context individuals when examining low context web sites.
Masculinity	(Robichaux et al. 1998)	GDSS	Anonymous participation with GDSS .
Masculinity	(Tunga et al. 2002)	CMC	Conflict and conflict resolution strategies with GDSS.
Masculinity	(Robichaux et al. 1998)	GDSS	Time dominance strategies with GDSS.
Masculinity	(Hasan et al. 1999)	Technology focus and adoption	Focus on technology and relationships.
Maculinity	(Lippert et al. 2007)	Technology adoption	Technology perception and adoption differences between Canada and the US.
Uncertainty avoidance	(Wilson 1997)	Search engines information retrieval	Risk aversion and search strategy.
Uncertainty avoidance	(Ohbushi et al. 1999)		Risk and impact to individual and the others.
Time horizon	(Yoon 2009)	e-commerce	National culture and e-commerce shoppers.
Time horizon	(Schmidt et al. 2008)	Computer security	Implications of time orientation in the awareness of computer security.
Time horizon	(Peterson et al. 2003)	Strategy	Different attitudes towards IS objectives in Asian and American cultures.
Time horizon	(Shore 2001)	Supply chain management	Differences in culture and their effect on supply chain management.

2.6 Unified Technology Acceptance and Usage Theory (UTAUT)

A fundamental area of research in IS deals with acceptance and usage of technology. While many models emerged from investigation done in this area, one theoretical framework became pivotal in IS research: the Unified Theory of Acceptance and Usage of Technology (UTAUT). According to the Web of Science, UTAUT was cited 719 times in 54 different subject areas. Approximately half of these citations belong to information systems, management, computer science, engineering, and other journals which concentrate on diverse scientific disciplines. The rest of the citations are from journals devoted to wide-ranging subjects covering psychology, ethics, medicine, social work, transportation, etc (Reuters 2010). The predominance of this model in IS is made evident by the number of citations within IS and also from those citations belonging to discipline outside of IS.

An important aspect of UTAUT is that it combines eight previously validated models to create a more robust framework. In fact, these eight models can explain approximately between 17 percent and 53 percent of the variance in user intentions to use information technology. UTAUT was found to outperform these eight models, and explain 70 percent of the variance in user intentions to use information technology (Venkatesh et al. 2003).

The eight models used to develop UTAUT are:

- TRA - Theory of Reasoned Action (Ajzen and Fishbein 1980);
- TAM - Technology Acceptance Model (Davis 1989);
- Motivational Model (Davis, Bagozzi et al. 1992);

- TPB - Theory of Planned Behavior (Ajzen 1991);
- C TAM-TPB- Combined TAM and TPB (Ajzen 1991; Ajzen et al. 1980; Davis 1989);
- Model of PC utilization (Thompson, Higgins et al. 1991);
- Innovation Diffusion Theory (Moore and Benbasat 1991) and;
- Social Cognitive Theory (Compeau and Higgins 1995).

UTAUT has four constructs which were derived from the earlier theories mentioned above: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs directly impact behavioral intention and use behavior (Venkatesh et al. 2003). The relationship between these constructs and behavioral intention and use behavior is moderated by gender, age, experience, and voluntariness (Venkatesh et al. 2003). The UTAUT model is summarized in Figure 1 and the four constructs are described in the following sections.

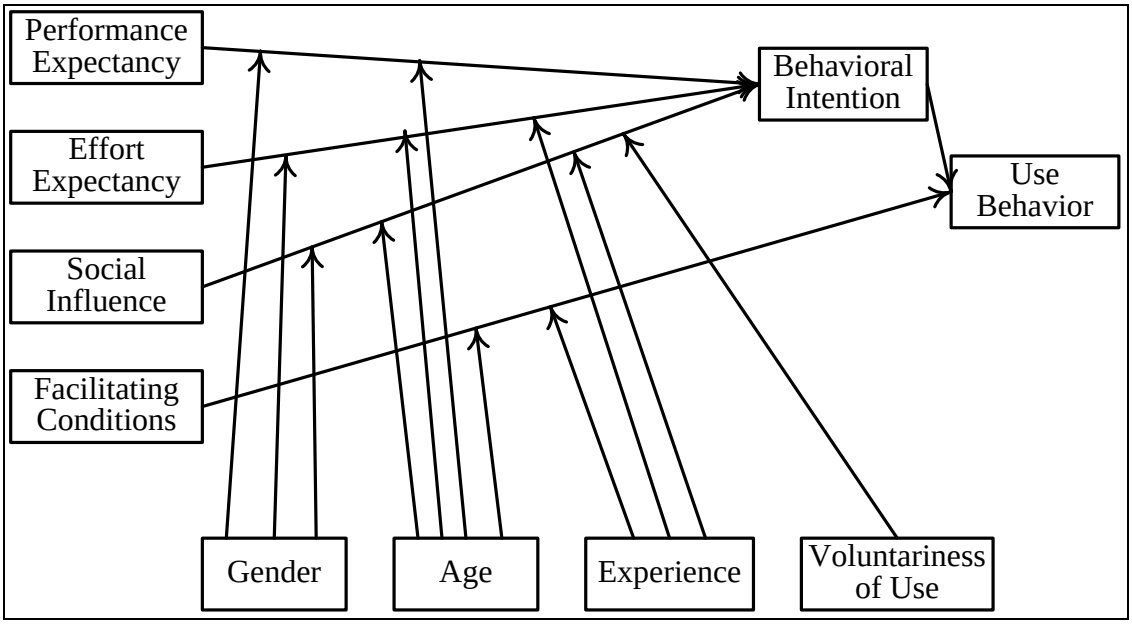


Figure 1. Unified Theory of Acceptance and Usage of Technology (UTAUT) (Venkatesh et al. 2003).

2.6.1 Performance Expectancy

Performance expectancy is the perception that an individual develops about how a system may help increase job performance. This variable has several root constructs that belong to the theories that are the foundation for UTAUT. The root constructs are: perceived usefulness (Davis 1989), extrinsic motivation (Davis et al. 1992), job-fit (Thompson et al. 1991), relative advantage (Moore et al. 1991), and outcome expectations (Compeau et al. 1995).

Based on empirical evidence, performance expectancy is the strongest predictor of behavioral intention, while gender and age are weaker predictors. Gender moderates the relationship between performance expectancy and behavioral intention based on the theoretical proposition that men are more task oriented than women (Minton and Schneider 1980). Age also has impact as a moderator, with younger individuals being more interested in extrinsic rewards (Hall and Mansfield 1995).

2.6.2 Effort Expectancy

Effort expectancy is the perception that an individual develops about the complexity associated with using a system. The root constructs of this variable are perceived ease of use (Davis 1989), complexity (Thompson et al. 1991), and ease of use (Moore et al. 1991). Gender and age also moderate the relationship between effort expectancy and behavioral intention with younger women possessing the strongest relationship between the two factors(Venkatesh et al. 2003).

2.6.3 Social Influence

Social influence is the perception that an individual develops about how others believe the system should be used. The root constructs of this variable are subjective norms (Ajzen 1991; Davis 1989), social factors (Thompson et al. 1991), and image (Moore et al. 1991). Gender, age, voluntariness, and experience will moderate the relationship between social influence and behavioral intention. This relationship will be stronger with older women in mandatory settings with limited experience.

2.6.4 Facilitating Conditions

Facilitating conditions are the perceptions that an individual develops about the existing support that the organization and / or infrastructure provides to use the system. The root constructs of this variable are perceived behavioral control (Ajzen 1991) facilitating conditions (Thompson et al. 1991), and compatibility (Moore et al. 1991). Based on empirical evidence, facilitating conditions do not influence behavioral intention. However, it does impact intention to use behavior.

Chapter 3.

Theory and Hypothesis Development

In this chapter we present eight hypotheses. In these hypotheses we use cultural dimensions to moderate the relationships between the main constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT). The hypotheses are contrasted against the original hypotheses developed in UTAUT. The Culture On-Line Search (COLS) model is presented at the end of the chapter.

3.1 Performance Expectancy and Behavioral Intention - Moderator: Individualism

Performance expectancy is defined as the expectation of an individual with regard to the gains in task performance that result from using a system (Venkatesh et al. 2003). Individualistic cultures value independence, autonomy, and self achievement (Hofstede 1980). In such cultures, every individual is unique; hence relying on others' perceptions to make a decision may not be useful, since every individual has distinct needs.

In individualistic cultures, innovation and willingness to use new and untested technologies and processes are expressions of self-confidence and self-reliance and are seen positively by others. Finding an alternative solution that best satisfies unique needs is seen as courageous. Furthermore, technology promotes individual decision making, thus independence (Cho et al. 2008). To the contrary, in cultures marked by low levels of individualism, a solution to a problem requires being non-disruptive to the group; the status quo needs to be maintained. Unknown or untested solutions can result in unrest in the group (Hall 1976).

In individualistic cultures, dependence on others is seen as a weakness. Individuals are self-made and independent, and achieve goals by resorting to tools and technology, rather than resorting to the group for solutions. The use of tools and technology to complete a task is therefore necessary to success in individualist cultures. Thus, for an individual who reflects the values of individualist cultures, the perception of performance gain by using a search engine is expected to be higher than for individuals from collectivist cultures.

H1. The influence of performance expectancy on behavioral intention will be moderated by individualism, such that the effect will be stronger for users from cultures that exhibit values of high individualism.

3.2 Performance Expectancy and Behavioral Intention - Moderator: Masculinity

Gender schema theory, used in the development of the original UTAUT hypotheses, suggests that there are differences in gender roles based not on biological gender, but on socialization processes (Bem. D. J. 1974; Venkatesh et al. 2003). Masculine cultures are defined as more task oriented (Hofstede 1980) because in general men are more task oriented than women (Minton et al. 1980) Hence, it is expected that masculinity will moderate the relationship between performance expectancy and behavioral intention.

H2. The influence of performance expectancy on behavioral intention will be moderated by masculinity such that the effect will be stronger for users from cultures that exhibit values of high masculinity.

3.3 Effort Expectancy and Behavioral Intention – Moderator: Individualism

Effort expectancy is defined as the expectation of an individual with regard to the ease of use of the system. Users from cultures that reflect individualist values have a preference for the use of tools and technology instead of resorting to others for assistance. The perception within these cultures is that technology is an enabler and its use is the most effective and effortless route to solve a problem. Users from collectivist cultures may resort to others as the first choice to complete a task. For individualist cultures, requesting assistance from another when tools are available represent weakness, fear and/or lack of knowledge (Hofstede 1980).

H3. The influence of effort expectancy on behavioral intention will be moderated by individualism, such that the effect will be stronger for users from cultures that exhibit values of low individualism (collectivism).

3.4 Effort Expectancy and Behavioral Intention – Moderator: Time Horizon

Individuals from cultures that reflect long term orientation are concerned with maintaining historical continuity. Frugality, effort, and persistence are valuable attributes considered necessary to achieve results (Hofstede 1980). Obtaining the desired results involves work; hence shortcuts are not acceptable, since no positive outcome can be achieved without effort. For users who reflect values of short term oriented cultures, persistence is not a significant factor for successful completion of a task. On the contrary, a job which is executed with less effort and in less time is considered more successful (Hofstede 1980).

H4. The influence of effort expectancy on behavioral intention will be moderated by time horizon, such that the effect will be stronger for individuals from cultures that exhibit long term orientation values.

3.5 Effort Expectancy and Behavioral Intention – Moderator: Uncertainty Avoidance

Individuals from cultures that rate high in uncertainty avoidance perceive ambiguity as a threat. Efforts are made to eliminate unknown variables and to ensure that a high level of control exists over all activities. It is expected that individuals from these cultures will mitigate the risks associated with obtaining erroneous information when using a search engine by performing more queries. These users perceive the need to corroborate the accuracy of information with multiple sources; individuals who come from high uncertainty avoidance cultures are expected to collect more information than their counterparts before moving to the analysis phase and reaching a conclusion.

H5. The influence of effort expectancy on behavioral intention will be moderated by uncertainty avoidance, such that the effect will be stronger for individuals from cultures that exhibit values of high uncertainty avoidance.

3.6 Social Influence and Behavioral Intention – Moderator: Individualism

Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al. 2003). Members of cultures who reflect values of low individualism tend to conform to the opinion of the majority in order to create and maintain harmony within the group. The

needs and desires of the group are more important than those of the individual (Hall 1976; Hofstede 1980; Walker 2002).

H6. The influence of social influence on behavioral intention will be moderated by individualism, such that the effect will be stronger for individuals from cultures exhibiting values of low levels of individualism.

3.7 Social Influence and Behavioral Intention – Moderator: Masculinity

Individuals from cultures that exhibit values of low masculinity cultures generally value relationships, commitment, and compromise over competitiveness and assertiveness, which are values generally associated with high masculinity cultures (Hofstede 1980). In low masculinity cultures, individuals tend to act in a manner that does not generate conflict in a relationship. This is further validated by theory which suggests that women are more sensitive to others' opinions (Miller 1976). In fact, the original UTAUT model makes this distinction when employing gender as a moderator in the relationship between social influence and behavioral intention (Venkatesh et al. 2003).

H7. Social influence on behavioral intention will be moderated by masculinity, such that the effect will be stronger for individuals from cultures that exhibit the values of low masculinity.

3.8 Social Influence and Behavioral Intention – Moderator: Power Distance

Power distance is expected to moderate the relationship between social influence and behavioral intention. In high power distance cultures, the place the individual has in the group hierarchy will determine whether he is prone to be influenced by others, or to

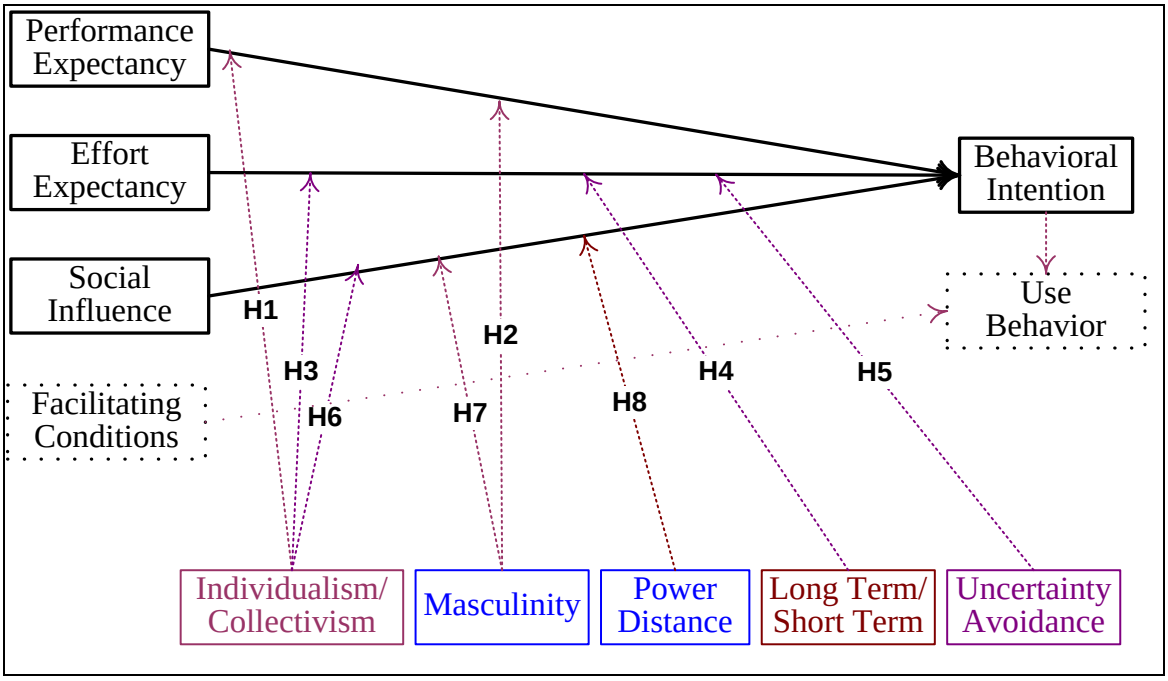
influence others. Individuals from cultures that rate low in power distance are more likely to be receptive to others' opinions and at the same time, they are willing to offer their own ideas regardless of their hierarchical position or that of the recipient of the information. In this environment, questioning and examination are expected. In high power distance environments, assertive and control oriented strategies are only taken by those who have a higher hierarchical position. Directions are generally described as orders, which those with lower status, the majority, must conform to.

H8. The influence of social influence on behavioral intention will be moderated by power distance, such that the effect will be stronger for individuals who exhibit the values of high power distance cultures.

3.9 The Culture and On-Line Search (COLS) Model

Figure 2 shows the culture and on-line search model (COLS), which is a modified version of the UTAUT model. In this model the original moderators of UTAUT (gender, age, experience, and voluntariness of use) were removed from the model. The new model includes Hofstede's dimensions, which act as moderators in the relationship between the constructs of UTAUT and behavioral intention. Hofstede's variables do not moderate the relationship between facilitating conditions and use behavior. As in the case in the original UTAUT model, the relationship between behavioral intention and use behavior is not moderated (nor mediated) by any construct. It is assumed that the findings of Venkatesh (2003) in regards to the relationship between behavioral intention and use behavior remain identical for this model. In this research actual behavior is not measured, but assumed to be impacted by behavioral intention and facilitating conditions.

The construction of the hypotheses was done taking in consideration the original hypotheses from UTAUT. Table 7 shows the original hypotheses of UTAUT and the hypotheses from COLS.



(Dotted lines show constructs and relationship present in UTAUT which are not considered in this research.)

Figure 2. Culture and On-Line Search (COLS) Proposed Model[1].

[1] Adapted from UTAUT (Venkatesh, V., and Morris, M. "User Acceptance of Information Technology: Toward a Unified View," *Management Information Systems Quarterly* (27:3) 2003, pp 425-478.

