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INFORMATION-SEEKING STRATEGIES OF DOCTORAL STUDENTS AND IMPLICATIONS FOR DESIGN OF THE GRADUATE SCHOOL WEB SPACE

by

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A dissertation submitted in partial fulfillment of the requirements
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ABSTRACT

This dissertation looks at the information-seeking practices of doctoral students in the context of their search for a doctoral program and considers the implications for design of the graduate school Web space. Of particular interest is the description of patterns of Web use and the practices related to students' preparation for interactions with technology, the nature of the interactions, and the thinking that occurs.

An exploratory study that brings together hypertext theory, contextual, holistic approaches, and information behavior, this research includes a focus group of current undergraduate and graduate students to gather fresh details about information-seeking for a graduate program as a preliminary investigation in this area, eight interviews with current doctoral students admitted in Fall 2007 to capture the specific details of students' information-seeking experiences for a doctoral program by mapping the journeys, and an online survey of current doctoral students admitted in Fall 2007 as further investigation of information-seeking for a doctoral program.

Doctoral students who participated in this study rely on the Web as the primary source of prior knowledge of graduate education and graduate school, as well as the source most used to build that knowledge during the information-seeking journey for a graduate program and to prepare them for the start of their graduate study. The eight maps of students' information-seeking journeys for a graduate program show how complex and wide-ranging these journeys are. Based on bits collected through their many Web encounters over six months to two years, students develop a "feeling" for the people who

make up the graduate program, social interactions within this group and research subgroups, and what it would be like to be a student in the program, all contributing to students' decision making.

Academic Web sites play a key role as support structures for students and have to do more than make the information available and findable; they must design in order to encourage and sustain engagement, or deep involvement. This study proposes several suggestions for academic Web design.

To My Family

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I am thankful for my loving parents, who always encouraged me to follow my dreams and supported me through all the choices I have made over the years, including the pursuit of a doctoral degree. Likewise, I am forever grateful for the unwavering encouragement and support from my husband, son, and daughter.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

With the proliferation of information available to people from multiple directions and media and the need to find a way through it, it is no wonder that people settle into patterns of use and favor strategies that "work" for them. People are interacting with systems more frequently and of increased size, complexity, and interconnectedness than even five years ago. Now system has become systems, and the multiplicity, layeredness, and interconnectedness present indistinct, blurred boundaries to users. The burden seems to have reversed itself so that design bears more responsibility than in the past for serving up to audiences those items they desire or seek, for guiding them unobtrusively to those items and through them as well, and for defining the details so that audiences can better find what they are seeking. On top of this, each site competes more than ever before with many others for audience time and interactions. The questions become difficult ones: Rather than just focusing on and organizing information, how does one design for increased success by audiences in finding what they are seeking, for better responsiveness to and engagement of audiences? How does a graduate school do this without really "knowing" the details of a complex audience made up of students of various backgrounds, disciplines, and intents? Knowing the demographics about these students is not enough by itself. As Diana Oblinger and James Oblinger note in *Educating the Net Generation*, "we might not be asking the right questions" (2005 2.2). In addition, the emergence of a convergence culture prompts redefinition of Web site to Web services, to provide the participatory, self-organizing environment required for actively making knowledge rather than passively receiving

information (Jenkins, *Convergence Culture* 2006). The development of a rationale and strategies for achieving service goals requires an understanding of the context, everyday practices, and preferences of students as they use the Web, as well as their technology experience in general. The more that is known about their information-seeking behavior and this knowledge is used in the design process, the more likely interactions with the Web resource will be more effective.

This dissertation study employs quantitative and qualitative research tools to gather data on early doctoral students and their preferences, practices, and strategies for information-seeking, with a focus on their experiences in seeking and choosing a graduate program and school, and then discusses the use of these results in decisions regarding design. This study follows a holistic approach to investigating information seeking. The focus is on overall process definition and searching for the details and practices of social context and behavior involved in students' preparation for interactions with technology, the nature of the interactions themselves, the thinking and decisions that occur during information seeking, and the physical contexts of the interactions.

Research Questions

- Initial questions focus on describing and defining how doctoral students find information on university Web sites. What are the information-seeking behaviors of early doctoral students using the Web in choosing a graduate program and

school? What shared behaviors are there among them? What patterns of information-seeking emerge?

- The next set of questions explores the origin and context of these behaviors. How are these strategies specific to the context? What explanations are there for why students have these information-seeking behaviors? What information-seeking and hypertext theories are useful in understanding these behaviors?
- How do these findings about students' information-seeking behaviors inform decisions regarding design? What hypertext and design theories are useful in applying these findings to Web design?

LITERATURE REVIEW

In this section, I first review selected literature on the holistic, contextual approach to studying information seeking and describe the components of the context that will be addressed in this study. Then the review turns to information behavior and information-seeking research that will be used to provide the foundation for discussion of this project's target group. Finally, the review discusses key hypertext theories that help understand the details of what is occurring.

Holistic, Contextual Approach

A gradual shift shows in human information behavior and human factors literature toward studying the larger social context surrounding interactions with technology to reveal the tensions among the institution or organization, technologies, and the people, as well as their knowledge making and practices. My study pays particular attention to discovering these otherwise hidden details of students' information seeking, with the hope of understanding better the larger picture of what is occurring, how it takes place, and why this may be so. There is a need for a broader, more in-depth understanding of audience in order to design Web resources that will better support the information seeking of visitors.

Avoiding a focus on information and instead re-focusing on the periphery of human-technology interaction points the way for my study. According to John Seely Brown and Paul Duguid, focusing on information reflects a futuristic bent that ignores the "fuzzy stuff that lies around the edges—context, background, history, common knowledge, social

resources" (2002 1). Due to the misdirected focus on information instead of people, they observe that "good design is very hard to do" and "successful design usually draws on these social resources, even while helping to change them" (86, 87). Following on these thoughts, designing a good Web resource for doctoral students requires knowing about the fuzziness that surrounds their interactions with technologies as well as using this knowledge in devising responsive ways to assist them with their "work." Another relevant discussion focuses on the concept of "process," which Brown and Duguid argue is normally dominant in the discussion regarding technologies rather than people. They observe that the "practice of the people … brings process to life … life to process," that the meaning making of the people, and how they do it, is the foundation for all that takes place (96). In other words, technologies are means, or support structures, to facilitate practices and knowledge making (146). From this point of view, learning and knowledge making are therefore heavily social processes and the technologies encountered affect the people, what they do and know, their identity (137-38). Brown and Duguid's discussion of communities of practice and social worlds are particularly relevant to the enculturation of doctoral students into the graduate university and academic discipline, both the immediate ones and the more encompassing ones beyond the student's initial enrollment (141, 190).

In *The Practice of Everyday Life*, Michel de Certeau observes that readers "function in another register" when engaged with a text as a means of avoiding the established order of the institution and its processes, procedures, mandates, its power and authority as manifested in the text (1984 32). He describes these everyday practices as "fantastic" because

of their inventiveness and creativity (42). In addition, de Certeau describes reading as "poaching" and "nomadic" because of the way readers move through a text in an unpredictable, free manner of acquisition (165). While engaged with a text, readers employ personal, invisible tactics to dart about and seize what they want from it. From this perspective, information seeking may be thought of as a series of free-flowing tactics focusing on a person's intentions. During this engagement the person subversively uses the text for his or her own means and may disregard or re-invent messages to suit personal desires. A tension exists between the reader and his or her desires and the persuasiveness and power of the encountered text and its intended messages. Both the internal and external context are important in my study; therefore, studies concerning the involvement of the body during interactions with technologies, humans' pleasure-seeking tendencies, and the influences of persuasion in technologies and documents likewise offer other aspects from which to observe information seeking and fill in the otherwise hidden details.

Among the many information-seeking models found in the literature, the contextual model described by Jarkko Kari and Reijo Savolainen (2003) seems most in line with the goals of my study. This model treats information seeking as a holistic experience, including both the natural and built environments, recognizing the continuous flux in the experience, and identifying the strategies audiences employ during information seeking by looking for the "pattern of Web moves" (2003 166). This approach also studies the Web structure as part of the analysis, as an artifact of the experience, and the reasoning behind the decisions made during information seeking. The "pattern of Web moves" is what my study is trying to

identify by attempting to detail the whole journey of the information-seeking process of prospective doctoral students as they search for a graduate program and school. To do this, I must get to the hidden details associated with start and end points, tactics, between moves, and the relation of strategies to context, as well as the thinking, feeling, and decision making and choices that take place during these engagements.

Amanda Spink and Charles Cole (2006) also observe that new approaches to human information behavior take a more holistic, social context perspective. In chapter 4, Eszter Hargittai and Amanda Hinnant discuss the importance of social context—described as "small worlds" or the "social aspects or social situation of the studied group"—to increase the ability to generalize and identify shared behaviors; they also note that excluding the social context can lead to misinterpretation (57-58). Their description of context includes autonomy (access to technology, location of use, constraints, etc.), social support (help and advice sources, how requested/received, trust/credibility of sources, etc.), goals and purposes (seeking characteristics, types of seeking, etc.), and population characteristics (experience, abilities, etc.) (59-62). I have used some of their context ideas in constructing my study.

Another key source for my study is Patrick Jordan's *Designing Pleasurable Products*, in which he argues for expanding human factors and usability research to become a more holistic study of audience that considers products as "*living objects* with which *people* have *relationships*" (2003 7, italics in original). Jordan proposes four pleasures to address when studying audience: physio-pleasure, socio-pleasure, psycho-pleasure, and ideo-pleasure (13-

14). He recommends using these four pleasures as "a tool that can help in taking a structured approach" in designing pleasurable products (15). From Jordan's work, I draw a systematic way to address the feeling and emotion that occur during the information-seeking process, and I have used his generic index of "Pleasure with Products" as a starting point to develop my own questions for the interview and survey (see Appendix B, Post-interview Survey, question 17; Appendix C, Information-seeking Survey).

Information Behavior

Foundational studies in technology use and preferences may be found in publications such as those from EDUCAUSE, the professional organization for education administrators who make decisions regarding technologies on their campuses. Oblinger and Oblinger provide an overview of technology use and preferences. Referencing a number of research studies, they describe college students (undergraduates 18-22 years old) as the "Net Generation" (or "Millennials," born 1982-1991) as having these general shared characteristics:

- Bricolage thought processes and preference for inductive discovery
- Experienced readers of visual images and users of visual-spatial environments
- Expectations for fast responses from both the system and individuals through communications
- Preference for visual over text as well as for media-rich environments
- Preference for experiential, social, and team (or group) engagements

- Preference for structure, with clear procedures, process, etc. (2005 2.4-2.7)

In addition, they note that Millennials do not focus on technology per se; instead, they view it as enabling activities. In other words, Millennials do not view the "computer-as-box" but rather the "computer-as-door," or "entrance to a social space" (2.11-2.12). These observations are of importance to this dissertation study, as the undergraduates exemplify a significant portion of the anticipated doctoral student target population to be studied. It will be interesting to see how many of the Millennial characteristics for these surveyed undergraduates are evident in the doctoral student results.

Another article in the same collection relates findings of a 2004 survey of undergraduates at 13 institutions in five states (Robert Kvavik, chapter 7 in Oblinger and Oblinger 2005). The number one use of technology was for educational purposes, with communication as a close second. Kvavik makes several important observations: the strong correlation between students' technology use/level of skill and their academic program and curriculum, with the highest skilled students residing in academic programs with the highest requirements for technology use and skills; the relationship of communication and entertainment usage to gender and age; and the greater and broader, more in-depth technology use by seniors as compared to freshmen, which indicates again the strong relationship of academic program and curriculum to technology use and skills development (7.4-7.6). Kvavik also notes, "students overrate their [IT] skills; freshmen overrate their skills more than seniors, and men overrate their skills more than women" (7.7). He interprets this finding as contributing to student difficulty with finding answers to their questions and

using more than basic technology. While Kvavik's article focused on the undergraduate learning context rather than the doctoral student information-seeking context of this dissertation, these findings do prompt questions regarding the technology use, skill, and preferences of doctoral students, whether expectations for the non-learning context will be similar or different from those described above, and whether the complex audience of doctoral students will fragment itself into subgroups based on undergraduate/master's educational background, affiliation with specific doctoral academic programs, work experiences, or other characteristics. Another question that arises is to what extent innovative technology presentation should be incorporated in a doctoral student services Web resource, especially if students tend to overrate their technology skills, or if instead the more successful direction might be increased options for participation and interaction, yet balanced with options for a less challenging, but still more visually displayed and well-guided presentation.

In chapter 8 of *New Directions in Human Information Behavior*, Amanda Spink, Minsoo Park, and Charles Cole discuss the importance of multitasking in the information-seeking process and recommend an integrated, holistic approach due to the multiplicity of purposes that occur during information seeking—for example, seeking, searching, sense making, foraging, using, organizing (Spink and Cole 2006 137-41). When referring to multitasking, they describe it as "task switching" during information behavior and observe that these behaviors "allow people to cope with a complex task laden and organized world" (141-42). An important tie to my study is their statement that Web design does not do a good job of

supporting multitasking (141); multitasking or task switching should be included in the survey and interview for my study to consider its importance for the doctoral students that are the focus of my study and to address this topic in the discussion relating study results to Web design. In chapter 9, Allen Foster describes a nonlinear model of information seeking and identifies three stages of the process that flow in any order, depending on the specific user's interaction: opening (seeking, exploring, revealing), orientation ("making sense," "picture building," "mapping out"), and consolidation ("judging and integrating," "continual questioning," "setting boundaries," "creation of relevance" or "sifting," "thinking, writing, and discussion," and "verifying of information, and finishing") (156-58). These three stages function within the internal and external contexts and the person's cognitive approach ("flexible and adaptable," "openness," "nomadic thought," "holistic approach") (159). This article by Foster, as well as the article on serendipity and how it relates to information seeking (Foster and Ford 2003), are of much interest to my study, as these ideas mesh well with hypertext theory and information architecture theory. For more guidance in understanding seeking tactics of a more complex audience, I refer to David Nicholas, Paul Huntington, Peter Williams, and Tom Dobrowolski, whose research uses deep log analysis to study human information behavior of a large body of diverse users ("The Digital Information Consumer," chapter 11 in Spink and Cole 2006). According to this study, searching and interacting for fun and entertainment are widespread and occur even in an academic context. They characterize these information-seeking interactions as more freely or openly executed, more comprehensive in nature and involving mixed modes

and resources, and involving more widespread, shallow seeking across many sources (described as "mega store/shopping mall") (204). Characteristics of the digital information consumer include

- Depth of searching behavior—typically shallow
- Repeat behavior—not very loyal
- Range of searching behavior—wide and "promiscuous"
- Changes in behavior—volatile
- "Trusting" behavior—"generally untrusting, except in the case of search engines"
- Retrieval behavior—"bouncer/checker," 70 percent, retrieve 1-3 views; "moderately engaged," 20 percent, 4-10 views; "engaged," 6 percent, 11-20 views; "seriously engaged," 4 percent, over 21 views (209-10)

This article notes that "digital visibility" (prominence/positioning in the site, in the site's search engine, and in directories of search engines) and the "structure, the architecture, and the nature of the Web site" are factors that affect the depth of users' seeking/searching and how much the information content is used (211). Other observations relevant to my study include

- Users get there by browsing, exact address, following a link, and search results.
- Users look for relevance and interest—anything that makes a Web page/site different from other sites helps retain the user. The first page encountered plays an important role in engaging the user.

- "People use little of a Web site's contents; they do not come back very often either."
- People are empowered by their seeking and abilities to cross boundaries. (211-17)

According to this study, users may perceive that they are accomplishing something through their information seeking; however, this may not be the case, as their interaction may lead them astray, they may not remember where they have been and what they have read, and they may or may not have used reliable content, all of which can seriously affect their ability for knowledge building (227). This article prompts a number of questions for my study, particularly since prospective doctoral students conduct most of their search for a graduate program through the Internet and graduate schools have moved to conducting most of the admission application process and preliminary enculturation of students into the academic community through the Internet. If the information-seeking strategies and practices of these doctoral students are similar to those described above, then a number of implications arise for the definition of information architecture and interface design.

Regarding information seeking in general and how my study fits into this larger picture, I found Peter Morville's *Ambient Findability* (2005) helpful, as it provides an overview of wayfinding (a.k.a. information seeking) history. Using cognitive mapping, our ancestors dealt with the challenges of daily life through control and alteration of their environment. This legibility does more than just help us find our way; it also affects how we think of the place. Morville's "history" is a summary at best but serves to show the connections of information seeking with both natural and built environments, architecture

and notions of location, marking, and space, and significant reliance on language and words. Morville observes, "Ambient findability describes a fast emerging world where we can find anyone or anything from anywhere at anytime" (6). Designing resources to be more ambiently available to audiences requires addressing the probable contexts of use and the structuring of the information and the interface to support these different choices.

Broadening choices available in the interface is a "natural" direction to take for design. Gary Marchionini observes that interactivity is "a basic human characteristic" and continues to recommend a less bureaucratic system, one instead more natural and "based on taking advantage of natural human capabilities and propensities" (1995 17, 195). He makes some observations about users that are relevant to my study:

- Satisficing—users settle for information they consider satisfactory, even when it may not be what they are really seeking (63)
- Wishful thinking—users are biased toward what they know and like (119)
- Protect themselves—users avoid overload, things they do not understand, formal presentations (64)

He also thoroughly discusses a number of information-seeking topics, such as various reasonings that may occur in the information-seeking process, differences between experts and novices, and the details related to patterns, strategies, tactics, and moves (64-66, 66-70, 71-161).

In their research in the academic setting focusing on prospective and current undergraduate students, Michael Poock and Dennis Lefond (2001) note the lack of research

studies on Web use in higher education and observe that the studies that have been conducted (they list several) deal mostly with improving processes for admissions and student services through use of technology or attempt to identify characteristics of student Web users rather than how these students use the Web. Their article identifies information topics that prospective undergraduate students want on admission Web sites and their perceptions of what helps and what hinders their use of these sites (for example, speed of connections, distinctiveness of site, importance of graphics). Other articles investigate effective graduate school, community college, and specific program (educational leadership) Web sites (Poock and Lefond 2003; Poock Oct. 2006; Poock Dec. 2006). These studies and those cited in them address other Web issues and are not very helpful for a holistic study of information seeking. A more recent article also observes the lack of research on Web sites used for administrative and academic information and services (Bitler, Rankin and Schrass 2006). While interesting, this study surveys Web sites of 65 Virginia institutions rather than the users of these sites. A gap exists in information-seeking research regarding higher education and particularly the graduate education environment and graduate administrative and service Web resources for these audiences (graduate faculty, students, and staff). Research on information seeking is widespread, but study definition is generally lacking in theoretical and synthesizing work. In recent years a holistic approach to information seeking favors a contextual model that provides a more comprehensive interpretation and more useful results focused on identifying strategies of information seeking.

Hypertext Theory

For direction, this study looks first beyond hypertext specifics to more encompassing theoretical concepts of human-computer interaction that help guide interpretation of a holistic, contextual approach to information seeking. Following this overview, I move to a rethinking of hypertext and reading of it as movement, as in motion, and what this means for both the readers and the texts being read. A discussion of engagement follows next, with a focus on the role of connection during reading. Lastly, the discussion turns to design theory I think will be helpful for the interpretation of data from this study and application to Web design.

Body and Environment

As mentioned earlier, my study approaches information seeking from a holistic perspective that includes the "fuzziness" surrounding the students' interactions with Web resources. In this context, "embodiment" refers to the merging of the body and environment and how this "spatializing body" constructs its own wayfinding practices and "landscapes" (Hansen 2006 183; Mirel 2004 36). In *Bodies in Code*, Mark B. N. Hansen remarks, "emphasis falls less on the *content* of the virtual than on the *means of access* to it, less on what is perceived in the world than on how it comes to be perceived in the first place" (2006 5). In other words, the body becomes the primary means of collecting sensory data and knowing the world. While information seeking through the Web, students choose to position themselves physically with the technology in such a way that fits their sensory collection

and seeking practices. Similar to de Certeau's comments regarding the subversive tactics of readers, Hansen notes the power and "embodied agency" of humans in their relationships with technologies (11, 13) and proposes "bodies in code" to refer to "embodiment as it is necessarily distributed beyond the skin in the context of contemporary technics" (x). Applying this concept to the human-computer setting of students information seeking for a graduate program, the boundaries between the body and the environment become increasingly blurred and technology becomes an "extension" of the body (44-45). Hansen describes this "coupling" of body and environment as "being-with" and "enactive cobelonging" (20). Thinking beyond the person and the computer, the physical, cultural, and social contexts are likewise embodied in the use (Mirel 2004; Nisbett 2005; Bowker and Star 1999). In other words, the choices the students make in where they conduct their information seeking, the limitations placed upon their interactions, the level of multitasking they engage in during information seeking, the kind and details of their equipment and Internet connections, the values and beliefs they hold due to their membership in social and cultural groups, the enculturation of the systems by the administrators and organizations responsible for their development and presentation, among other details of context, contribute to the construction of the interaction.

Movement

The doctoral students in this study have learned to read hypertext somewhere, somehow: we do not know the origins of their hypertext skills. No doubt they have learned from many experiences with hypertext over a number of years in a variety of situations. No

doubt they have varied levels of skills and expertise in using hypertext sites, which makes designing successful sites a difficult task. Reading hypertext requires readers to learn the conventions of the hypertext form, which is different from other forms in many respects while at the same time retaining remnants of print and other previous forms. The unsettled state of multimodal design complicates this learning because conventions are either not well known or not documented or accepted widely. As Karen Schriver observes, there is a good deal of "groping through design space and inventing as we go" (1997 379). According to Jay David Bolter, "Diagrams . . . become the rule in electronic writing, which invites us to read the whole computer screen as a moving, evolving diagram" (2001 63). The computer interface is made up of various elements that the reader then interprets and reads, as well as uses to perform functions. As the reader becomes engaged with the text, he loses sight of the elements as interface technology and instead reads them as signs in the text, called "transparent immediacy." When faced with choices of links or other elements in the interface, the reader then becomes aware of the interface and looks at specific elements in it, which foregrounds the technology, called "hypermediacy." The reader, therefore, oscillates between seeing the interface as pictorial space and verbal space, while the interface itself oscillates in what and how elements display (63, 184-85). As Bolter describes, "The elements oscillate between being signs and being images" (185).

N. Katherine Hayles describes the hypertext reading experience and the emergence of meaning through interrelations of elements:

> hypertexts mix words with graphics, sounds, images, animation, and a host of other multimedia components. Moreover the links go every which way, from word to navigational apparatus to image to mouseover to animated graphic. In the process, the foundational metaphor of the page as a two-dimensional plane mutates into a very different kind of experience. Instead, the textual space is increasingly represented as a topographic area to explore, with layered strata, hidden openings, crosscutting pathways, links between different world levels, and other spatial and temporal unfoldings that merge the functionality of the artifact—its material and processual properties—with the representations of the imagined world we create when we read. (2004 86)

This passage describes electronic hypertext as a complex representation or image, similar to Bolter's "moving, evolving diagram," full of patterns and cues that signify the assemblage of elements and the pathways to and from them. For an information seeker, the visible interface serves as a partial map of a larger topographic area, which remains hidden except for the visits the reader makes to selected areas: "The screen enters into a series of configurations, and that evolving series is the visual expression of a particular reader's journey through the text" (Bolter 68). The reader's mental model of the overall topographic area depends largely upon the image presented in the interface and the scope and depth of visits to various locations within the area. These partial views together help the reader visualize the whole and understand the relations among the parts: "Electronic readers therefore shuttle between two modes of reading, or rather they learn to read in a way that

combines verbal and picture reading" (Bolter 68). The doctoral students in this study will likely have a variety of ways they approach reading of hypertext Web pages and sites, based on their previous experiences with them, and other differences will arise from the diversity of the academic programs of the students. In my study, the identification of possible shared practices offers an opportunity to strengthen Web design to support all subgroups.

Having students show the specific elements of a site that they use will also help me understand how much they rely on words, and what words in what situations or positions, and on more visual cues to find their way through Web pages. Reading prose requires the reader to read the letters, words, sentences, and paragraphs in sequence to make sense of them. Images, however, "place many fewer constraints on how people read them," but this does not mean that they are easier to understand than words (Schriver 372-73). In reading the image of the interface in electronic hypertext, readers have more flexibility available to them in making decisions about what to read and in what order to read these elements. If there is, indeed, such flexibility in the interface and its use, then students should demonstrate different ways to find the information they need, and the found information will not necessarily be the same for all. Readers rely heavily on an easy-to-see structure, consistent visual cues and patterns, and the "graphic integrity of images" in this process (400-401). As readers view the interface, "elements oscillate between signs and being images, or rather it is the reader who oscillates in her perception of the elements" (Bolter 63). When in doubt, readers make their "best guess" and follow through, making decisions later whether it was a good choice or not based on their goals and interests (Schriver 380). The

"visual rhythm" perceived by readers as they experience the text greatly influences their movement and judgments about the text (404). Again, the idea of the interface as "user illusion" requiring "suspending belief" arises, but, as Johnson observes, the relationship is really one of positive "belief" in the view presented through the interface (*Interface Culture* 1997 242).

Since an electronic hypertext is a process and not a fixed object, all of its elements are image-like because they are produced through a distributed environment that includes computer actions and user actions, which occur in different layers of the system. We can, therefore, no longer speak of images and words as being separate or different as in print culture: "Text on screen is produced through complex internal processes that make every word also a dynamic image, every discrete letter a continuous process" (Hayles 2004 78). Meaning arises from the reader engaging with the interactions or interrelationships among elements and does not arise from the words alone. From this view, Web design becomes primarily focused on images, appearance, and visual organization, as well as on access, delivery, and functionality. The interface becomes the layer of signification in a multi-layered computer system, and the text is displayed in the elements used in the interface. The text is a process, a work as assemblage, and dependent on the reader's interactions with the interface and interpretation of the elements and relationships viewed on the screen, which shows only a small portion of the text at a time. The embodiment of the text arises through the interactions of the text's physical entity with its signification in the interface and the reader's use of it. This representation process flows from translation and encoding to re-

encoding, re-constituting, and resurfacing in the interface (Hayles 2003 28). As Steven Johnson observes, "A computer system . . . is a symbolic system from the ground up. Those pulses of electricity are symbols that stand in for zeros and ones, which in turn represent simple mathematical instruction sets, which in turn represent words or images, spreadsheets or e-mail messages" (*Interface Culture* 1997 15). On the surface this results in the performative, visual illusion of the interface.

Engagement

In order to foster engagement of audiences, designers must build to fit the audiences they are intending to attract. Engagement is more than clicking through in two seconds flat. Engagement, real engagement, means the site has arrested or captured the audience's interest, or attention, for what might be considered a "long" time in Web time but certainly not long enough to read *War and Peace*, *Gone with the Wind*, or even a Dr. Seuss book. It is not a mistake that "arrest" and "capture" carry physical connotations of seizing onto the reader, of catching them unaware through persuasive presentation and content (for example, Fogg *Persuasive Technology*; Jordan *Designing Pleasurable Products*; Norman *Emotional Design*; Barthes *The Pleasure of the Text*). Indeed, people's attention is so valuable these days that it is referred to as "the new currency of business" by Thomas H. Davenport and John C. Beck in *The Attention Economy* (2001). According to Davenport and Beck, people are overwhelmed by the amount of information flowing about them and rely on various tactics to avoid over-immersion (6). In addition, their human biology kicks in at opportune moments to "screen out" other data and focus their attention; Davenport and Beck refer to this biological

information management asset as "inattentional blindness," an adaptive trait from our long ago ancestors but still very much in the playing field, that blocks extraneous objects and words from being seen during high attention interludes (58-59). From this perspective, prospective students seeking a graduate program and school wade neck high through a flood of Web-available information, not to mention all the other non-Web resources, and at times may step into holes that lose them below the surface and obscure their view. Likewise, the texture of Web sites and pages can either facilitate easy rhythm and movement or impede them as if they were slogging through marshland muck. Their attention may wander from their information seeking as certain visuals and words register in their gaze, capturing their interest momentarily, and then they recover and redirect themselves to their information seeking, which moves in and out of their attention as they move through Web space. Likewise, the level of their engagement in information seeking fluctuates throughout the duration of their session.