Table 7. Original UTAUT and COLS Hypotheses		
Relationship Moderated	UTAUT Hypothesis	COLS Hypothesis
Performance expectancy on behavioral intention	H1: The influence of performance expectancy on behavioral intention will be moderated by gender and age, such that the effect will be stronger for men and particularly for younger men.	H1: The influence of performance expectancy on behavioral intention will be moderated by individualism, such that the effect will be stronger for users that exhibit values of high individualism. H2: The influence of performance expectancy on behavioral intention will be moderated by masculinity such that the effect will be stronger for users that exhibit values of high masculinity.
Effort expectancy on behavioral intention	H2: The influence of effort expectancy on behavioral intention will be moderated by gender, age, and experience, such that the effect will be stronger for women, particularly younger women, and particularly at early stages of experience.	The influence of effort expectancy on behavioral intention will be moderated by individualism, such that the effect will be stronger for users who exhibit values of low individualism (collectivism). H4: The influence of effort expectancy on behavioral intention will be moderated by time horizon, such that the effect will be stronger for individuals who exhibit values of short term orientation. H5: The influence of effort expectancy on behavioral intention will be moderated by uncertainty avoidance, such that the effect will be stronger for individuals who exhibit values of high uncertainty avoidance.
Social influence on behavioral intention	H3: The influence of social influence on behavioral intention will be moderated by gender, age, voluntariness, and experience, such that the effect will be stronger for women, particularly older women, particularly in mandatory settings in the early	H6: The influence of social influence on behavioral intention will be moderated by individualism, such that the effect will be stronger for individuals who exhibit the values of low individualism cultures. H7: The influence of social

	stages of experience.	influence on behavioral intention will be moderated by masculinity, such that the effect will be stronger for individuals who exhibit the values of low masculinity cultures. H8: The influence of social influence on behavioral intention will be moderated by power distance, such that the effect will be stronger for individuals who exhibit the values of high power distance cultures.

Chapter 4.

Research Methodology

In order to evaluate the proposed model a survey instrument was developed based on Hosftede's Survey Value Model (Hofstede 1980; Hofstede 2007) and UTAUT (2003). In this chapter we provide a detailed description of the research methodology, including the sample population, the recruiting process, the development of the survey instrument, and the data collection process. Additional details are provided about the electronic administration of the survey. The actual items used in the survey are also presented.

4.1 Participants

Participants were recruited from the student population of a large metropolitan university in the United States. This population is ideal for this research study because this university is ranked among the most internationally diverse universities in the country, with students from more than 160 countries.

The recruitment process consisted of promoting the research by posting flyers across the College. Flyers included a short description of the research being done, a description of prizes that would be raffled off to participants, time required, and an email address to request an invitation to participate. In addition, announcements to solicit participants were made in classes. Information was given about the survey, the types of questions asked, length, and prizes that would be awarded. Those interested were asked to send an email to request an invitation to participate. Participants were not required to have special skills.

4.2 Survey

To evaluate how search engine behavior is impacted by cultural background, participants completed a survey composed of the modified UTAUT (2003) instrument and the original SVM (Hofstede's Survey Value Model) instrument (Hofstede 1980; Hofstede 2007). All subjects were informed that participation was voluntary and would not impact their grades or standing in their respective courses. Furthermore, the subjects were notified that the answers to the items in the survey were neither right nor wrong, and would have no impact on their grades, standing in their courses, or the results of the raffle.

Each participant was rated on Hofstede's five cultural variables using the Hofstede Survey Value Model (Hofstede 2007). Answers were provided using a Likert scale. At no point in the survey were participants asked for their country of origin, nationality, ethnicity or religion, since the intention is not to determine the particular ranking of a country or ethnic group. Results of this research are given at the aggregate level. Participants also answered an adapted version of the UTAUT instrument. The original UTAUT items, and the modified items that the participants answered are shown at the end of the chapter. Table 8 contains the original and modified performance expectancy items. In table 9 the original effort expectancy items are found. Original and modified social influence items are listed in Table 10. Table 11 contains original and modified items for behavioral intention. Participants provided answers based on their past experiences on a Likert scale.

The survey was originally designed in two parts. The first part contained the modified UTAUT instrument, and the second part the original SVM instrument. A pilot was run with ten subjects with varying level of technical skills, academic backgrounds, and ethnicities. The purpose of the pilot was to evaluate the quality of the instructions provided, the ease of navigation, and the readability of the items. Pilot participants stated that navigation was simple and intuitive. They also pointed out that they found the survey items repetitive, and many seemed identical. All those involved in the pilot indicated that the first portion of the survey (UTAUT) was "long" and monotonous, with too many questions. These comments generated concern since the two part set-up of the survey could cause participants to lose interest and provide random answers without reading the questions. In order to make the survey less monotonous, the items from the first part (UTAUT) and the second part (SVM) were combined. The final survey was set up so that participants would answer one page of UTAUT questions and one page of SVM questions sequentially, with seven pages in total. Each page would contain between 10 and 12 items. Those participants who took part in the preliminary test were informed about this change and agreed that it would make the survey "easier to take". The changes made did not impact the length of the survey (number of items). The final survey instrument is included in Appendix A.

4.2 Data Collection

The survey was administered electronically using Surveymonkey.com, an internet-based surveying tool. This tool allows researchers to design survey instruments using a web-based interface and collect data on-line, via a website. Upon setting up a

researcher account with Surveymonkey.com and completing the registration process, all items were entered into the system, together with the appropriate response scales (5 point Likert-type). The number of items per page was balanced so that participants would spend equal time on each page. Surveymonkey.com also provides a progress bar that gave the participant an indication of the amount of work still required to complete the survey. As participants moved from one page to the next, the SurveyMonkey.com system verified that no items were left unanswered. If items were left unanswered, SurveyMonkey.com presented the participant with a message indicating that responses are required. A welcome page was included with instructions on how to navigate and answer the items. Completed survey information was stored in Surveymonkey.com servers and only accessible, via password, by the researcher who set up the account. In addition to password security, no personal information was required in the survey, ensuring that responses could not be linked to individual participants.

Following the preliminary test, the data collection stage began. Face-to-face sessions were scheduled in a lab with a maximum of 25 participants. In each session participants were congregated in the same computer lab. Upon arriving to the lab, participants were given brief verbal instructions, required to consent to the survey and provided with printed cards which contained the address of the website where they could find the survey. Each of the cards also contained a ticket number for a raffle which took place after the participants completed the survey. On average, participants completed the survey in 20 minutes. Upon finishing, participants saw a thank you message on the web browser and were asked to wait until everyone in the group completed the survey in order

to participate in the raffle. The raffle, which awarded one MP3 player, was conducted once everyone completed the survey (See Appendix B and C).

A number of participants took the survey on their own, not in a group setting. These participants received instructions in class about the purpose of the experiment and were given cards identical to those who took the survey in the lab (the cards included the address of the website where they could find the survey and a ticket number for a raffle). Participants then completed the survey in their free time and retained the raffle ticket. The researcher met them approximately one week later, during class, to participate in the raffle. Regardless of the form in which the survey was taken (as a group or individually) the raffle and award reception was done in front of all participants in the group. The protocol and data collection process described here was approved by the University's IRB committee (See Appendix D).

A total of 173 participants took the survey. Five participants, who took the survey on their own, abandoned the survey before completing it and their responses were discarded, leaving 168 usable cases for analysis. The data collected was downloaded from SurveyMonkey and imported into an MS Excel spreadsheet. Before proceeding to validate and analyze the data, it was necessary to change the layout of the spreadsheet by re-arranging columns and deleting unnecessary information so that it was readable by SmartPLS (Ringle, Wende et al. 2005), the software package selected for the analysis.

Table 8. Original and adapted Performance Expectancy items	
Original Item from UTAUT	Modified Item
Using the system in my job would enable me to accomplish tasks more quickly.	Using a search engine for school work would enable me to accomplish tasks more quickly.
Using the system would improve my job performance.	Using a search engine would improve my school performance.
Using the system in my job would increase my productivity.	Using a search engine for school work would increase my productivity.
Using the system would enhance my effectiveness on the job.	Using a search engine would enhance my effectiveness at school related work.
Using the system would make it easier to do my job.	Using a search engine would make it easier to do my school related work.
I would find the system useful in my job.	I would find a search engine useful for my school work.
Using the system enables me to accomplish tasks more quickly.	Using a search engine enables me to accomplish tasks more quickly.
Using the system improves the quality of the work I do.	Using a search engine improves the quality of the school work I do.
Using the system makes it easier to do my job.	Using a search engine makes it easier to do my school work.
Using the system enhances my effectiveness on the job.	Using a search engine enhances my effectiveness when doing school work.
Using the system increases my productivity.	Using a search engine increases my productivity.
I will increase my effectiveness on the job.	I will increase my effectiveness in school.
I will spend less time on routine job tasks.	I will spend less time on routine tasks.
I will increase the quality of output of my job.	I will increase the quality of output of school work.
I will increase the quantity of output for the same amount of effort.	I will increase the quantity of output for the same amount of effort.
My coworkers will perceive me as competent.	My peers will perceive me as competent.
I will increase my chances of obtaining a promotion.	I will increase my chances of obtaining the grade I want.
If I use the system, I will increase my chances of getting a raise.	If I use a search engine, I will increase my chances of getting a good grade.
Use of the system will have no effect on the performance of my job (reverse scored).	Use of a search engine will have no effect on the performance of school work (reverse scored).
Use of the system can decrease the time	Use of a search engine can decrease the

needed for my important job responsibilities.	time needed for my important school responsibilities.
Use of the system can significantly increase the quality of output on my job.	Use of a search engine can significantly increase the quality of output on my job / school work.
Use of the system can increase the effectiveness of performing job tasks.	Use of a search engine can increase the effectiveness of performing school work.
Use can increase the quantity of output for the same amount of effort.	Use can increase the quantity of output for the same amount of effort.
Considering all tasks, the general extent to which use of the system could assist on the job.	Considering all tasks, the general extent to which use of a search engine could assist on a task (when doing school work).

Table 9. Original and adapted Effort Expectancy items	
Original Item from UTAUT	Modified Item
Learning to operate the system would be easy for me.	Learning to operate a search engine would be easy for me.
I would find it easy to get the system to do what I want it to do.	I would find it easy to get a search engine to do what I want it to do.
My interaction with the system would be clear and understandable.	My interaction with a search engine would be clear and understandable.
I would find the system to be flexible to interact with.	I would find a search engine to be flexible to interact with.
It would be easy for me to become skillful at using the system.	It would be easy for me to become skillful at using a search engine.
I would find the system easy to use	I would find a search engine easy to use.
Using the system takes too much time from my normal duties.	Using a search engine takes too much time from my normal duties.
Working with the system is so complicated it is difficult to understand what is going on.	Working with a search engine is so complicated it is difficult to understand what is going on.
Using the system involves too much time.	Using a search engine involves too much time.
Using the system involves doing mechanical operations (e.g., data input).	Using a search engine involves doing mechanical operations (e.g., data input).
It takes too long to learn how to use the system to make it worth the effort.	It takes too long to learn how to use a search engine to make it worth the effort.
My interaction with the system is clear and understandable.	My interaction with a search engine is clear and understandable.
I believe that it is easy to get the system to do what I want it to do.	I believe that it is easy to get a search engine to do what I want it to do.
Overall, I believe that the system is easy to use.	Overall, I believe that a search engine is easy to use.
Learning to operate the system is easy for me.	Learning to operate a search engine is easy for me.

Table 10. Original and adapted Social Influence items	
Original Item from UTAUT	Modified Item
People who influence my behavior think that I should use the system.	People who influence my behavior think that I should use a search engine (such as Google or Yahoo).
People who are important to me think that I should use the system.	People who are important to me think that I should use a search engine.
I use the system because of the proportion of coworkers who use the system.	I use a search engines because of the proportion of peers who use them.
The senior management of this business has been helpful in the use of the system.	The school has been helpful in the use of the search engines.
My supervisor is very supportive of the use of the system for my job.	My professors are very supportive of the use of a search engine for work / school.
In general, the organization has supported the use of the system.	In general, the school has supported the use of search engines.
People in my organization who use the system have more prestige than those who do not.	People in my school who use the search engines have more prestige than those who do not.
People in my organization who use the system have a high profile.	People in my organization who use search engines have a high profile.
Having the system is a status symbol in my organization.	(This item is not applicable. All subjects have equal access to search engines.)

Table 11. Original and adapted Behavioral Intention items	
Original Item from UTAUT	Modified Item
I intend to use the system in the next <n> months.	I intend to use a search engine in the next <n> months.
I predict I would use the system in the next <n> months.	I predict I would use a search engine in the next <n> months.
I plan to use the system in the next <n> months.	I plan to use a search engine in the next <n> months.

Chapter 5.

Results

In this chapter we present the validation of the proposed model, including tests of construct validity, convergence validity, discriminant validity, and composite reliability. This is followed by an analysis of the significance of the cultural moderators in our model. Out of eight moderating relationships, four were found to be significant with three of these having the hypothesized effect. An explanation for these results is offered, and some modification to the model are proposed and tested. Results after these modification yield identical results.

5.1 Model Validation

SmartPLS (Ringle et al. 2005), a path modeling software package which uses the partial least squares method was used to validate and analyze the data. SmartPLS is a free software package developed by the School of Business of the University of Hamburg, Germany. There is a large user community for SmartPLS and an active discussion group; therefore information and support for SmartPLS is readily available on-line. In addition, there is a significant volume of published IS articles in which SmartPLS was used.

Convergence and discriminant validity tests were performed to ensure the correct operationalization of each construct, and to ascertain that the items used in the survey loaded in the corresponding constructs as intended. Composite reliability was also

obtained to evaluate internal consistency. These test, and their results, are covered in the next section.

Following the construct validity tests, the COLS (Culture On-Line Search) model was evaluated. The significance of both the direct and moderating effects was measured in the proposed model. Two separate tests were conducted for this purpose.

5.1.1 Construct Validity

For convergent and discriminant validity tests among the nine constructs, the model was re-arranged so that all constructs had a direct relationship with behavioral intention. While this re-arranged model is different from the actual model proposed in this research it serves to test construct validity. The purpose of convergence and discriminant validity tests is to verify that the operationalization of one construct diverges from another, implying that constructs are actually independent of each other and good representation of the variable in question (Campbell and Fiske 1959). The model employed for testing convergence and discriminant validity is shown in Figure 3.

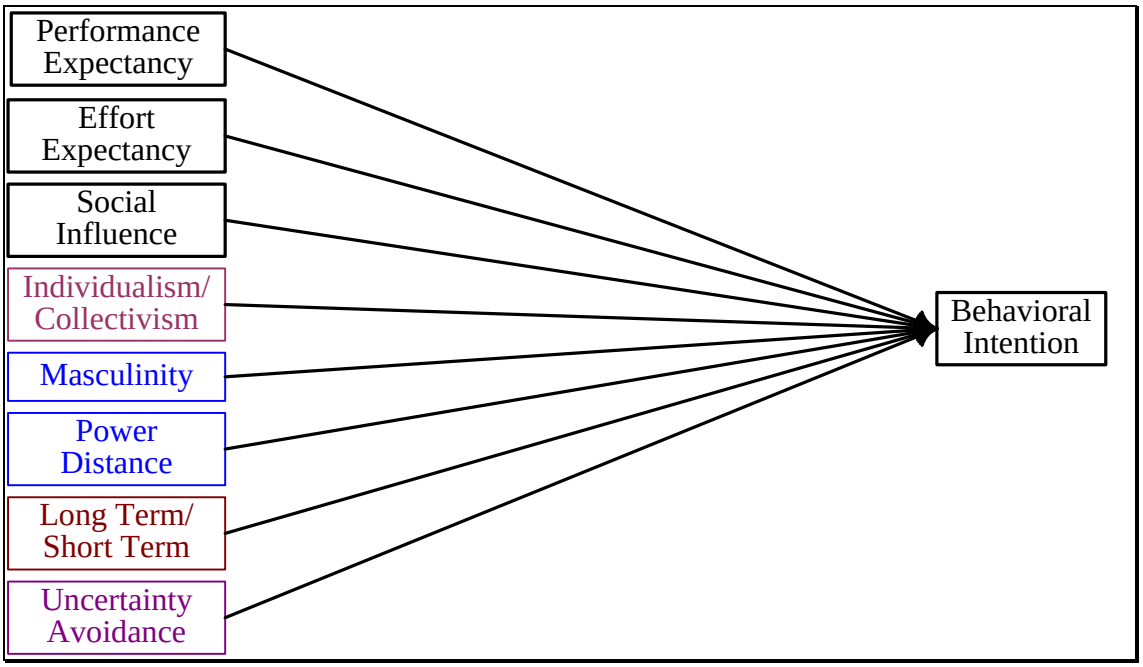


Figure 3. Discriminant validity test model (moderators)

5.1.2 Convergence Validity

Convergence validity was evaluated by comparing the correlations among items and constructs. The results of this test indicated that some items did not load properly on the corresponding constructs, exhibiting low correlation values (IDV1, LTO2, LTO4, PD2, PD4, UA1 and UA4; see table 12). These items were discarded and convergence was re-tested. The remaining items and their corresponding loadings to the constructs are shown in table 13.