Based on their previous experiences and knowledge, the students look for patterns in the site that help them make decisions about where to go and what to do, as well as interpret and make sense of what they encounter. Visual patterning occurs in many ways in electronic hypertext, encompassing navigational structure, "micro-navigation" (within sections, pages, or smaller units of the site), page structure, sub-site structure, site structure, Internet relationships, among other things (Nielsen 2000 222, 225). Schriver describes five ways to integrate prose and graphics: redundant, complementary, supplementary,

juxtapositional, and stage-setting. While all five conventions are familiar to us from their use in previous media, it is the last two that are most descriptive of hypertext form:

> *Juxtapositional*—characterized by different content in words and pictures, in which the key ideas are created by a clash or a semantic tension between the ideas in each mode; the idea cannot be inferred without both modes being present simultaneously
>
> *Stage-Setting*—characterized by different content in words and pictures, in which one mode (often the visual) forecasts the content, underlying theme, or ideas presented in the other mode (412-13)

The clash or tension in juxtapositional relationships "have a way of surprising the reader," and stage-setting helps readers develop mental models through "advance organizers, summaries, and previews" (423). During information seeking, people hold a "search image" in mind that indicates the specifications for the target; they then scan the environment, in the case of students seeking a graduate program, the Web sites they peruse, for similarities and differences in order to identify a match to their image in mind (Davenport and Beck 60). In electronic hypertext the collage-like design, described by Bolter as "a scattering of alphabetic signs among picture elements" (61), delivers frequent juxtapositional relationships that the reader confronts and interprets; the chunking of elements and flux of the interface encourages readers to read the content as images rather than as text. Associative links present chunks of content that constantly challenge the reader to address the similarities and differences between and among elements, to figure out the puzzle of the

linkings. Tips and hints abound to "stage-set" electronic hypertext for readers' choice-making; these elements become image-like in the familiarity of their use and marking function.

Another way to look at hypertext is to view it as full of gaps, holes, lesions, sieve-like, pockets of space, a field of similarities and dissimilarities (Barthes, Stafford, de Certeau, Bolter, Schriver). Gaps in information create tension, which can be viewed as positive or negative, depending on the viewer. For example, Donald Norman describes the tension created when a building has a door with no doorknob or easily discernible pattern of structure; people were unable to enter the building because they did not know how the door mechanism worked (*Design of Everyday Things* 2002). Likewise, a nondynamic, "frigid" text may cause frustration during viewing, resulting in an unsatisfying experience (Barthes 1975). "Resistances" and "irregular patterns" may be seen as positive contributions to the text's rhythm and the reader's experience with it (36). According to Barthes, the point of the text that is most captivating is the gap, break, or seam—the moment of "intermittence" (9-10). While he was referring to a print text, these ideas seem to describe well the interaction of the hypertext reader with pattern. Gaps may also be viewed as "opportunities for interweaving," as means for connecting (Stafford 2001 184). The more data available, the more prevalent the gaps. The more prevalent the gaps, the more active the viewer in determining the message. In this sense, space, gaps, holes become positive elements that serve as potential rhythmic elements in hypertext and contribute to the reader's engagement.

Another aspect of engagement is the level of emotional involvement the students feel during the information-seeking experiences. Emotions might range from negative to positive, from feelings of confusion, frustration, disappointment or disbelief to those of mild interest, contentment, satisfaction, excitement, or loss of self in the moment. Positive emotions may bolster the students as they interact with various Web sites and contribute to their patience, stamina, and confidence during information seeking. Negative emotions, or even neutral emotions, may seriously affect students during information seeking and contribute to abandonment of information seeking or tendencies toward a much less directed seeking that is easily distracted and interrupted with other tasks and attractions. Satisfaction with information seeking requires finding the information they are looking for and doing so with the emotional continuum tilted toward positive. In other words, one way to persuade students or get their attention through a Web site is to foster the building of relationships that elicit feelings of being socially accepted and belonging (Jordan 29). Beginning the enculturation of students into the graduate academic community of their program early on, while they are still prospective, through Web design and presentation could have a significant effect in facilitating a smooth transition into graduate school and retention. Web design can promote identity altering and affecting engagements that move students from thinking of a graduate program and school to seeing themselves as graduate students in the program and as part of the academic community. One of the four pleasures that Jordan describes, socio-pleasure "can help a person to establish a positive, affirming social identity" and "can contribute to a sense of belonging" (34). Similarly, Hansen

observes that "the organism undergoes change by reorganizing in reaction to external perturbation" (13); and "when the situation changes and the observer becomes a player, he suddenly begins to identify himself with the situation" (Hansen 19, quoting Monica Fleischmann and Wolfgang Strauss, *Liquid Views* [1993], a digital interactive work). In other words, students engaged in information seeking are affected both directly and indirectly by the Web experience, which leads to internal reorganization, alterations of identity, and emergence of feelings of connection with the graduate community represented in the site.

Design

Web design standards continue to evolve at a rapid pace to keep in sync with social and cultural change regarding technologies. Designing Web resources for a complex audience such as more than seven thousand graduate students with varied experience and skills in using sites and from diverse academic programs and educational backgrounds is not an easy task. Knowing more about the information-seeking practices of these students will help guide design; however, this is not enough. In *Convergence Culture*, Henry Jenkins foretells the need to change the overall approach of design from an information-focused effort to an open, participatory model more in line with the "convergence culture," or culture of mass collaboration, that is emerging (2006 2-4). He clearly states, "Convergence does not occur through media appliances, however sophisticated they may become. Convergence occurs within the brains of individual consumers and through their social interactions with others" (3). Rather than focusing on the technologies, he instead shifts the focus to the practices surrounding the use of the technologies and the design decisions

needed to support participation, collaboration, and collective knowledge-making rather than passive consumption (13-14, 18). In *Wikinomics*, Don Tapscott and Anthony D. Williams complement Jenkins's recommendations with their detailed guide on building Web resources that support a "collaboration economy" driven by mass participation in generating, co-creating, and constantly revising and polishing (2006 32). In such an environment, self organization, peering and sharing, and production are important, and institutional control bends toward consumers, called "prosumers" (producer + consumer) (124).

Regarding design, Gunther Kress and Theo Van Leeuwen observe that we are currently in a "period of profound transition," that "arrangements and framings are coming undone, or are quite deliberately being disassembled, while new assemblings are . . . emerging" to accommodate the multimodal discourse of today (2001 48). Schriver comments similarly that "we are experiencing a period in which we document designers are groping through the design space and inventing as we go" (379). In earlier times, language served a central role in representation, and other modes were supportive. This monomodal representation focused on being coherent, integrated, and cohesive. In late modernity, multimodal representation foregrounds the visual, and design is being redefined by multimodality (Kress and Van Leeuwen 2001 46). The variability and nonstandard design of Web sites today reflect this instability and the newness of multimodal representation. Images are in the foreground and designers are experimenting as previous scripts of monomodal representation are no longer valid. When a text is fragmented in multimodality,

the individual semiotic objects no longer are defined by their original context and must instead derive their meaning from their new, reconstituted context (47, 89). This mixture of varied design layers in electronic hypertext is accepted and expected by readers, who are then confronted with a more sensual, visual text (Bolter 52, 54). The variability and nonstandard site design today presents further challenges for students seeking answers to their questions. They must either learn to use these differently designed sites or find other ways to satisfy their information-seeking needs; their engagement with these different sites must also present some instances of confusion and frustration, some leading to abandoning the seeking activity, due to the differences in site design and presentation. Tracking the full information-seeking journey of the students in this study should help me better understand what challenges these students face.

Web design is a balancing act: decisions made can both enhance certain use and constrain other use. Likewise, decisions made to help students are balanced with those made to promote the university and its academic programs. As a "deliberate" process, design involves "social action" (Kress and Van Leeuwen 2001 45, 63). Relating this statement to electronic hypertext, the design arises out of the social and cultural context of the moment, influences of the past, and choices made among available options. Johnson remarks, "Each design decision echoes and amplifies a set of values, an assumption about the larger society that frames it"; the interface, as a product of the design process, becomes "an autonomous entity, a work of culture as much as technology" (*Interface Culture* 1997 44, 50). While hypertext has been referred to as a freer text structure, that liberation derives

from planned illusion. Jakob Nielsen strongly supports carefully planned information architecture, deliberately designing the structure of the site as well as its navigation. Jay David Bolter calls for a "structure of possibilities," Karen Schriver recommends an inviting document presentation that serves its audience well, and Steven Johnson points out the need for "better road maps" and "better ways to *pull*" (*Interface Culture* 1997 191, emphasis in original). A quick look at a hypertext Web page's underpinnings using "View Source" in a browser or review of an organizational plan of a moderately sized Web site serves as evidence of the highly structured nature of electronic hypertext. Even when the intention is to provide a more flexible, inclusive, participatory, open forum to readers, the underlying structure is quite complex and controls the variables of the environment through code. A "random Web site" is thus a misnomer. Too much control of the structure, however, results in reduced possibilities and pleasure for readers. An obvious paradox exists for designers of electronic hypertext: Designers must establish a deliberate, complex visual structure with choices and at the same time restrain control and avoid oppression, both of which might turn readers away. In this sense, Web design becomes the artistic expression of a visual illusion.

Because of the fragmentation and partial visibility of the text, mapping the relationships among elements and parts becomes important (Hayles 2004 83). Developing a navigational structure that works smoothly throughout the site requires careful analysis of audiences, intent and purposes for the site, content components, anticipated ways that these components might be assembled through audience actions and system responses,

opportunities for audience contributions, anticipated wayfinding patterns, and site sections, levels, and organizational elements. Kress and Van Leeuwen also note the importance of convention: "only recognised modes are available as elements for the design process. Similarly, only recognised structures and sequences (syntagms), whether as 'script' or as 'genre,' are available to the design process"; however, other unrecognized "'invisible' elements and structures" are present and understood by readers (2001 55). These invisible elements are "real" to readers as are conceptual holes; "readers may interpret not only what is visually or verbally present in a document but also what is absent" (Schriver 400, 439). The image world of electronic hypertext thus extends to include a willing belief in the existence of illusionistic elements in the interface and the images within the reader's imagination that fills the gaps in the interface.

METHODS

Research Design

This study uses combined quantitative and qualitative methodology in order to gain a better understanding of the information-seeking process of early doctoral students through collection of descriptive data. As applied research, the study focuses on understanding these information-seeking behaviors and then addressing how they may affect information design. I referred to Mary Sue MacNealy's *Strategies for Empirical Research in Writing* (1999) for guidance throughout and John Creswell's *Qualitative Inquiry and Research Design* (1998) as a supplement for the qualitative aspects of the study. I also referred to Carol Barnum's *Usability Testing and Research* (2002) and JoAnn Hackos and Janice Redish's *User and Task Analysis for Interface Design* (1998) for details regarding methods, particularly for examples of planning, collection, and analysis tools. This project studies four data sets in order to construct a more holistic understanding of the information-seeking behavior of early doctoral students, including: demographic data from the university records, a focus group with undergraduate and master's students, semi-structured interviews with doctoral students, and an online survey of doctoral students. MacNealy recommends using triangulation, employing multiple measures to converge on a research issue, to increase reliability of the overall study (202). My study includes the survey results but also the focus group, interviews, and demographic details, in order to arrive at a richer picture of information-seeking strategies, and follows MacNealy's recommendation for

triangulation. The focus is on process definition and searching for the details and practices of social context and behavior involved in students' preparation for interactions with technology, the nature of the interactions themselves, and the thinking and decisions that occur during information seeking. Collecting and reviewing data from more than one approach enables comparison to guide interpretation of data and a more holistic look at the information-seeking process, with intent of getting at the human side of the picture as well as the emergence of patterns.

This combined quantitative and qualitative study extends the current research on information seeking by focusing on doctoral student information seeking in more detail and attempting to understand the process through a holistic approach. Further discussion addresses the implications of doctoral student information-seeking process for Web design in a graduate school setting.

Demographics

Participants

Permission was granted to use data in the university records to study the group of students (n = 213) who enrolled for the first time in a doctoral program at the university in Fall 2007. This was a purposive sample with students chosen on the basis of their graduate admission and enrollment records in the university system.

Protocol

I excluded these two groups from my dissertation study: (1) students who were not enrolled in Spring 2008 and (2) students who had requested that the university not share their contact information.

Procedure

I submitted a data request with selection criteria and needed information fields to the graduate office, and the sampling was done by the graduate office from the university records system. Data was collected using queries currently in use in the graduate office and queries newly defined for this study.

Data Analysis

Data analysis focuses on observations of the general population and subgroups. Demographic data includes age, ethnicity, academic program, academic background, enrollment (e.g., full-time, part-time), gender, academic credentials, residency (Florida, out of state, international), previous undergraduate and graduate degrees, previous undergraduate and graduate institutions, and whether international students with visas came from abroad or from a U.S. institution.

Focus Group

To provide a richer understanding of the information-seeking process and assist in developing interview questions, I conducted a single, 90-minute focus group. This part of my study is an attempt to gather fresh details about the information-seeking process from

individuals who are currently engaged in this experience and to guide the development of interview and survey questions more likely to reveal the hidden practices of information seeking. The focus group was held on March 26, 2008, in an on-campus setting.

Participants

Participants (n = 7; 5 undergraduate, 2 graduate; 5 female, 2 male) were recruited from currently enrolled students at the university. This was a purposive sample with students chosen on the basis of their admission and enrollment records in the university system. Population and sampling draw from individuals having these characteristics: UCF student, at least 18 years of age, undergraduate junior or senior student or master's student, interested in pursuing a graduate degree (can be looking for a master's and/or doctoral program), and actively seeking a graduate program and school (has been looking for information on Web sites, talking to people, trying to figure out how to do this task, etc.).

Protocol

Appendix A includes the telephone screening questionnaire, initial e-mail invitation, e-mail invitation, informed consent form, and moderator's guide for the focus group approved by the university Institutional Review Board. Also included is the e-mail request for possible participants.

Procedure

In order to identify undergraduate students seeking information regarding graduate study, I contacted representatives in the Burnett Honors College, RAMP/McNair Office,

International Services Center, and selected graduate programs and requested their help in identifying students who met the selection criteria for the focus group. These representatives regularly advise undergraduates regarding graduate study and were able to provide me with the names of students who satisfied the focus group requirements and might be willing to participate in the focus group. I sent e-mail invitations to these 13 students with details of the focus group; of these, seven students agreed to participate in the focus group. At the beginning of the session, I reviewed the description and purpose of the focus group, and participants reviewed and signed an Informed Consent Form (Appendix A). As recommended by the research sources I consulted, I encouraged an informal discussion style that is nonjudgmental, exploratory, and open-ended. I audio taped the focus group session and prepared a session transcription and summary; following completion of this dissertation, I will destroy the audio tape. At the end of the focus group, I gave all participants a $20 Barnes & Noble giftcard.

Data Analysis

Following the focus group session, I prepared a summary of the sample group, transcribed the audio tape, and removed student identifying information. I then summarized the key findings.

Interviews

To provide a richer understanding of the information-seeking process and assist in developing survey questions, I conducted a limited number of 90-minute, semi-structured

preliminary interviews with new doctoral students. This part of my study originated from reading a study of the interdisciplinary context in the information-seeking behavior of faculty, conducted by Allen Foster ("A Nonlinear Model of Information-Seeking Behavior" 2004). As in Foster's study, my study targets an understanding of the overall model of information-seeking behavior. Interviews are important to get at the practices, thinking, and context of individual information behavior, which are often lost or difficult to study through more detached instruments. The intent of these preliminary interviews was to capture the details of students' information-seeking journeys and to guide the development of survey questions more likely to reveal the hidden practices of information seeking. Interviews were conducted during the period May 16-June 6, 2008.

Participants

Participants (n = 8) were recruited from the list of students who began a doctoral program in Fall 2007 and were enrolled in both Fall 2007 and Spring 2008 semesters. This was a purposive sample with students chosen on the basis of their admission and enrollment records in the university system. I attempted to diversify the sample regarding these characteristics: age, gender, ethnicity, previous bachelor's institution, previous master's institution, and discipline of doctoral program.

Protocol

Appendix B includes the e-mail invitation, informed consent form, interview guide, and online post-interview survey for the interviews approved by the university Institutional Review Board.

Procedure

With a target group of eight students in mind, I reviewed the list of possible participants and sent e-mail invitations to individual students with follow-up e-mails if no response was received within a few days. I invited a total of 21 students; of these, eight students agreed to participate. To make it easy for students to find the interview location, ensure that Web access was available (including two large-screen monitors), and ensure privacy during the session for audio taping, I conducted all interviews in my office in Millican Hall 230 (all participants were familiar with this location). At the beginning of the session, I reviewed the description and purpose of the interview and my dissertation study, and participants reviewed and signed an Informed Consent Form (Appendix B). As recommended by the research sources I consulted, I encouraged an informal discussion style that is nonjudgmental, exploratory, and open-ended. I audio taped the interview sessions, took detailed notes during the interviews, and bookmarked or printed samples from the Web sites reviewed during the interviews.

To facilitate analysis and conduct a partial pilot test for the online survey, I developed an online post-interview survey in order to collect additional details about the participants' prior knowledge about graduate school, the social context of their information-seeking experience, details of their general computer and Internet use, and rating of their ability to perform information seeking, and rating of their overall information-seeking experience. The post-interview survey was hosted on the survey manager in the College of Graduate Studies and within the protected university and Graduate College networks. I am

the only person able to access the administration of the survey and the data collected by it. I assigned a unique identifier to each student. Following the face-to-face interview session, I left the room so students could complete the online post-interview survey in private; the student entered the unique identifier at the beginning of the survey and then completed the survey questions.

At the end of the interview session, I gave each participant a $25 Barnes & Noble giftcard. Following completion of this dissertation, I will destroy the audio tapes and delete the data that was collected from the survey manager.

Data Analysis

Following the interviews, I prepared a summary of the sample group, transcribed the audio tapes and my notes, and removed student identifying information. I then summarized the key findings from the interviews and post-interview survey and plotted the participants' information-seeking steps to look for similarities and differences and to note when participants relied on the Web for information seeking.

Survey

Using information collected through the focus group and interview sessions to identify and prioritize topics, I developed a single Web survey that focuses on human information behavior as it relates to information-seeking of early doctoral students.

Participants

Participants (n = 213) were recruited from the list of students who began a doctoral program in Fall 2007 and were enrolled in both Fall 2007 and Spring 2008 semesters; of these, 74 (35%) of the students responded to the invitation and completed the survey. This was a purposive sample with students chosen on the basis of their admission and enrollment records in the university system.

Protocol

Appendix C includes the e-mail invitation, informed consent statement, and the online survey.

Procedure

I developed and conducted the survey using www.surveymonkey.com because it offers more flexibility in data export and analysis and it can provide the required security. I am the only person able to access the administration of the survey and the data collected by it. I assigned a unique identifier to each student and then uploaded these numbers with first and last names and e-mail addresses into the survey manager. Before administering the survey to the entire group, a pilot test was run. The same survey was administered using e-mail communications and an Internet survey engine to the entire group. The survey period was July 29, 2008 through September 1, 2008, and I sent an initial e-mail invitation to every potential participant and then two reminders and a "last chance" e-mail. The survey manager offered the option of excluding those who had completed the survey or selected

"opt out" from receiving further communications. I used my dwinter@mail.ucf.edu address as the sender in order to dispel suspicion of spam.

Data Analysis

After the survey collection period ended, I protected exported data by saving the source files on a CD and storing the CD in a locked file drawer in my UCF office. Identity fields were replaced with a code from the code key and these coded files were used as working files through analysis. Data collection was analyzed using quantitative methods, yet adopting a more flexible interpretive approach that studies overall process rather than proving specific hypotheses. Responses are confidential. The study matches survey data with demographics, academic program background, and current academic program affiliation in order to achieve a richer overall view of audience. As required by IRB, I will destroy the source files and delete the data residing in the survey manager when this study is completed.

Limitations of This Study

Several limitations affect the interpretation of this study:

- Collection of student details and responses is limited to one focus group, eight personal interviews, and survey of students admitted to a doctoral program at the university for Fall 2007 semester.

- Data collection started six months after students began study at the university and after students completed their information-seeking journey. Due to the time lapse students were unable to recollect full details of their information seeking.
- Student responses are reconstructions of their information-seeking journeys through memory. In other words, their responses are selective interpretations of their past experiences, including mediation due to changes in their thinking and influences of others and experiences since starting their doctoral program.
- The temporal distance from their information-seeking journeys affects students' reporting of their emotional states during their journeys.
- For the most part, students' information-seeking journeys are undocumented experiences with limited artifacts for study, other than the Web places they encountered.

Permissions and Approvals

I submitted this dissertation study to the university Institutional Review Board and received approval (Appendix D). I also received permission from the Dean of the College of Graduate Studies to use student information from the university records (Appendix D).

RESULTS

Focus Group

The focus group was a preliminary investigation of how students engage in information seeking for a graduate program and school. Seven currently enrolled UCF students (five female, 2 male) participated, and the group included junior and senior undergraduate students and master's students from engineering, sciences, social sciences, and arts and humanities disciplines. All students expressed an interest in attending graduate school. Some were already attending or admitted to graduate school and considering doctoral study; others were in various stages of seeking a graduate program and school. All but one participant was graduating within one year; and all but one participant visited UCF prior to enrolling.

First thoughts of attending graduate school arise in initial self-assessment and self-realization episodes. These are, in turn, initiated, supported or encouraged by personal life experiences, conversations with family and friends for advice and to learn from their previous experiences, conversations with faculty, educational experiences, conversations with people in the chosen field(s), and conversations with program or institutional representatives. The first encounter with the Web concerns preliminary research to identify the preferred region(s) of the country for graduate school, possible programs, and possible institutions. This investigation yields a rather broad preliminary scope within which the person then attempts to focus; however, unexpected encounters, introduction of new

information, and re-thinking occur that negate a regular, linear progression and instead yield an irregular, nonlinear pattern with indistinct steps and simultaneous consideration of multiple resources (Web and non-Web alike). In general, participants did little planning and preparation prior to beginning the information-seeking experience and followed a rather spontaneous and organic pattern. In retrospect, however, some were able to document a more organized accounting of the steps they followed; others were much less specific and detailed in their summary of the steps they followed. During the information-seeking experience, individuals seem to be learning not just about different graduate schools and programs but also how to go about the task of information seeking itself. More than one participant stated that they would conduct their information seeking differently if they were to do it again, which indicates discovery of new knowledge about themselves and graduate education as well as development of new skills and competencies in conducting an information search to assist with decision making.

Other steps include comparing programs and schools in an effort to narrow the selection, gathering and understanding admissions details and how to present the applicant most advantageously to the admissions committee, researching financing possibilities, and evaluating credentials of programs, faculty, institutions, and surrounding areas. Particular attention is given to determining the lifestyle that would be possible for all choices. While participants indicate they spend a good deal of time looking for information and clues on the Web to help them answer these questions, they also pursue and often prefer to talk face-to-face with faculty in the program or with other trusted institutional representatives (e.g.,

admissions counselor). Participants use the Web extensively but are unable to cite particular sites or recall the details of their research. None recorded their research formally; however, they did engage in informal note-taking and collecting. The discussion was at a disadvantage by not having Web access readily available as reference during the session.

The importance of the context within which participants conducted their information-seeking experience was evident in their comments. For example, proximity to the institution affected how easy it was for participants to gather the information they were seeking. While a great deal of information was gathered from the Web sites they visited, the participants who were geographically close to the institution could easily visit the campus and ask questions face-to-face to supplement their Web research, were able to take advantage of local telephone calls to the university, and were familiar with the surrounding area. Those who were familiar with the institution due to a previous degree there or had a friend or family member who attended the institution also had significant advantages. Familiarity with the institution seems to reduce stress during the information-seeking experience and the number of questions so less research is needed, which may lead to consideration of the institution as a "safer" choice. Continuing a graduate program in the same academic department as a previous degree provides the added advantages of knowing faculty and arranging financial support through these connections. In contrast, an international student abroad who is information seeking for a graduate program in the United States tends to consider more schools and programs and apply for admission to more schools and programs possibly due to the physical distance and inability to visit

institutions, increased uncertainty and difficulties in getting answers to their questions without face-to-face or even telephone conversations, and the need for substantial financial support in order to attend. The importance of the human element and personal touch that several participants voiced seem difficult to deliver through the Web, especially when coupled with differences in culture and language.

The age range of the participants was 21-27, with an average age of 23. Participants have similar computer use habits and Web preferences, including ownership of a personal laptop that is portable and wireless, habitual multitasking (excluding extended oral conversations with others), high expectations for Web sites, easily bored or distracted, avoidance of mechanical, text-heavy, inhuman Web sites, and gravitation toward those with visuals representing real-life people and places, honest presentation of the programs and school that enables the prospective students to imagine their life there, and an engaging persona. None of the participants identified any limitations on their computer use that might have affected their information seeking. The human element in Web sites seems crucial to engagement and return visits. As one participant describes, "I want to see if I'll be happy at that institution; it's that basic human element that you look for; you want to know that you'll feel at home." All but one participant visited the UCF campus before deciding to attend; the one who did not visit schools is an international student who applied to more than five schools before deciding to attend UCF for undergraduate study. Several participants described their awareness of the need to evaluate the integrity of Web sites they used, including overall design, organization of information, the messages delivered by

images and words, and the omissions noticed by the visitor. For example, more than one participant related their comparison of Web site visits with in-person visits.

The participants were well aware that their emotions ranged erratically throughout the information-seeking experience and required their conscious management in order to stay on course. Their emotions ranged from eager, very excited, optimistic and confident to frustrated, extremely vulnerable and stressed, and despair. Descriptions of the feelings included "like pressure, kind of like an unknown abyss," "that panic, frantic what is going on next," and "I was really unsure." To maintain the information-seeking flow, participants must overcome, transform, or arrest these feelings. A few ways they do this are: "sometimes you just forget about it," "the biggest thing that helps me move forward with it is having that personal face-to-face interaction with somebody," and "then you have to sleep on it."

Interviews

The interviews enabled more in-depth discussion with individual doctoral students regarding their information-seeking experience for a graduate program and school. Interviewees included eight doctoral students with varying characteristics (Table 1).

Table 1. Interviews with Doctoral Students: Demographics

Characteristics	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Age	38	27	25	31	24	25	24	26
Gender	Female	Male	Male	Female	Male	Female	Male	Female
Ethnicity	White	Asian	White	Asian	White	White	Black	White
Previous institution - Bachelor's	Out of state	Abroad	Same	Abroad	Out of state	Out of state	Out of state	Same
Previous institution - Master's	In state	N/A	N/A	Abroad	N/A	N/A	N/A	N/A
Discipline of doctoral program	Education	Physical Sciences	Engineering	Physical Sciences	Physical Sciences	Life Sciences	Physical Sciences	Physical Sciences

Notes: The student's academic program was coded as discipline. "N/A" stands for "not applicable," as the student held a bachelor's degree only at the time of admission to the doctoral program.

From the post-interview survey, general computer use (Table 2) indicates that all interviewees own their own computer and have no limitations on using it. Most students had been using a computer for more than ten years (4 students, 16-20 years; 3 students, 11-15 years; one student, 6-10 years). All interviewees spent considerable time each week using a computer (Table 2, Typical Computer Use). Activities and hours spent varied among interviewees. In addition, comparing this information with the undergraduate data collected by Kvavik (2005) indicates that these interviewees differ from undergraduate in these activities: chatting with friends or acquaintances using instant messaging, analyzing data or creating spreadsheets or charts, and creating presentations (Table 3). Top Internet options (those used very often or frequently) indicate that searching and following links are the most used options (Table 4); however, use by individual student varied widely beyond the searching and following links options (Table 5).