Table 12. Correlation among constructs and items (test #1)

	Behavioral Intention	Effort Expectancy	Individualism	Long Term Orientation	Masculinity	Power Distance	Performance Expectancy	Social Influence	Uncertainty Avoidance
BI1	0.896	0.444	-0.129	0.164	-0.115	0.170	0.370	0.278	-0.143
BI2	0.896	0.428	-0.119	0.145	-0.123	0.176	0.325	0.169	-0.097
BI3	0.873	0.386	-0.106	0.150	-0.072	0.121	0.378	0.239	-0.027
BI4	0.840	0.401	-0.145	0.137	-0.096	0.095	0.289	0.168	-0.168
EO15	0.522	0.889	-0.117	0.081	-0.180	0.098	0.357	0.080	-0.005
EO3	0.382	0.898	-0.095	-0.007	-0.198	0.161	0.355	0.067	-0.082
EO5	0.338	0.820	-0.038	0.023	-0.082	0.086	0.299	0.133	-0.084
EO6	0.386	0.914	-0.136	0.036	-0.164	0.095	0.352	0.103	-0.038
IDV1N	-0.090	0.012	0.358	-0.213	-0.446	-0.273	-0.148	-0.169	-0.020
IDV2	-0.068	-0.115	0.616	0.416	0.598	0.230	-0.008	0.001	-0.170
IDV3N	-0.055	-0.103	0.522	0.394	0.553	0.318	0.034	0.079	-0.141
IDV4	-0.035	-0.035	0.483	0.317	0.600	0.276	-0.045	0.081	-0.024
LTO1N	0.129	0.050	0.196	0.675	0.208	0.186	-0.006	0.040	-0.182
LTO2	0.085	0.059	0.094	0.458	0.223	0.188	0.025	0.101	-0.080
LTO3N	0.113	-0.006	0.332	0.734	0.462	0.236	-0.105	0.019	-0.104
LTO4	0.020	-0.076	0.255	0.424	0.453	0.161	-0.034	0.094	-0.032
MA1N	-0.115	-0.106	0.283	0.429	0.817	0.212	-0.213	0.047	0.003
MA2	-0.074	-0.147	0.360	0.330	0.731	0.314	0.009	-0.002	-0.164
MA3	-0.084	-0.144	0.332	0.325	0.758	0.271	0.059	0.045	-0.026
MA4N	-0.068	-0.183	0.388	0.413	0.738	0.218	-0.146	0.133	-0.116
PD1N	0.077	0.044	0.140	0.273	0.327	0.427	0.029	-0.069	-0.168
PD2	0.010	-0.097	0.433	0.357	0.536	0.363	-0.041	0.100	-0.155
PD3	0.140	0.111	0.058	0.171	0.130	0.852	0.161	0.115	-0.046
PD4N	0.011	0.163	0.084	0.241	0.278	0.289	0.025	0.016	0.001
PE11	0.259	0.302	-0.058	-0.014	-0.043	0.193	0.890	0.198	0.025
PE18	0.351	0.353	-0.067	-0.043	-0.117	0.042	0.855	0.263	-0.009
PE6	0.361	0.389	-0.097	-0.087	-0.108	0.159	0.935	0.210	0.016
PE7	0.404	0.347	-0.166	-0.034	-0.113	0.175	0.923	0.222	-0.021

SI1	0.195	0.220	-0.064	-0.026	0.054	0.060	0.216	0.862	-0.064
SI2	0.245	0.168	-0.057	0.008	0.019	0.107	0.200	0.880	-0.150
SI4	0.212	-0.040	-0.039	0.203	0.092	0.011	0.183	0.790	0.006
SI5	0.131	-0.051	-0.066	0.104	0.078	0.071	0.249	0.770	0.012
UA1N	-0.048	-0.181	-0.124	-0.084	-0.116	-0.093	-0.104	-0.037	0.375
UA2	-0.068	0.081	-0.166	-0.416	-0.240	-0.195	-0.020	-0.154	0.495
UA3	-0.084	-0.016	-0.007	0.177	0.198	0.064	0.071	0.057	0.684
UA4N	-0.016	-0.098	-0.188	-0.308	-0.264	-0.165	0.023	-0.038	0.265

Table 13. Correlation among constructs and items (test #2)

	Behavioral Intention	Effort Expectancy	Individualism	Long Term Orientation	Masculinity	Power Distance	Performance Expectancy	Social Influence	Uncertainty Avoidance
BI1	0.895	0.444	-0.064	0.137	-0.115	0.167	0.370	0.278	-0.151
BI2	0.895	0.428	-0.064	0.124	-0.123	0.182	0.325	0.169	-0.083
BI3	0.875	0.386	-0.055	0.164	-0.072	0.131	0.378	0.239	-0.001
BI4	0.840	0.401	-0.075	0.132	-0.096	0.101	0.289	0.168	-0.157
EO15	0.522	0.889	-0.126	0.050	-0.180	0.100	0.357	0.080	0.052
EO3	0.382	0.898	-0.113	-0.032	-0.198	0.161	0.355	0.067	0.010
EO5	0.338	0.820	-0.042	0.060	-0.082	0.082	0.299	0.133	0.010
EO6	0.385	0.914	-0.131	0.027	-0.164	0.096	0.352	0.103	0.063
IDV2	-0.068	-0.115	0.824	0.382	0.598	0.201	-0.008	0.001	-0.064
IDV3N	-0.055	-0.103	0.761	0.328	0.553	0.288	0.034	0.079	-0.088
IDV4	-0.035	-0.035	0.670	0.242	0.600	0.250	-0.045	0.081	0.067
LTO1N	0.130	0.050	0.252	0.803	0.208	0.180	-0.006	0.040	-0.107
LTO3N	0.113	-0.006	0.425	0.731	0.462	0.207	-0.105	0.019	-0.041
MA1N	-0.115	-0.106	0.547	0.379	0.817	0.185	-0.213	0.047	0.066
MA2	-0.074	-0.147	0.608	0.259	0.731	0.285	0.009	-0.002	-0.111
MA3	-0.084	-0.144	0.582	0.286	0.758	0.236	0.059	0.045	0.041
MA4N	-0.068	-0.183	0.616	0.356	0.738	0.181	-0.146	0.133	-0.033
PD1N	0.077	0.044	0.335	0.195	0.328	0.413	0.029	-0.069	-0.114
PD3	0.140	0.111	0.160	0.165	0.130	0.864	0.161	0.115	-0.026
PE11	0.260	0.302	0.064	-0.009	-0.043	0.200	0.890	0.198	0.072
PE18	0.351	0.353	-0.012	-0.075	-0.117	0.047	0.855	0.263	0.015
PE6	0.361	0.389	0.014	-0.097	-0.108	0.166	0.935	0.210	0.078
PE7	0.404	0.347	-0.049	-0.050	-0.113	0.181	0.923	0.222	0.011
SI1	0.195	0.220	0.032	-0.077	0.054	0.056	0.216	0.861	-0.051
SI2	0.245	0.168	0.029	-0.016	0.019	0.103	0.200	0.880	-0.111
SI4	0.212	-0.040	0.081	0.154	0.092	0.005	0.183	0.790	-0.015

SI5	0.132	-0.051	0.066	0.093	0.078	0.069	0.249	0.770	0.027
UA2	-0.068	0.081	-0.309	-0.332	-0.240	-0.181	-0.020	-0.154	0.578
UA3	-0.083	-0.016	0.182	0.149	0.198	0.048	0.071	0.057	0.749

5.1.3 Discriminant Validity

To assess discriminant validity, the Average Variance Extracted ("AVE") method proposed by Fornell and Larcker (1981) was used. AVE values are shown for all of the constructs (Table 14). Table 15 shows the square root AVE values replacing the diagonal elements of the latent variable correlation table. Once the AVE values are replaced, each square root AVE is compared to the values below and to the right (correlations) to ensure that the square root AVE value is higher than any of the other correlations. We note that individualism and masculinity showed a high correlation. Similar claims of overlapping relationships has been presented before (Gooderham and Nordhaug 2003; Mc Sweeney 2002; Smith 2002). The specific correlation of masculinity and individualism has been addressed by Hofstede in response to criticism (Smith 2002). Given this, we continue to validate the model, but proceed with caution and take into account this relationship when evaluating the model outcome.

Table 14. AVE of constructs

Construct	AVE	SQRT(AVE)
Behavioral Intention	0.768	0.876
Effort Expectancy	0.776	0.881
Individualism	0.569	0.754
Long Term Orientation	0.589	0.768
Masculinity	0.580	0.762
Performance Expectancy	0.459	0.677
Power Distance	0.812	0.901
Social Influence	0.683	0.827
Uncertainty Avoidance	0.448	0.669

Table 15. Construct correlations and AVE values									
Construct	Behavioral Intention	Effort Expectancy	Individualism	Long Term Orientation	Masculinity	Power Distance	Performance Expectancy	Social Influence	Uncertainty Avoidance
Behavioral Intention	0.876								
Effort Expectancy	0.474	0.881							
Individualism	-0.073	-0.121	0.754						
Long Term Orientation	0.158	0.031	0.433	0.768					
Masculinity	-0.116	-0.182	**0.759**	0.424	0.762				
Power Distance	0.167	0.124	0.316	0.250	0.284	0.677			
Performance Expectancy	0.390	0.389	-0.002	-0.068	-0.110	0.162	0.901		
Social Influence	0.246	0.106	0.060	0.040	0.069	0.071	0.249	0.827	
Uncertainty Avoidance	-0.113	0.041	-0.057	-0.099	0.002	-0.081	0.045	-0.056	0.669

5.1.4 Composite Reliability

Composite reliability was calculated using SmartPLS. Results show high scores for all variables except power distance. Based on these results, the elimination of this variable is not required; but rather we must exercise caution in analyzing results and deriving conclusions when power distance in involved. Composite reliability values are shown in Table 16.

Table 16. Composite Reliability Scores

Construct	Composite Reliability
Behavioral Intention	0.929824
Effort Expectancy	0.932752
Individualism	0.797223
Long Term Orientation	0.741276
Masculinity	0.846511
Power Distance	0.601228
Performance Expectancy	0.945306
Social Influence	0.895933

5.2 Validity of COLS Model

5.2.1 Results

After checking for construct validity, SmartPLS was used to validate the proposed model. In Figure 4 the significances of all paths are shown. Table 17 and 18 show the significance and direction of direct and moderating effects, respectively. All direct effects

were significant. Only four of the moderating effects were significant, with three in the direction predicted the corresponding hypothesis.

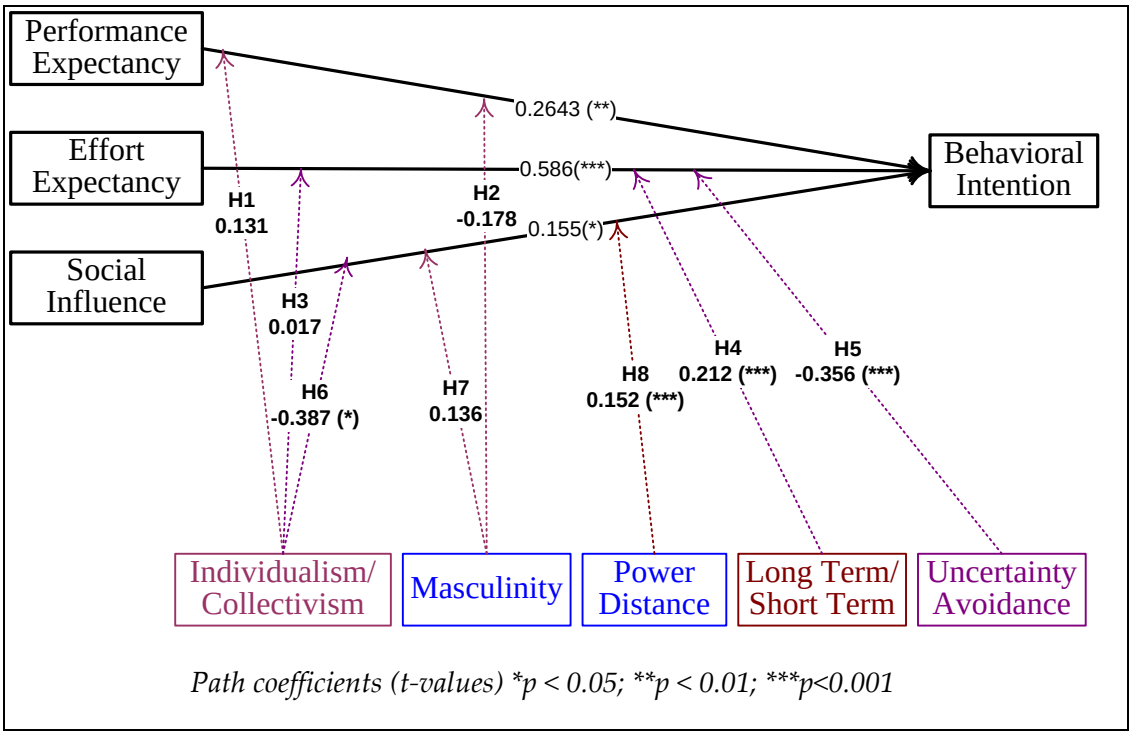


Figure 4. Research model hypotheses coefficients and t- statistic

Table 17. Significance of direct effects		
Relationship	T test	Direction
Effort Expectancy → Behavioral Intention	4.880 (***)	Positive
Social Influence → Behavioral Intention	2.274 (*)	Positive
Performance Expectancy → Behavioral Intention	2.643 (**)	Positive
Path coefficients (t-values) *p < 0.05; **p < 0.01		

Table 18. Significance of Moderating effects and conclusions			
Relationship	T test	Direction	Conclusion
H1 - Performance Expectancy X Individualism	0.800		Not supported
H2 - Performance Expectancy X Masculinity	1.473		Not supported
H3 - Effort Expectancy X Individualism	0.106		Not supported
H4 - Effort Expectancy X Long Term Orientation	6.573 (***)	Positive	Supported
H5 - Effort Expectancy X Uncertainty Avoidance	4.227 (***)	Negative	Not supported (opposite direction)
H6 - Social Influence X Individualism	2.178 (*)	Negative	Supported
H7 - Social Influence X Masculinity	0.836		Not supported
H8 - Social Influence X Power Distance	4.871 (***)	Positive	Supported
Path coefficients (t-values) *p < 0.05; **p < 0.01; ***p<0.001			

5.3 Interpretation of findings

Out of the eight hypothesized moderating relationships, four were found to be significant. The results also showed that one of the moderating relationships was significant but contradict the hypothesized effect (see Table 19). In the next few sections, a discussion of those hypotheses that were supported (H4, H6 and H8) is provided. The

hypothesis that was found to be statistically significant but contradicted the predicted results (H5) is covered immediately after.

5.3.1 Supported Hypothesis. Effort Expectancy X Long Term Orientation (H4)

In agreement with the COLS model proposition, time horizon positively influences the relationship between effort expectancy and behavioral intention. In cultures that exhibit long term orientation values, effort and persistence are valuable attributes which are necessary to achieve results (Hofstede 1980). Contrary to this, cultures that show values of short term orientation would consider the outcome of a job more successful if it required less effort and persistence (Hofstede 1980). The relationship between effort expectancy and behavioral intention was found to be positively moderated by long term orientation ($p<0.05$).

As suggested by the results, the expectation of effort required to use a search engine by a user who reflects values associated with a long term horizon is higher than the effort expected by a user who reflects values associated with a short term horizon. This proposition concurs with Hofstede's (1980) theory. In addition, and in agreement with Yoon (2009), trust takes time to develop, and confidence in the results obtained from a search engine increases after observing several outcomes.

5.3.2 Supported Hypothesis. Social Influence X Individualism (H6)

Hypothesis six stated that low individualism (collectivism) positively moderating the relationship between social influence and behavioral intention in the context of search engine behavior. The premise for this hypothesis is that collectivist cultures tend to conform to the opinion of the majority. This behavior is the result of the need to maintain harmony within the group. Conflict may create disagreement and divisions within the

group. In collectivist cultures, the needs and desires of the group are placed ahead of those of the individual (Hall 1976; Hofstede 1980; Walker 2002). Based on the results obtained, individuals that reflect values of low individualism (collectivism) will be more likely to be influenced by their peers when selecting and using a search engine.

5.3.3 Supported Hypothesis. Social Influence by Power Distance (H8)

As proposed in hypothesis eight, power distance was found to positively moderate the relationship between social influence and behavioral intention. In cultures that reflect values of high power distance, individuals who show a high hierarchy in a group will impose themselves by providing guidance and direction (Hofstede 1980). Members of the group will follow the leader and will not present objection to his/her authority. The effect of social influence, therefore, is accentuated in cultures that reflect values of high power distance. As predicted, the relationship between social influence and behavioral intention was found to be positively moderated for those individuals who reflect values of high power distance.

5.3.4 Unsupported Hypothesis (significant effect in opposite direction). Effort Expectancy by Uncertainty avoidance (H5)

Based on Hofstede (1980), this study suggests that uncertainty avoidance will positively moderate the relationship between effort expectancy and behavioral intention. In this context, an individual who reflects values of high uncertainty avoidance (low risk tolerance) would attempt to reduce risk by obtaining more information, corroborating results, and taking all necessary steps to minimize errors. These extra activities result in the perception of additional effort.

The results obtained indicate that this relationship is significant in the opposite direction as predicted: Individuals who reflect values of cultures associated with high uncertainty avoidance cultures would have the perception that less effort is required for completing a task using a search engine when compared to individuals who reflect values of cultures associated with low uncertainty avoidance cultures. In explaining this, we suggest that it is likely that those who reflect values of cultures associated with high uncertainty avoidance will minimize risk by performing more searches and corroborating information with more sources. However, this may not imply more effort, or may just imply limited additional effort for these individuals. Furthermore, the perception of a higher effort requirement may be negligible.

5.4 Unsupported Hypothesis (non-significant).

Four out the eight hypotheses were found to be non-significant. These hypotheses include relationships that are moderated by either individualism or masculinity. As mentioned in the section describing convergence validity, individualism and masculinity produced unreliable results, showing high correlation among them. This outcome has been addressed by other studies, which imply that there is an overlap between these constructs' items (Smith 2002). To address this, the next section repeats the validation of the model, removing the masculinity moderator from the model.

5.4.1 Re-evaluation of the model (without masculinity)

In this section we re-evaluate the model with the absence of the masculinity moderator. The decision to remove this construct from the model, and not individualism, is based on the fact that our results reported that individualism moderated one

relationship (H6), while all the relationships moderated by masculinity were non-significant.

The re-evaluation of the new model included tests of convergence validity, discriminant validity, composite reliability, and significance. The test of convergence validity (Table 19) did not show any significant difference with respect to the model that included masculinity. Discriminant validity (Table 20) was evaluated using the Fornell and Larcker (1981) method, as in the previous model. In this case, however, all variables were shown to be independent. Composite reliability scores (Table 21) reported identical results when compared to the previous model.

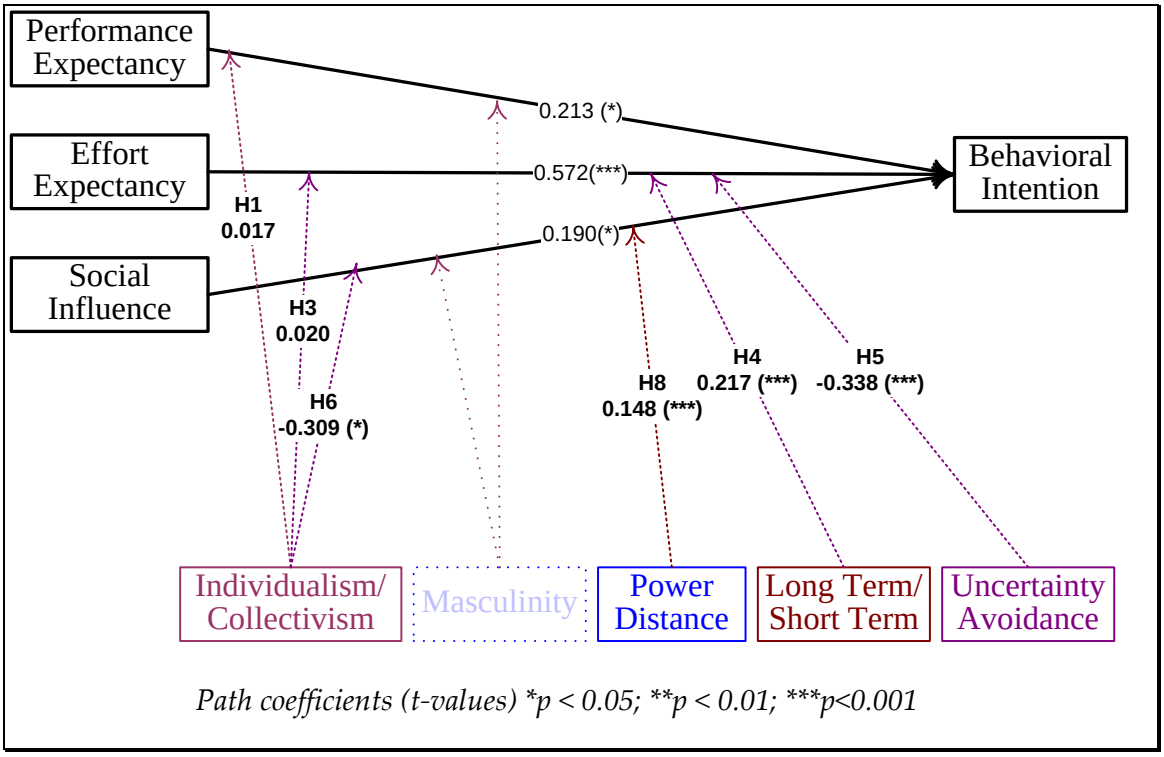
Table 19. Correlation among constructs and items (model without masculinity)								
	Behavioral	Effort	Individualism	Long Term	Power	Performance	Social	Uncertainty
BI1	0.895	0.444	-0.064	0.137	0.167	0.370	0.278	-0.151
BI2	0.894	0.428	-0.064	0.124	0.182	0.325	0.169	-0.083
BI3	0.875	0.386	-0.055	0.164	0.131	0.378	0.239	-0.001
BI4	0.840	0.401	-0.075	0.132	0.101	0.289	0.168	-0.157
EO15	0.522	0.889	-0.126	0.050	0.100	0.357	0.080	0.052
EO3	0.382	0.898	-0.113	-0.032	0.161	0.355	0.067	0.010
EO5	0.338	0.820	-0.042	0.060	0.082	0.299	0.133	0.010
EO6	0.385	0.914	-0.131	0.027	0.096	0.352	0.103	0.063
IDV2	-0.068	-0.115	0.823	0.382	0.202	-0.008	0.001	-0.064
IDV3N	-0.055	-0.103	0.761	0.328	0.288	0.034	0.079	-0.088
IDV4	-0.035	-0.035	0.671	0.242	0.250	-0.045	0.081	0.067
LTO1N	0.130	0.050	0.252	0.804	0.180	-0.006	0.040	-0.107
LTO3N	0.113	-0.006	0.425	0.730	0.207	-0.105	0.019	-0.041
PD1N	0.077	0.044	0.335	0.195	0.413	0.029	-0.069	-0.114
PD3	0.140	0.111	0.160	0.165	0.864	0.161	0.115	-0.026
PE11	0.260	0.302	0.064	-0.009	0.200	0.890	0.198	0.072
PE18	0.351	0.353	-0.012	-0.075	0.047	0.855	0.263	0.015
PE6	0.361	0.389	0.014	-0.097	0.166	0.935	0.210	0.078
PE7	0.404	0.347	-0.049	-0.050	0.181	0.923	0.222	0.011
SI1	0.195	0.220	0.032	-0.077	0.056	0.216	0.861	-0.051
SI2	0.246	0.168	0.029	-0.016	0.103	0.200	0.879	-0.111
SI4	0.212	-0.040	0.081	0.154	0.005	0.183	0.790	-0.015
SI5	0.132	-0.051	0.066	0.093	0.069	0.249	0.770	0.027
UA2	-0.068	0.081	-0.309	-0.332	-0.181	-0.020	-0.154	0.579
UA3	-0.083	-0.016	0.182	0.149	0.048	0.071	0.057	0.749

Table 20. Construct correlations and AVE values

	Behavioral Intention	Effort Expectancy	Individualism	Long Term Orientation	Power Distance	Performance Expectancy	Social Influence	Uncertainty Avoidance
Behavioral Intention	0.876							
Effort Expectancy	0.474	0.881						
Individualism	-0.073	-0.121	0.754					
Long Term Orientation	0.159	0.031	0.433	0.768				
Power Distance	0.167	0.124	0.316	0.250	0.677			
Performance Expectancy	0.390	0.389	-0.002	-0.068	0.162	0.901		
Social Influence	0.246	0.106	0.060	0.040	0.071	0.249	0.827	
Uncertainty Avoidance	-0.113	0.041	-0.057	-0.099	-0.081	0.045	-0.056	0.669

Table 21. Composite Reliability Score	
Construct	Composite Reliability
Behavioral Intention	0.929829
Effort Expectancy	0.932751
Individualism	0.797256
Long Term Orientation	0.741261
Power Distance	0.601275
Performance Expectancy	0.945305
Social Influence	0.895936
Uncertainty Avoidance	0.614771

The purpose of removing masculinity from the model was to determine if this would increase the significance of those variables moderated by individualism. The expectation was to obtain significant moderating effects on hypothesis 1 and hypothesis 3. As shown in Figure 5, this was not the case. Path coefficients and significance remained almost identical to the proposed model.



The masculinity dimension is not present in this model.

Figure 5. Research model hypotheses coefficients and t- statistic (new model)

5.5 Analysis of non-significant relationships

5.5.1 Unsupported Hypothesis. Performance Expectancy X Behavioral Intention

Two of the hypothesis in our model involved individualism as a moderator. These propositions are based, in part, on the definition of individualism, which suggests that users that reflect the values of individualist cultures will generally work independently and make use of tools available to complete a task. Tools, in this case a search engine, are perceived as performance enhancers which empower users. An individual who exhibits values of individualist cultures perceives dependence on others as a weakness; individuals should be self-made and independent, and resort to tools and technology for solutions. For hypothesis 1, in a situation where the use of a tool (i.e. search engine) is

possible, if such tool is used, individualism will positively moderate the relationship between performance expectancy and behavioral intention. On the other hand, users of cultures who exhibit values of low individualism will generally work in a group setting, collaborate with each other, and tend to depend less on interacting at the individual level with a specific technology. Therefore, the relationship between expected performance and intention to use would be attenuated. At the same time, the amount of perceived effort required to complete a task is reduced when a user from a culture that reflects values of individualism can use a tool (i.e. search engine) to complete such task.

This proposition was not confirmed by our results, which showed individualism did not moderate the relationship between performance expectancy and behavioral intention. Possible justification for these results involves a combination of two factors:

- the concept of personal computing and;
- the soundness of Hofstede's (1980) individualism operationalization in the present time.

In explaining these two we first examine the subject pool. No demographic data was collected; however some assumptions can be drawn. No items in the survey ask for the age of the participants; however the complete sample is made up of undergraduate college students. At the time when the survey was conducted, these students were also members of a sophomore or junior introductory CIS class. Based on this evidence, it is reasonable to assume that the average age of the participants was below 25.

Personal Computing Concept. The concept of personal computing and its changing definition are reviewed here. Hofstede's (1980) theory was developed in a world in which most computer interaction took place at the individual level with users

working independently. Around the late 70s and 80s most of the tasks performed with a computer involved an individual operator, who worked on his or her own (Ceruzzi 2003). Most computer systems of this era were designed for single user operation. In the few cases where networks were implemented, the purpose was to allow access to shared resources and not for collaborative multi-user applications.

Today, an increasing number of computer applications are collaborative in nature and require the efforts of multiple users to achieve optimum performance. Such is the case of GDSS, where tools are rendered useless if the right participation and contribution from members is not achieved (Dennis, George et al. 1988). Furthermore, Supply Chain Management ("SCM"), Customer Relationship Management ("CRM"), inventory control, workflow and several other process flow software are designed with multiple users in mind. Widely popular social networking applications, such as Facebook and Myspace, benefit from network effects. These applications are focused on group communication; participation is solely for social development, and contributions from members benefit the entire group. While some users may "free-ride", in general users contribute. We note that most users who participated in the survey, because of their age group and status as college students, are heavy users of social networking applications. In this segment of the population, social networking applications are the most popular type of software (Corbett 2010). Consequently, we suggest that the sample that completed this survey tends to see computer technology as a social networking tool and personal computing as a social networking enabler. This is in contrast to the view presented earlier, where computer technology and personal computing were seen mostly as a solitary and isolated activity.

The application of Hofstede's Theory in the present context. As mentioned earlier in our literature review, Hofstede's contribution to the field of cross culture communication is invaluable. Nonetheless, it has been pointed out that the dimensions he identified may be outdated (Mc Sweeney 2002). Hofstede's theory predicts that collectivist groups would tend to establish relationships, form ties, and collaborate with each other, rather than act individually to complete a task, as is the case with members of groups from cultures that reflect individualist values. A personal computer and its applications in the early 80s empowered individual users by enhancing their performance. Users who exhibited values of individualist cultures would have sensed a higher degree of performance when using computer technology in that time period.

Today, personal computing and networking applications allow for social networks to interact more effectively. The perception of personal computers enhancing the performance of an individual may have been overshadowed by the perception of personal computers enhancing the performance of the group. Collectivist cultures, whose sense of performance increases in direct relationship to the amount of communication that exists within the group, may perceive that the use of computer technology enhances performance more than individualist cultures. This presents a conflict in the application of Hofstede's individualism dimension in the present time and for this specific context. Non-significant results may be attributed to this.

5.5.2 Unsupported Hypothesis. Effort Expectancy X Behavioral Intention

Effort expectancy is related to the perception of ease of use of a system. In this research, we hypothesized that the relationship between effort expectancy and behavioral intention is moderated by individualism, in such way that the relationship will be stronger

in the presence of individuals who belong to cultures that reflect low levels of individualism. This hypothesis was not confirmed by our survey. In understanding this result we examine the definitions of individualism and contextuality.

Individuals from cultures that exhibit values of collectivist cultures have been associated with high contextuality (Hofstede 1980; Trompenaars et al. 1997). For these cultures, when a message is transmitted in a face to face environment, portions of the message are transmitted implicitly. The message is encoded in multiple channels, and not limited to the verbal route. The use of facial gestures, hand signals, and other expressions complement verbal communication. In societies associated with low individualism, where there is high contextuality, Internet sites transmit content more effectively if they use high context communication, including the use of symbols, images, animations, and other non-textual media (Ahmed et al. 2009).

Furthermore, in educational environments, it has been noted that for societies that rate low in individualism (where high context communication is predominant), individuals generally process both verbal and non-verbal messages in communication exchanges. For these groups, certain internet websites are found to be challenging because the content is lacking non-verbal cues such as images, animation and sounds (Twu 2009). The use of a search engine, a low context environment, appears to be an imperfect match for individuals who reflect values of high collectivism.

5.5.3 Unsupported hypotheses involving masculinity as a moderator (H3 and H7)

Two of the four hypothesized relationships found to be non-significant involved masculinity. In these, masculinity moderated the relationship between (1) performance expectancy and behavioral intention, and (2) effort expectancy and behavioral intention.

These two relationships were also moderated by individualism, and in both cases the moderating effect was reported as non-significant. We addressed the results of those relationships moderated by individualism in the previous sections. In this section we examine the relationship moderated by masculinity.

As indicated earlier, masculinity and individualism show a strong correlation in tests of convergence validity. This suggests that items that correspond to these constructs are either similar in nature or presentation, or have possibly been misread or misunderstood by participants in the survey. The items are listed in table 22. It is also suggested here that participants, due to their status as college students, may interpret these items differently than older adults who may have full time jobs.

Table 22. Individualism and Masculinity Items

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ...	
Individualism	**Masculinity**
have security of employment	have chances for promotion
have sufficient time for your personal or home life	live in a desirable area
have a job respected by your family and friends	get recognition for good performance
do work that is interesting	have pleasant people to work with

While these items belong to different constructs, it appears that they all relate to quality of life and well-being. An overlap is apparent, and this may have lead participants to associate these items. Respondents may have not taken the time to evaluate each question, and may have attribute equal importance to similar items, leading to the results obtained.

Chapter 6.

Conclusion and Contributions

In light of the ubiquitous nature of the Internet, search engines have become the major starting point of the web experience. Regardless of the search task, language, or search engine used, users exhibit search behavior contingent on cultural traits. This thesis proposes and validates the Culture On-Line Search (COLS) model. This model rests on the Unified Theory of Acceptance and Use of Technology (Venkatesh et al. 2003) and Hofstede's (1980) culture dimensions as its theoretical foundation. The model establishes a link between the cultural dimensions identified by Hofstede and the use of search engines. Hypotheses developed and results have proved the moderation value of several of Hofstede's variables on this link.

In summary, the research consists of:

- Development of the Culture On-Line Search (COLS) model to evaluate how culture impacts the use of search engines;
- Adaptation and validation of the COLS survey instrument based on both UTAUT's (Venkatesh et al. 2003) survey instrument and Hofstede's Value Survey Model (Hofstede 2007) and;
- Analysis of the results in light of the hypothesized propositions.

6.1 Contributions

The combination of UTAUT and Hofstede's cultural dimensions is quite common in IS research. Cross cultural studies in IS usually deal with attitudes at the organizational

level. National culture is customarily studied within the national setting. This approach suggests a flaw, since it is assumed that those who participate in the study in a given country must be nationals of this country and therefore are part of the predominant culture of this country. Alternatively, researchers may categorize participants by country of birth, or culture with which they identify.

By using cultural dimensions instead of nationality, this research is unique. The study participants were recruited from a large metropolitan university in the United States. This University is ranked as one of the most diverse colleges in the United States, with students from more than one hundred and sixty countries. Although the student population has a diverse background, we recognized that many of our subjects were raised in the United States. As a result it is possible that some cultural variables are not as pronounced in some of the subjects. This study did not attribute a particular cultural label based on the nationality of the participant. Cultural background of all participants was determined by obtaining a score (or ranking) for each cultural dimension for each participant. It is important to note that our participants were likely to experience some cultural erosion: for example, some participants may have lived in the United States long enough that their native culture is no longer predominant in their behavior.

In summary, the contributions are:

- The COLS model to determine the impact of culture on search engine user behavior;
- A model that operationalizes culture using Hofstede's cultural dimensions, and not nationality;

- A model that can be adapted to other information systems and used in other disciplines;
- A novel methodology that can be used for new research, to reassess earlier research, and to obtain results that have a higher degree of generalizability within and outside of Information Systems research.

6.2 Results

In this research a novel Culture On-Line Search (COLS) model was developed using UTAUT and Hofstede's cultural dimensions. The model was validated by examining all constructs as well as testing convergence validity, discriminant validity, and composite reliability. The convergence validity test demonstrated poor loading for some survey questions (associated with individualism, long term orientation, and power distance); thus, these questions were discarded. The discriminant validity test exhibited an overlap between two survey questions (associated with masculinity and individualism), which indicated potential issues in the conceptualization of these constructs. Composite reliability scores reported high values, which ensured good construct validity.

The COLS model was evaluated after completing the tests for construct validity. Out of eight hypothesized moderating relationships, four were found to be significant, with three of these showing the expected moderating effect (long term orientation positively moderating the relationship between effort expectancy and behavioral intention, individualism negatively moderating the relationship between social influence and behavioral intention, and power distance positively moderating the relationship between social influence and behavioral intention in the context of search engine use),

and one with its moderating effect opposite to what was hypothesized (uncertainty avoidance negatively moderated the relationship between effort expectancy and behavioral intention).

However, four other hypothesized relationships were not supported (masculinity moderating the relationship between effort expectancy and behavioral intention, masculinity moderating the relationship between social influence and behavioral intention, individualism moderating the relationship between effort expectancy and behavioral intention, and individualism moderating the relationship between performance expectancy and behavioral intention). While further research is needed, it seems reasonable that hypotheses that were not supported may be attributed to:

The sample population. Hofstede's survey was originally intended for full time professionals, with several survey questions about an ideal job. In examining some of the results, it appears that participants of the survey may not have adequate experience to properly address these questions.

The conceptualization of personal computing in the present time. As discussed previously, personal computing in the late 70s and 80s was usually described as a discrete task performed by an isolated user connected to a computer application. Today, personal computing has evolved into continuous communication and interaction of many globally dispersed users.

The application of Hofstede's theory in the present time and context. While cultural background affects the way an individual acts, the concept of national culture has blurred due to globalization. While Hofstede's theory is still prevalent, the results of this study suggest that, at least for several cultural dimensions, some adjustments may be

required to reflect current times, including the concept of an ideal job, work-life balance, work recognition, and the role of technology in these areas.

In summary, the results of this research are:

- The new COLS model, which evaluated the impact of culture in the behavior of search engine users;
- Validation of the COLS model;
- The results of the measurement model showed support for three of the eight hypotheses proposed.
- The unsupported hypotheses were analyzed, leading to potential changes in the methodology and future areas of research.

6.3 Future research

Use of search engines is an active area of research. In light of ongoing developments in on-line technology and new applications, such as mobile and social computing, many users switch from searching as application (e.g. Google) to searching as a function of an advanced, more complex system (e.g. Facebook's search function). This paradigm switch may require review of survey instrument in future research. Our survey instrument is based on Hofstede's survey instrument developed more than three decades ago. While the model has been repeatedly updated, changes may not have taken into consideration all newly developed technologies. In particular technologies such as social networking applications, which re-defined the concept of personal computing and empower members of cultures that reflect collectivist values. Also, acceptance and use of new technologies will affect user behavior and consequently new or modified hypotheses will need to be developed. A potential area or future research may concentrate

on a particular application, such as search engines or social networking, and include a modified Hofstede's instrument to specifically address the advances of computation technology.

In summary, the future research directions are:

- Update the survey instrument to incorporate new technologies and applications;
- Design an instrument for a specific technology, such as search engines or social networking;
- Develop new hypotheses incorporating other dimensions of culture and;
- Revise unsupported hypotheses.
- Examine actual use behavior

6.3 Limitations

The study presented here has limitations that are to be taken into consideration when interpreting the results. Furthermore, any generalizations derived from this work should be subject to careful inspection taking into consideration the limitations indentified here.