Table 2. Interviews with Doctoral Students: General Computer Use

Activities*	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Computer ownership	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limitations on computer use	No	No	No	No	No	No	No	No
Length of time using computer	16-20 years	16-20 years	11-15 years	16-20 years	11-15 years	6-10 years	11-15 years	16-20 years
Typical weekly computer use								
Classroom activities and studying	3-5 hours	6-10 hours	11 or more hours	1-2 hours	11 or more hours	6-10 hours	11 or more hours	Less than an hour
Writing documents (word processing)	3-5 hours	1-2 hours	11 or more hours	6-10 hours	1-2 hours	3-5 hours	11 or more hours	1-2 hours
Surfing the Internet for pleasure	3-5 hours	6-10 hours	1-2 hours	6-10 hours	6-10 hours	3-5 hours	6-10 hours	1-2 hours
Creating, reading, sending e-mail	6-10 hours	3-5 hours	3-5 hours	6-10 hours	3-5 hours	3-5 hours	3-5 hours	Less than an hour
Chatting with friends or acquaintances using instant messaging	Do not use	Less than an hour	Less than an hour	Less than an hour	3-5 hours	3-5 hours	Do not use	Less than an hour
Using an electronic device (computer, Palm device) at your place of employment	Do not use	11 or more hours	1-2 hours	11 or more hours	6-10 hours	6-10 hours	11 or more hours	1-2 hours
Downloading or listening to music or videos/DVDs	Less than an hour	Less than an hour	11 or more hours	3-5 hours	Less than an hour	3-5 hours	6-10 hours	1-2 hours

Activities	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Completing a learning activity or accessing information for a course using course management systems	6-10 hours	Do not use	1-2 hours	1-2 hours	Do not use	3-5 hours	Less than an hour	Do not use
Using a university library resource to complete a course or research assignment	1-2 hours	Less than an hour	Do not use	6-10 hours	Less than an hour	1-2 hours	Less than an hour	Less than an hour
Playing computer games	Do not use	Less than an hour	Do not use	Do not use	Less than an hour	1-2 hours	Do not use	1-2 hours
Analyzing data or creating spreadsheets or charts (Excel or other software)	1-2 hours	1-2 hours	11 or more hours	11 or more hours	3-5 hours	3-5 hours	11 or more hours	Do not use
Online shopping	Less than an hour	Less than an hour	Do not use	Less than an hour	Less than an hour	Less than an hour	Less than an hour	Less than an hour
Creating presentations (PowerPoint or other software)	Less than an hour	3-5 hours	Do not use	6-10 hours	Less than an hour	1-2 hours	11 or more hours	Do not use
Creating graphics (Photoshop, Flash or other software)	Less than an hour	Do not use	Do not use	1-2 hours	Do not use	Less than an hour	Less than an hour	Do not use
Creating Web pages (Dreamweaver or other software)	Do not use	Do not use	Do not use	Do not use	Less than an hour	Do not use	Do not use	Do not use
Creating and editing video/audio	Do not use	Do not use	Do not use	Do not use	Do not use	Do not use	Do not use	Do not use

* Activities list from Robert B. Kvavik, "Convenience, Communications, and Control: How Students Use Technology," *Educating the Net Generation*, ed. Oblinger and Oblinger (2005), Table 1, page 7.4. Graduate data from eight interviews with doctoral students conducted by the author for this dissertation study.

Table 3. Comparison of Hours Spent Per Week on Computer-related Activities by Undergraduate and Graduate Students

Activities and Hours Spent (per week)	Undergraduate* Mean	Doctoral Mean
Classroom activities and studying	4.01	4.63
Writing documents (word processing)	3.76	4.25
Surfing the Internet for pleasure	3.47	4.25
Creating, reading, sending e-mail	3.47	3.38
Chatting with friends or acquaintances using instant messaging	3.45	2.25
Using an electronic device (computer, Palm device) at your place of employment	3.31	4.38
Downloading or listening to music or videos/DVDs	3.15	3.50
Completing a learning activity or accessing information for a course using course management systems	2.48	2.50
Using a university library resource to complete a course or research assignment	2.46	2.50
Playing computer games	2.39	1.75
Analyzing data or creating spreadsheets or charts (Excel or other software)	2.07	4.13
Online shopping	2.06	1.88
Creating presentations (PowerPoint or other software)	1.82	3.00
Creating graphics (Photoshop, Flash or other software)	1.79	1.63
Creating Web pages (Dreamweaver or other software)	1.39	1.13
Creating and editing video/audio (Premier, Final Cut, Director, iMovie or other software)	1.34	1.00

Scale: 1 = Do not use, 2 = Less than an hour, 3 = 1-2 hours, 4 = 3-5 hours, 5 = 6-10 hours, 6 = 11 or more hours

* Activities list and undergraduate data from Kvavik, "Convenience, Communications, and Control: How Students Use Technology," *Educating the Net Generation*, ed. Oblinger and Oblinger (2005), Table 1, page 7.4. Graduate data from eight interviews with doctoral students conducted by the author for this dissertation study.

Table 4. Interviews with Doctoral Students: Internet Options Used "Very Often" and "Frequently"

Internet Options	Used Very Often	Used Frequently
Searching	8	0
Following links on the Web pages	7	0
Saving to my computer	4	2
Adding bookmarks to Favorites in my browser	3	2
Site indexes	2	0
Printing	2	0
Chat	1	0
Instant messenger	1	1
Discussion boards or forums	0	3
Help	0	1

Table 5. Interviews with Doctoral Students: Top Internet Options, Used "Very Often" (bold) or "Frequently"

Interviews							
I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Searching	Adding bookmarks to Favorites in my browser	**Following links on the Web pages**	Printing	Saving to my computer	**Searching**	Printing	Saving to my computer
Following links on the Web pages	**Searching**	**Searching**	Saving to my computer	**Searching**	**Following links on Web pages**	Saving to my computer	**Searching**
Site indexes	Saving to my computer		Adding bookmarks to Favorites in my browser	**Following links on Web pages**	Chat	Adding bookmarks to Favorites in my browser	**Following links on Web pages**
Adding bookmarks to Favorites in my browser	Discussion boards or forums		**Searching**	Instant messenger	Instant messenger	**Searching**	Site indexes
			Following links on the Web pages		Saving to my computer	**Following links on Web pages**	
			Blogs		Adding bookmarks to Favorites in my browser	Help	
			Discussion boards or forums		Discussion boards or forums		

Description of students' general information-seeking experience includes the ranking of the top sources of social support, self-evaluation of information-seeking ability, and rating of the overall information-seeking experience. Reporting sources ranked as 5 (most contribution) or 4 (significant contribution) shows the strong reliance of the interviewees on Web sites, as 23 (66%) of the 35 sources are Web sources (Table 6); however, interviewees also indicated substantial reliance on academic advisers and family and friends (Table 7).

When asked to rate their ability to information seek for a graduate school and program, four (50%) students assigned themselves "Most capable," the highest score, on all four items; overall averages for each student ranged from "Very capable" (4) to "Most capable" (5), except for one student, whose average (3.75) was slightly below "Very capable" (Table 8). Tasks that received the lowest ratings were "Choose the graduate program that is the best fit for me" (4.5) and "Overall success in finding a graduate program and school" (4.5).

When asked to rate their overall information-seeking experience for a graduate school and program, students rated the statements in this section from 1 (Strongly disagree) to 5 (Strongly agree), using all choices of the five-level scale (Table 8). The overall average of their ratings ranges from 2.81 to 4.68, with the two students with the lowest self-rating also having the lowest rating of the overall experience.

As noted with the focus group participants, interviewees could not recollect the full details of their experience, possibly due to the time lapse and no longer having the need to

remember these details. They did, however, recollect their general approach and steps, as well as selected specific Web sites and pages that they had used. Regarding their specific information-seeking experience (Table 9), for this group of students, first thoughts of graduate school arose during high school (2 students), undergraduate study (5 students), and following completion of a master's degree (1 student). The experience that prompted these first thoughts was personal and thus quite variable; for example, they arise from interactions with others (adviser, instructor, family, etc.) or specific experiences such as teaching or research. Students spent an average of 9.5 months from the time they began information seeking and until they applied for graduate admission, with the least amount of time spent being 5 months and the most amount of time spent being 15 months. Following the completion of their information-seeking experience, students applied for admission to about 4 graduate programs, with three in-state students applying to just one graduate program, one out-of-state student applying to 2 graduate programs, and four students (two abroad and two out-of-state) applying to 5 or 6 graduate programs. While the number of admission applications seems tied to where the student is coming from, the number of months spent in information seeking does not.

As expected, the major steps in information seeking for a graduate program and school varied by student and by discipline (Table 10). Each student had a distinctive general approach, based on, for example, the origin of first thoughts about attending graduate school, what was most important to the student (location, funding, research groups, etc.), and self-evaluation of competitiveness. In addition, the importance of research groups,

facilities, and publications, as well as funding, emerges as a pattern for students pursuing graduate study in engineering and the sciences. Overall, reliance on Web and non-Web sources complement each other in providing students with the information needed for decision making (Table 11). All students used the Web throughout their information-seeking experience, and all but one student talked to various people during this time, including academic advisers, professors and instructors, family and friends, people in the program, people in the profession, among others.

Table 6. Interviews with Doctoral Students: Sources of Support, "Most Contribution" and "Significant Contribution"

Sources of Support	Most Contribution	Significant Contribution
Graduate school Web sites	6	2
Graduate program Web sites	5	3
Academic advisers	4	2
Family and friends	2	2
College Web sites	2	2
Other Web sites	2	1
Workshops and training sessions	1	0
Published guide to graduate schools	0	1

Table 7. Interviews with Doctoral Students: General Information Seeking, Sources of Support

Characteristics	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Top sources of support, rated "most contribution" or "significant contribution" (reported values 5 and 4 only; 1 is least contribution and 5 is most contribution; ordered 5 in bold and then 4, but not ranked within category)								
Support source 1	Family and friends	Academic advisers	Academic advisers	Family and friends	Graduate school Web sites	Graduate school Web sites	Workshops and training sessions	Academic advisers
Support source 2	Graduate school Web sites	Graduate school Web sites	Graduate school Web sites	Academic advisers	Graduate program Web sites	College Web sites	Graduate school Web sites	Graduate school Web sites
Support source 3	College Web sites	College Web sites	Graduate program Web sites	Graduate school Web sites	Family and friends	Graduate program Web sites	Graduate program Web sites	Family and friends
Support source 4	Graduate program Web sites	Graduate program Web sites		Graduate program Web sites	Other Web sites	Academic advisers	Academic advisers	Graduate program Web sites
Support source 5		Other Web sites		Other Web sites			College Web sites	
Support source 6				Published guide to graduate schools				

Table 8. Interviews: General Information Seeking, Ratings of Ability and Overall Information-seeking Experience

Characteristics	Interviews								
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**	**Totals**
Ability to information seek (1 is least capable and 5 is most capable)									
Find the information I want on the Internet	4	4	5	5	5	5	5	4	**37**
Evaluate the information that I find on the Internet	5	4	5	5	5	5	5	4	**38**
Choose the graduate program that is the best fit for me	4	3	5	5	5	5	4	5	**36**
Overall success in finding a graduate program and school	3	4	5	5	5	5	4	5	**36**
Average self-evaluation of ability	4	3.75	5	5	5	5	4.5	4.5	**36.75**
Overall information-seeking experience (1 is strongly disagree and 5 is strongly agree)									
I felt stimulated when information seeking for a graduate school	3	3	4	4	2	3	5	3	**27**
I felt entertained when information seeking for a graduate school	2	3	4	4	2	2	5	3	**25**
I felt excited when information seeking for a graduate school	4	2	4	3	4	3	5	4	**29**
I enjoyed information seeking for a graduate school	2	1	4	4	2	3	5	2	**23**
I felt relaxed when information seeking for a graduate school	2	1	3	2	3	4	4	3	**22**
The graduate academic Web sites gave me satisfaction.	2	2	3	4	3	4	4	3	**25**
I could rely on the graduate academic Web sites.	2	4	4	5	4	4	4	4	**31**
I would miss the graduate academic Web sites if they had not been available.	4	4	3	4	5	4	5	4	**33**
I will continue to use the graduate academic Web sites at my institution.	4	4	5	5	5	4	5	5	**37**
I felt connected to the academic institutions whose Web sites I used.	3	2	3	3	3	4	5	2	**25**
The academic Web sites gave me greater confidence in my academic program and the university.	2	2	4	3	4	4	5	2	**26**
My information-seeking experience made me feel enthusiastic about graduate school.	3	1	4	4	4	4	5	3	**28**
Rating of overall information-seeking experience	3.12	2.81	4.12	4.12	3.88	4.00	4.68	3.56	**3.79**

Table 9. Interviews with Doctoral Students: Specific Information-seeking Experience

Characteristics	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
First thoughts of graduate school	Making a career decision	Second-year undergrad	Second-year undergrad	Undergrad	Third-year undergrad	Since high school	Senior in high school	Fourth-year undergrad
Experience that prompted first thoughts	Graduated with master's degree	Recommendation from professor	Undergrad research experience	Family and master's study	Dissatisfied with internship experiences	Relative encouraged me	My interest in two areas and graduate school was needed	Teaching experience
Start (m/yyyy)	9/2006	3/2006	1/2006	1/2006	8/2006	8/2006	6/2006	8/2005
End (m/yyyy)	3/2007	12/2006	12/2006	1/2007	1/2007	6/2007	1/2007	11/2006
No. of months	6	9	12	12	5	10	7	15
No. of applications	1	6	1	5	5	6	2	1

Table 10. Interviews with Doctoral Students: Specific Information-seeking Experience, Major Steps

Major Steps*	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
1	Time to degree	Choose a specific area of study	Funding	Prepare my English speaking and writing	Check US News & World Report for top schools in my area	Decide on my research interests	Location	Talk to my professors
2	Transfer credit	Find schools in that specific area	Advisers	Find schools	Look at schools in my area	Look for faculty in my area	Groups within the school or college	Talk to my supervisor
3	My interests	Recommendations from my adviser		Look for programs	Look at research in the programs	Look for programs	Research groups and their interests	Choose the program and curriculum
4	Benefit to career	Funding, especially fellowships		Admission requirements	Funding	Program and course requirements	General search in area	Look at people first
5	Plan of study	TOEFL and GRE test score requirements		Make a decision	Consider whether I was a good fit for the school	Admissions requirements	Focus my interests	Check courses taught

Major Steps*	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
6	Scheduling of courses	Consider my spouse's life			Research the area and location		Look for research groups in my area of interest	Admissions requirements
7	My schedule	Review research group details			Admission requirements and deadlines		Look at programs	Compare programs
8	Feedback from others in the program	Check published papers					Look at institutions	
9							Funding	

* Listed in order given by interviewees.

Table 11. Interviews with Doctoral Students: Specific Information-seeking Experience, Reliance on Web and non-Web Sources

Characteristics	Interviews							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**
Reliance on Web sources	Throughout the whole thing	Looked for graduate school, program, and research group information	A lot; looked for details about program, funding, application, facilities, professors and their interests	Looked for testing information and programs, faculty, and research group details	That's where I got most of my information	Found most of information on the Web	Used Web at all points	Looked for the program, courses, and requirements; compared programs
Reliance on non-Web sources	Talked to people who had done the program, people in my office who were taking classes, my supervisor, and Career Services	Talked to my academic adviser, graduate students in my research group, and graduate students at the schools	Talked to my academic adviser and completed undergraduate research experiences	Talked to my academic adviser and friends in school abroad	Talked to my future academic adviser and graduate students I know	Talked with people I worked with and with family	Observed how people in research groups worked together	Talked to professors, students, and my family and fiance

Maps of Information-seeking Journeys

During the interviews I asked students to describe the major steps in their information-seeking experience for a graduate program and school and to show me some of the Web sites they used and how they used them. The purpose of this discussion was to help me map each student's overall information-seeking journey. This was an attempt to gather the general descriptive details in order to construct a visual representation of each student's information-seeking journey. Descriptive components of this journey include

- The profile of the student (demographics, previous degree and institutions, number of months spent information seeking, number of admission applications submitted)
- Major steps in the information-seeking experience, as described by the student
- The generically represented Web structures used by the student and relationships among these structures
- Both general and specific comments made by the student to provide richer contextual details.

These maps are, therefore, my interpretations of the details recounted by students during the interviews and have limitations.

- Only eight interviews were conducted and the sessions were limited to ninety minutes in length. More interviews or more time spent with each student would increase the details collected.

- Interviews were conducted in May-June 2008, more than six months since the students completed their information-seeking journey. Due to the time lapse students were unable to recollect full details of their information seeking.
- Students' recollections, therefore, are oversimplifications and hint at the intensity, complexity, order, and details of their experience. Even so, these recollections and maps are informative.
- The wide variability of Web design and content encountered limits the ability of this study to compare the experiences of students and draw conclusions.
- Students' information-seeking journeys varied in duration and breaks in engagement, which also limit the ability of this study to compare the experiences of students and draw conclusions.

Observations on Interview 1 Journey

An Education student, Interviewee 1 restricted her search to universities within driving distance so the scope of her journey was limited; however, her journey still proved quite complex due to her previous degree and desire to look for graduate options in the same as well as other disciplines. Her journey included two universities and nine graduate programs in three different disciplines. Hence, the context of her decision making required comparing the details of nine programs. The lack of adviser support and clear and complete details were contributors to her dissatisfaction and negative comments regarding her overall information-seeking experience. Her information-seeking journey (Figure 1) includes two

university Web spaces and then venturing to a testing site and human resources site for specific purposes.

Observations on Interview 2 Journey

Interviewee 2 is an international student in Physical Sciences who completed a bachelor's degree in his home country and conducted his full information-seeking journey through the Web for a school in the United States (Figure 2). His first step was to collect a long list of universities, using books about U.S. schools, USA Today's site, and predominately a private site in his home country popular with students seeking to attend school abroad. After compiling a list of possible universities, he consulted with his adviser to get a recommended list of six universities. Unable to visit universities prior to applying for admission or attending, he spent his journey exploring the Web sites of the six recommended universities in great detail and e-mailing students at these schools for the inside story. Particularly, he focused on research group Web sites, reviewing multiple research group Web sites at each of the six institutions, searching for and reading the published papers for each group, and looking for details of people in the group and what each research group does. Having spent extensive time reviewing research group Web sites, Interviewee 2 expressed his ideas on what they should include (see Figure 2 for more details). He noted that the MIT and Harvard research group Web sites are "beautiful" and observed that the university produces these sites for the research groups. Research group Web sites were so important to him that he remarked, "If they have no research group Web sites or the site doesn't have enough information on it, then I did not apply to it." He also

viewed them as indicative of the university's quality: "There is a strong correlation between the quality of the school and the quality of the research group Web sites." By "quality," he is referring to the reputation of the institution for research and scholarly contributions.

Observations on Interview 3 Journey

An Engineering student, Interviewee 3 spent one year information seeking and applied to only one university, the same one where he completed his bachelor's degree (Figure 3). For him, familiarity with the institution, program, and faculty was a strong influence, and he only looked at one other institution and program. Due to the limited scope of his journey he was able to recollect details of Web sites and Web pages that he used and even remembered the shortcomings of various places he visited online. He also expressed strong opinions about what should be presented on Web sites. He wanted to see descriptions of research facilities with photos, professors and their research interests, links to projects with an abstract, links to recent dissertations, descriptions of courses and who is teaching them, links to research publications, application deadlines, and especially details about financial support. He wanted everything to be easy to find and found the admission application to be "kind of difficult to decipher." He observed that it was difficult to find information about the treatment and dynamics of graduate students in the program and university system, but that this information was important. Overall he appeared to be a more advanced Internet user with established preferences and fairly specific expectations, as well as a more organized, methodical approach to his journey.

Observations on Interview 4 Journey

Interviewee 4 approached her information seeking in a spontaneous, playful manner characterized by extensive searching and clicking around. She relied heavily on the Web for information to support her decision making and remarked, "The Internet is the best way to find information." She observed positively that "I can find different information at different search times." She used sites such as Education USA to check rankings of institutions and find their Web sites and general information about them (Figure 4). An international student who completed both bachelor's and master's abroad, she spent one year seeking a doctoral program and applied to five different schools in the United States. A student in the Physical Sciences, she focused on faculty and research group Web sites during her information-seeking journey and spent time looking for e-mail addresses for both faculty and current students. She contacted only faculty but did not receive replies because, according to her, "They were busy. I understand I'm just an applicant." Her information-seeking journey appears unorganized and open to unexpected results and connections.

Observations on Interview 5 Journey

A Physical Sciences student, Interviewee 5 began his information-seeking journey using Google search to find the U.S. News and World Report site (Figure 5). There he searched by program name to identify top programs and familiarize himself with the universities where these programs reside and the research details at each. From this site he then sought information on seven different university Web spaces, including university, department, college, and graduate school sites. In addition, he particularly explored the

"People" section on each university site, looking for faculty sites and their research group sites, as well as details about both. While a U.S. student, he conducted his information seeking from out of state and did not visit any of the institutions prior to applying for admission or attending one of them. Because of this limitation, he spent time researching "the area and location to see if there were options for me" and remarked, "Finding information about the area of town the college was located in was a problem." He spent five months information seeking, applied to five institutions, and observed that "organization was a big problem for me, trying to keep track of everything." To help him keep track of the details of his information-seeking journey, he used Notepad on the computer to compile information as he searched and saved Web pages in his browser Favorites. Researching seven institutions and applying to five, he found the journeying to be an "overwhelming project."

Observations on Interview 6 Journey

A Life Sciences student whose previous bachelor's institution was out of state, Interviewee 6 identified her research interests before beginning her information-seeking journey (Figure 6). This helped her narrow her search early and focus on faculty and their research interests, projects, and publications, which she found on PubMed and read. She also spent substantial time reviewing research groups and looking for an institution and program where there was a good fit with the people there. She remarked, "I didn't accept admission if there was a faculty/people issue." In her discipline, most programs conduct rigorous in-person interviews with prospective students, which gave her the opportunity to

meet potential faculty advisers and talk with them about possible research projects and their current projects and research group configuration. She explained that most of the education is labwork, so it is important to ascertain the quality of work the professor is producing and to choose a professor that the student can work with smoothly and productively. She looked for faculty and student contact information so she could send e-mails and attempt to complement the Web information with electronic communications. In addition, ranking sites were not important to her because she observed, "It's not really the school you come out of, it's who you work for." Therefore, her searches often focused on faculty names and she sought the details of research group life. Her journey lasted ten months, after which she applied to six graduate programs.

Observations on Interview 7 Journey

Interviewee 7 engaged in undergraduate research programs to prepare for graduate school and develop relationships with faculty and research groups. Due to this prior research experience his journey focused on a particular program in Physical Sciences at one institution and the research groups that he might join (Figure 7). One of his most important questions was "Can I get along with the people I'm working with for five years? I want to be successful." During his information seeking he looked for evidence of social life in the program and research group, what people do, the "cohesion of the group," and the kind of research conducted. He read research group Web sites and faculty publications in detail. He already knew four faculty, four postdoctoral research scientists, and students, and used these relationships to his advantage by e-mailing these people with his questions to

supplement the information he found on Web sites. While photos "did not make much difference" to him, he was very interested in laboratories and descriptions of the facilities, even though he had already had the opportunity to visit the program's facilities as an undergraduate researcher. His information-seeking journey was not very broad but was very deep.

Observations on Interview 8 Journey

Interviewee 8 spent 15 months information seeking for a graduate program in Physical Sciences at the same institution where she completed her bachelor's degree. She had personal reasons for wanting to remain at the same institution. Her journey included seeking details about the several programs she was interested in and then comparing master's and doctoral programs in the same area and comparing programs in different areas (Figure 8). She found comparing difficult due to the inability to see programs side by side and instead relied on scrolling back and forth or clicking back and forth. She questioned certain terminology during her information seeking and had to look further for explanation. For example, "data mining" was an unfamiliar term to her, and she had questions about "candidacy exam" and "dissertation" and wondered what the difference was between "scholarships" and "fellowships" and how to apply for them. While most of her information seeking focused on programs, she also explored course offerings, financial support options, and the department's Web site. After more than a year of information seeking, she only applied to one program.

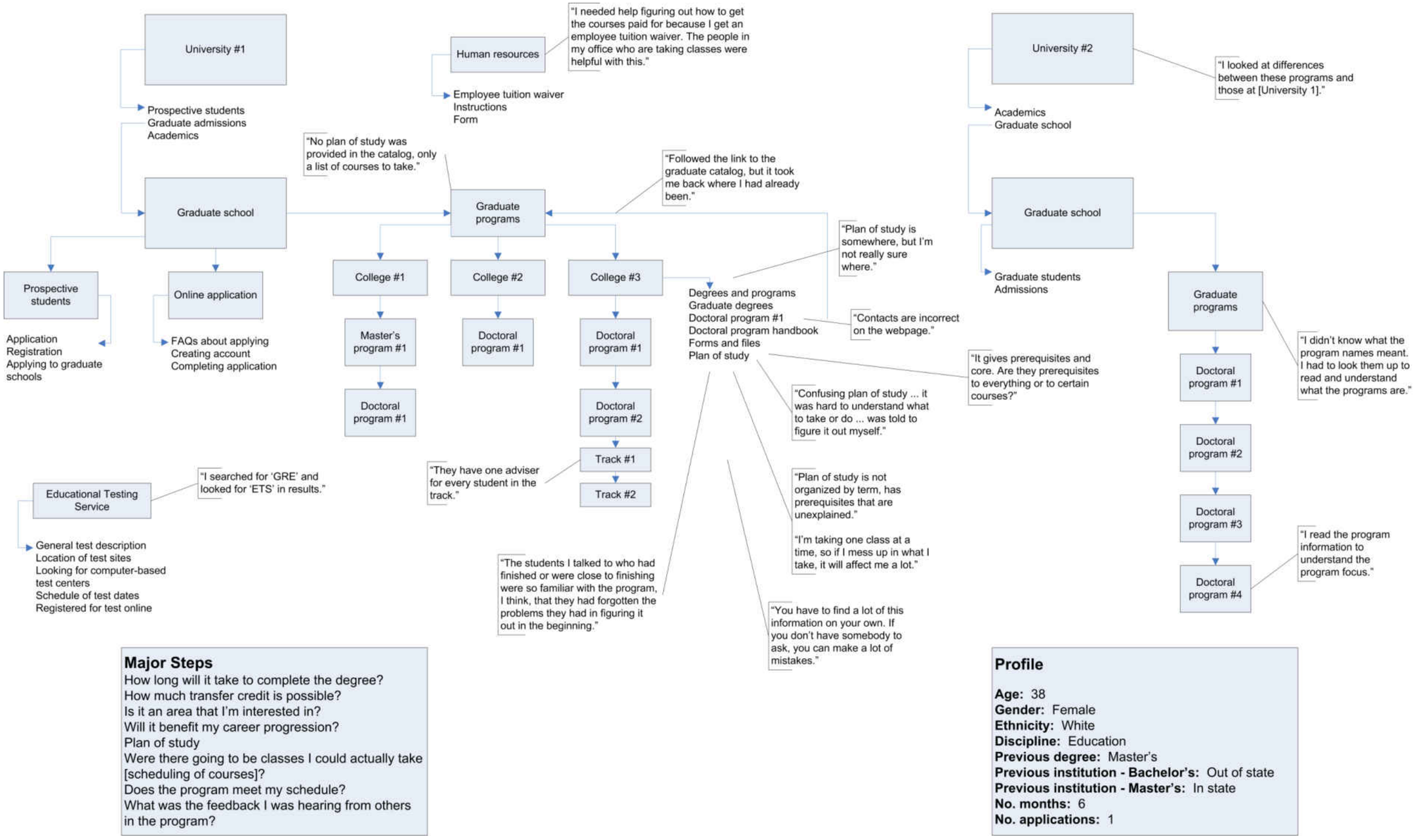


Figure 1. Interview 1: Recollection of Information-seeking Journey

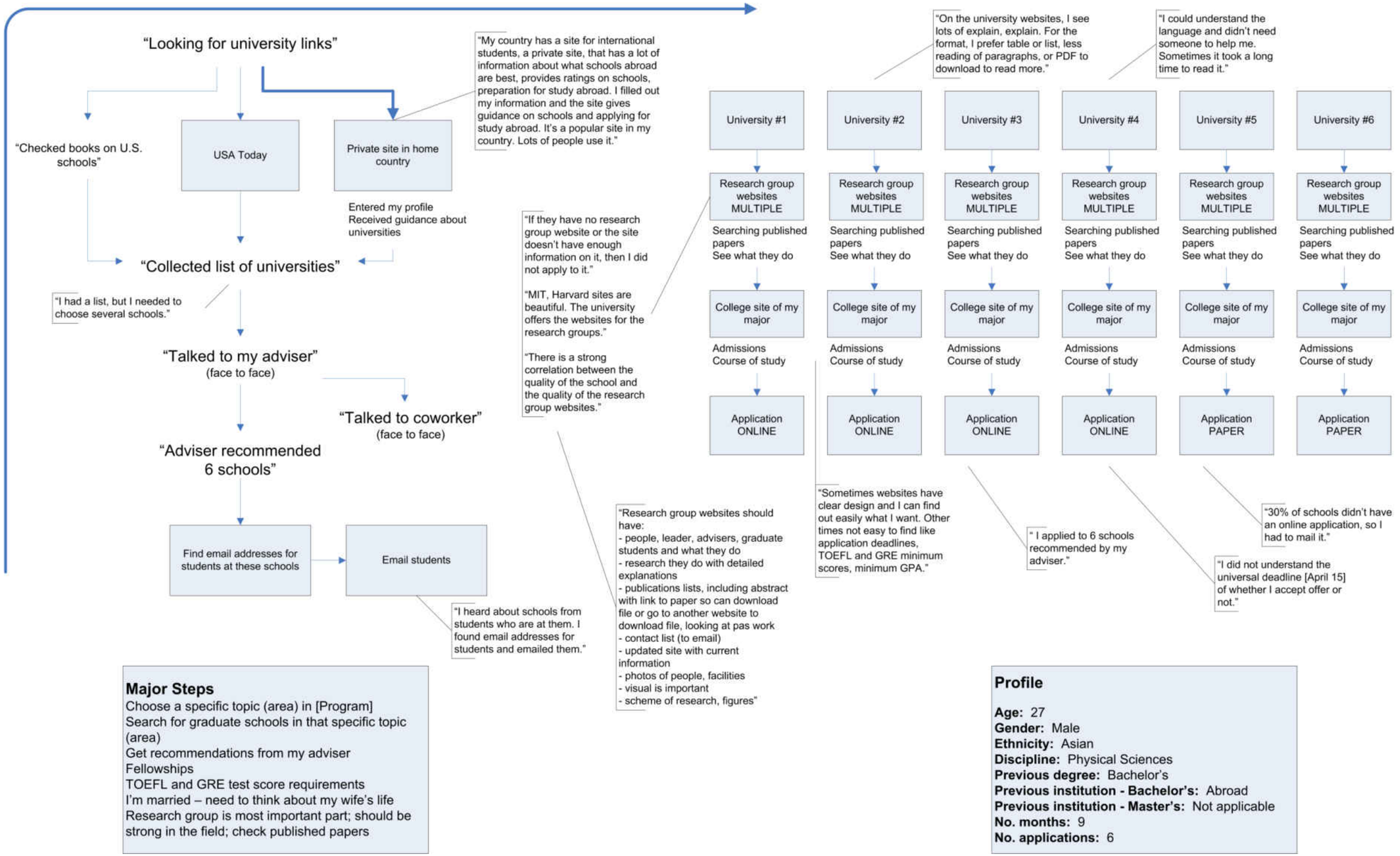


Figure 2. Interview 2: Recollection of Information-seeking Journey

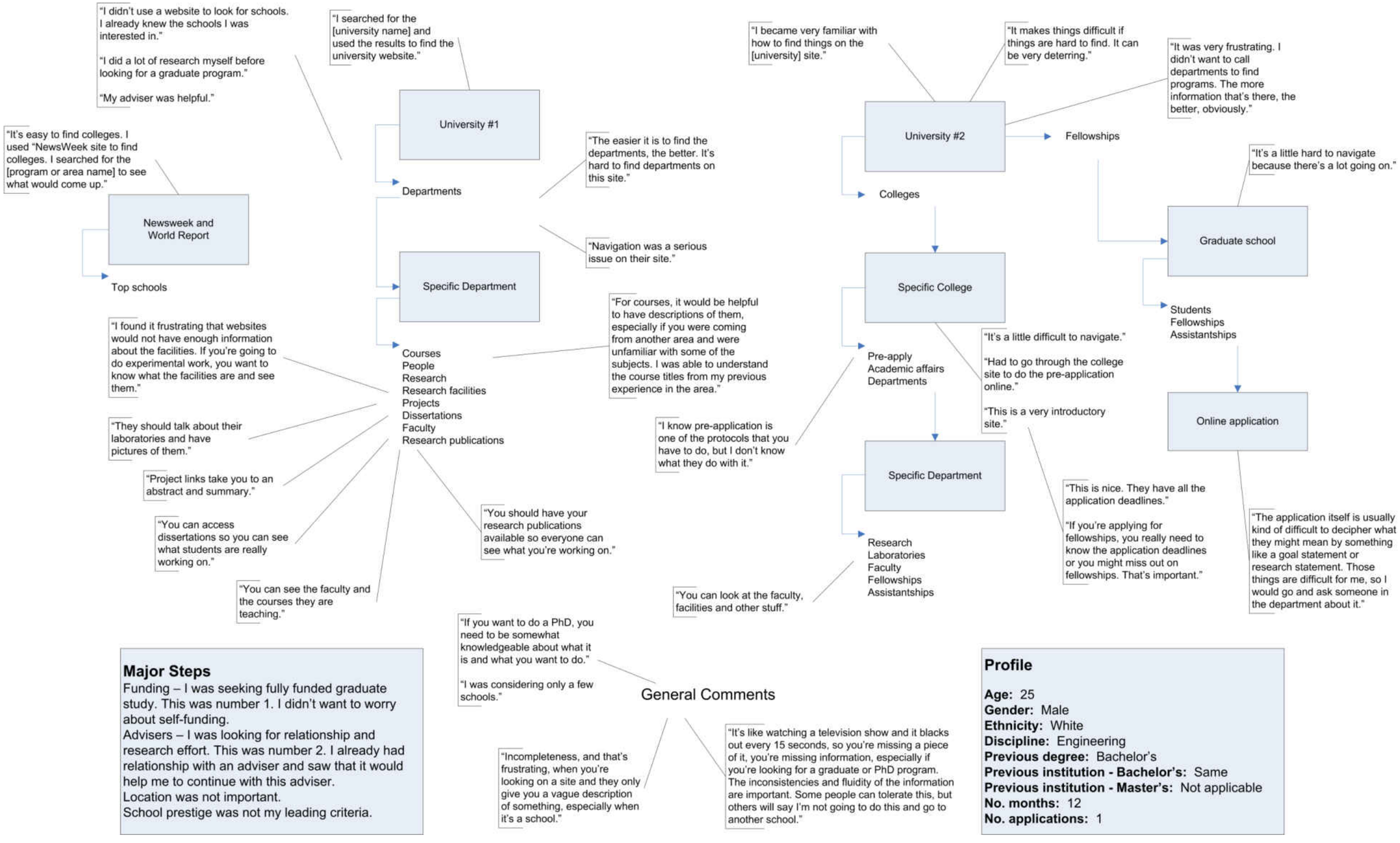


Figure 3. Interview 3: Recollection of Information-seeking Journey

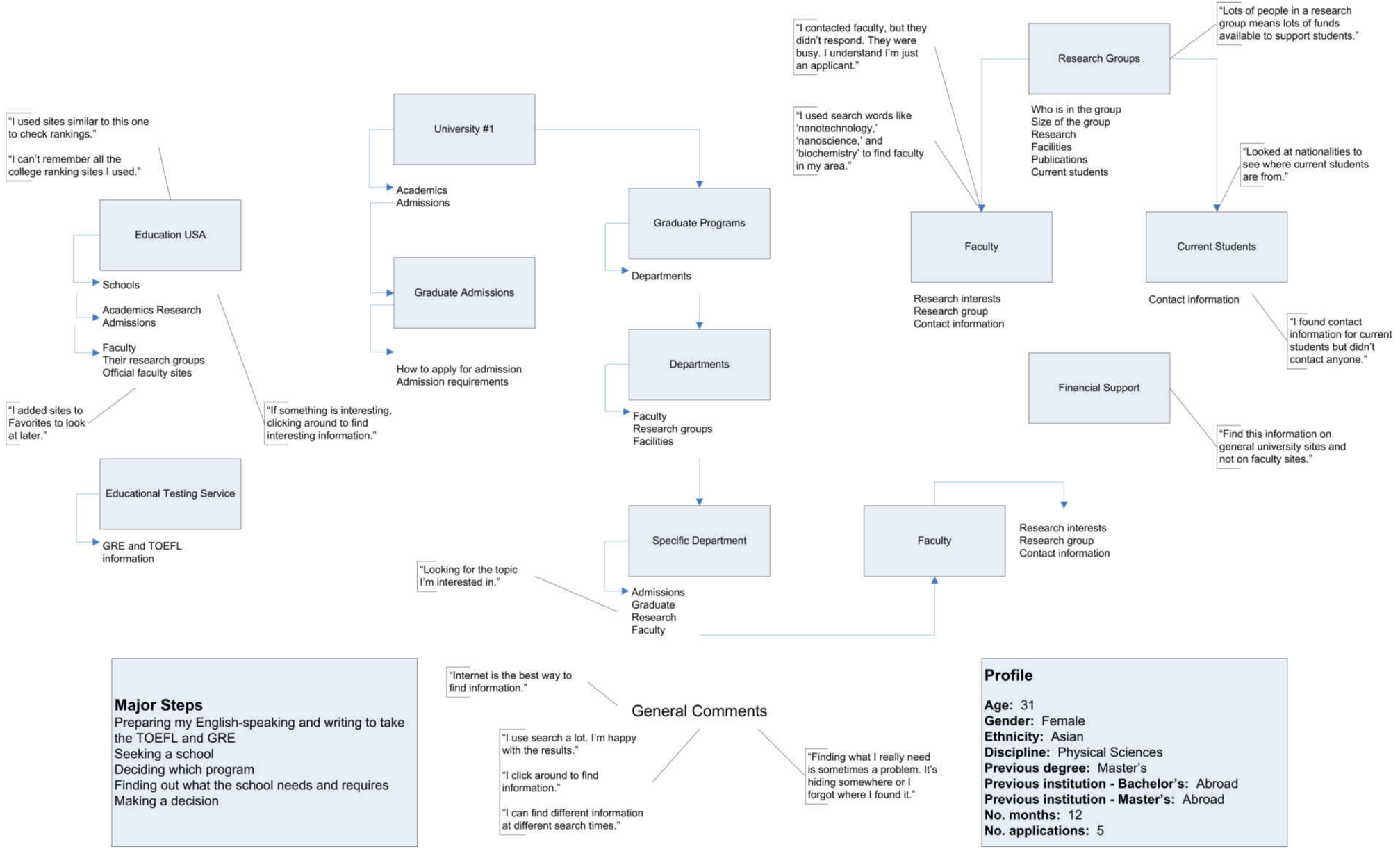


Figure 4. Interview 4: Recollection of Information-seeking Journey

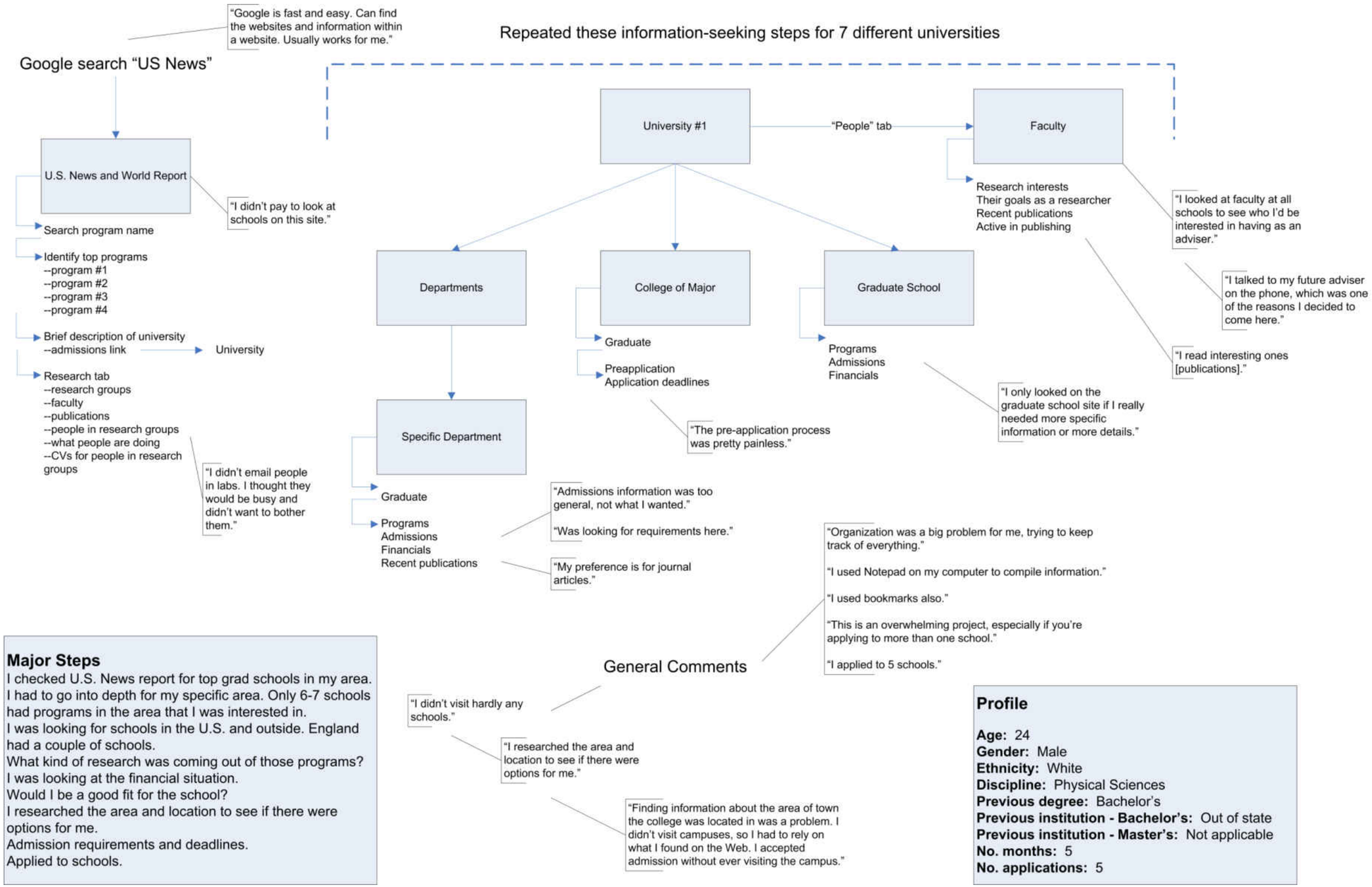


Figure 5. Interview 5: Recollection of Information-seeking Journey

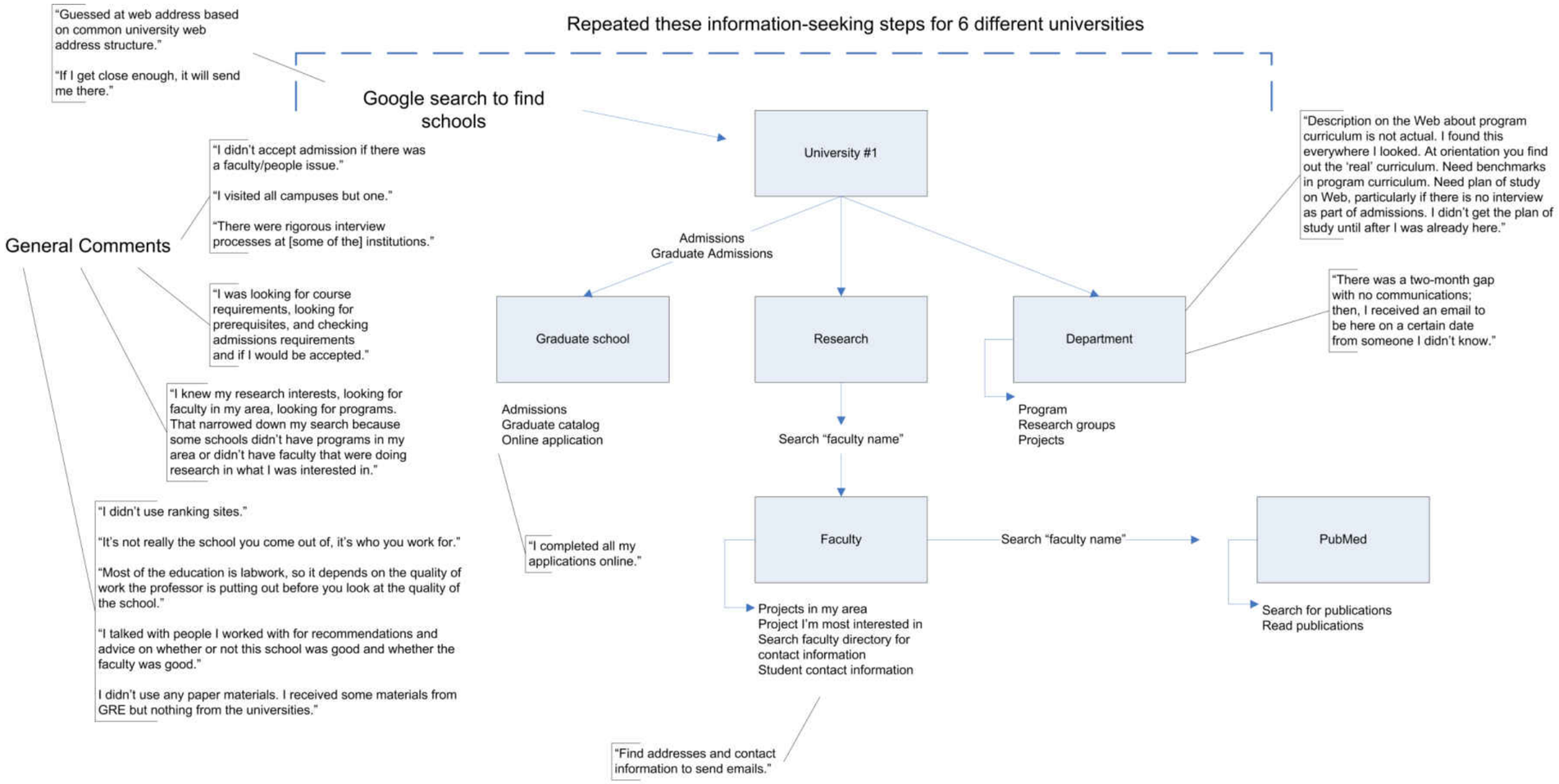


Figure 6. Interview 6: Recollection of Information-seeking Journey

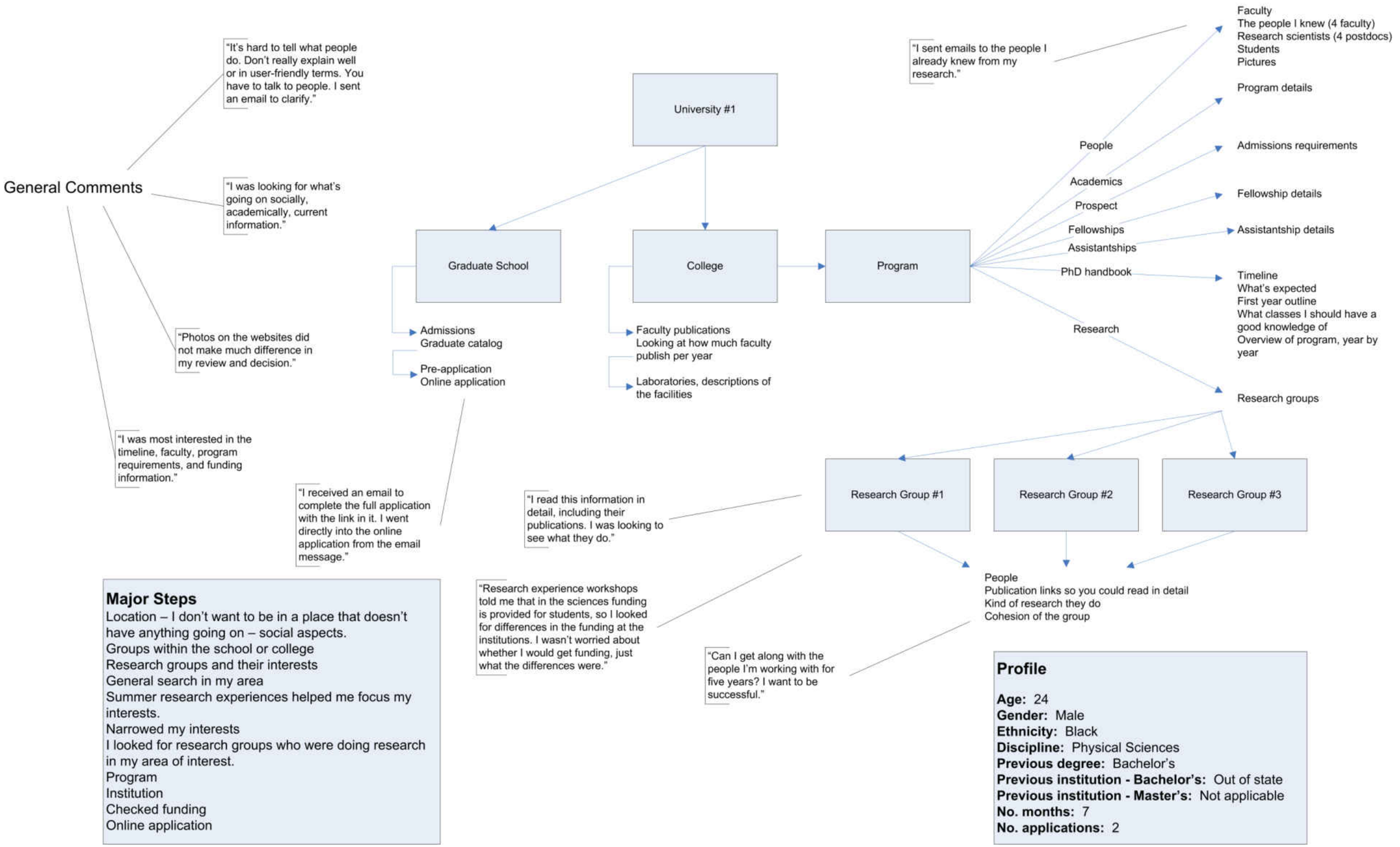


Figure 7. Interview 7: Recollection of Information-seeking Journey

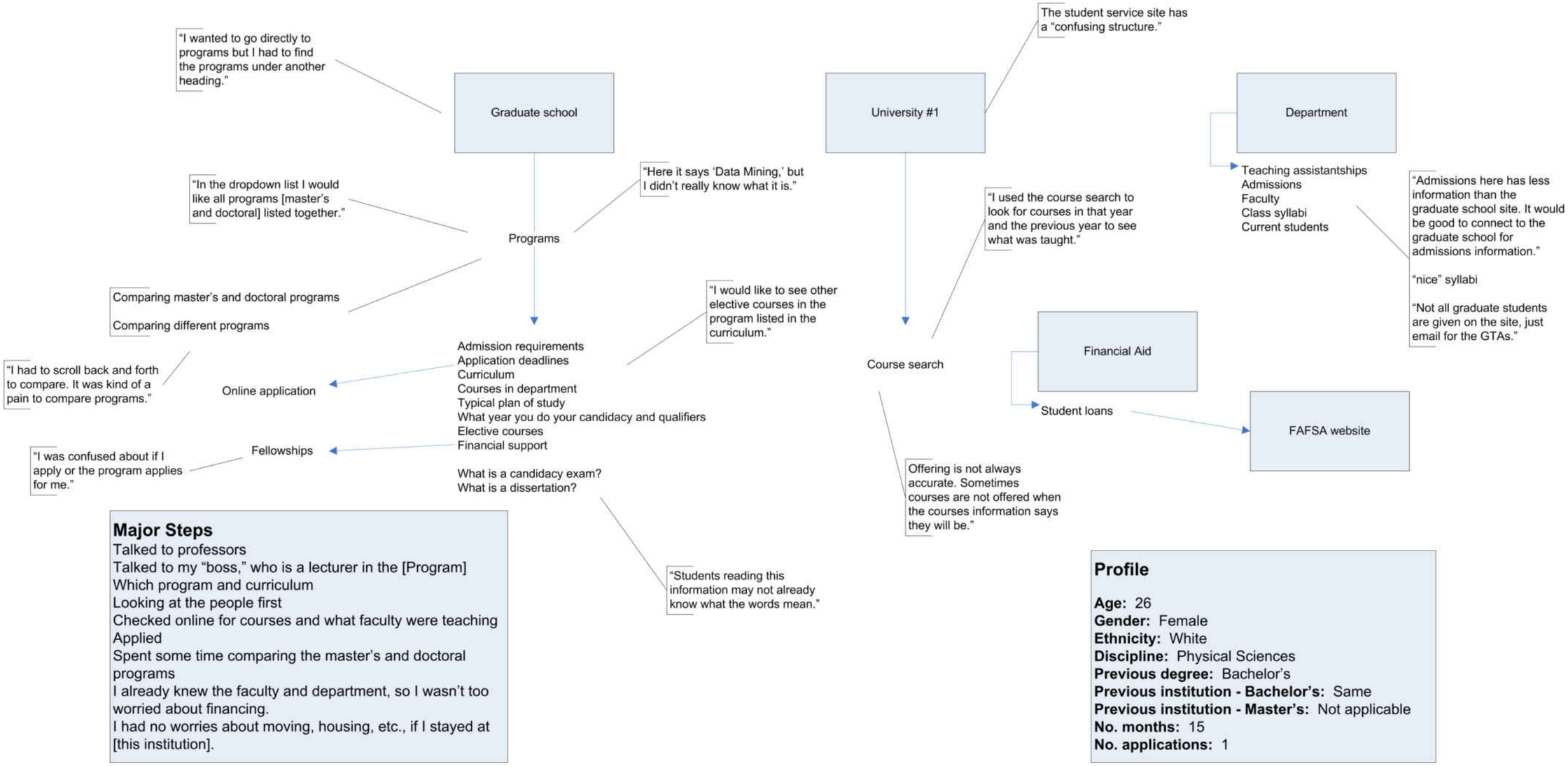


Figure 8. Interview 8: Recollection of Information-seeking Journey

Survey

Demographics

Review of demographics for the survey sample and the total population of doctoral students admitted in Fall 2007 shows similar profile characteristics (Table 12). This similarity allows more reliable application of findings to the overall population and Web design to serve the larger group. Regarding the generation based on birth year, the sample and overall population are both predominately Generation X (birth year 1965-1982), with the next largest group being Net Generation (birth year 1983-1991). Another observation is that more than half of the doctoral students are in disciplines (i.e., Engineering, Life Sciences, Physical Sciences) in which highly organized research groups are required to sustain graduate study. In addition, over 30 percent of the doctoral students are coming to the university from outside the United States (from abroad) or from outside the state of Florida. Only 15-20 percent of the new doctoral students are coming to the university from another central Florida institution or continuing from a bachelor's or master's program at the university. About 70-80 percent of the students have financial support in the form of fellowships and/or assistantships, which indicates that they are full-time students but also faced the challenges of researching and understanding financial support mechanisms at the university and preparing themselves for these experiences in the first semester.

Table 12. Comparison of Survey Sample with Total Population

Demographics	Survey Sample n (%)	Total Population n (%)
Generation Based on Birth Year		
Matures 1900-1946	0 (0%)	0 (0%)
Baby Boomers 1947-1964	13 (18%)	20 (9%)
Generation X 1965-1982	46 (62%)	123 (58%)
Net Generation 1983-1991	15 (20%)	70 (33%)
Gender		
Female	35 (48%)	92 (43%)
Male	38 (52%)	121 (57%)
Ethnicity		
Asian	19 (24%)	71 (33%)
Black	6 (8%)	15 (7%)
Hispanic	3 (4%)	11 (5%)
Not specified	2 (3%)	4 (1%)
White	48 (61%)	112 (52%)
Previous Institution		
UCF	11 (15%)	27 (13%)
In central Florida but not UCF	6 (8%)	5 (2%)
In state of Florida but not in central Florida	10 (13%)	28 (13%)
Outside state of Florida but in the United States	28 (38%)	75 (35%)
Outside the United States (Abroad)	25 (34%)	78 (37%)
Discipline of Doctoral Program		
Business	2 (3%)	8 (4%)
Education	18 (23%)	31 (14%)
Engineering	17 (22%)	44 (20%)
English	2 (3%)	4 (2%)
Life Sciences	7 (9%)	23 (11%)
Nursing	9 (11%)	12 (6%)
Physical Sciences	16 (20%)	60 (28%)
Psychology	4 (5%)	17 (8%)
Public Affairs	1 (1%)	6 (3%)
Social Sciences	2 (3%)	8 (4%)
Fellowship and/or Assistantship	55 (70%)	173 (81%)

General Computer and Web Use

Responses show that students have considerable years of experience in using a computer (Figure 9). The average hours they use a computer per week is about 46 hours, with the lowest use around 20 hours per week and the highest use more than 100 hours per week (Figure 10). Results are similar to those collected from the interviews (Table 3). As graduate students, they show increased activity in using a computer for research, publication, and study (e.g., presentations, spreadsheets, library research, word processing, and classroom work).