In addressing the existing limitations in this research, the subject pool is considered first. The subject pool used in this research were students from a university. Even though this population is ethnically diverse, it is limited to college students. Both UTAUT and Hosftede's survey instrument were repeatedly validated in the business setting. In that context, the participants were full time employees. Based on this, it is assumed that the priorities and responsibilities of such group are different from those of college students. This would impact the responses to the items corresponding to

UTAUT. This scale was originally designed and validated in the business context. Further validation took place in different industries. In all cases, the subjects were professionals.

The distinction between professionals and college students is more pronounced when considering Hofstede's items. In the scales that correspond to the cultural dimensions, the subjects are required to answer questions in regards to their preference of work/life balance, upward mobility, promotions, recognition, family time and use of free-time. While the participant pool in this study may have some professional experience, it may not be sufficient to prioritize among these. It is suggested that, in order to further validate results, this research is repeated with a different population, which includes professionals. This future step may validate the findings of this work, and may also clear the issues that were reported between Hofstede's dimensions in the data collection stage.

Another important limitation in this research is the conceptualization of personal computing. As it was mentioned in Chapter 5, the perception of personal computing has changed dramatically since the introduction of Hoftsede's theories in the early 80's. At that time personal computing was seen as an individual and isolated activity. Today, personal computing is generally associated with social networking activities. This perception is even more prominent in our group, which is composed of college students who are users of social networking application (i.e. Facebook); in contrast to full time professionals who may actually spend more time using productivity suites (i.e. Microsoft Office). While the context of this research is search engines, the general perception of a personal computer, for our subject group, is that of a tool that enables communication.

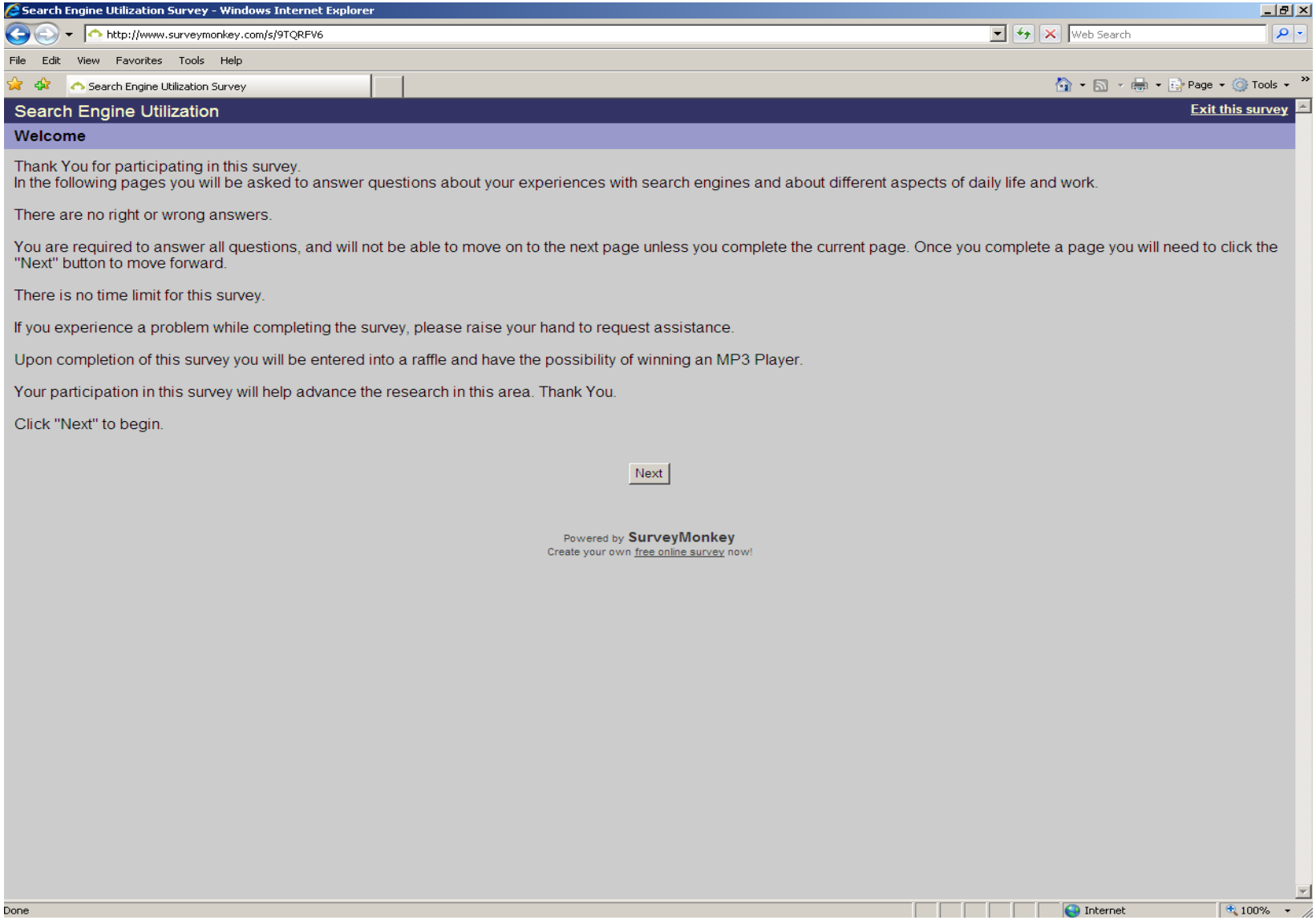
This view may affect the strength with which individualism moderates relationships in our model.

There are other limitations that arise from our subject group. Generational gaps and their attitudes towards technology may create a difference in the way the subjects perceive and use search engines. Most of our subjects may prefer the use of technology, including search engines to complete school tasks. This preference may be partially attributed to their age group, if compared to previous generations which may resort to other tools to complete their tasks. The use of other tools, which may include library resources, does not indicate a difference in any cultural dimension. Nonetheless, a limitation of the COLS instrument lays on the fact that individuals are categorized within a cultural dimension based on whether they use or not use a search engine to complete a task. This categorization is made with no consideration to the fact that participants may choose other methods to complete a task which may be equivalent, from a culture perspective, to using a search engine.

The last limitation that we address in this research relates to the constructs in the COLS model and their adaptation from constructs in the UTAUT model. One important consideration that must be noticed is that the COLS model does not incorporate the use behavior measure. In this research actual use behavior was not measured, only behavioral intention. Measuring actual use behavior of a search engine to complete a task may yield inaccurate results, considering that most participant generally use a search engine, but not necessarily to complete a specific task. The use of a search engine may be part of the general routine that participants engage during web session. However, this use may not include actual work towards the completion of a task related to school.