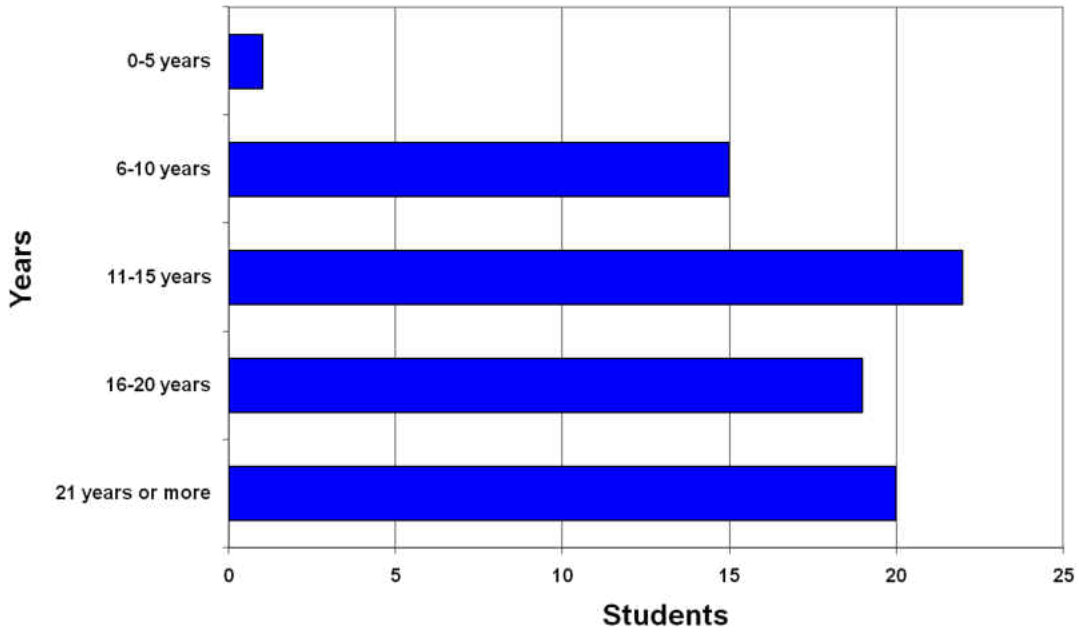


Figure 9. Survey Responses: Length of Time Using a Computer

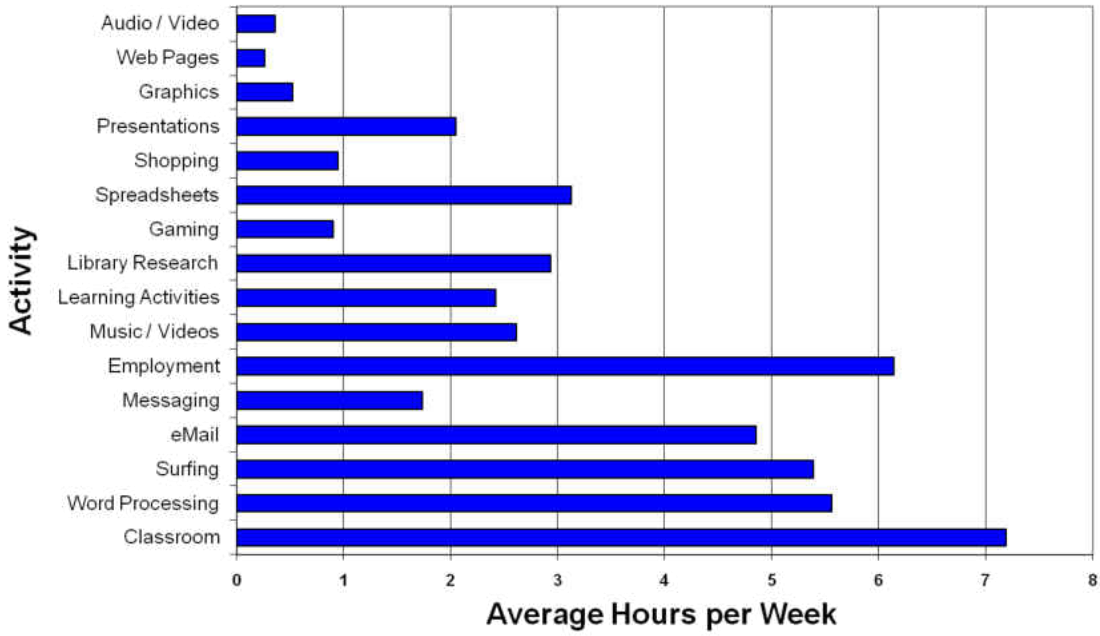


Figure 10. Survey Responses: Hours Spent Per Week on Computer-related Activities

Survey responses indicate that students rely heavily on searching to locate both Web sites and information on Web sites (Figure 11). Google, and similar general search sites, are used very often in students' information-seeking journeys. Following searching, the next most used Internet option is following links on Web pages to explore specific sites and construct an overall understanding of site organization and to pursue links of interest to the student. To remember specific journeying, students save Web information to their computers, print selections, and bookmark specific locations in their Favorites. Interesting observations are that help and social options such as blogs and instant messenger are not used very much. As expressed in both the focus group and interviews, students appear to spend most of their time moving through Web space rather than spending time at any one

location. As they move, they gather bits of information that they assemble into their version of the "answer" to their pursuits.

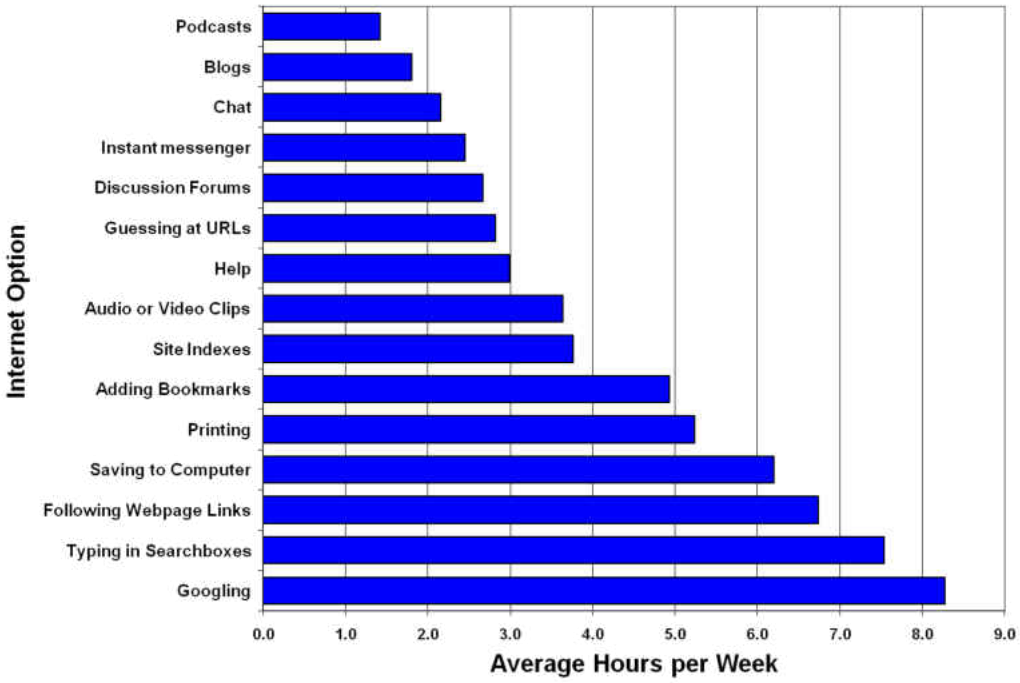


Figure 11. Survey Responses: Use of Internet Options

The survey included several open-ended questions to give students an opportunity to share their thoughts on aspects of information seeking on the Web. These questions provide valuable glimpses inside the thoughts of students during information seeking and self-reported observations on preferences and practices. Describing their "typical approach" to using a Web site for the first time, students used search to find Web sites and then to locate information within them, clicked links that interested them, and browsed or scanned the initial page and subsequent pages to find the information they were seeking (Table 13). During this information seeking they practiced caution in several ways, for example, checking the sponsor of the site or the domain name, ascertaining the currency of the

information, relying on protection software to advise of "safe" sites, and determining if the site promoted a marketing or advertising message. The general approach included looking for the "big picture" on entering a Web site to determine the general layout and organization, navigation controls, and topics or links that seemed relevant or promising.

Regarding the presentation of the content and site components, students generally preferred a well organized, easy-to-use site with limited graphics and special design features such as interactivity and overly robust or "busy" options (Table 14). Students preferred simple, intuitive organization with readily understood, easy-to-use navigation. Also, they wanted visual presentation that allowed quick, effortless discernment of the organizational structure of the site and how to use it. Other visual aspects of interest to students were the size of fonts and ability to adjust them for easy reading and the desire not to have too many choices or too much information displaying at any one time.

Determining what to read on a site is not an easy task (Table 15). With reliance on Google and other search sites to help find Web sites of interest, students sometimes make decisions about what sites to pursue based on what is said about those sites in the search sites. One student observed, "If it didn't look appealing through Google's written description, I wouldn't open the site." Once in a Web site they look for relevancy to their immediate need in the titles of tabs, sections, links, and other labeling on the site. Then they skim or scan to see if the site is appropriate for their information-seeking journey and browse the site by clicking on links and generally just looking around. They read very little, just phrases and a couple of sentences at a time, until they locate the specific target

information, at which time they read in more detail and may print, bookmark, copy or save content for future reference or to be sure they can find it again at a later date.

Responses show that students consider the visual appearance of a Web site to be important to them (Figure 12); however, they were neutral about photographs and other images on a Web site and observed that they were not strongly influenced by them in their decision making for a graduate program. Their preference for visual appearance, therefore, is more related to the overall organizational and navigational structure of the Web site and crucial to students finding the information they are seeking effectively.

Table 13. Survey Responses: Examples of Typical Approach to Using a Web Site for the First Time

Search
Utilize search engines if available
Use search options
Search for what I'm looking for
Google what I need to find
Click Links
Click on links of interest
Click on tabs of interest
Clicking on different links
Click on it
Click on relevant links
Explore links
Browse or Look Around
Look around and see if it pertains to my inquiry
Browse the site
Explore
Peruse the entire home page and search through the buttons to find what I'm interested in.
Review choices, menus, topics on home page. Pick a topic to further explore.
Practice Caution
Who sponsors the site
Currency of data
Glance at the domain name to see if it's .org or .gov or just .com
Have McAfee SiteAdvisor so if it has a warning on the site I don't go there.
First I'll check for a green light from the spyware and antivirus software.
Making sure it is not a marketing come on
General Approach
First I try to get the big picture, identify the most important aspects to me, then I open (generally in another window) those pages that I need or became interesting to me.
If a search feature is not available, I look for keywords that might link to my area of concern. I will often use a search engine such as Google or Yahoo to get to the Web page I am looking for initially.
The homepage is usually what I first view. Then I may access the links to additional pages that I am interested in. I often use a site index if I am search for something that is not listed on the initial page. I have also frequently used the search function or items I could not find.
Trying to understand the navigation system. Using the navigation system to get towards what I am interested in. Viewing the materials that I am interested in.
Look for navigation controls such as buttons, menus, etc. Then browse to wherever I want to go.
Explore the site by clicking on different links to see the organization of it.

Table 14. Survey Responses: Examples of Preferences for How Content Is Presented on a Web Site

Clear options with easy "go back" features
I prefer links to pages to be clearly visible on the left hand side or along the top of the page.
Graphics and easy navigation is a must. Too much text is a turn-off.
Larger font or option to increase font. "Search," "contact us," and "menu" of choices easy to find. I prefer professional "look" and verbiage. "Cute" and "slang" on a Web site is not preferred unless it is age appropriate for children.
Entertainment
Easy navigation is very important for me, and I think many people who are older. It needs to be simple to use and prompt.
In an organized manner with tabs. I also prefer a search bar in case I can't find what I'm looking for.
Less graphics, avoid redundancies
Easy to read, decent size of fonts, easy to navigate
Obvious, most needed items large and near the top
I would prefer content to be presented in an interesting way.
Make it easy to navigate, and easy to find the features and services offered. Limit the number of links required to reach the services. Provide useful information about what is offered, and where. If the site provides information, it should be meaningful and should avoid "fluff." Sources should be acknowledged.
Organized, simple, intuitive. Not too much graphics, not too interactive.
I like when the information is organized under tabs and subcategorized for convenience.
I like to see everything on the screen or available with pull-down boxes. I don't like to scroll down in order to select options.
I like things visually organized. I don't like a Web page to be busy or saturated with too much information. Drop down tabs that list what is located under the section are essential.
The most important aspect for me is that contents are presented in a very well organized way (related topics appearing together).

Table 15. Survey Responses: Examples of How Students Decide Whether or Not to Read a Web Site

Search
If it didn't look appealing through Google's written description, I wouldn't open the site.

Determine Relevancy
If it seemed relevant to me personally
Seeing if it pertained to my search. I usually read one or two paragraphs.
Does it apply to ME?
If the information was relevant to my search for information and would provide further guidance

Titles
I'd read the titles of the page to see if it was relevant to what I was looking for.
After glancing at the titles
Did the title say what I was looking for or seem important
The title or subject heading had to appeal to my interest
The titles

Skim, Scan, Browse, Read
Title first, then skim the information
I would skim a page to see if the first paragraph gave me what I was looking for. If it didn't, I'd quickly skim the rest of the page.
By scanning first
Scan the first couple of sentences
Read the information carefully
If the information was relevant to the program I was searching, I would read it in detail. I would also read info about students, faculty and research relative to the program I was researching.
I didn't read everything, only what I needed.

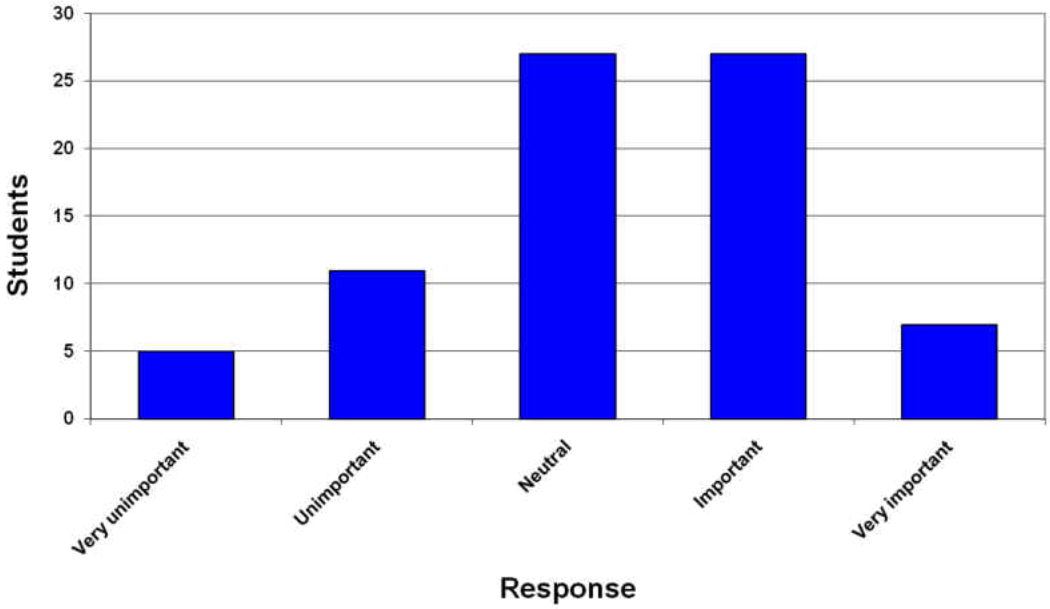


Figure 12. Survey Responses: Importance of the Visual Appearance of Web Sites during Information-seeking Journeys

General Information Seeking for a Graduate Program

Most students considered themselves knowledgeable or very knowledgeable about graduate school before they began their information seeking for a graduate program (Figure 13). Some, however, indicated that they were less knowledgeable and thus needed more social support or increased information-seeking time and effort in order to gather the details needed for decision making. Prior knowledge about graduate school arose predominately from interaction with Web sites; however, students also gained knowledge from talking with faculty advisers, talking with family and friends, and reviewing printed materials of various types (Figure 14).

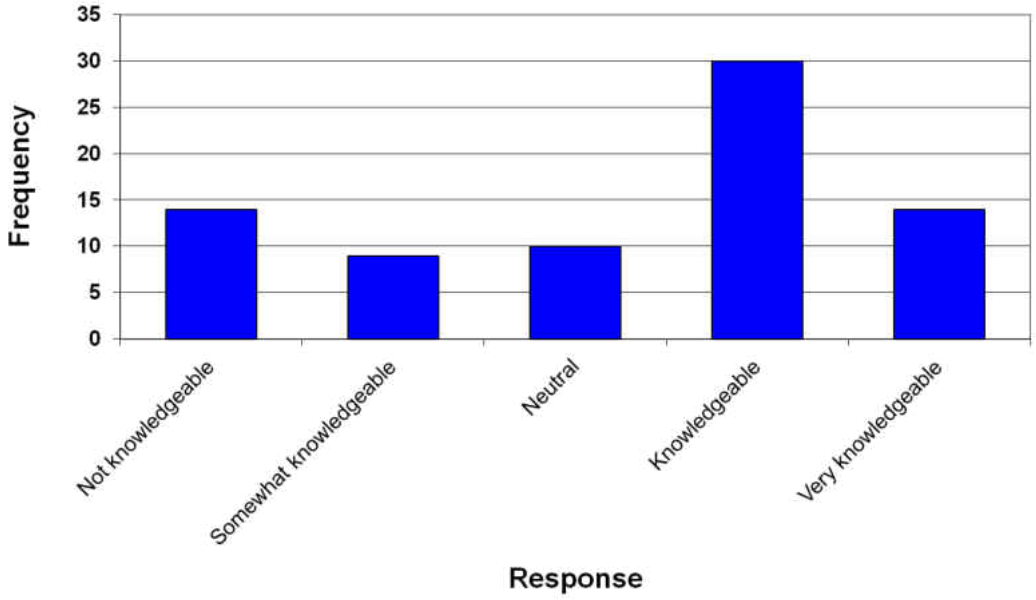


Figure 13. Survey Responses: Prior Knowledge of Graduate School

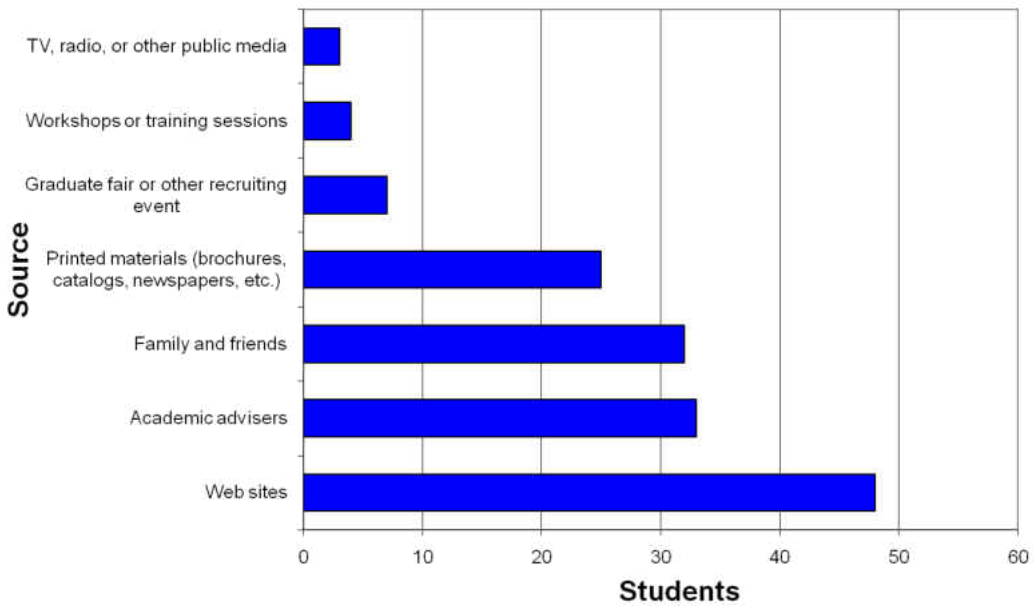


Figure 14. Survey Responses: Sources of Prior Knowledge of Graduate School

Some students indicated that they received significant social support during their information-seeking journeys (Figure 15). While students engage for many hours with Web sites during their information-seeking period of six months to two years or more, they seem to balance this engagement with non-Web interactions that complement, enhance, and confirm their Web findings. Web sites (i.e., graduate school, program, college, and research group Web sites) are indeed the major source of their information, but family and friends, faculty advisers, and students in the graduate program are also targets for information gathering (Table 16).

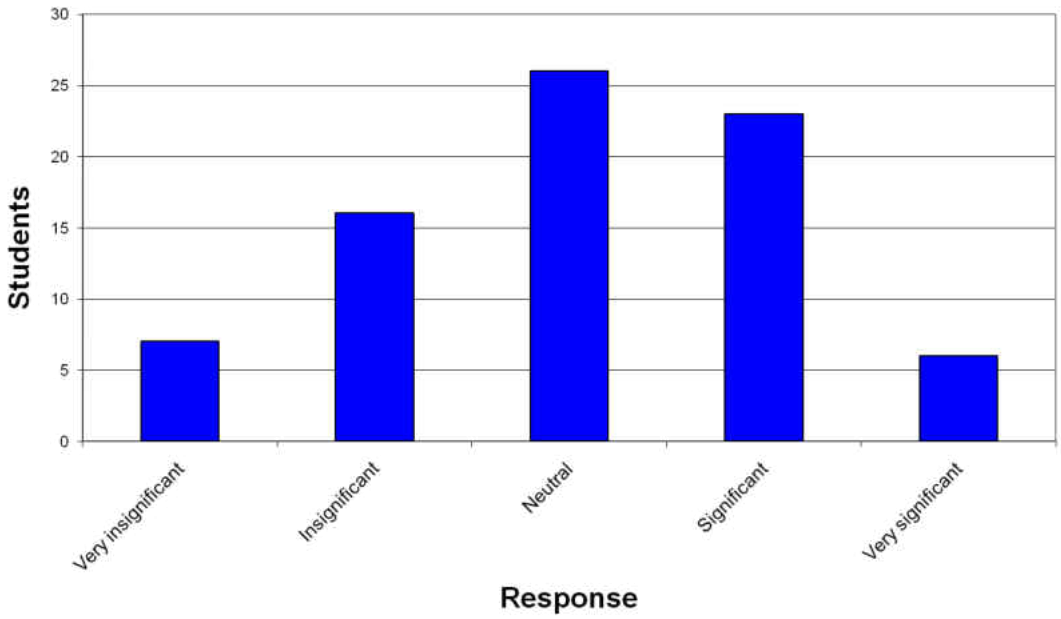


Figure 15. Survey Responses: Social Support for Information Seeking

Table 16. Survey Responses: Contributions of Sources to Overall Knowledge of Graduate School

Sources	No Contribution	Very Little Contribution	Some Contribution	Significant Contribution	Most Contribution	Average Rating
Family and friends	19 (24.7%)	9 (11.7%)	**24 (31.2%)**	17 (22.1%)	8 (10.4%)	2.82
Academic advisers	16 (21.3%)	7 (9.3%)	**26 (34.7%)**	17 (22.7%)	9 (12.0%)	2.95
Students in the graduate program	**24 (31.6%)**	12 (15.8%)	14 (18.4%)	19 (25.0%)	7 (9.2%)	2.64
Workshops or training sessions	**52 (69.3%)**	11 (14.7%)	8 (10.7%)	2 (2.7%)	2 (2.7%)	1.55
Graduate fair or other recruiting event	**53 (70.7%)**	11 (14.7%)	7 (9.3%)	2 (2.7%)	2 (2.7%)	1.52
University graduate school Web sites	2 (2.6%)	5 (6.5%)	19 (24.7%)	**34 (44.2%)**	17 (22.1%)	3.77
College Web sites	9 (11.8%)	9 (11.8%)	17 (22.4%)	**27 (35.5%)**	14 (18.4%)	3.37
Graduate program Web sites	4 (5.3%)	5 (6.6%)	17 (22.4%)	**31 (40.8%)**	19 (5.0%)	3.74
Research group Web sites	**36 (48.6%)**	11 (14.9%)	9 (12.2%)	8 (10.8%)	10 (13.5%)	2.26
Other Web sites	**39 (52.0%)**	11 (14.7%)	16 (21.3%)	6 (8.0%)	3 (4.0%)	1.97
Printed materials	**33 (46.5%)**	14 (19.7%)	15 (21.1%)	6 (8.5%)	3 (4.2%)	2.04

When asked to assess their ability to do information seeking, the majority of students responded that they were very capable or most capable (Table 17). No one assessed themselves as not capable, and only three students considered themselves somewhat capable. The average rating of their overall information-seeking experience is 3.56 on a scale of 1 to 5 (Table 18). For ten of the twelve statements, most students rated their experience as a 4.00. Two statements, the ones regarding the entertainment aspects of the information-seeking experience and the connection fostered through the information-seeking experience, were rated 3.00 by most students. Indeed, the emotional flux that students experienced during their information-seeking journeys may be an explanation for why the experience is less entertaining. The word "entertaining" may also have been a poor choice, as it reminds one of gaming, videos, music and similar pastimes and less of academic pursuits. The lower rating of the connection-building aspects of the information-seeking journey was anticipated, as there appear to be gaps in providing the inside stories about the people engaged in graduate study and research at the institution. A number of students noted this omission and the difficulties they had in filling the gaps and feeling confident in their decision making for a graduate program. Students did express their reliance on and confidence in academic Web sites for information, as well as their intent to continue to use them in the future. Overwhelmingly, students indicated they relied heavily on the Web during their information-seeking journeys for a graduate program (Figure 16).

Table 17. Survey Responses: Ability to Do Information Seeking

Abilities	Not Capable	Somewhat Capable	Capable	Very Capable	Most Capable
Find the information I want on the Internet.	0	3	6	33	32
Evaluate the information that I find on the Internet.	0	2	12	37	23
Choose the graduate program that is the best fit for me.	0	3	13	34	23
My overall success in finding a graduate program and school.	0	2	10	35	26

Table 18. Survey Responses: Overall Rating of Information-Seeking Experience

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average Rating
I felt stimulated when information seeking for a graduate school.	3 (4.2%)	9 12.5%)	20 (27.8%)	**32 (44.4%)**	8 (11.1%)	3.46
I felt entertained when information seeking for a graduate school.	11 (15.3%)	19 (26.4%)	**25 (34.7%)**	12 (16.7%)	5 (6.9%)	2.74
I felt connected to the academic institutions whose Web sites I used.	7 (9.6%)	6 (8.2%)	**28 (38.4%)**	25 (34.2%)	7 (9.6%)	3.26
I felt excited when information seeking for a graduate school.	2 (2.7%)	9 (12.3%)	18 (24.7%)	**31 (42.5%)**	13 (17.8%)	3.60
The graduate academic Web sites gave me satisfaction.	6 (8.2%)	6 (8.2%)	24 (32.9%)	**32 (43.8%)**	5 (6.8%)	3.33
I could rely on the graduate academic Web sites.	2 (2.8%)	1 (1.4%)	8 (11.1%)	**42 (58.3%)**	19 (26.4%)	4.04
I would miss the graduate academic Web sites if they had not been available.	2 (2.7%)	1 (1.4%)	15 (20.5%)	**28 (38.4%)**	27 (37.0%)	4.05
The academic Web sites gave me greater confidence in my academic program and the university.	3 (4.2%)	5 (6.9%)	23 (31.9%)	**31 (43.1%)**	10 (13.9%)	3.56
I enjoyed information seeking for a graduate school.	5 (6.8%)	2 (2.7%)	23 (31.5%)	**32 (43.8%)**	11 (15.1%)	3.58
I felt relaxed when information seeking for a graduate school.	3 (4.1%)	17 (23.3%)	22 (30.1%)	**27 (37.0%)**	4 (5.5%)	3.16
My information-seeking experience made me feel enthusiastic about graduate school.	3 (4.1%)	2 (2.7%)	23 (31.5%)	**35 (47.9%)**	10 (13.7%)	3.64
I will continue to use the graduate academic Web sites at my institution.	1 (1.4%)	1 (1.4%)	12 (16.4%)	**38 (52.1%)**	21 (28.8%)	4.05

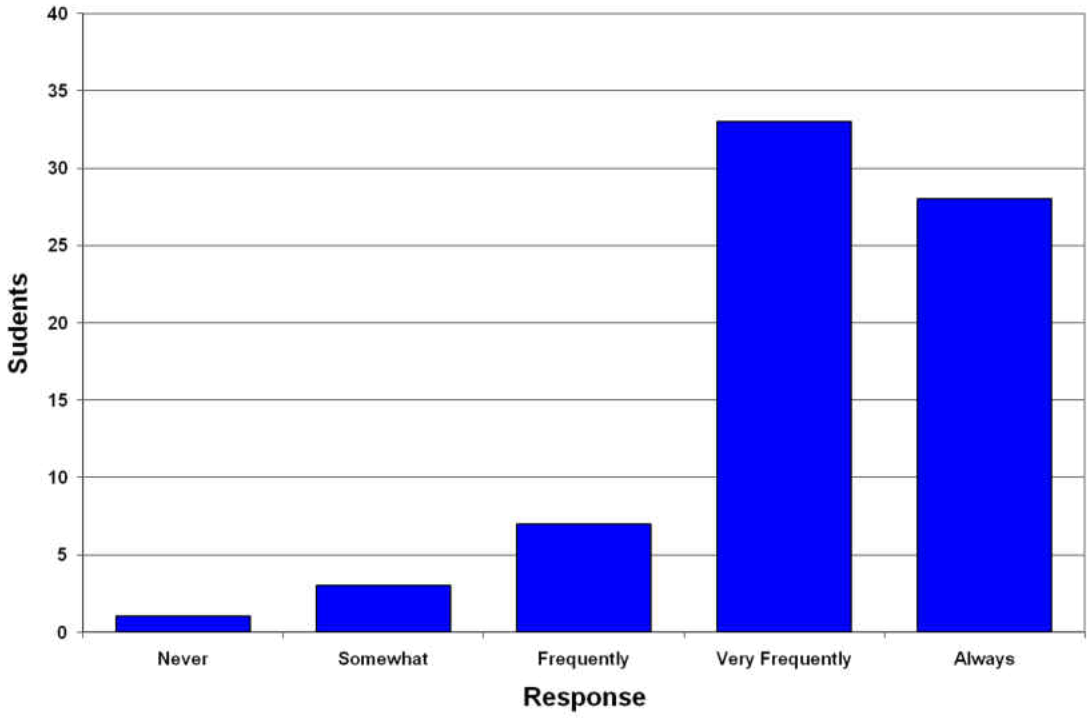


Figure 16. Survey Responses: Overall Reliance on the Web during Information Seeking

Specific Information Seeking for a Graduate Program

Responses indicate a wide range of start dates for students' information-seeking journeys, with most students beginning their seeking within one or two years of the admission term (Figure 17). Most students made decisions about where to apply about one year before the admission term and completed the admissions applications in October-December before the Fall admission term (Figure 18). The key application deadline of January 15 drives prospective students to apply October-December in order to compete for university financial support. The number of institutions that students researched also varied widely from one institution to more than twenty institutions (Figure 19).

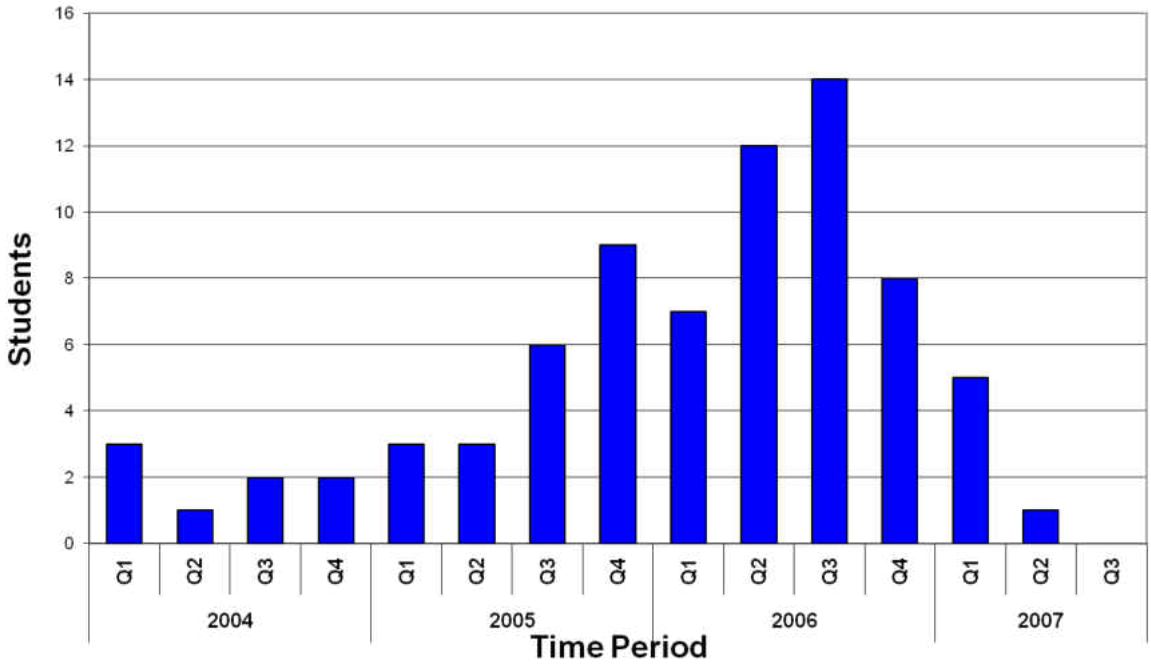


Figure 17. Survey Responses: Time Period in Which Students Began Their Information-seeking Journey

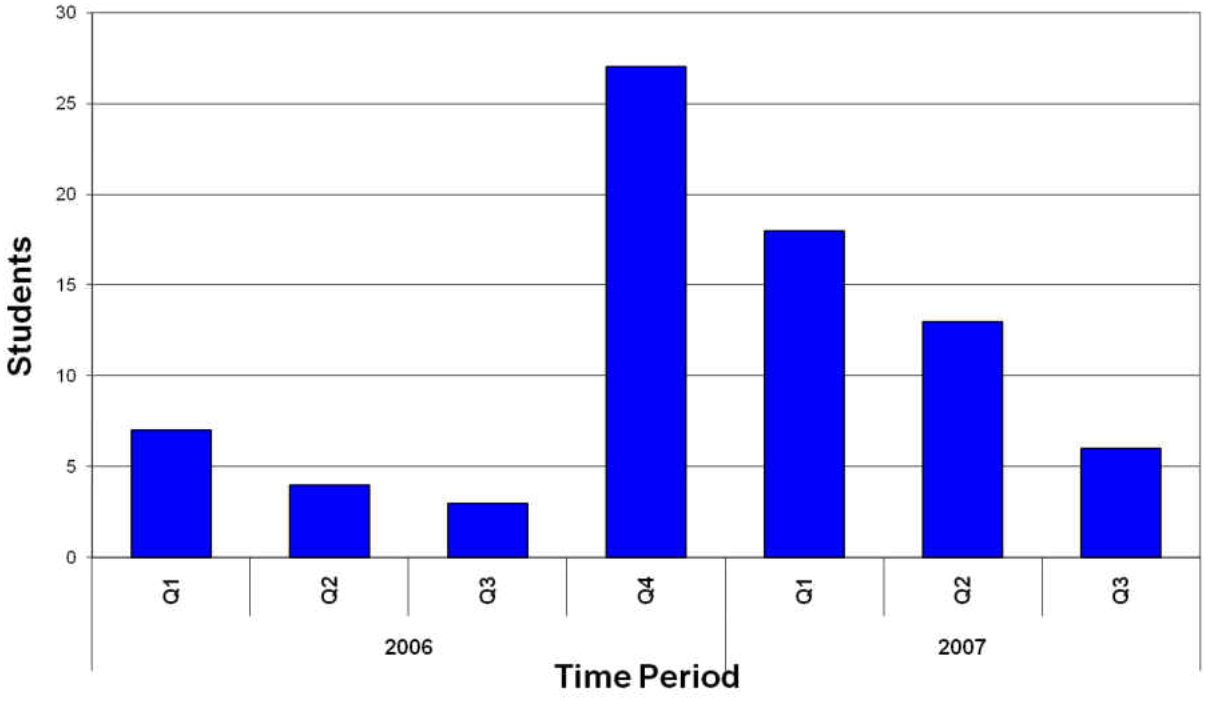


Figure 18. Survey Responses: Time Period in Which Students Applied for Admission

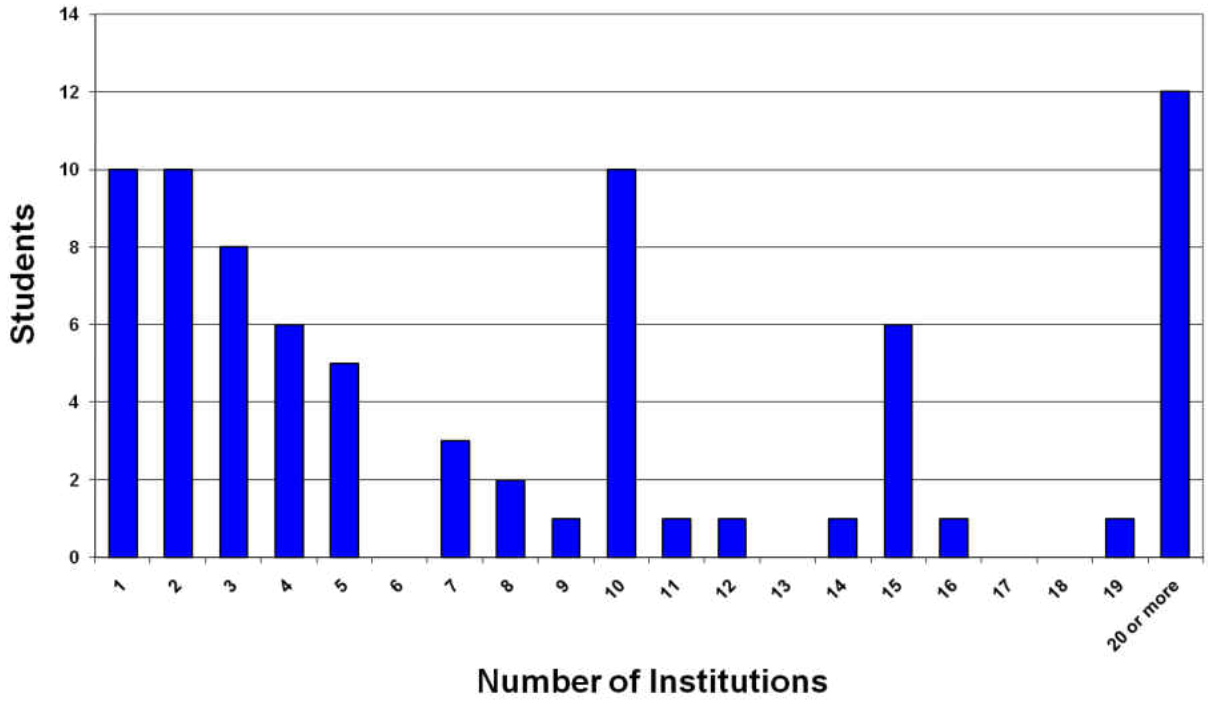


Figure 19. Survey Responses: Number of Institutions That Students Researched during Their Information-seeking Journeys

Several open-ended questions focused on gathering students' thoughts on their specific information-seeking experience. One question asked students to describe their emotional state during their information-seeking experience (Table 19). It was interesting that the same student would describe his or her emotional state as alternately positive and negative, for example, "excited" and "anxious," "excited" and "nervous, mildly frustrated." A number of students were in control of their information-seeking journey and described their emotional state only in positive words, for example, "comfortable," "excited, anticipatory, charged up, unstoppable," "excited, enlightened." A few students described their emotional state as more neutral, for example, "indifferent," "stable." Others, however, used only negative words to describe their emotional state, for example, "stressful," "very

anxious," "a mess," "desperation and despondency," "frustrated and overwhelmed." Students appeared to be aware of their emotions and the flux of these emotions during the information-seeking journey. The next question asked if they experienced any problems during their information-seeking journeys (Table 20). Responses cover a variety of issues, including vague, ambiguous, and outdated content, gaps in content, discrepancies or incongruence in information among university Web sites, ineffective searching, and difficulties in learning how and where to find information and how to use navigation options. In addition, students noted the lack of information about current students and difficulty in ascertaining what it is like being a graduate student in a specific program. They also noted the lack of support in filling in the gaps in Web information, for example, from staff who answered questions but did not answer them completely and faculty who did not respond to questions sent by e-mail.

The last two open-ended questions were more abstract in nature and, therefore, received fewer responses from students. Regarding how their imagination figured into the information-seeking journey, students related this question to visualizing themselves as graduate students in the program or institution, as well as visualizing their future experience in taking courses, conducting research, and interacting with other students and with faculty in the program (Table 21). They also imagined their life after completion of their doctoral degree, for example, "I pictured myself in the hat" and "I imagined I could make more money and find a job I liked." Others imagined what their graduate student life would be like based on the Web information they found about the program, for example, "I

compared Web sites honestly. I wondered what my treatment in the program would be based on the Web site." Regarding the unexpected things they encountered during their information-seeking journey (Table 22), students tended to interpret this question similarly to the one asking about problems encountered. Therefore, responses focus on negative issues, for example, "that it was so hard to find the information that I wanted," "the school is not as good as I thought," "pages were not updated," and "the lack of information on some programs' sites."Another group of responses focus on the difficulty in finding a program in a student's specific research interest, for example, "how few universities had what I was looking for" and "limited number of schools which were doing research in my area."

Table 19. Survey Responses: Examples of Words Used to Describe the Student's Emotional State during Information Seeking

Positive	Neutral	Negative
Analytical	Indifferent	Anxious
Anticipatory	Neutral	Apprehensive
Awesome	Normal	Cautious
Calm	Stable	Confused
Charged up		Desperation
Comfortable		Despondency
Confident		Frustrated
Eager		Lack of self-confidence
Enlightened		Overwhelmed
Excited		Stressful
Fine		
Focused		
Interested		
Persistent		
Practical		
Realistic		
Tranquil		
Unstoppable		

Table 20. Survey Responses: Examples of Problems Encountered during Information Seeking

Number of recommendation letters varied by program, even within the same department. Transcripts – should they be send/ordered/mailed?
I looked for and was unable to find advice on which undergraduate classes to take that could prepare me for my future program.
Would like to have seen typical stipends
Vagueness in program completion requirements
When needing specific questions answered, the Web was not useful.
Trying to link degree requirements, electives, prerequisites and course descriptions together is very difficult.
Current student thoughts about being a PhD student
Exact grades and GRE scores needed
The professors may or may not answer your email
Detailed curriculum by semester
It took a while for me to learn how to navigate where to look (academic, admissions, etc.) but my children helped me.
Sometimes Web pages were not updated.
Sometimes the information on certain school Web sites can be ambiguous.
Lots of unanswered emails, inaccurate answers and too many generalities sometimes
Sometimes there are discrepancies that one needs to send an email asking for clarification.
Not much detail given out when questions were asked. The staff know the programs and potentials better than they let on and could be more detailed in their responses.
I was in communication with two different people from the same graduate school and program when planning the college visit. Unfortunately, they gave me conflicting information through e-mail which caused some problems on the visit.
No minimum score for the GRE was posted on the program Web site. I call the university directly to see what score would make me competitive.
One school had an online application, and it was a nightmare navigating it. I had three separate logins for various aspects of the application. Plus, they didn't deal well with things that could not be provided electronically.
Searches did not always give me what I wanted or was looking for.
A lot of unanswered questions
Incongruent information between the graduate school and department Web sites
The application was tedious at times and it would have helped if I had someone to ask questions of.

Some people I emailed never emailed me back. Some sites were very confusing and had broken links or links which had no information attached.

Sometimes hard to find exact information you are looking for in a timely manner.

Hard to find contact information sometimes

Confusion in some poorly designed Web pages, and getting lost in all the pages that you open one after another.

Not listing those students who had graduated recently

The information on the Web site was often incomplete and followup materials had to be sent after the admission form was turned in

It's not always clear what kind of student they are really looking for and the culture of a department is not always readily apparent.

Some Web sites provide a lot of information about their faculty, students and programs. You could tell if a program had put effort into the Web site.

It was hard to find how many days a week one had to go to school. Being a working and full time parent, I needed to know how I could fit the program with my life.

The various schools offer multiple programs that sometimes are grouped together for a description. Understanding the specific requirements was often difficult. I was also frustrated with the financial aid piece, specifically in determining the cost of the programs.

Difficult to get an answer when you need to speak to someone. There should be someone to clarify concerns that is accessible.

Table 21. Survey Responses: Examples of How Imagination Came into Play during Information Seeking

PhD requires the development of new science, so I imagined how I could build on the research currently pursued in my graduate program
Imagined graduation day
I had to have imagination that I would actually get enough funding to go back to school before I had the nerve to start this process and risk major disappointment if I didn't get to go
Dreaming I would receive my PhD
I pictured myself in the hat
I could imagine myself attending the university as well as how I would feel after receiving my PhD
It helped me really think about what was needed to be a student again and the necessary lifestyle changes
I imagined I could make more money and find a job I liked
I had to imagine where a certain program might take me in the future
I imagined what it would be like to do research there
Imagining what life would be like at an institution
I could picture some of the course programs
I compared what I was seeing with my assumptions of what a doctoral program would be like
I compared Web sites honestly. I wondered what my treatment in the program would be based on the Web site.
My mind took me back to when I was younger and decided to continue higher education and was seeking a program for my master's degree
I was trying to imagine how research and courses were actually taking place, based on the brochures from the Web sites.

Table 22. Survey Responses: Examples of Surprises or Unexpected Things Encountered during Information Seeking

That it was so hard to find the information that I wanted
Some of them were under construction or very outdated
Number of programs available at my school
The school is not as good as I thought
Pages were not updated
The lack of information on some programs' sites
Some less known schools are such great places to go to
The details of doing a dissertation and taking qualifying exams were new to me
Sometimes couldn't log on to my application
Information was so readily available and this is a good thing
Not finding things where I expected them to be
How few universities had what I was looking for
A lot of paperwork for application
Limited number of schools which were doing research in my area
Sometimes the faculty was smaller than I expected
At how poor some Web sites were and how infrequently they were updated
That some schools did not have online application processes
How quickly frustrated I became when trying to find information

Information-seeking Profiles of Subgroups

Looking at some of the characteristics of subgroups based on the location of the student's previous institution reveals a few patterns and preferences of information seeking that can assist in defining profiles of subgroups (Table 23). Regarding birth year, students from outside the United States are younger than those in the other four subgroups. While Generation X (1965-1982) is dominant in all five subgroups, Baby Boomers (1947-1964) are strongly represented in two subgroups: (1) Outside the state of Florida but in the United States and (2) In the state of Florida but not in central Florida. The abroad subgroup focuses mostly in engineering, life sciences, and physical sciences disciplines, while other subgroups include such disciplines as Psychology, Education, and Nursing, among others. The most diverse disciplines are found in the UCF subgroup, most likely because the students are already here and therefore all programs are equally available for undergraduates to consider and these students generally consider one school and one program. Likewise, all subgroups show master's as the previous degree for most students except for the UCF subgroup, in which bachelor's is the most common previous degree. All subgroups other than UCF researched more than one school, with the abroad subgroup researching 20 schools or more and the other subgroups researching three or four schools. In all subgroups most students applied to just one program. The duration of students' information-seeking journeys range from 15 months for the abroad subgroup and 12 months for the UCF subgroup to 9 months for the out-of-state subgroup, 8 months for the in-state subgroup, and 11 months for the central Florida area subgroup. While Web sites was the number one

source of prior knowledge of graduate school for all subgroups, the out-of-state, in-state, and central Florida subgroups also noted printed materials as a top source of information about graduate school. Three subgroups, abroad, out-of-state, and UCF, received significant support during their information-seeking journeys, while the other two subgroups did not. Only two subgroups, abroad and UCF, indicated that academic advisers contributed substantially to their overall knowledge about graduate school. The UCF subgroup also had the advantage of being able to talk in person with students in the graduate program. All subgroups assessed themselves as "very capable" of performing information seeking for a graduate school and program. The overall rating of the information-seeking experience is fairly similar among subgroups. Most members of the abroad subgroup "always" rely on the Web for information; for all other subgroups, most members "very frequently" rely on the Web for information. Internet options used are also fairly similar among subgroups; however, the abroad subgroup is the only one that indicated using audio or video clips, and three of the other subgroups indicated printing from the Web either "very often" or "frequently." "Googling" and "typing in the searchbox" were dominant options for all subgroups. For all subgroups, the visual appearance of a Web site is "important" or "very important"; however, all subgroups except one were "neutral" about the importance of photos and other images on Web sites. Reviewing the average rating of the overall information-seeking experience by individual statement and subgroup shows that all subgroups considered the information-seeking journey as less than entertaining, particularly for domestic respondents (Table 24). Likewise, domestic students felt less

"connected" to the academic institution through the Web than did the abroad subgroup. Juxtaposing the information-seeking steps of three Education students and three Engineering students shows the reliance on the Web throughout the journey (Table 25); however, in these selections the Engineering examples seem to rely more heavily on the Web than the Education examples.

Table 23. Survey Responses: Information-seeking Profiles of Subgroups, by Location of Previous Institution

Characteristics	Subgroup of Survey Respondents				
Location of Previous Institution	**Outside the United States (Abroad)**	**Outside the state of Florida but in the United States**	**In the state of Florida but not in central Florida**	**In central Florida but not UCF**	**UCF**
Number of Survey Responses	14	23	10	6	8
Generation Based on Birth Year	Generation X 1965-1982 (11) Net Generation 1983-1991 (3)	Generation X 1965-1982 (12) Baby Boomers 1947-1964 (6) Net Generation 1983-1991 (5)	Baby Boomers 1947-1964 (5) Generation X 1965-1982 (5)	Generation X 1965-1982 (4) Baby Boomers 1947-1964 (2)	Generation X 1965-1982 (5) Net Generation 1983-1991 (2) Baby Boomers 1947-1964 (1)
Discipline of Doctoral Program	Business, Engineering, Life Sciences, Physical Sciences	Education, Engineering, Life Sciences, Psychology	Education, Nursing	Education, Engineering, Nursing	Education, Engineering, Life Sciences, Physical Sciences, Psychology
Previously Earned Degree	Master's (10) Bachelor's (4)	Master's (17) Bachelor's (6)	Master's (9) Bachelor's (1)	Master's (6)	Bachelor's (7) Master's (1)
Number of Graduate Schools (Institutions) Researched	20 or more schools (5)	3 schools (5)	3 schools (3)	4 schools (3)	1 school (3)
Number of Graduate Programs Applied to for Admission	1 program (6)	1 program (13)	1 program (8)	1 program (5)	1 program (6)
Time Period in Which Most Students Began Their Information-seeking Journey	April-June 2006	October-December 2005	April-June 2007	January-March 2007	October-December 2006
Time Period in Which Most Students Applied for Admission	October-December 2006	October-December 2006	April-June 2007	January-March 2007	October-December 2006
Average Duration of Information-seeking Journey	15 months	9 months	8 months	11 months	12 months
Prior Knowledge of Graduate School	Knowledgeable (9) Very knowledgeable (2) Not knowledgeable (2) Neutral (1)	Knowledgeable (10) Not knowledgeable (7) Neutral (3) Very knowledgeable (2)	Knowledgeable (5) Very knowledgeable (4) Somewhat knowledgeable (1)	Knowledgeable (2) Not knowledgeable (2) Very knowledgeable (1) Somewhat knowledgeable (1)	Not knowledgeable (3) Somewhat knowledgeable (2) Knowledgeable (2) Neutral (1)
Top Sources of Prior Knowledge of Graduate School	Web sites Family and friends Academic advisers	Web sites Academic advisers Family and friends Printed materials	Web sites Family and friends Printed materials	Web sites Printed materials	Web sites Academic advisers Family and friends
Social Support for Information Seeking	Significant	Significant (8) Neutral (8) Insignificant (7)	Neutral	Neutral (3) Very insignificant (2)	Significant (3) Insignificant (2)
Contributions of Sources to Overall Knowledge of Graduate School	Graduate program Web sites University graduate school Web sites Academic advisers Research group Web sites College Web sites	University graduate school Web sites Graduate program Web sites College Web sites Family and friends	Graduate program Web sites College Web sites	College Web sites University graduate school Web sites Graduate program Web sites	Academic advisers University graduate school Web sites Graduate program Web sites Students in the graduate program
Ability to Do Information Seeking	Very capable	Very capable	Very capable	Very capable	Very capable
Overall Rating of Information-seeking Experience (1=Strongly Disagree and 5=Strongly Agree)	3.65	3.38	3.87	3.62	3.44
Overall Reliance on the Web during Information Seeking	Always (8)	Very frequently (11)	Very frequently (6)	Very frequently (4)	Very frequently (5)
Internet Options Used Very Often and Frequently	Googling Typing in the searchbox Following links on the Web pages Saving to my computer Audio or video clips	Googling Typing in the searchbox Printing Following links on the Web pages Saving to my computer	Googling Typing in the searchbox Printing Saving to my computer Adding bookmarks to Favorites Following links on the Web pages Site indexes	Googling Following links on the Web pages Typing in the searchbox Adding bookmarks to Favorites	Googling Typing in the searchbox Printing Saving to my computer
Importance of Web site's Visual Appearance	Very important	Important	Important	Important	Important
Importance of Photos and Other Images on Web sites	Neutral	Neutral	Important	Neutral	Neutral

Table 24. Survey Responses: Average Rating of Overall Information-seeking Experience, by Location of Previous Institution Subgroups

Statements *Scale of 1 to 5, with 1 being Strongly Disagree and 5 being Strongly Agree*	**Outside the United States (Abroad)**	**Out of State**	**In Florida but not in Central Florida**	**In Central Florida but not UCF**	**UCF**
I felt stimulated when information seeking for a graduate school.	3.64	3.35	3.80	3.83	3.29
I felt entertained when information seeking for a graduate school.	3.14	2.14	2.60	2.50	2.25
I felt excited when information seeking for a graduate school.	3.71	3.39	4.00	4.00	3.50
I enjoyed information seeking for a graduate school.	3.64	3.26	4.10	3.50	3.50
I felt relaxed when information seeking for a graduate school.	3.57	3.00	3.10	2.83	3.00
Average Rating of Emotional Level	**3.54**	**3.03**	**3.52**	**3.33**	**3.11**
I felt connected to the academic institutions whose Web sites I used.	3.57	3.04	3.50	2.83	3.13
My information-seeking experience made me feel enthusiastic about graduate school.	3.71	3.65	4.20	3.50	3.50
Average Rating of Transition to Graduate	**3.64**	**3.35**	**3.85**	**3.16**	**3.31**
The graduate academic Web sites gave me satisfaction.	3.36	3.13	3.70	3.67	3.38
I could rely on the graduate academic Web sites.	3.93	3.96	4.30	3.67	4.13
The academic Web sites gave me greater confidence in my academic program and the university.	3.50	3.39	4.30	4.00	3.75
I would miss the graduate academic Web sites if they had not been available.	4.00	4.13	4.40	4.67	3.88
I will continue to use the graduate academic Web sites at my institution.	4.07	4.13	4.40	4.50	4.00
Average Rating of Academic Web Sites	**3.77**	**3.75**	**4.22**	**4.10**	**3.83**

Table 25. Survey Responses: Examples of Reliance on Web during Information Seeking, by Education and Engineering Students

STEP	EDUCATION 1	EDUCATION 2	EDUCATION 3	ENGINEERING 1	ENGINEERING 2	ENGINEERING 3
1	Web Thought about going	Web Read about program in a flyer	Deciding to continue my education	Formulate my research interest	Web Surfing top universities	Web Find out the program
2	Decided not to go	Discussed with husband and family	Web Web searches for schools and programs	Web Search the Web for grad schools	Web Contacting professor	Web Search the Web site
3	Web Thought about going and where	Talked to advisor via email, phone, and in person	Web Searching for financial assistance	Discuss with my family	Web Seeking scholarship opportunity	Web Find a suitable university
4	Web Looked at two schools	Web Looked at other nearby grad schools	Web Narrowing down the school search	Discuss with my boss	Web Establishing communication with potential advisor	Web Find the requirements
5	Web Looked at price	Web Applied for admission	Talk to others in the program	Web Select 10 grad schools	Web Exploring possible ways of funding	Web Email to get more information
6	Determined my financial ability to pay	Web Studied and took GRE	Talk to others who have completed a similar degree	Web Review interest of professors	Web Evaluating my chances of being accepted	Web Contact the coordinator of the program
7	Contacted professors	Web Submitted all materials online	Web Apply	Web Select final 6 grad schools	Web Deciding on the universities I am gonna apply to	Web Find out the professors you are interested in
8	Found out about cohort	Web Confirmed with an advisor receipt of application	Talk to family and friends for advice	Web Contact some professors about my interest	Web Filing applications	Web Contact the professors
9	Web Took GRE and applied for admission	Waited to hear about acceptance	Interview	Web Select final 4 grad schools	Web Taking the needed exams (TOEFL, GRE)	Decide to apply or not
10	Web Registered for classes			Web Apply to the 4 grad schools	Web Contacting my professors for recommendation letters	Web Finish the apply forms
11	Have not looked back			Select the first 2 schools to offer financial assistance	Sending the needed documents	Web Mail the apply forms
12	Hope to graduate					Web Wait for the result

DISCUSSION

No more than ten years ago, students looking for graduate programs did so through research in the library, letters sent by postal services, telephone conversations, and visits to campus. They sent inquiries to the program and waited for the reply; they attended graduate fairs in their local area to help them gather the details about graduate programs and institutions. They completed a paper admission application and mailed it in. Then, they waited for the admission decision to arrive. Today, students still look for graduate programs and go through the steps of collecting the information they need to choose the best graduate program for them; however, both students and environment have changed, as has the experience, which now relies heavily on the Web. I am reminded of the amazement expressed by Sven Birkerts in *The Gutenberg Elegies* that anyone could be oblivious to the changes happening everywhere from the influx of technologies into everyday life (1994 Preface 4-5). He describes colleagues as focused on the "here and now" and unaware of the "finely filamented electronic scrim" coming between them and the world (5). So, too, am I amazed when reviewing the results of this study focused on revealing Brown and Duguid's "fuzzy stuff" of social context surrounding the information-seeking practices of prospective doctoral students for a graduate program and observing the large influence of Web information seeking on the experience. Doctoral students who participated in my study rely on the Web as the primary source of prior knowledge of graduate education and graduate school, as well as the source most used to build that knowledge during the information-seeking journey for a graduate program and to prepare them for the start of their graduate

study. The eight maps of students' information-seeking journeys for a graduate program show how complex and wide-ranging these journeys are. However, in *Leaving the Ivory Tower*, Barbara Lovitts comments, "In sum, many graduate students appear to select and enter their graduate programs possessing too little information about the program and about the nature of graduate education and the graduate school experience" (2001 57-58). The questions arise then of what is going on in these journeys and how might graduate programs and schools rethink and redo Web support so that students get the information they need and enter their graduate program better prepared for what lies ahead.