Appendix A

Survey Instrument


Search Engine Utilization Survey - Windows Internet Explorer
http://www.surveymonkey.com/s/9TQRFV6
Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Welcome
Thank You for participating in this survey.
In the following pages you will be asked to answer questions about your experiences with search engines and about different aspects of daily life and work.
There are no right or wrong answers.
You are required to answer all questions, and will not be able to move on to the next page unless you complete the current page. Once you complete a page you will need to click the "Next" button to move forward.
There is no time limit for this survey.
If you experience a problem while completing the survey, please raise your hand to request assistance.
Upon completion of this survey you will be entered into a raffle and have the possibility of winning an MP3 Player.
Your participation in this survey will help advance the research in this area. Thank You.
Click "Next" to begin.
Next
Powered by SurveyMonkey
Create your own free online survey now!
Done
Internet
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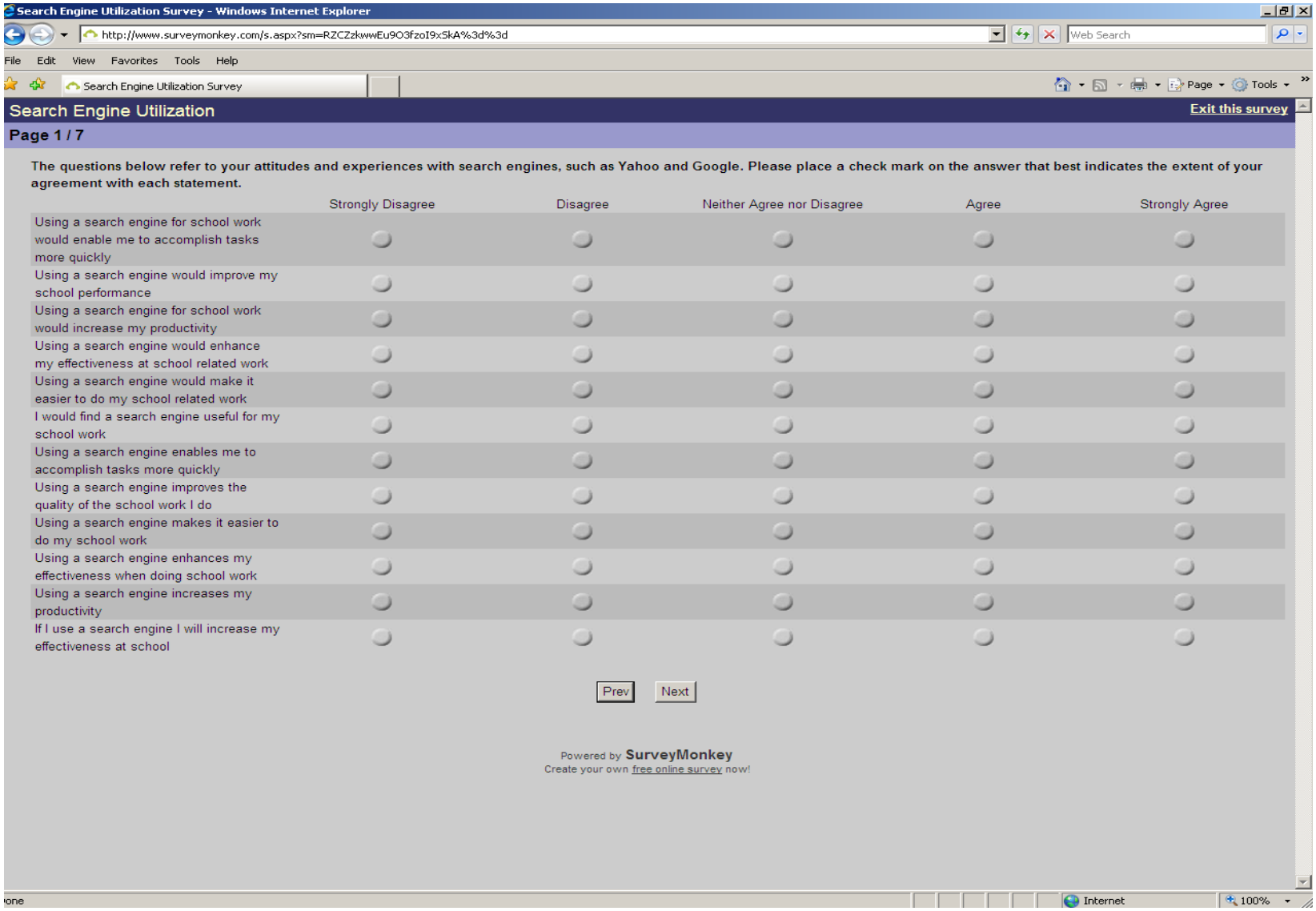
Search Engine Utilization Survey - Windows Internet Explorer
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Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 1 / 7
The questions below refer to your attitudes and experiences with search engines, such as Yahoo and Google. Please place a check mark on the answer that best indicates the extent of your agreement with each statement.
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree
Using a search engine for school work would enable me to accomplish tasks more quickly
Using a search engine would improve my school performance
Using a search engine for school work would increase my productivity
Using a search engine would enhance my effectiveness at school related work
Using a search engine would make it easier to do my school related work
I would find a search engine useful for my school work
Using a search engine enables me to accomplish tasks more quickly
Using a search engine improves the quality of the school work I do
Using a search engine makes it easier to do my school work
Using a search engine enhances my effectiveness when doing school work
Using a search engine increases my productivity
If I use a search engine I will increase my effectiveness at school
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Internet
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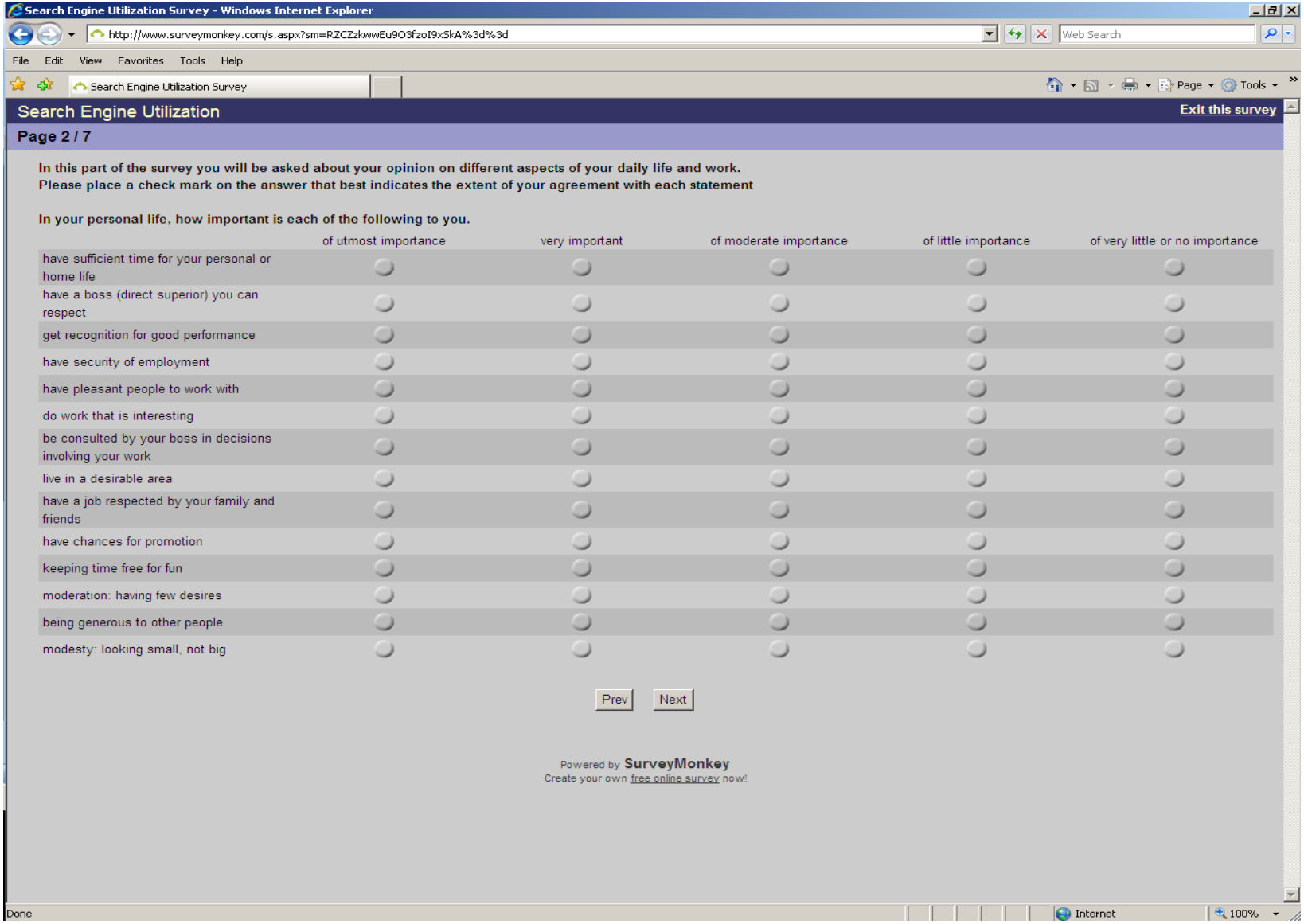
Search Engine Utilization Survey - Windows Internet Explorer
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Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 2 / 7
In this part of the survey you will be asked about your opinion on different aspects of your daily life and work.
Please place a check mark on the answer that best indicates the extent of your agreement with each statement
In your personal life, how important is each of the following to you.
of utmost importance
very important
of moderate importance
of little importance
of very little or no importance
have sufficient time for your personal or home life
have a boss (direct superior) you can respect
get recognition for good performance
have security of employment
have pleasant people to work with
do work that is interesting
be consulted by your boss in decisions involving your work
live in a desirable area
have a job respected by your family and friends
have chances for promotion
keeping time free for fun
moderation: having few desires
being generous to other people
modesty: looking small, not big
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Done
Internet
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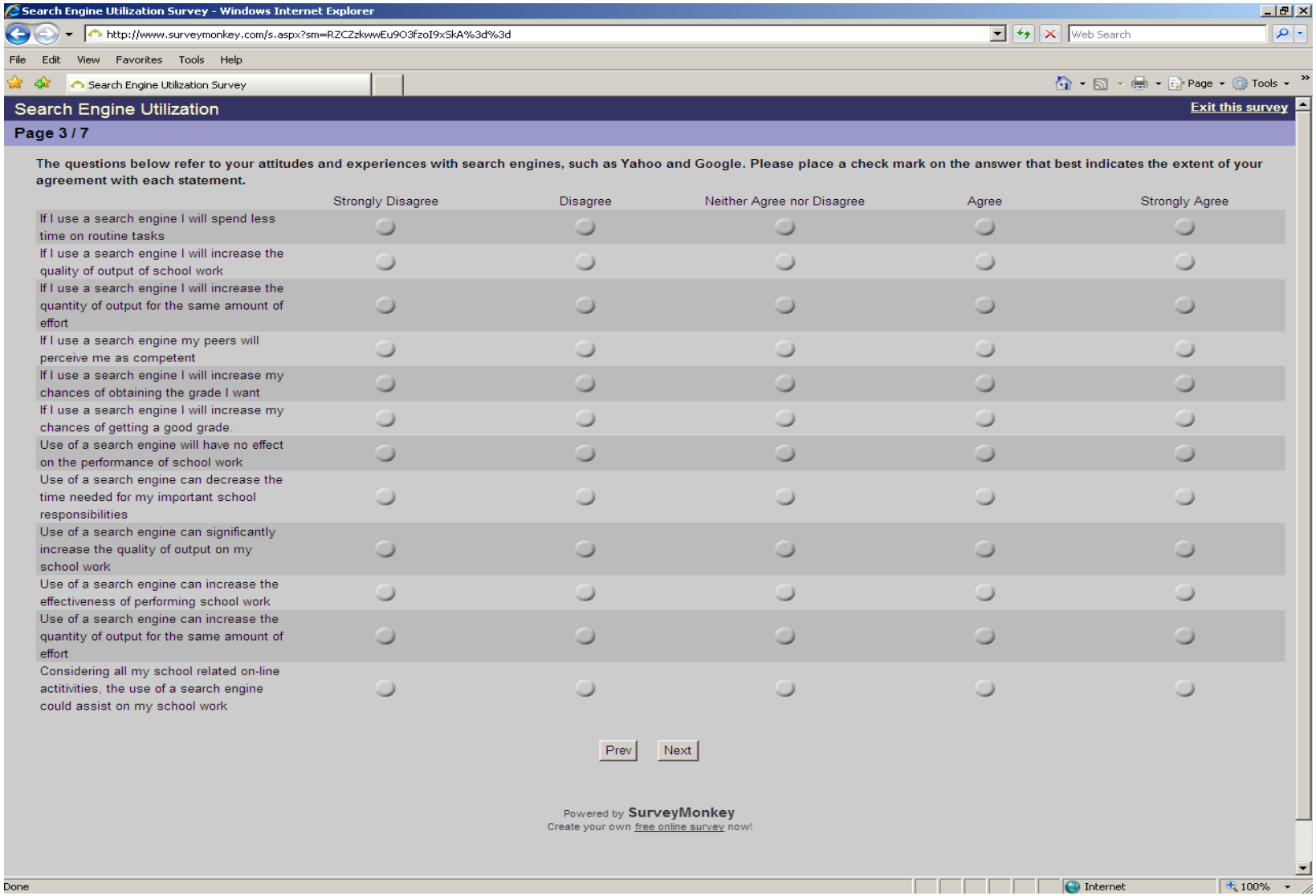
Search Engine Utilization Survey - Windows Internet Explorer
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Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 3 / 7
The questions below refer to your attitudes and experiences with search engines, such as Yahoo and Google. Please place a check mark on the answer that best indicates the extent of your agreement with each statement.
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree
If I use a search engine I will spend less time on routine tasks
If I use a search engine I will increase the quality of output of school work
If I use a search engine I will increase the quantity of output for the same amount of effort
If I use a search engine my peers will perceive me as competent
If I use a search engine I will increase my chances of obtaining the grade I want
If I use a search engine I will increase my chances of getting a good grade.
Use of a search engine will have no effect on the performance of school work
Use of a search engine can decrease the time needed for my important school responsibilities
Use of a search engine can significantly increase the quality of output on my school work
Use of a search engine can increase the effectiveness of performing school work
Use of a search engine can increase the quantity of output for the same amount of effort
Considering all my school related on-line actitivities, the use of a search engine could assist on my school work
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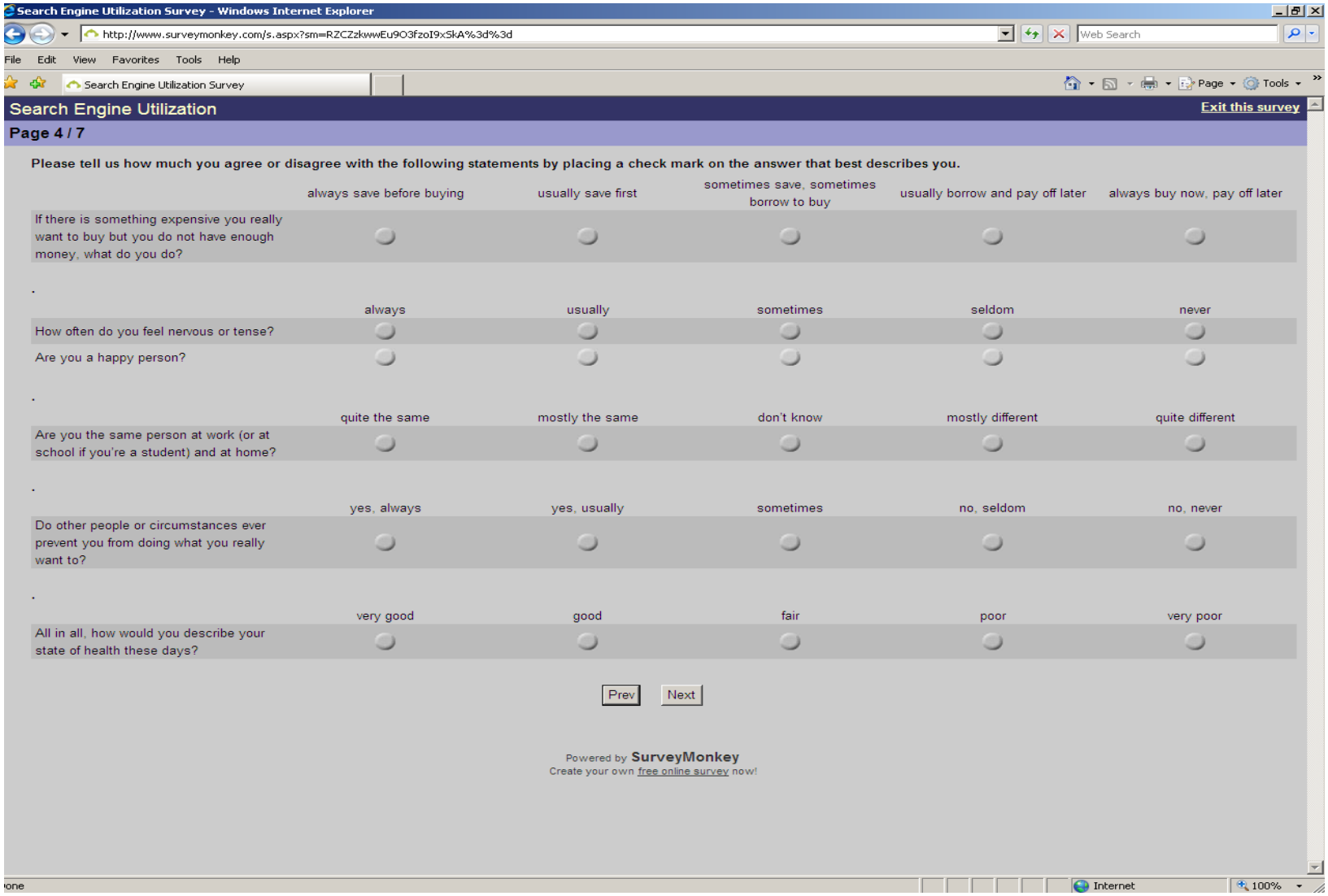
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Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 4 / 7
Please tell us how much you agree or disagree with the following statements by placing a check mark on the answer that best describes you.
always save before buying
usually save first
sometimes save, sometimes borrow to buy
usually borrow and pay off later
always buy now, pay off later
If there is something expensive you really want to buy but you do not have enough money, what do you do?
always
usually
sometimes
seldom
never
How often do you feel nervous or tense?
Are you a happy person?
quite the same
mostly the same
don't know
mostly different
quite different
Are you the same person at work (or at school if you're a student) and at home?
yes, always
yes, usually
sometimes
no, seldom
no, never
Do other people or circumstances ever prevent you from doing what you really want to?
very good
good
fair
poor
very poor
All in all, how would you describe your state of health these days?
Prev
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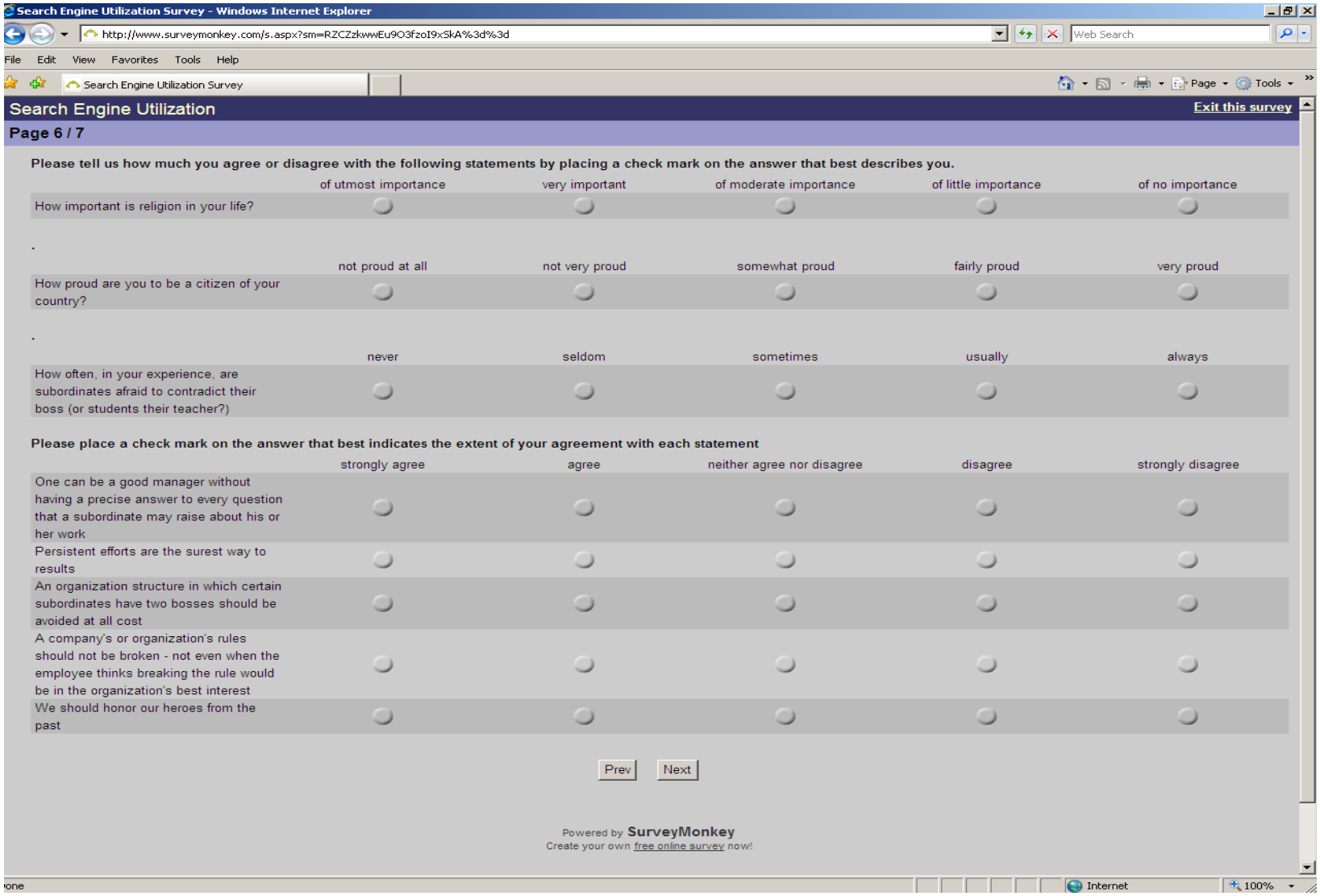
Search Engine Utilization Survey - Windows Internet Explorer
http://www.surveymonkey.com/s.aspx?sm=RZCZzkwwEu9O3fzoI9xSkA%3d%3d
Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 6 / 7
Please tell us how much you agree or disagree with the following statements by placing a check mark on the answer that best describes you.
of utmost importance
very important
of moderate importance
of little importance
of no importance
How important is religion in your life?
not proud at all
not very proud
somewhat proud
fairly proud
very proud
How proud are you to be a citizen of your country?
never
seldom
sometimes
usually
always
How often, in your experience, are subordinates afraid to contradict their boss (or students their teacher?)
Please place a check mark on the answer that best indicates the extent of your agreement with each statement
strongly agree
agree
neither agree nor disagree
disagree
strongly disagree
One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work
Persistent efforts are the surest way to results
An organization structure in which certain subordinates have two bosses should be avoided at all cost
A company's or organization's rules should not be broken - not even when the employee thinks breaking the rule would be in the organization's best interest
We should honor our heroes from the past
Prev
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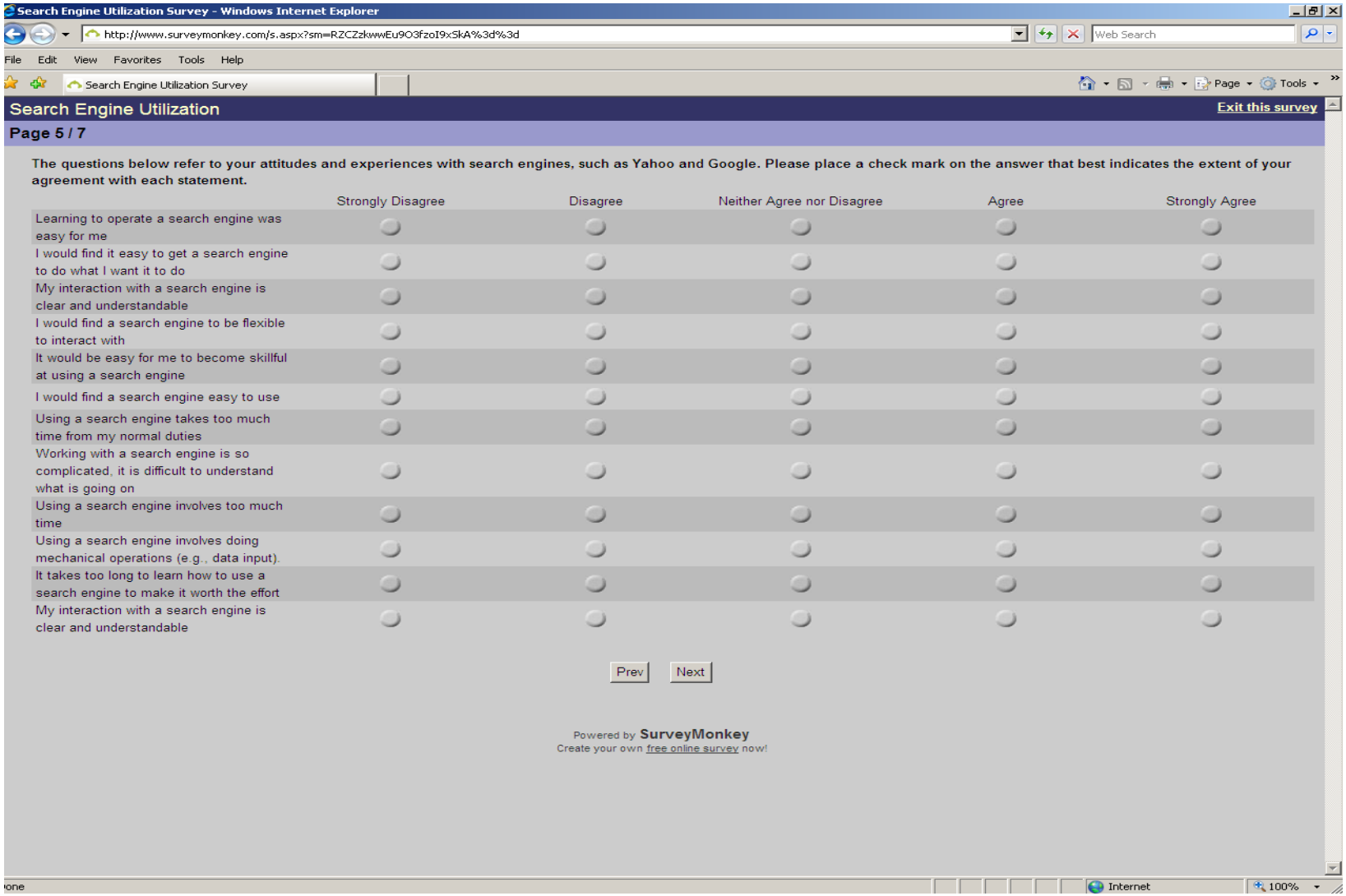
Search Engine Utilization Survey - Windows Internet Explorer
http://www.surveymonkey.com/s.aspx?sm=RZCZzkwwEu9O3fzoI9xSkA%3d%3d
Web Search
File Edit View Favorites Tools Help
Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Page 5 / 7
The questions below refer to your attitudes and experiences with search engines, such as Yahoo and Google. Please place a check mark on the answer that best indicates the extent of your agreement with each statement.
Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree
Learning to operate a search engine was easy for me
I would find it easy to get a search engine to do what I want it to do
My interaction with a search engine is clear and understandable
I would find a search engine to be flexible to interact with
It would be easy for me to become skillful at using a search engine
I would find a search engine easy to use
Using a search engine takes too much time from my normal duties
Working with a search engine is so complicated, it is difficult to understand what is going on
Using a search engine involves too much time
Using a search engine involves doing mechanical operations (e.g., data input).
It takes too long to learn how to use a search engine to make it worth the effort
My interaction with a search engine is clear and understandable
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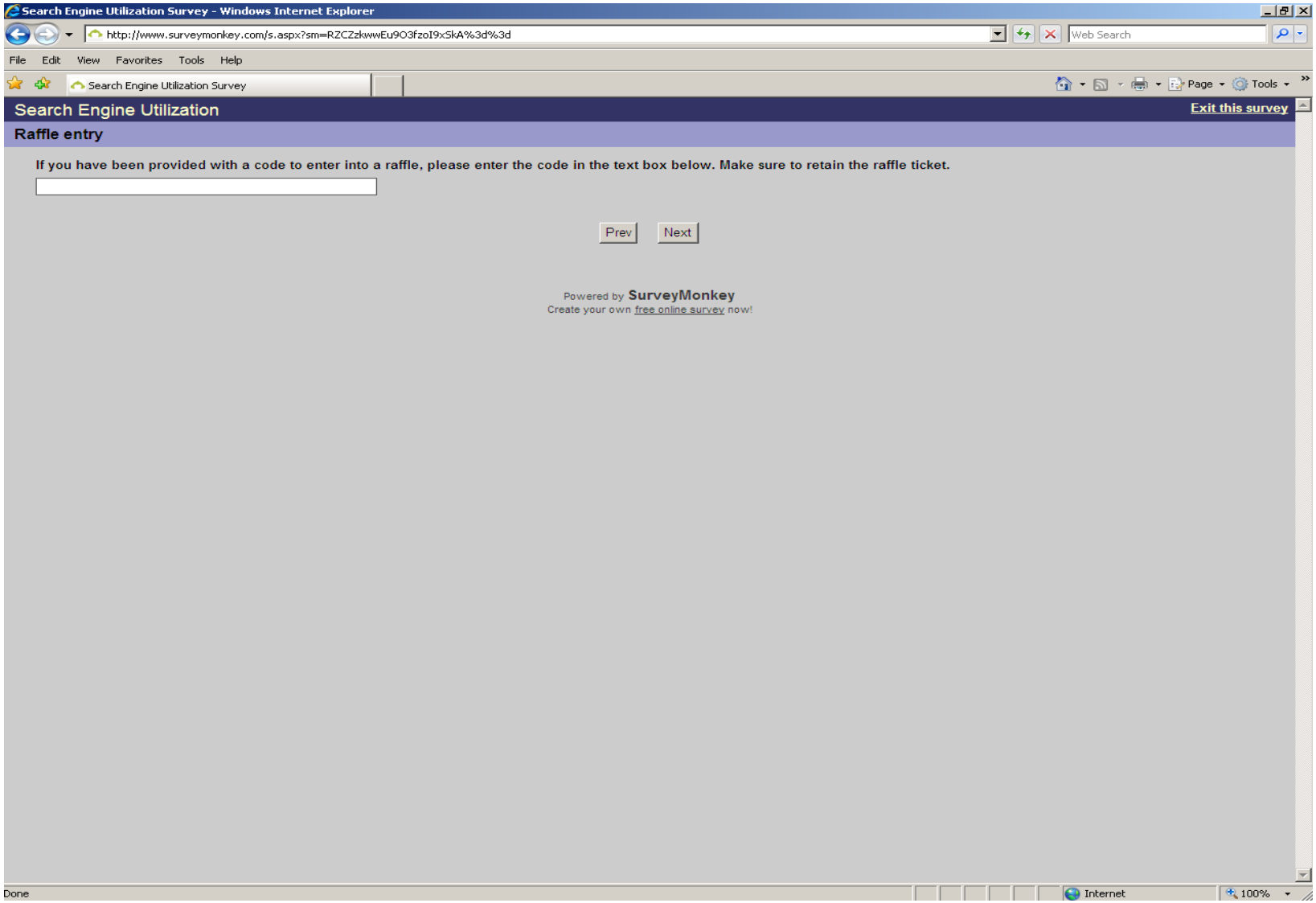
Search Engine Utilization Survey - Windows Internet Explorer
http://www.surveymonkey.com/s.aspx?sm=RZCZzkwwEu9O3fzoI9xSkA%3d%3d
Web Search
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Search Engine Utilization Survey
Page Tools
Search Engine Utilization
Exit this survey
Raffle entry
If you have been provided with a code to enter into a raffle, please enter the code in the text box below. Make sure to retain the raffle ticket.
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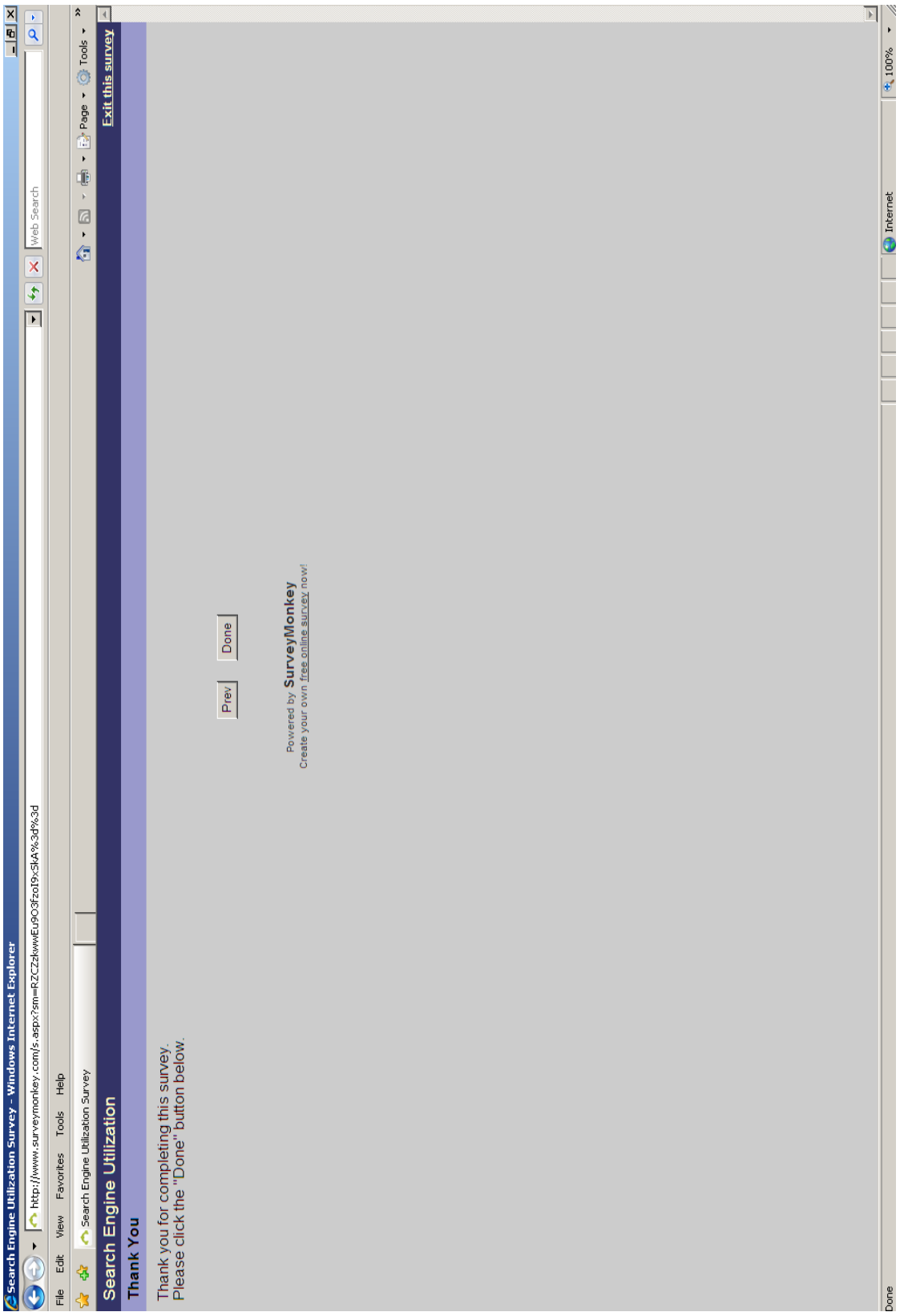
Search Engine Utilization Survey - Windows Internet Explorer
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Search Engine Utilization Survey
Page Tools
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Search Engine Utilization
Thank You
Thank you for completing this survey.
Please click the "Done" button below.
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Appendix B