This discussion of my study begins with "information," defined by Daniel Headrick in *When Information Came of Age* as "patterns of energy that humans can understand" (2000 3). As he explains, these patterns of energy can be almost anything, as long as humans can recognize and understand them and, therefore, reduce the "uncertainty" in the communication. He observes, "As society becomes more complex and its interactions speed up, access to information becomes increasingly important. . . . What matters is not knowing the answer but knowing where to look it up" (3). The environment of information seeking for a graduate program has indeed become quite speedy, and in order to succeed in this effort, students actively research the details they need and construct a personal text from the many artifacts encountered. While the overall information-seeking journey of most students in this study ranges from six months to more than two years, students seem to have high expectations for finding what they seek and low tolerance for Web information that does not meet their expectations. Their information-seeking experiences are charged with emotion,

depending on the specifics of the current Web engagement. At times, the intensity of their information-seeking journey overwhelms them to such an extent that they purposively disengage themselves, and then resume when they regain their balance. To choose the graduate program and school that would be the best fit for them, they look for information fabric from many sources at different moments in time to mash them together into the felt of their own making, which they then interpret and employ to remove the "uncertainty," or as much of it as possible, from their decision making. Based primarily on "evidence" found through the Web, the student develops a "feeling" for the people who make up the graduate program, social interactions within this group and research subgroups, and what it would be like to be a student in the program, all of which figure importantly in the student's decision making. This Web information-seeking journey also sets the stage for the start of the student's graduate study.

Body and Environment

Population Characteristics

Following the generation descriptions of Oblinger and Oblinger (2005), survey responses (n = 74) show the majority of participants to be Generation X (1965-82), with no representation of Matures (1900-1946) and equal representation of Baby Boomers (1947-64) and Net Generation ("Millenials," 1983-91). In the total population (n = 213), while Generation X (n = 123, 58%) still makes up the majority, Net Generation (n = 70, 33%) has the next largest representation, and Baby Boomers (n = 20, 9%) has a much smaller

representation. In the near future Baby Boomers will likely disappear from the total group and Net Generation will grow to represent the majority, with Generation X gradually shrinking. Fifty-four percent of the survey responses and 60 percent of the total population are from disciplines with highly organized research groups. In addition, the largest previous institution subgroups are from outside the United States (survey responses 38%, total population 37%) and from outside the state of Florida but inside the United States (survey responses 38%, total population 35%).

For interviews and survey responses, general computer and Internet use are similar. Most students in this study have more than fifteen years of computer experience with regular computer use of 20-100 hours per week in activities ranging from classroom and word processing to presentations and spreadsheets (Table 12, Figures 9-10). Internet options used most often are searching (#1 choice) and following links (#2 choice). Social functions such as blogging and instant messaging are not used very much. This may be due to the majority of responses being Generation X rather than Net Generation. Overall, it seems that these social functions are not used in the doctoral context as much as in the undergraduate context at this time; however, use of social functions will likely change as the makeup of the total group changes over time. Participants seemed to prefer well organized sites that are easy to use and have limited graphics and rich media features. Most participants preferred visual presentation of the site's structure that required limited reading and enabled intuitive understanding of how to use navigation and other elements. The nature of academic Web sites seems to lead students information seeking for a graduate program to expect less in

"experiential, social, and team (or group) engagements," as well as "media rich environments" that Oblinger and Oblinger note are preferences of Net Generation students (2005 2.4-2.7). Graduate program and school sites may be viewed as more serious, an assumption based most likely on what is currently presented on these sites. As these academic Web sites change, then likely the expectations of students using them will change as well. Also, most participants preferred not to have too many choices or too much information presented at any one time and exercised caution in a variety of ways before engaging in extended reading of Web sites. From the interviews, which provided more in-depth descriptions of students' information-seeking experiences, it seems that students spend most of their time moving through Web space, looking for the information that is most relevant to their personal needs. When making decisions of where to go and what to read, they described frequent reliance on Google and other search sites. They seem to do limited reading, and their reading rhythm appears to mimic their shallow and broad movement through Web space. These practices reflect those of "the digital information consumer" who seeks shallow and wide on the Web and who is more trusting of search engines and their results than other Web information found (Nicholas et al. 2006). Nicholas et al. explain consumers' untrusting behavior as due to the flatness of digital space and loss of the "physical form" of the text, which increases uncertainty (223-24). Brown and Duguid describe the digital context as "thin" due to reduced "cues and clues" (2002 2). Due to this flatness and thinness, people look for easy ways to evaluate the voluminous and varied texts available to them and use search functions and accompanying results lists to assist

them. While Nicholas et al. describe the retrieval practices of their study participants (the general public) as "fragile searching," due to their findings of 1.9 queries per session and 2.1 search words, interviewees in my study seem to have used more intense retrieval practices in the context of seeking a graduate program that exceed those described by Nicholas et al. (225). In addition, the cautiousness practiced is evidence of the tension that exists during the information-seeking journey as students look carefully at what they encounter and subvert it to their own purposes (de Certeau 1984). Given the somewhat broad range of ages (22 to 55) of the students surveyed and the probable variability of the computer monitors and systems used by different students, the emphasis on flexible choices in displaying content and preference for more moderate options and avoidance of overloading viewers with information is understandable. Nicholas et al. (2006) note how digital information consumers protect themselves from overload and prefer a strongly visual presentation of organizational structure. When reviewing Web sites and pages, students tend to look at only what is relevant to them and ignore the rest, exhibiting the "inattentional blindness," the blocking out of unneeded information, proposed by Davenport and Beck (2001 58-59). As Brown and Duguid remark, "When only information is on offer, more often means less" (2002 3). In other words, graduate programs and graduate schools must do more than just provide information on a Web site; they must not forget the context in which students conduct their information-seeking journey for a graduate program and the details that help them build the knowledge they need. In addition, the large scope task of information seeking for a graduate school and program itself may encourage the need for simplicity and

moderation due to the experience occurring across many engagements with a number of Web sites over several months to more than a year. The more time it takes for a student to assess how to use a particular Web site or to find relevant content, the more time it will take for the student to complete his or her overall information-seeking journey.

Participants of the focus group, interviews, and survey generally indicated that they had access to a computer with no limitations, sometimes to more than one computer. Even though they indicate no access issues and academic Web sites are public and have no security restrictions on their use, these Web sites do exclude those who do not own or have access to computers, reliable and sustained Internet connections, as well as computer knowledge. They are privileged texts for those who have the economic and social resources, as well as the political accommodation, to use them. The majority of participants were active in a higher education community throughout their information-seeking journey, which afforded them access to both Web and non-Web sources. In addition, as most U.S. academic Web sites are in English only, they exclude or cause additional effort for visitors who are non-English-speaking or for whom English is not their first language. All participants are in the privileged group of those who applied for graduate admission and were accepted.

According to Oblinger and Oblinger (2005), generation can be an indicator of certain Internet use and preferences; however, survey respondents, although they are clearly from different generations, do not seem to exhibit strong differences in Internet use and preferences, possibly because they have been using a computer for many years and have engaged in a wide variety of activities during that time, which have enabled development of

their overall computer and Internet skills and abilities. With their extended education and complementary computer experience, individual participants often break the generation bounds and exhibit practices and preferences of younger generation groups. In addition, for this particular information-seeking context, categorizing the participants by generation overlooks what may be more significant subgroup characteristics, such as discipline, previous institution, and university financial support (i.e., fellowship or assistantship).

Most students indicated strong confidence in their abilities to conduct information seeking for a graduate program (Table 17) and strong reliance on the Web during information seeking (Figure 16). While most students assessed their prior knowledge of graduate school to be knowledgeable or very knowledgeable (Figure 13), they also indicated that they developed this prior knowledge primarily through Web sites, with interactions with academic advisers and talking with family and friends as the next most used sources (Figure 14). Students believed themselves to have the abilities to information seek successfully and thus entered into the experience from a position of confidence and control (Table 17). Robert Kvavik notes the tendency of undergraduates to overrate their computer skills (chapter 7 in Oblinger and Oblinger 2005, 7.7). It may be that graduate students tend to do so as well; however, as shown earlier, these students have substantial years of computer experience, have engaged in research in previous undergraduate or graduate programs, and often times are employed in responsible positions that require intermediate or higher computer skills. Contrary to this is the fact that a number of doctoral students stop out and do not succeed in earning their degree due to various reasons, one of which is not

choosing a program that is the best fit for the student. Interestingly, if students believe that they have the knowledge, they are more likely to complete their doctoral study. Lovitts refers to this as "the illusion of knowing" (2001 77). Another observation is that since these students received admission offers and were currently enrolled, and some also received financial offers, they do not reflect the total group of information-seeking students, which would also have included those who did not receive admission offers or who received admission offers but chose to attend another institution. In addition, interview and survey responses indicate that, for many students, the information-seeking journey was accompanied by a flux of emotions, which may contradict self-assessment of their abilities and knowledge of graduate school.

Context

The total population of this study is a complex audience, and "hidden" details about this group allow filtering by key criteria to describe these contexts. In this section I describe some examples of specific contexts that are helpful in designing Web sites.

Previous Institution

The previous institution of students seems an important criteria for information seeking. For example, students in the Abroad subgroup are generally younger in age than the rest of the total group and primarily focused on graduate programs in Engineering, Life Sciences, and Physical Sciences disciplines, which all have highly organized research groups. Their responses show that they received significant social support in general and

also received guidance from academic advisers during their information-seeking journey. They "Always" relied on the Web during information seeking. Abroad students researched twenty or more schools, and their average information-seeking journey was 15 months, the longest duration of all previous institution subgroups. The longer journeys are most likely due to the complexities of going abroad to school and identifying schools and programs from the many that are available, as well as the reduced likelihood that these students will visit campuses and contact graduate programs by telephone. Regarding their Internet use, the Abroad subgroup is the only one that indicated using audio or video clips, and their overall rating of the information-seeking experience indicated that they felt more "connected" to the academic institution through the Web than did any of the domestic subgroups.

Previous Degree at Institution

For all previous institution subgroups except the UCF subgroup, students were more likely to have earned a master's degree prior to entering their doctoral program. These students had already bridged the gap between undergraduate and graduate education. Therefore, during information seeking they only needed to understand the differences between master's and doctoral. In contrast, students in the UCF subgroup, most of whom were entering their doctoral program from a bachelor's degree, had a larger challenge during information seeking. The UCF subgroup researched an average of one school (usually the same institution) and applied to an average of one program. Given the convenience of being currently enrolled in UCF and able to visit and talk with faculty and

staff in person, their average information-seeking journey still was 12 months, the second longest duration of all previous institution subgroups. The longer journeys are most likely due to the complacency of proximity for UCF undergraduates and less prior knowledge of graduate school. In addition, the undergraduates who participated in the focus group noted that undergraduate advisers are generally unhelpful and unreliable when it comes to advisement about graduate school. Lovitts' study of doctoral noncompleters describes similar inadequacies in undergraduate advising (2001 52). This subgroup did not indicate much reliance on printed materials, so the Web was the primary source and secondary sources included academic advisers, family, and friends. If the Web sites do not provide the additional information to bridge the knowledge gap for these students and if academic advisers do not provide the guidance needed to complement Web use, then these students most likely will have a more circuitous and confusing information-seeking experience.

Reliance on Printed Materials

While all participants indicated that they relied heavily on the Web for information about graduate school, students who were within the United States but not currently at UCF (out-of-state, in-state, and central Florida) were more likely to rely on printed materials as a source of information to complement what they found on the Web. These students are generally older than the Abroad and UCF subgroups, which helps explain why they might still rely on printed materials. In addition, the higher cost and delivery time of mailing materials Abroad as opposed to within the United States and the convenience of in-person pickup of materials by the UCF subgroup provide explanations for this difference.

Personal Narrative

This study looks for "the fuzzy stuff that lies around the edges—context, background, history, common knowledge, social resources" (Brown and Duguid 2002 1), specifically the practices situated in students' personal narrative of their information-seeking experiences. Understanding the pattern of their information seeking requires understanding their personal narrative, which defines the boundaries, influences, and goals and purposes of individual students, as well as the Web encounters and interpretations of found artifacts. Preserving the context of personal narrative provides the rich textuality needed to re-constitute journeying experiences, in hopes of discovering ways to support them through Web spaces. Within these personal narratives may be found layerings of social, cultural, and political practices and story, just as the Web spaces themselves exhibit. In this section I review a couple of examples of how personal narrative fits into the information-seeking journey for a graduate program.

First Thoughts of Graduate School

For both focus group and interview participants, first thoughts of attending graduate school arise in initial self-assessment and self-realization episodes that are tied to personal life experiences. For example, they may arise from planned and unplanned interactions with others, such as conversations with academic advisers or instructors and talks with family and friends for advice and to learn from their previous experiences. One focus group participant commented, "One of my professors asked me to stay after class, and he asked if I was interested in grad school. I was surprised by this, but it helped me begin to think about

it" (PF). This serendipitous experience led to the student seriously thinking about attending graduate school. When asked about first thoughts of graduate school, one interviewee shared that her aunt was a science teacher and had encouraged her (I6), while a focus group participant commented that her involvement in undergraduate research, as well as the experience of a family member with cancer, prompted her to consider graduate school (PE). As the latter example shows, first thoughts of graduate school may also emerge from specific experiences such as teaching or research, educational experiences, or observations of others engaged in graduate study or presenting about their work. These early thoughts of graduate school may also arise from self-assessment and contemplation of specific experiences. For example, another interviewee stated that his "internships weren't satisfying" and that "the best way to get more interesting work was to go to graduate school" (I5). For most of the interview participants, first thoughts occurred as early as high school or during undergraduate study. For students who leave their bachelor's degree for the working world or other pursuits, first thoughts may occur much later and may be related to such life experiences as considering a career change or increasing financial income. Another interviewee, age 38, already holding bachelor's and master's degrees, and with considerable work experience, stated, "I have a varied background and I thought a doctorate would augment my professional skills" (I1).

New Knowledge Making

During their information-seeking journeys, students are not only discovering what it means to be a graduate student in a doctoral program, but also learning how to information

seek. As they do this over the months of their journey, they are themselves changed by the experience through knowledge making and skills building (Brown and Duguid 2002 137-38). As part of this knowledge making, they begin to envision themselves as "doctoral students" and establish the connections with the graduate program that will be crucial to their future success. Thus, the enculturation of prospective students into doctoral education in a specific graduate program begins predominately through the Web and this ongoing socialization continues to be supported heavily through the Web throughout graduate study. Enculturation is the process of becoming an active member of the academic and social graduate program, referred to as "learning to be" (Brown and Duguid 2002 219) and "integration" (Lovitts 2001 83). The "human element" in academic Web sites is therefore of great importance in helping students make these connections, as evidenced by comments of focus group and interview participants.

Presence

While information seeking on the Web, the student's presence is invisible, unseen by the graduate programs and institutions. The anonymous student moves through the institution's Web space and selects the moments to reveal presence. In this sense, their movement and reading become subversive (de Certeau 1994). By "revealed presence" I mean the identification and assertion of self required in a communication from the student to the entity represented by the Web site. In effect, revealing presence is an ambitious punching through the Web interface or outside it to connect. Students may continue their subversive practices by making this connection anonymous. For some students, this first

moment of revealed presence may occur when requesting information through an online form. For others, this first moment of revealed presence may be the creation of an account to complete the online admission application. At the moment of first assertion of presence by the student, the graduate program and institution usually begin the attempt to build the relationship through e-mail communications initiated by an organized plan of recruitment and often pointing students to more Web information. Rarely is there an opportunity for students to connect socially with people (e.g., online chats, instant messaging) through academic Web sites. In another sense, the student's information seeking is secret reading, with the ulterior motive of ascertaining the "implied or actual presence" of the graduate program and institution by sifting through the details served up on the Web (Marvin 1988 89). Surprisingly, many of the participants in this study chose not to contact faculty or current students directly to gather details; instead, they seemed to prefer the distance (and "control") of Web information seeking or perceived Web engagement itself as "connecting" to the graduate program. Participants also were sensitive to "ambiguous presence" and acknowledged moments when they perceived possible manipulation or unintentional misrepresentation (95). It is important to remember, however, that students internalize information gathering as knowledge building, which contributes to the students' learning to be doctoral students and, ultimately, academic scholars, researchers, and teachers.

Another presence during the information-seeking journey is that of the graduate program. Production of Web content about the graduate program compromises the "authenticity" of the program while at the same time it extends the reach of the graduate

program beyond its normal existence and enables the program's presence to be depicted in a variety of Web contexts. Providing description of the graduate program on the Web "enables the original to meet the beholder halfway"; however, "its presence is always depreciated" (Walter Benjamin, "The Work of Art in an Age of Mechanical Reproduction"). While publishing the graduate program in various places on the Web does provide easy access for many people, it nevertheless requires the student to take the various bits of content gathered during Web reading and re-constitute them into the graduate program. This re-constituting process reminds me of Bolter's reading "the whole computer screen as a moving, evolving diagram" and Hayles's description of "the imagined world we create when we read" (2001 63; "Print Is Flat, Code Is Deep" 2004 86). A double loss is therefore introduced into the information-seeking journey: the loss of graduate program authenticity in the production of Web content and the loss resulting from the student's reassembling of the graduate program. This double loss helps explain the inadequacies encountered during the information-seeking journey for a graduate program, especially since the Web is the primary source of prior knowledge about graduate school and the information-seeking journey for a graduate program. These losses may also represent the inadequacies of academic Web sites available to students and the difficulties students have in arriving at global and local cognitive maps about graduate education and their selected graduate program that are reasonably close to the knowledge they need to have in order to begin their doctoral study. According to Lovitts, "Some evidence exists that indicates that first-year students do not have well-constructed global or local maps and that ill-structured maps

create obstacles that hinder students' progress through the system [graduate study]" (2001 45). As Johnson proposes in *Interface Culture*, rather than students "suspending belief" in the interface and the graduate program represented there, the relationship is really one of positive "belief" in what they see (1997 242). In other words, students for the most part accept what they see presented about the graduate program as "the real thing," even though it is a copy, as well as a fragmented or partial likeness. Removal of the graduate program from its original context, however, does encourage students to view the Web graduate program critically and question it (Benjamin "The Work of Art in an Age of Mechanical Reproduction"). This is not a bad thing, only an artifact of the reproduction of the graduate program in the Web and the inevitable losses that accompany this mechanical process.

Web Structures

Students information seeking on the Web delight in the "exact correspondence" of the large, diverse mass of information it presents, the analytical organization of that information into texts, and the seemingly unlimited choices available for traversing the text (Ong 1982 147). A high-level view of the text reveals the chunking of information, numerous compartments and divisions denoted on each Web page, and the strong mix of both words and images, as well as words as images and images as words. The Web page becomes the dominant borders of society's view of the graduate program, following the conventions of the printed page. The Web page boundaries encourage reduction and manipulation of information in order to balance the information provided with the number of choices presented. This means there are fewer and shorter passages of words, increased use of

illustrations, increased lists, increased labeling and brief descriptive and explanatory text, and frequent use of familiar icons or site-specific icons. The complex presentation and organizational structures place great demands on the student to recognize or discover meaning and relationships among the text segments and are representative of the "deep interiorization of print" and emphasis on "control of position" (Ong 101, 121). A consumer-oriented text, the Web attempts to sell the student on the graduate experience (Ong 122; Davenport and Beck 2001). Academic Web sites covet the student's attention, and the student takes on the characteristics of "digital information consumer" and "prosumer" in this context (Nicholas et al. 2006; Tapscott and Williams 2006).

The student visitor participates with the unknown masses of other visitors to the Web site and attempts to feel part of the "graduate" group, that of the graduate program, school, and country. This involvement of the individual with the group is fictional, yet is a felt association and recorded as part of the student visitor's experience. The experience is indirect and distant, removed from the senses yet sensual, full of stimulation yet devoid of texture. The student interacts with a portion or part and lacks the vision of the invisible whole, except as a mental model constructed over time. The student interacts with a reduced, manipulated representation rather than with the original, all the while interpreting the experience as "new" and "original" (Ong 1982; Benjamin "The Work of Art"). The student seems to suspend willingly the ability to see the text as tightly controlled and instead opts to see it as offering freedom, control, and pleasure. Of secondary orality Ong observes, "We plan our happenings carefully to be sure that they are thoroughly

spontaneous" (137). In other words, much time and effort is invested in the development and production of the underlying code and technical complexities that make it possible to conjure up a Web page in the interface and enable the seemingly magical clicking to move about in virtual space.

Web sites, whether hosted by the graduate school, graduate program, or research group, serve as a plan for potential experience, defined by the institution's representatives, pre-recorded in the components of the Web site, re-constituted into real experience by the student's use of the Web technology, and then internalized as the student's memory. In this way, the student serves as a receiver of an approved interpretation of the topic provided by the institution's administration in collaboration with the teams of experts that produce the Web sites. However predetermined it might be, the Web experience of each student visitor is still personal and highly variable. Whether accessed by laptop or desktop, from the office or home, during the day or night, the experience resonates within the body and transforms a visually dominant experience into one felt and absorbed by the body. Depending on how one views it, this mediation can be seen as connecting the student with the graduate program or enhancing the experience; or, it might be viewed as separating or blocking the direct experience of the visitor with the graduate program. In this sense, the graduate program Web site may simultaneously clarify and distort the student's perspective of the graduate program because of the inclusion of certain information and the exclusion of other information on the Web site, as well as the student's choices in determining what to experience and what not to experience.

Relationship with Web Technology

Study results show that most participants relied heavily on the Web for prior knowledge about graduate school and throughout the information-seeking journey for a graduate program. This places a large burden on graduate programs and schools to provide Web sites that can support students; likewise, this places a large burden on students to know how to information seek and construct knowledge effectively through this seeking, based on their information fluency. During information-seeking engagements, students are situated in the "here and now" of their own social space but playing the game of envisioning the "not there" or timeless time and space of Web description of a graduate program, with their ultimate goal of projecting themselves "there" in the future time and space. Their approach to this information-seeking journey seems not much different from how they go about using the Web for other purposes. This is indicative of the convergence of entertainment, education, and other areas in the Web, as well as the "digital information consumer" described by Nicholas et al. (2006) and the "embodied agency" by Hansen (2006 11, 13). The merging of the student with the technology used for the information-seeking experience yields the "coupling" and "being-with" and "enactive cobelonging" described by Hansen (20). Much has been written about the personification of the computer interface and the seeking of the "human element" mentioned by participants. The imagination of the student plays an important role in interpretation of the Web information encountered. Some participants mentioned having difficulty in imagining the person or persona presented in

the Web page. Students are looking for the details that will help them ascertain what it is like to be there, in that graduate program.

Participants seemed well aware of their ability to exercise power and control over the information-seeking experience through organizing their search and choosing what to pursue, as well as managing engagement and disengagement. At times, however, they may overrate their own abilities and find themselves in a less than satisfying engagement, which they then must mediate to regain their control. Both focus group participants and interviewees remarked that they disengaged when the experience became too much for them to handle or they moved away from a Web site that evoked negative experience (e.g., dissatisfaction, distrust). Likewise, they were also well aware of moments or situations when the power and control shifted toward the graduate program and institution, when what was sought was not present or what was delivered inadequately met expectations or was viewed by students as too promotional. Focus group and interview participants and survey responses indicate strong reliance on search engines such as Google to identify Web sites; this practice not only finds Web sites but also excludes others due to the functioning of the search engine and the descriptions provided there, as well as the student's interpretations of this display. Ultimately, the body is the filter through which students experience information seeking for a graduate program; it shapes the experience as it is reshaped through the same (Hansen 2006 13; Marvin 1988 109-13). Bodily space and influence extend beyond the body's physical boundaries to encompass the surrounding immediate environment, as well as the virtual. To the Web experience, the body brings

along its memories, values, feelings, as well as social, cultural, and other codes inscribed upon it, all of which affect the Web experience. Likewise, the body's experience is affected by the academic Web site, which is deliberately and socially constructed through interactions among the institution's people and reflects certain values, beliefs, and cultural and social practices (Kress and Van Leeuwen 2001 63). The student alternates between the active seeking of "digital information consumer" and "prosumer" (Nicholas et al. 2006; Tapscott and Williams 2006) and at times a less active seeking or passive receiving, based on the immediate experience. As a result, a good deal of flux exists in the information-seeking experience, which introduces another level of uncertainty for the student to address.

Movement

Web sites are based on the premise that the visitor is using the technology while moving through virtual space, usually at his or her own pace. This visitor movement is determined partially by the architectural structure and the plan provided to the visitor by the institution's administration through the Web site performance itself. The importance of the visitor's pleasure-seeking goal, as it reveals itself in choices made based on curiosity and personal interests, also assists in determining movement through Web space. The Web site visitor functions within a personal social space, while at the same time maintaining the institutional social space as well as possible other social spaces, if multitasking. Since educational institution sites rarely require a login, Web site information seeking is secret in the sense that no one else is generally aware of the specific object the student is currently

engaged in exploring. Web information seeking may be characterized as exploring elsewhere because it is focused on objects outside the current social experience and tied instead to institutionally approved Web content as well as Web content of other entities outside the academic institution, such as Google, various commercial sites designed to assist students as well as market products, and publication sites like *USA Today* and *US News & World Report*, all of which are also presented out of their socio-cultural context. Indeed, the main purpose of graduate program Web sites is to help the visitor re-situate the graduate program in its "original" context and then achieve a bridge from that context to the visitor's own life experience, as well as helping the visitor project future life experience as a graduate student and beyond degree completion. By choosing to use a Web site to augment the task of seeking a graduate program, students shift the focus from direct engagement with the graduate program (i.e., talking face-to-face) to the indirect looking activity of the Web. The student's movement when using the Web sites does much to counter the ideological and predetermined nature of the sites and facilitates imaginative construction of individual experience from the pre-recorded experience.