Consent Form

Informed Consent Form

Project Title: The impact of culture in the behavior of search engine users

Principal Investigators:
XXX XXXX XXXX XXXXX
Department of Statistics and Computer Information Systems XXXXXXX
XXXXXXXXXXX, XXXXXXXXXXXXXX, XXXXXXXXXXXXXXXXXXX.

Informed Consent Form

The primary purpose of this study is to examine the relationship between cultural background and internet search behavior. For this study you are asked to complete a survey in which you are asked to answer questions about how you would behave in certain situations and about on-line search habits and experiences.

Participation is completely voluntary. In **order to participate you must be 18 (years of age) and over.** Refusal to participate does not involve any penalties and participation may be discontinued at any time. Your participation is totally anonymous. Your professors will not be informed about your participation or lack thereof or your answers. By participating in this study, you will have an opportunity to reflect about you current search behavior and advance the research in this area.

The total time required to complete the survey is estimated to be 25-30 minutes. At the end of each survey session (aprox 25 participants) a raffle will be conducted for an MP3 Player.

All records of this study will be kept confidential. No one other than the PI and CoPI (XXXXXX XXXXXXX or XXXX XXXXXX) will have access to the data, which will be archived in a secure location after use. All information is anonymous; you do not have to type your name, ID, or any other identifiable information on your survey. Any publications from this study will refer to aggregate results and the group will be referred to as XX XXX XXX.

If you have any questions regarding this research, you can call XXXXXXXXXXXX XXXXX XXXXX XX XXX XXXX XXXX. If you have any questions concerning your rights as a participant in this study, you can contact the XXXX IRB Office at XXXXXXXXX XXXXXXXXXX.

The IRB (Institutional Review Board) is the college committee that protects the rights of human subjects in research. For information of how your rights are protected if you participate on this survey, please contact XXXXXXX XXXXXXXXXXX XXXXXXXXX XXXXXXXXXXX

By signing below, you understand and accept the terms of this research study as stated above and that your participation is completely voluntary.

Please check box to indicate consent:
☐ I consent to the Survey

_____	_____
Participant Signature	Researcher Signature
_____	_____
Full name (please print)	Date

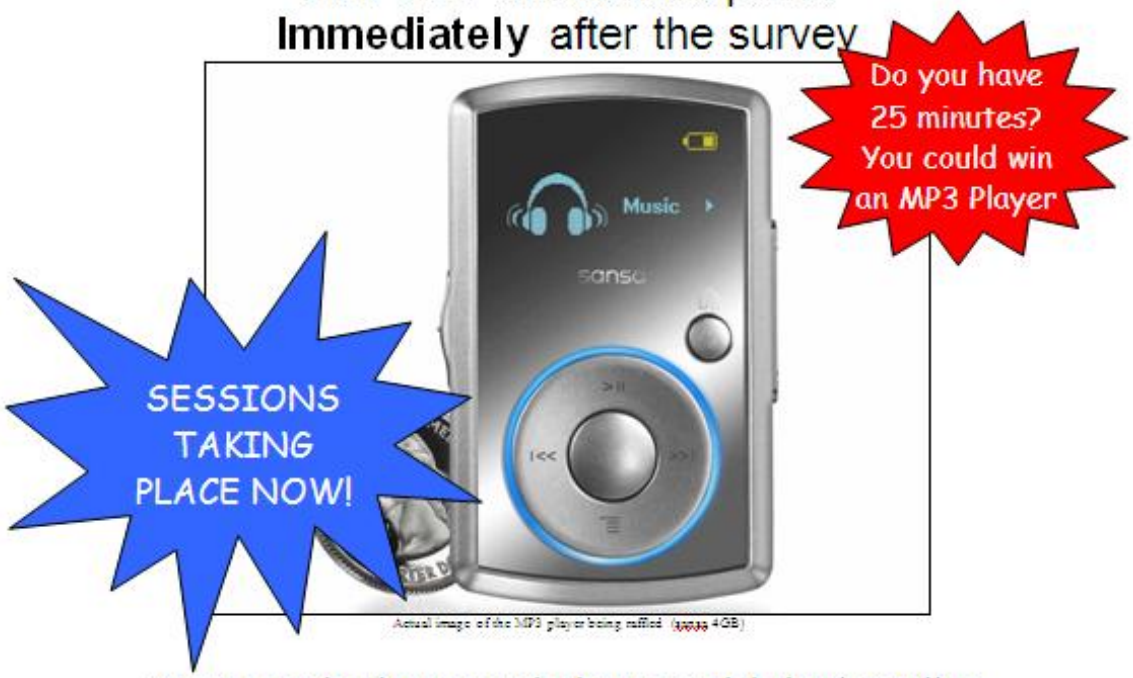
Appendix C

Promotional Banner

Computer Information Systems Department

Participate in a survey and enter into a raffle to win an MP3 Player.

RAFFLE will be take place **Immediately** after the survey



Actual image of the MP3 player being raffled (~~8GB~~ 4GB)

We are conducting research about search behavior online. Your participation in this survey will help advance the research in this area. No special experience or skills are required. The survey will take approximately 25 minutes.

All Majors welcome, undergrad and graduate students!

You will not be required to provide any personal / private information.
In order to participate you must be 18 (years of age) and over.

This section contains contact information about the Author,

Dissertation Advisor and IRB Administrator and has been removed

Appendix D

IRB Application

CITY UNIVERSITY OF NEW YORK

INSTITUTIONAL REVIEW BOARD
(I R B)
APPLICATION FOR APPROVAL TO USE HUMAN SUBJECTS IN RESEARCH

Step-by-step instructions and other information relevant to filling out this form are contained in CUNY's *Principal Investigator's (PI) Manual for Research Involving Human Subjects*, available at your campus IRB Office or by accessing it on-line at http://www.rfcuny.org/ResCompliance/pi_manual.html. All Principal Investigators are expected to be familiar with the policies and procedures it contains. Failure to follow the instructions may result in a delay in the approval process. Be sure to sign where indicated by the ➲.

1. Project Title:

The impact of culture in the behavior of search engine users

PRINCIPAL INVESTIGATOR INFORMATION (See Page 4 of the PI Manual)

2. Principal Investigator: Jaime Muro Flomenbaum

Department: **Stats and Comp Info Systems** Phone: [redacted] Fax: [redacted]

Email: jaime_flomenbaum@baruch.cuny.edu

3. Co-PI (if any) _____

Department: _____ Phone: _____ Fax: _____

Email: _____
(Required)

4. Status (check one): ☐ Faculty **X Doctoral Student** ☐ Graduate Student ☐ Undergraduate Student
☐ Other (please explain) _____

For student and non-CUNY researchers *only*, please give your home address and phone number:

[redacted]

FACULTY ADVISOR INFORMATION (See Page 4 of the PI Manual)

NOTE: The IRB will not review protocols submitted by students without the signature of a faculty advisor on page 7 of this application.

5. Faculty Research Advisor: ***Dr. Isak Taksa***

Department: **Stat & Comp Information System** Phone: [redacted]
Fax: [redacted]

Email: [redacted]

For IRB Use Only
Date Received: Protocol Number:
(Revised April. 2003)

PROTOCOL INFORMATION (See Pages 4-12 of the PI Manual)*

6. Does your study involve individually identifiable protected health or mental health information (PHI), including demographic information and biological specimens identified to an individual, created or maintained by, or received from, a person or an entity covered by the Privacy Rule issued under the Health Insurance Portability and Accountability Act (HIPAA) (e.g., a hospital; a physician, or a practice in psychology, psychotherapy, or social work; a health insurer, HMO, or health plan; or a community clinic, or a social service or mental health agency)?

___Yes **_X NO**

7. If your answer to question (6) is Yes, please list below or on a separate sheet the PHI that is necessary for your research and that you intend to use in your research.

_____

_____

_____

8. If your answer to question (6) is Yes, please list below or on a separate sheet the name and address of each person or entity that is creating, maintaining or providing the PHI for your research.

_____

_____

—

9. If your answer to question (6) is Yes, please note that a person or entity covered by the HIPAA Privacy Rule can use or disclose PHI only under narrow conditions. Check below the authority under which you intend to obtain, use, and/or disclose PHI in your research.

___You will seek each subject's HIPAA authorization (this HIPAA authorization is is required in addition to each subjet's informed consent.) If so, please attach a copy of the appropriate CUNY IRB HIPAA Research Authorization form prepared by you (PI) or the covered entity's HIPAA authorization to this application. (These forms are available at http://www.cuny.edu under Research and Funding on the Faculty and Staff page.)

___You intend to request a waiver or alteration of HIPAA authorization. If so, please attach a copy of the CUNY IRB Request for Waiver or Alteration of HIPAA Authorization form prepared by you (PI). (This form is available at http://www.cuny.edu under Research and Funding on the Faculty and Staff page.)

___The covered entity will provide you with a "limited data set" for your research. If so, please attach a copy of the covered entity's Data Use Agreement to this application (consult the covered entity's Data Use Agreement to the application (consult the covered entity's Privacy Officer for additional information.

CUNY Investigators whose research involves PHI are required to ask all non-CUNY personnel who will have access to research data (e.g., co-investigators, outside statisticians, contractors) to sign the CUNY Subject Information Confidentiality Agreement, a copy of which is available at http://www.cuny.edu under Research and Funding on the Faculty and Staff page.

- *Until the revised PI Manual that includes instructions on the questions in this form related to Research Authorization and to Limited Data Sets required by the HIPAA Privacy Rule is available, please refer your concerns about these questions to you IRB Chair or IRB Administrator.

(Required)

PROTOCOL INFORMATION (See Pages 4-12 of the PI Manual)

10. Does your study involve the collection of data from a vulnerable population? ☐ Yes **X No**

If yes, please specify type of population:

☐ Children/Minors
☐ Prisoners
☐ Fetuses
☐ Pregnant Women
☐ Cognitively Impaired Persons
☐ Other _____

For a complete list of categories of vulnerable populations, as well as the special safeguards required when conducting research with them, see pages 9-10 of the PI manual. Special Informed Consent procedures are necessary when conducting research with minors. See page 20 of the PI Manual for information.

11. Does this study involve deception (research in which the subject is purposely led to have false beliefs or assumptions)? ☐ Yes **X No**

12. If the study involves risk to subjects, is the risk greater than that incurred in ordinary life or tasks? ☐ Yes **X No**

13. Has this study ever been previously approved by this IRB? ☐ Yes **X No**

14. Is this proposal new or revised in response to previous IRB review? **X New** ☐ Revised

15. Is funding being sought for this study? If yes, through what sponsoring agency? ☐ Yes **X No**

Agency: _____

I certify that the research plan and safeguards to human subjects described in this application conform to that which has been submitted/will be submitted to an external funding source.

Principal Investigator: _Jaime Muro Flomenbaum_____

Date: __03/08/2010_____ ☐ Yes **X No**

16. Is this study being reviewed by an IRB at another institution? If yes, please list the institutions below.

_____

_____

Documentation of IRB reviews of this study conducted at other institutions must be provided when it becomes available. **Research may not begin until IRB review has been concluded at all institutions involved.**

17. Have you (PI) completed the federally required CUNY Human Subjects Protection Education Program [see www.rfcuny.org/ResConduct/CBT]? **X YES** ☐ No
Documentation needs to be provided only once; if this is your first time submitting an Application for Approval, please attach a copy of your certificate.

I certify that each of the following key personnel involved in this project either have completed an approved training program for the protection of human subjects in research and have certificates on file with the IRB office, or they will have completed an approved training program and certificates will be placed on file before the research actually begins.

Principal Investigator: **Jaime Muro Flomenbaum** Date: 03/08/2010

Name	Role on Project	Date Training Completed

18. Please indicate the type of review requested:

The IRB will make the final determination of the type of review.

☐ Exempt
Provide the information requested on pages 4 and 6 and sign pages 3 and 7.

☒ Expedited
Provide the information requested on page 4 and sign on pages 3 and 7.

☐ Full IRB Review
Provide the information requested on page 4 and sign on pages 3 and 7.

ALL Applicants must answer questions 1-8 (See Pages 12-20 of the PI Manual)

All researchers must submit a fully complete application and detailed research protocol to the IRB, addressing all questions, regardless of type of review the researcher is requesting. Please consult pages 6-9 of the PI Manual for an explanation of expedited, full and exempt IRB review and the types of research that may be reviewed under each procedure. The IRB chair will determine the type of review for which your project qualifies under federal guidelines. Research cannot start until written IRB approval notification is obtained. Final judgement rests with the IRB.

Please answer the following questions on a separate sheet.

1. State the purpose of the research. Include major hypotheses and research design. If the study is part of a larger study, briefly describe that larger study and indicate whether it has received IRB approval from another institution *(see page 13 of the PI Manual)*. **Please keep in mind that the IRB is composed of individuals from many disciplines and thus the description of your research should be written in terms readily comprehensible by non-experts.**

2. Describe the source(s) of subjects and the selection criteria. Selection of subjects must be equitable and, in the case of protected populations such as children, prisoners, pregnant women, the mentally disabled, etc. should address their special needs. Include the number of subjects. *(See pages 13-15 of the PI Manual for a discussion of equity in subject selection and pages 9-10 for a discussion of protected populations)*. The text of any advertisement, letter, flier, oral script or brochure used to solicit potential subjects **must be attached**.

3. Provide a description of the procedures to be followed. If available, include copies of questionnaires and/or interview protocol, or a sufficiently detailed description of the measures to allow the IRB to understand the nature of subjects' involvement.

4. Describe any potential harms or benefits to be derived by subjects, with a discussion of the risk/benefit ratio. For approval of any study with more than minimal risk, the benefits must clearly be shown to outweigh the risk. Describe how the study may expose participants to stress, physical, psychological or interpersonal hazard, including the possibility of pain, injury, disease, discomfort, embarrassment, worry or anxiety.

5. Describe the specific methods by which confidentiality and anonymity will be protected, including the use of data coding systems, how and where data will be stored and who will have access to it, and what will happen to data after the study has been completed.

6. If applicable, provide the following: 1) a description of the debriefing procedures to be used in cases where deception has occurred; 2) a statement describing what actions you will take should the research reveal the possibility of a medical or other potentially troubling condition.

7. **Before submitting this application, all investigators should familiarize themselves with the discussion of informed consent contained in pages 17-21 of the PI Manual.** Describe the oral and written consent processes and attach all consent documents, including scripts for oral consent and assent form for research involving minors ages 12-17. When the consent form to be used will be in a language other than English, an English translation must be provided. **Unless one or more of the required elements described below is explicitly waived by the IRB, informed consent documents should contain:**
   A. A fair explanation of the purposes of the research and the expected duration of the subject's participation, a description of the procedures to be followed, and identification of any procedures which are experimental;
   B. A description of any possible discomforts and risks reasonably expected. This includes any potential financial risks that could ensue;
   C. A description of any benefits reasonably expected;
   D. A disclosure of any appropriate alternative procedures;
   E. A statement that participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled, and the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled;
   F. An offer to answer any inquiries concerning the goals of the research or the research procedures and to provide a summary of results upon request and an explanation of whom to contact for answers to pertinent questions about the research and research subjects' rights, and whom to contact in the event of a research-related injury to the subject;
   G. An instruction that the subject is free to withdraw or discontinue participation at any time without prejudice.
   H. A statement describing the extent, if any, to which confidentiality of records identifying the subject will be maintained; and
   I. Provisions for parent or guardian approval for participation of minors or for subjects from vulnerable populations when appropriate.

Upon approval of the study, the consent document will be stamped with an expiration date. **Only this document may be used when enrolling subjects.** Studies extending beyond the expiration date must be submitted for a continuation review. **Any changes in the consent form must be approved by the IRB.**

8. Please provide any other information that might be pertinent to the IRB's decision.

If you are requesting exempt status, please continue on page 6.

For expedited or full review, please continue on page 7.

For EXEMPT STATUS Requests ONLY (See Page 20 of the PI Manual)

Following are the categories of research eligible for Exempt Review. Please indicate the category in which you believe your research fits:

☐ 1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as
   (i) research on regular and special education instructional strategies, or
   (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

☐ (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
   (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
   (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

☐ (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if:
   (i) the human subjects are elected or appointed public officials or candidates for public office; or
   (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

☐ (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

☐ (5) Research and demonstration projects which are conducted by or subject to the approval of Department or Agency heads, and which are designed to study, evaluate, or otherwise examine:
   (i) Public benefit or service programs;
   (ii) procedures for obtaining benefits or services under those programs;
   (iii) possible changes in or alternatives to those programs or procedures; or
   (iv) possible changes in methods or levels of payment for benefits or services under those programs.

☐ (6) Taste and food quality evaluation and consumer acceptance studies,
   (i) if wholesome foods without additives are consumed or
   (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

FINAL DETERMINATION ON EXEMPTION RESTS WITH THE IRB.

SIGNATURE and CERTIFICATION (See page 21 of the PI Manual)

I agree to use procedures with respect to safeguarding human subjects in this activity that conform to University policy. If significant change in investigative procedure involving human subjects is called for during the activity covered by this application, I shall seek prior approval for such change from the IRB and agree to follow the advice of the IRB. The faculty sponsor's signature indicates that s/he has reviewed this application and accepts the responsibility of insuring that the procedures approved by the IRB are followed.

Signed:

Principal Investigator Jaime Muro Flomenbaum **Date** 11/12/2009

Co-PI _____

Faculty Advisor Dr Isak Taksa **Date** 03/08/2010
(required for student research)

Before submitting this form, consult pages 22-23 of the PI Manual, "Frequent Oversights."

For EXPEDITED and EXEMPT reviews, submit the original and 3 copies of this Application together with the consent form, recruitment materials, and other relevant information.

On most campuses, for FULL IRB reviews, submit the original and 10 copies of this Application, together with the consent form, recruitment materials, and other relevant information no less than 12 days prior to the IRB meeting at which you wish your application to be reviewed. Please consult your grants or sponsored programs officer for the exact requirements on your campus.

Questions

1. *State the purpose of the research. Include major hypotheses and research design. If the study is part of a larger study, briefly describe that larger study and indicate whether it has received IRB approval from another institution (see page 13 of the PI Manual).* ***Please keep in mind that the IRB is composed of individuals from many disciplines and thus the description of your research should be written in terms readily comprehensible by non-experts.***

   In this study, individuals complete a survey which evaluates culture variables and on-line behavior when using search engines and e-commerce websites. This research assumes that behaviors that are characteristic of culture are replicated when searching for information on-line.

   In the first portion of the survey, each participant will be rated in five different cultural variables: Power Distance (PD), Individualism versus Collectivism (IC), Masculinity versus Femininity (MC), Uncertainty Avoidance (UA) and Time Horizon (TH). For this part of the survey we will use *Hofstede Survey Value Model*. Answers will be provided in a Likert scale. At no point in the survey participants will be asked for their nationality, ethnicity or religion. Results of this research will be given at the aggregate level.

   In the second part of the survey, the items will be related to on-line search behavior. Participants will answer based on their past on-line experiences with search engines, filtering tools and on-line recommendations. Participants will answer questions in relation to how frequently they use filtering tools and on-line recommendations, how many different search engines they use to look for information and the number of queries performed when searching on-line. Four sample hypotheses are included below:

   The level of individualism / collectivism will moderate the relationship between social influence and use behavior. Those participants that are categorized as collectivists will tend to be more receptive to other's opinions (i.e. user reviews / recommendations). For participants that reflect values associated with individualist cultures, limited attention will be allocated to user reviews.

   H1. Individuals who display values of collectivist cultures will be more likely to seek opinions of other users than individuals who display values of individualist cultures.

   Individualism and collectivism moderates the relationship between facilitating conditions (i.e. filtering tools) and use behavior. Those users who reflect the values of individualist cultures will be more likely to use filtering tools, than those users associated with individualist values. Members of individualist cultures rely more on technology and tools than members of collectivist cultures (Leidner, Carlsson et al. 1999).

   H2. Users who display values of individualist cultures will be more likely to use filtering tools than those individuals who display values of collectivist cultures

   Participants who rate high in uncertainty avoidance (risk adverse individuals), will tend to query a search engine multiple times before arriving to a conclusion. Comparatively, an individual who rates low in uncertainty avoidance, a risk taker, will query the search engine less to arrive to a conclusion, independent of whether this conclusion is right or wrong. Furthermore, this behavior will also display in the number of search engines used.

   H3. Members of cultures which rate high in uncertainty avoidance will use more queries for a particular task than members of cultures that rate low in uncertainty avoidance.

   H4. Members of cultures which rate high in uncertainty avoidance will use more search engines for a particular task than members of cultures that rate low in uncertainty avoidance.

   Results of the study are at the aggregate level and will be presented in the form of: Participants who rate high in (PD,IC,MC,UA,TH) will have a propensity to (use more/less search terms, use more/less search engines, use more/less feedback from others, use more/less assistance from electronic agents).

2. *Describe the source(s) of subjects and the selection criteria. Selection of subjects must be equitable and, in the case of protected populations such as children, prisoners, pregnant women, the mentally disabled, etc. should address their special needs. Include the number of subjects. (See pages 13-15 of the PI Manual for a discussion of equity in subject selection and pages 9-10 for a discussion of protected populations). The text of any advertisement, letter, flier, oral script or brochure used to solicit potential subjects* ***must be attached****.*

   Participants will be recruited from the student population of Baruch College (graduate and undergraduate). **Participation on this study is limited to persons who are 18 (years of age) and over**. The survey will be promoted in two different ways:

   1. A sample flyer (as shown in Appendix C) will be posted on the vertical campus (floors 9 thru 13). The flier includes a short description of the research being done, the prizes, time required, and email address of the primary investigator to request an invitation.
   2. The primary investigator will request permission from faculty members to make announcements to solicit participants in class. Information will be given about the survey, the types of questions asked, length and prizes. Those interested will be asked to send an email to the primary investigator to request an invitation.

   The PIs will not invite their current students to participate in this project. Students will be informed that faculty members will not be aware of their participation, and in no way may their participation affect their grades. It will also be noted that no special skills are needed to participate in the survey.

   All participants who wish to participate in the survey will have to send an email to the email address used to promote the experiment. Only the primary investigator has access to this mailbox, which is password protected. Messages received will only be used to plan and allocate space appropriately for each session and inform participants of any changes of schedule. We intend to survey groups of 25 participants. At the completion of each survey session, participants will be asked to wait outside the location (classroom) until the entire group has finish. Upon the entire group, in that session, completing the survey, an IPOD Shuffle (approximate value $59.00) will be raffle among the participants (approximately 25). While all possible efforts will be made to have groups of 25 participants it is possible that some participants missed the session, or that some participants requested a different time. We estimate the odds of winning the IPODs at approximately 1/25.
   Furthermore, while participation is voluntary, we intend to survey a minimum of 125 participants.
   All emails will be discarded once the survey sessions are completed.

3. *Provide a description of the procedures to be followed. If available, include copies of questionnaires and/or interview protocol, or a sufficiently detailed description of the measures to allow the IRB to understand the nature of subjects' involvement. Please refer to Appendix D for a sample list of items included in the questionnaire.*

   Students who responded to the email or invitation will be asked to read and sign a consent form (Appendix B). Subjects will be notified that their participation consists of answering a set of questions in a survey that would last less than an hour. Prospective participants will be assured that their participation is totally anonymous and that there is no impact on their grade. Furthermore, faculty members will not be informed about their participation (or lack thereof), or about their answers to the survey.

4. *Describe any potential harms or benefits to be derived by subjects, with a discussion of the risk/benefit ratio. For approval of any study with more than minimal risk, the benefits must clearly be shown to outweigh the risk. Describe how the study may expose participants to stress, physical, psychological or interpersonal hazard, including the possibility of pain, injury, disease, discomfort, embarrassment, worry or anxiety.*

   The risk to participants falls in the intermediate risk category, according to section 5.4 of the Principal Investigator's Manual. Participants will not be exposed to personality inventories; interviews; the dissemination of any data or information concerning an identified individual; information gathering activities conducted in classrooms or elsewhere; individual or group therapy sessions; or the use of photographs, taped records, and stored data. Participant will answer question in relation to how they would behave in certain circumstances. Participation is entirely voluntary and subjects can discontinue participation if and whenever they wish to do so. No adverse physical or psychological effects are expected to be produced by their participation in this project.

5. *Describe the specific methods by which confidentiality and anonymity will be protected, including the use of data coding systems, how and where data will be stored and who will have access to it, and what will happen to data after the study has been completed.*

Subjects who agree to participate will complete an Internet-based survey. The survey does not require students to identify themselves in any way. There is no way to trace students to their surveys. No name or identifying information will be entered into any databases or used in the analysis or reporting. Publications from this study will refer to aggregate results and the group would be referred to Baruch College Students. All emails received to participate in the survey will only be used to allocate space appropriately to conduct the survey and to conduct a raffle. Upon completion of the data collection, all email messages will be discarded.

Survey answers will be captured electronically using SurveyMonkey. Access control to the responses is based on two-level user authentication via SurveyMonkey infrastructure (username and password). Only the primary investigator and faculty advisor (Professor Isak Taksa) will have access to this internet facility (username and password). Once the data collection period is over, information will be transferred to a database and the SurveyMonkey forms will be discarded.
Information will reside on a MySQL database. Physical security of the database relies on the fact that the database will be installed in the primary investigator's personal desktop computer, which reside in the primary investigator home. Logical security is enforced by the database 2 level authentication security (user/password) policy (MySQL) and the actual computer operating system user/password policy. The MySQL database will be set up as stand-alone, limiting all access to remote users. All database files are encrypted.
All communication between the primary investigator and Co-PI which require transferring subsets of the data will be done using compresses encrypted files, which require passwords to open. The passwords will be exchange verbally and never transmitted electronically.
Upon creating the database, a physical backup will be created with the entire dataset. The backup will be stored in the primary investigator's apartment, and the file will also be encrypted.
Upon completion of the study the data will be transferred to physical media. Access to this media will be physically (located at the primary investigator home) and logically enforced (encrypted), and therefore limited to the primary investigator.

6. If applicable, provide the following: 1) a description of the debriefing procedures to be used in cases where deception has occurred; 2) a statement describing what actions you will take should the research reveal the possibility of a medical or other potentially troubling condition.

   N/A

Appendix A – Email to recruit participants

Subject: Participate in Research involving search engines and win an IPod

Message: We invite you to participate in our research involving search engines and behavior online. You are only required to complete a survey. An IPod will be raffled at the end of each survey session.
Your participation is completely anonymous, you are not required to provide your name or school ID, and your grades will not be affected in any way. **In order to participate you must be 18 (years of age) and over.**
In the first portion of the survey, you are asked to answer questions about how you would behave in certain situations. In the second part of the survey, you will answer questions based on your past on-line experiences.
Several survey sessions will be allocated and you will have an opportunity to pick the one that works best for you. If you are interested in participating in this survey please respond back to this email address: XXXX@XXXX.com
If you have any questions about the survey, please contact Jaime Muro Flomenbaum [redacted] or Dr. Isak Taksa [redacted] u may also email us at [redacted]

Your participation will help advance the research in this area.
Thank You.

The IRB (Institutional Review Board) is the college committee that protects the rights of human subjects in research. For information of how your rights are protected if you participate on this survey, please contact Keisha Peterson, IRB Administrator (Keisha.Peterson@baruch.cuny.edu)

Appendix B - Informed Consent Form

Project Title: The impact of culture in the behavior of search engine users

Principal Investigators:
Jaime Muro Flomenbaum and Dr Isak Taksa
Department of Statistics and Computer Information Systems (B11-220)
Zicklin School of Business, Baruch College, CUNY, 1 Baruch Way New York, NY 10010

Informed Consent Form

The primary purpose of this study is to examine the relationship between cultural background and internet search behavior. For this study you are asked to complete a survey. In the first portion of the survey, you are asked to answer questions about how you would behave in certain situations. In the second part of the survey, you will answer questions based on your past on-line search experiences.

Participation is completely voluntary. In **order to participate you must be 18 (years of age) and over.** Refusal to participate does not involve any penalties and participation may be discontinued at any time. Your participation is totally anonymous. Your professors will not be informed about your participation or lack thereof or your answers. By participating in this study, you will have an opportunity to reflect about you current search behavior and advance the research in this area.

The total time required to complete the survey is estimated to be 45 minutes. At the end of each survey session (aprox 25 participants) a raffle will be conducted for an IPod.

All records of this study will be kept confidential. No one other than the PI and CoPI (Jaime Muro Flomenbaum or Dr. Isak Taksa) will have access to the data, which will be archived in a secure location after use. All information is anonymous; you do not have to type your name, ID, or any other identifiable information on your survey. Any publications from this study will refer to aggregate results and the group will be referred to as Baruch College Students.

If you have any questions regarding this research, you can call Jaime Muro Flomenbaum at [redacted] or Dr. Isak Taksa at [redacted] If you have any questions concerning your rights as a participant in this study, you can contact the Baruch IRB Office at [redacted].

The IRB (Institutional Review Board) is the college committee that protects the rights of human subjects in research. For information of how your rights are protected if you participate on this survey, please contact Keisha Peterson, IRB Administrator (Keisha.Peterson@baruch.cuny.edu)

By signing below, you understand and accept the terms of this research study as stated above and that your participation is completely voluntary.

Please check box to indicate consent:
☐ I consent to the Survey

Participant Signature	Researcher Signature
Full name (please print)	Date

Appendix C

Computer Information Systems Department

Participate in a survey and enter into a raffle to win an IPod.

We are conducting research about search behavior online.
Your participation in this survey will help advance the research in this area. No special experience or skills are required. The survey will take approximately 45 minutes.
All Majors welcome, undergrad and graduate students!

If interested, please email:
XXXX@YYYYY.com

You will not be required to provide any personal / private information.

In order to participate you must be 18 (years of age) and over.

If you have any questions about the survey, please contact Jaime Muro Flomenbaum [redacted] or Dr. Isak Taksa 646-[redacted] You may also email us at Jai[redacted]@baruch.cuny.edu a[redacted]aruch.cuny.edu.

The IRB (Institutional Review Board) is the college committee that protects the rights of human subjects in research. For information of how your rights are protected if you participate on this survey, please contact Keisha Peterson, IRB Administrator ([redacted]@baruch.cuny.edu)

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