Conducted over months and sometimes years, students' information-seeking journeys encounter changes in the Web itself in which content found may be different at different moments in time and changes in the students who move through Web space and "look" differently at different encounters. In addition, students themselves are changing over time—their abilities, expertise regarding graduate school and information seeking, perception, ideas. The virtual spaces they encounter are so expansive, unedged and open

that at times they misunderstand what they see. In these wide open spaces, Morville's "ambient findability" has its meaning; students can find the graduate program only if its Web presentation is constructed in such a way that it is findable, preferably by a variety of Web approaches. Here uncertainty enters the experience, as students wonder where am I, what am I looking at, question and wonder at the authenticity and reliability of what they see. They distractedly consume the imagistic interface, assembling the elements as they go and making choices from the available many (Bolter 2001 63; Hayles "Print Is Flat, Code Is Deep" 2004 86). Their movement through Web space oscillates between shallow, skimming of the surface across broad spaces to foraging into the details when their interest is captured. Similar to the "digital information consumer" described by Nicholas et al. (2006) that is based on detailed study of many general Web users, students freely acquire from various Web sources and not just those of the official graduate programs, selectively consume bits from across many sources that may or may not be reliable, and may not remember where they found certain information or be able to retrace their Web path to find it again. Tension exists between the students and the Web site constructions, so that students counteract control of the Web producers by adjusting their seeking to "poaching" and "nomadic" movements that assist them in subverting the Web texts for their own purposes (de Certeau 1984 32, 165). Students may perceive that they are accomplishing something through their information seeking; however, this may not be the case, which can seriously affect their ability for knowledge building (Nicholas et al. 2006 227).

Engagement

Heather O'Brien and Elaine Toms approach the definition of "engagement with technology" holistically by including a number of attributes and considering engagement as a "quality of user experience." They identify five steps in the engagement process: point of engagement, period of engagement, disengagement, reengagement, and nonengagement (2008 938). I use their organizational structure to discuss engagement findings in my study and comment on other related research.

Point of Engagement

As described earlier, first thoughts of attending graduate school occur in high school or undergraduate study and arise from a variety of personal interactions and experiences. Most survey participants began their information-seeking journey for a graduate program one to two years prior to the admission term. For focus group participants, a mix of both current undergraduate and master's students, first Web encounters look for preferred regions of the country and search for possible programs and institutions, as well as general information about them. This investigation yields a rather broad preliminary scope within which the person then attempts to focus. For interview participants, all current doctoral students, first Web encounters are more variable, including checking *US News & World Report* or *USA Today* or other commercial sites for top schools, deciding on a specific area of study, looking at program details such as time to degree and funding support, among others. Focus group and interview participants generally did little concrete preparation

prior to Web seeking; however, they did mention thinking about it for a while and talking with professors, academic advisers, coworkers or professionals in their field of interest, and family and friends for guidance. For all study participants, the primary seeking practice is Google and other search engines to identify and find Web sites as well as find specific information within Web sites. Some students were already familiar with academic Web addresses and could go directly to sites or could URL guess their way to sites. Students did not seem to find sites often by following links through the hierarchical Web structures of an academic institution. One interviewee described the initial Web encounters as "meandering through the Internet," which indicates a less directed browsing of just looking and not necessarily engaging deeply in Web content (I3). The lack of planning and unorganized approach to Web seeking supports the assumption that students expect to find what they are seeking and find it easily, as this interviewee remarks, "Google is fast and easy" (I5; Oblinger and Oblinger 2005 2.4-2.7). Students seem to think that the Web already functions following Morville's notion of "ambient findability," and so they find something, although the somethings they find may or may not be what they were looking for (2005 6). In this scenario, they seem to lose track of what they were seeking and instead settle, or "satisfice," for less or something else (Marchionini 1995 63). A Physical Sciences interviewee commented, "I click around to find information" and "I can find different information at different search times," both comments examples of a free, distracted movement through Web space and a willingness to settle for what is found (I4). Due to the searching mechanism, students often arrived within a Web site and not necessarily at the entrance

page. If students arrive anywhere in a site, then it is more challenging to engage them, as every Web page must be engaging and reflective of the site context and content.

Sometimes students have problems finding the information they want, as this interviewee described, "Finding what I really need is sometimes a problem. It's hiding somewhere or I forgot where I found it" (I4). This student's comments indicate a game-like perception of content "hiding," as well as the lack of continuity and coherence of the overall information-seeking journey. Situations in which the student is limited to Web information seeking only can cause problems, as this interviewee commented, "Finding information about the area of town the college was located in was a problem. I didn't visit campuses, so I had to rely on what I found on the Web" (I5). To find the information they are seeking, students must understand the organizational structure of academic Web spaces and sites and how to navigate through them effectively. One Engineering student observed, "It makes things difficult if things are hard to find. It can be very deterring" (I3). This same student stated, "It was very frustrating. I didn't want to call departments to find programs. The more information that's there, the better, obviously." In this case, the student was reluctant to reveal presence, to contact the department and ask questions directly to clarify what was found on the Web. A student in the Abroad subgroup commented about the format generally encountered on academic Web sites, "On the university Web sites, I see lots of explain, explain. For the format, I prefer table or list, less reading of paragraphs, or PDF to download to read more" (I2). This same student remarked, "Sometimes Web sites have clear design and I can find out easily what I want. Other times not easy to find like

application deadlines, TOEFL and GRE minimum scores, minimum GPA." Knowing where to look for certain information is crucial, as this interviewee observed, "Find this information [financial support] on general university sites and not on faculty sites" (I4). In this case, the problem arises from the prevalence of paragraph format, essay-like text rather than the minimal text structure of tables and lists. Paragraph format inhibits fast reading and skimming, while tabular format and lists enable skimming and jumping about in the text.

Period of Engagement

Focus group participants were generally unable to recall the details of their information seeking and did little note-taking. When they found useful information, they may save it informally to their desktop, print it, add it to their browser "Favorites," record it in Notepad or Word. Many, however, did no recording at all and relied on their memory and ability to find the information again in future engagements. They did evaluate and assess Web sites and the content they found. They looked for "the human element" and evidence of lifestyle in Web sites and attempted to see themselves as a student in the graduate program. Similarly, interviewees could not recollect full details of their information-seeking experiences. They could, however, remember the overall information-seeking journey, major steps, as well as problems and preferences of the experience. Survey responses indicate that most students begin information seeking for a graduate program about one to two years before the admission term, which means the information-seeking journey is comprised of many cycles of point of engagement, period of engagement,

disengagement, and reengagement. Depending on time lapses between information-seeking episodes or desire for more in-depth engagement or clarification of previous engagements, students may repeat all or part of previous information seeking.

With such an extended information-seeking journey, students experienced many occurrences of engagement, of deep involvement in the Web texts. The interviews were most helpful in seeing the scope and depth of these engagements. Examples of areas or topics that students indicated they read deeply include: program curriculum, plan of study, and requirements; application for admissions process and requirements; people in the graduate program, including faculty, current students, research groups, students who have graduated; evidence of research, including publications, projects in progress, university and program commitment to research; facilities and services; location of the institution; lifestyle of a student in the graduate program, institution, location, as well as lifestyle for spouse and family; comparisons among graduate programs and institutions; financial support; among others. At times, their engagement was interrupted by various issues, some of which I describe below, which may cause the student to disengage and reengage later or just nonengage.

Students may not understand the "why" behind certain requirements. An Engineering student shared, "I know pre-application is one of the protocols that you have to do, but I don't know what they do with it" (I3). Another student stated, "I did not understand the universal deadline of whether I accept offer or not" (I2). Referring to the application for graduate admission, a student observed, "The application itself is usually

kind of difficult to decipher what they might mean by something like a goal statement or research statement" (I3). Another example refers to fellowships: "I was confused about if I apply [for fellowships] or the program applies for me" (I8). At times, students struggle to decipher the full context behind the institution's Web pages. With limited knowledge and experience of graduate education they need a helping hand to enlighten them in specific instances, such as in the application for admission and its many parts, the pre-application process, application deadlines, and financial support.

Students may not understand the terminology used on academic Web sites or English may not be their first language and thus reading may be more of a challenge. A student from abroad remarked, "I could understand the language and didn't need someone to help me. Sometimes it took a long time to read it" (I2). A U.S. student commented, "Here it says 'Data Mining,' but I didn't really know what it is" and "Students reading this information [candidacy exam, dissertation] may not already know what the words mean" (I8). An Education interviewee shared, "I didn't know what the program names meant. I had to look them up to read and understand what the programs are" (I1). Not understanding program names indicates a lack of familiarity with the discipline and research, which leads students to investigate further or abandon the content. Explaining the program name more on the Web page and providing examples of the types of research and publications of faculty would help clarify the name. Not understanding terms such as *candidacy exam* and *dissertation* indicates unfamiliarity with doctoral education in general,

which might be resolved by providing a glossary and an introduction to doctoral study at the institution and then linking to these support areas.

At times, engagement stalled due to incorrect, inadequate, or missing information in the Web site. A bachelor's student seeking an Engineering doctoral program commented, "I found it frustrating that Web sites would not have enough information about the facilities. If you're going to do experimental work, you want to know what the facilities are and see them" (I3). This student's discipline relies heavily on working in research groups, so the facilities available in specific research groups were of great importance to this student. The student needed to assess if the research group and program had the facilities available for the student's research interests. Another example of the critical reading of Web information by students, a Life Sciences student observed, "Description on the Web about program curriculum is not actual. I found this everywhere I looked. At orientation you find out the 'real' curriculum" (I6). Regarding course searching, "[Course] offering is not always accurate. Sometimes courses are not offered when the courses information says they will be" (I8). When Web information did not match with in-person interactions with the program, students expressed dissatisfaction. They may make decisions about which program is best for them from the Web information, so when it is not reflective of the graduate program, it is normally too late for students to change their minds and go elsewhere. Among other reasons, discrepancies may occur from outdated Web information or incorrect Web information and from students misunderstanding what they read or reading between the lines unsuccessfully.

For a number of students, information about current students and faculty, what's going on socially and academically in the graduate program, and details of research groups are important, as they help fill in the "human side" of the graduate program. Inadequacies in this area require students to seek non-Web sources for clarification, as this interviewee stated, "It's hard to tell what people do. Don't really explain well or in user-friendly terms. You have to talk to people. I sent an e-mail to clarify" (I7). From the same student comes the description of self-evaluation that occurs along with finding out about people: "Can I get along with the people I'm working with for five years? I want to be successful" (I7).

Getting lost during engagement occurs, which interrupts attention, for example, "The plan of study is somewhere, but I'm not really sure where" (I1). The minimal planning and note-taking that students do set the stage for repeated occurrences of getting lost, disorientation, and inability to remember details of previous engagements. Students tend to deal with this by continuing to look around until something familiar or interesting catches their eye. Inadequate Web design also interrupts engagement, as this example of looping links describes: "Followed the link to the graduate catalog, but it took me back where I had already been" (I1). In this case, the student visited several Web sites at the same university and followed a non-typical information-seeking path, which led to exploring links against the intended flow of the Web sites.

Disengagement and Reengagement

Due to the duration of the information-seeking journey, students had to disengage and reengage many times. Since they did not relate the specific details of their information seeking, examples in this section note some general issues that students shared.

Gaps in Web content may cause disengagement, for example, "No plan of study was provided in the catalog, only a list of courses to take" (I1). Later, this student found the plan of study online, but it still was inadequate: "Confusing plan of study … it was hard to understand what to take or do" (I1). Eventually, the student sought non-Web sources to help.

Mediation of Web engagement with non-Web sources requires disengagement and reengagement later. For example, after initial searching on several Web sites to identify graduate programs and schools, a Physical Sciences interviewee disengaged: "I had a list, but I need to choose several schools" (I2). This student compiled a long list of possible schools but reached a point in the information seeking where consulting with an academic adviser to narrow the list of schools seemed most effective. This is an example of "task switching" used to cope with the excess information collected (Spink and Cole 2006 137-42).

Student assumptions and beliefs shape their information seeking and may prompt them to disengage from particular Web sites. A Physical Sciences interviewee remarked, "There is a strong correlation between the quality of the school and the quality of the research group Web sites" (I2). If a graduate program had no research group Web sites or the information on their sites did not meet this student's standards, then disengagement

occurred. Another Physical Sciences interviewee observed, "Lots of people in a research group means lots of funds available to support students" (I4). If a research group Web site had few group members identified, then this student disengaged from the Web site. A Life Sciences student stated, "It's not really the school you come out of, it's who you work for" because "Most of the education is labwork, so it depends on the quality of work the professor is putting out" (I6). This same student shared, "I didn't accept admission if there was a faculty/people issue," indicating that this student disengaged from a graduate program if the student was unable to feel confident about the student-faculty adviser relationship.

Nonengagement

At times, students chose to keep seeking and avoid engagement. "If the Web site didn't catch my interest in the first couple of minutes, well, forget this place, it's kind of like a commercial" (PD) and "If the Web site is crappy, then I won't hang around" (PE) and "I was easily bored, if it wasn't extremely compelling I would just go somewhere else, I would move on" (PB). These comments are reflective of the digital information consumer, who exhibits volatile behavior, looks for personal relevance and interest, and expects the first Web page encountered to be attention-getting (Nicholas et al. 2006 211-17). Empowered by the information-seeking experience and their agency, students make snap decisions about whether a Web site is worthy of their time or not. Astute at shopping, they are wary of insincere or unbelievable content and freely question what they encounter. Speaking of products and consumers in general, Jordan observes that being usable is required now and

consumers regularly expect more (2000 3, 7). If a Web site does not meet expectations of students, then they go elsewhere, and they go quickly. Today, students want more than functional academic Web sites; they want sites that treat them as people and enable relationships.

Journeying

Journeying for a graduate program is a creative, exploratory practice using multiple sites in conjunction with each other to construct a next text, a personal one. A "symbolic system" (Johnson *Interface Culture* 1997 15), the Web challenges students to collect and assemble the symbols into a personal text. As Kari and Savolainen note, there is continuous flux in the information-seeking experience and the overall resulting journey is a becoming from which emerges what may be described as a "pattern of Web moves" (2003 166). Similarly, Bolter describes the "evolving" of the "reader's journey" through a series of choices and encounters (2001 68). Students find their way through Web space by following the symbols and signs of navigation, page and site structures, as well as the common and uncommon practices of Web use. They bring to the Web their knowledge and experiences with other technologies such as books, radio, and telephone, as well as their previous Web experiences. Throughout this journeying, students compare and combine across Web encounters, Web experiences with face-to-face experiences, as well as Web experiences with other collected non-Web bits. They view the information they encounter regarding graduate education and programs as representative of these entities and the people who comprise

them. These symbolic blocks they stack, categorize, and organize according to their viewpoint. As these assemblages accumulate, patterns arise that become recognizable to students and are reflective of their movement through their information-seeking journey and their problem-solving for a graduate program decision. Throughout, they are imagining the "real," in this time and place and in future times and spaces, as well as questioning and validating their imaginings. The journey itself becomes the artifact of becoming, of the alterations of the student's identity and connection-building with the graduate program occurring over time. For, while the information-seeking journey for a graduate program may resolve itself in the admission of the student into the graduate program and enrollment, the evolving of the person into "graduate student," "scholar," and "researcher" continues beyond. In other words, the information-seeking journey for a graduate program is a snippet of the personal narrative that begins before and continues after, as well as participates in collective experiences of Web spaces and other non-Web spaces.

Design

From this study I confirm that doctoral students is a complex audience that would be best served by a matrix approach in order to understand its subgroups and facets and design to meet these needs. I would need to conduct further studies in order to break down the audience into the details for successful design and would need to establish regular, ongoing assessments of the audience in order to be aware of changes in it as the population ages, their skills and preferences evolve, and graduate education at the institution evolves

(e.g., adding new programs or new disciplines, modifying its strategic plan). From my observations in this study, I propose several suggestions for Web design.

- **Reliance on Web** – For prospective doctoral students, the Web is the primary source of information for graduate programs and schools. Students may or may not take advantage of other forms of information-gathering (e.g., e-mail, telephone, campus visits), but many do consult with family and friends and many undergraduates and Abroad students do consult academic advisers to complement Web information. Due to the importance of the Web to their prospective and current students, graduate administrators should be involved in the decisions about content and design for their Web sites.
- **Knowledge of Graduate School** – Prior knowledge of graduate school also comes primarily from the Web and originates as early as high school and through undergraduate study. Overall, students considered themselves knowledgeable; however, a closer look shows that some students in all subgroups but one (In the state of Florida but not in central Florida) said they were not knowledgeable. This finding seems to indicate that general information about graduate education and graduate school would be helpful and would serve as a starting point for students to build upon in their information-seeking journey. This design suggestion is supported by Lovitts' comments that students possess "too little information" when choosing a graduate program and beginning graduate study (2001 57).

- **Minimal Information-seeking Planning** – Overall, students appear to do minimal planning prior to beginning their information-seeking journey, which seems related to their freely or openly executed and more comprehensive searching in general Web contexts characteristic of the "digital information consumer" (Nicholas et al. 2006). This finding indicates an organic, free organizational structure for the journey, which may benefit from journey guidance on the graduate school Web site or informal planning tools that are easy to use but would help students ensure that their journey was thorough enough and addressed their needs prior to decision making. According to Lovitts, students are "relatively uninformed about the programs to which they apply" (2001 51). Sketchy planning most likely contributes to students not choosing the graduate program that is the best fit for them, which may in turn affect their success in the chosen program. Since the information-seeking journey spans across institutions, a service site sponsored by a consortium of institutions and focused on helping students choose a graduate program that is the best fit for them would help facilitate a satisfying graduate education experience. Among other features, such a site might include a myspace option where students could collect information about various institutions and programs, credible guidance from institutions and programs about graduate education in general and specific disciplines and programs, social spaces for sharing with

other students and engaging with faculty and administrators, and self-assessment tools to help students clarify what they are looking for.

- **Information-seeking Journeys** – The interviews provide examples of students' complex information-seeking journeys that include many Web encounters across many Web sources over an extended period of time. Survey responses similarly report complex information-seeking journeys. Again, informal planning tools and guidance on the graduate school Web site may help support these journeys. However, since a large portion of the journey occurs outside the graduate school Web site, there are limitations in how much can be done to help with the overall journey. Strong efforts should be made to address the information-seeking issues revealed in this study within the institutional Web space, including coordination among graduate school, graduate programs, departments, research group, faculty, and other graduate education-related Web sites. Addressing only the graduate school Web site will have limited benefits to students.
- **Searching** – Overall, students in this study have a strong preference for using Google and search options to identify and find graduate programs and schools and also to locate information within Web sites. This preference is supported by the research of Nicholas et al. describing "the digital information consumer" and specifically to the concept of "digital visibility," which includes the prominence and positioning of the content in the Web site, in the Web site's search engine, and in the directories of other search engines such as Google (2006 209-11).

Reviewing search logs and testing and revising search functions on the graduate school Web site as well as those within the institutional Web space will help students. In addition, revising the results display to make them more helpful and providing guidance on how best to use search functions may also help students get reliable results. Testing of Google searching and investigation of how to make the best use of this search site should be done; however, there will be limitations on how much can be done.

- **Following Links** – Overall, students in this study rely heavily on following links on Web pages to find information. Increasing connections among content blocks with linking should help students find the information more easily. Carefully naming links for easy recognition by students and avoiding misrepresentation and therefore dissatisfaction should help students. Again, standardizing key linkings throughout the institutional Web space would provide more reliable connections among institutional Web sites and greatly aid students in moving through them freely and confidently.
- **Emotion** – Students' information-seeking journeys extend from six months to more than two years. During this time students may use specific academic Web sites multiple times and for different purposes. They may perceive these sites differently over time, which can lead to their experience with the sites moving from "pleasure of appreciation" when a site is new and fresh to "need pleasure" when it is assimilated into students' information-seeking practices and

considered trustworthy and relevant (Jordan 2003 30). Emotions figure in the Web information-seeking journey in a number of ways, for example, in student responses to colors, images, and other content on a site; in reactions to how a site functions or what happens during use; in the feelings of self-confidence, interest or disinterest, satisfaction or frustration in response to Web engagement or occurring in the body for other reasons at the moment of Web engagement; or in feelings of social acceptance and belonging, from interactions through the Web or from imaginings of themselves as graduate students. As "living objects," Web sites support relationships and deliver "not only functional benefits but also emotional ones" (6-7).

- **Critical Reviewer** – The distance from which students engage with Web sites, as well as the nature of the information-seeking journey for a graduate program, encourages critical reading that normally occurs singularly. If there were easy mechanisms to collect or infuse this critical reading into a generative Web tool (e.g., wiki, blog), then individual readings or observations may benefit the collective group. At the least, capturing the critical notations of students currently engaged in their information-seeking journey for a graduate program would be very helpful to those making Web design decisions.
- **The Human Element** – The primary reliance on Web sites for graduate information appears to reduce the interactions students have with faculty, current students, and staff in the graduate program and school. While some

students pursue communications through e-mail or visits, others are more timid and wish not to interrupt "busy" faculty and others choose to rely solely on the Web for graduate program information. In addition, from students' descriptions of their information-seeking journeys for a graduate program, it seems clear that academic Web sites at the institution do not adequately support students' needs regarding the social-cultural aspects of the graduate program. At this time, students spend a good deal of time interpreting the "invisible text" (i.e., reading the gaps, reading between the lines) of academic Web sites to arrive at their thoughts on this topic (Schriver 1997 400, 439). Among other things, students want to know what it would be like as a student in the graduate program and the social environment of the program; who the faculty, research staff, current students, and alumni are and what they do; and how graduate students are treated within the institution. Holistically studying the information-seeking journey for a graduate program reveals this strong need for the human element, which is included in research studies consulted (for example, Brown and Duguid 2002; Jordan 2003; Kari and Savolainen 2003; O'Brien and Toms 2008). Currently, there is limited use of social functions in these academic Web sites. The human element is an important issue, and one that can contribute much to students as well as graduate education at the institution. Addressing this issue might include such items as incorporating new content for this topic across the institutional

Web space and offering social functions through the Web to help students interact with faculty, current students, alumni, and staff.

- **Lifestyle** – A number of students in this study commented that they sought information about the lifestyle possible in the location of the institution, which is a specific aspect of "the human element" category. This support requires reviewing current content on academic Web sites at the institution, researching local Web sites for relevant content, and creating a resource on the graduate school Web site that incorporates general narrative and connects students to local Web sites for more information. Including quotations and guidance from current students in various disciplines might also help complement the collection.
- **Preferences for Web Site Organization and Navigation** – Survey responses indicate that students are neutral about the addition of photos and other images on academic Web sites, except in reference to research group Web sites and research facilities. However, they considered the Web site's visual appearance important and related this to the overall organizational and navigational structure crucial to finding information effectively. This preference for visual organization is similar to the "digital visibility" noted by Nicholas et al. (2006 211). Study results seem to support the proposal that users do not wish to be overwhelmed with too many choices or too much information on a Web site (Marchionini 1995 64; O'Brien and Toms 2008 946).

- **Terminology and Explanations** – A number of students in this study had difficulties with graduate terminology and with requirements. These students would benefit from further explanations of these items in Web content and graduate communications. Another possibility would be a Web glossary of graduate terms and concepts, which would enable linking from other graduate Web sites at the institution and would help encourage consistent use of these terms and concepts across the institution, therefore reducing confusion.

As O'Brien and Toms observe, "Successful technologies are not just usable; they engage users" (2008 938). In other words, academic Web sites have to do more than make the information available and findable; they must design in order to encourage and sustain engagement, or deep involvement. As anticipated, students expressed the desire for more than the traditional description of an academic program, for more personal narrative and guidance. Through their Web information seeking, prospective students assess what it might be like to be a student in the graduate program at the institution and begin their socialization into graduate education and develop a sense of belonging (Brown and Duguid 2002; Hansen 2006; Jordan 2003; Davenport and Beck 2001; Lovitts 2001). Overall, this study points toward confirmation of the Web design proposed in my Introduction, one that provides a participatory, self-organizing environment for actively making knowledge rather than passively receiving information (Jenkins 2006). Included in this Web design is the idea of "a collaboration economy" supporting the "prosumer" practices proposed by Tapscott and Williams (2006 32, 124) and the "digital information consumer" practices described by

Nicholas et al. (2006 204, 209-17). Above all, continued awareness of design as "social action" and the tensions that exist between the strategic plans of the graduate program and institution and supporting students in their personal information-seeking journeys can help maintain the focus on service to students (Kress and Van Leeuwen 2001 45, 63). Web sites play a key role as support structures for changing students and their actions, as well as affecting their identity, what they do, and what they know (Brown and Duguid 2002 137-38, 146). Therefore, approaching Web design through the holistic, contextual study of audience seems the way to go.

Future Research

This study explores the contextual details of the information-seeking experience of new doctoral students and attempts to represent the overall journey. In this study I look at the big picture; future research might spin-off this work to focus on a number of subtopics and related issues, for example:

- Expand the total population to include doctoral students for other admit terms, people who applied for admission but were not admitted, or people only visiting the graduate school Web site; expand to include master's students to see if there are differences between academic levels.
- Extend the interview protocol with students for other admit terms, starting as soon as they are in the applicant stage and conducting multiple interview sessions over time through the first year of doctoral study, in order to capture

more details of their information-seeking practices and to assess knowledge making and enculturation related to becoming a graduate student.

- Using the survey data in this study, code the information-seeking steps of the responses and look for patterns.
- Focus the survey on the information-seeking journey only and administer it to multiple admit term groups, multiple academic levels, multiple disciplines.
- Evaluate the level of "belonging" that prospective/newly admitted students feel during the Web information-seeking journey for a graduate program, referring to such sources as Hansen (2006), Jordan (2003), Brown and Duguid (2002), and Lovitts (2001).
- Explore the relationship between the information-seeking journey for a graduate program and satisfaction with their graduate study, retention, time to degree.
- Focus on the information-seeking journey for a graduate program for key subgroups, such as Abroad, non-Florida domestic students, undergraduates, or specific disciplines.
- Focus on identifying the problems students encounter during information-seeking for a graduate program and how they deal with them.
- Using O'Brien and Toms (2008) as a starting point, investigate one or more stages of engagement for doctoral students or other graduate student groups.
- Using Jordan (2003) as a starting point, investigate pleasure as it relates to Web information seeking of graduate students.

- Identify the emotional hotpoints during the information-seeking journey for a graduate program and consider what might be done to help alleviate these difficulties.
- Design a study to profile information-seeking characteristics and conduct profiling of different graduate student groups.
- Research concept mapping; construct maps of information-seeking journeys for a graduate program through multi-session interviews and then have interviewees review and iterate the maps.
- Study a specific user characteristic or group of related characteristics, using as a starting point such studies as Nicholas et al. (2006), Oblinger and Oblinger (2005), and Marchionini (1995).
- Research "presence" of Web sites and design a study to assess the presence of research group Web sites at the institution in selected disciplines; conduct this same assessment for graduate program Web sites; seek ways to optimize Web site presence.

Outcomes of this research include a better understanding of the strategies and journeying patterns practiced by doctoral students during the search for a graduate program and school. Findings of this study may be used to contribute to the development of more helpful support structures for graduate students; more effective enculturation of new students into the graduate community; facilitate better fit of student, faculty, program, and school, which may facilitate a higher level of satisfaction with students' choice of graduate

program and also contribute to reduced attrition due to better fit and higher level of satisfaction.

APPENDIX A. FOCUS GROUP

Request for Participant Recommendations

Hi _____,

I'm hoping you can help me by providing some student recommendations.

My dissertation focuses on learning how doctoral students engage in information seeking, particularly when seeking a graduate school, and the implications of these results for Web design and information (providing support structures to help them). As the first step, I'm going to conduct a single focus group to help me understand better this information-seeking process and assist in developing interview and survey questions. The focus group will be held within the next week or two, will take about 90 minutes of the student's time, and will be confidential. I will give the participants a $20 Barnes & Noble giftcard at the end of the session.

Would you please recommend 2-3 students for this group? Here are the selection criteria:
UCF student

- At least 18 years of age
- Undergraduate junior or senior or master's student
- Interested in pursuing a graduate degree (can be looking for master's and/or doctoral program)
- Actively seeking a graduate program and school (has been looking for information on Web sites, talking to people, trying to figure out how to do this task, etc.)

When I receive the student names, I will call or e-mail them and complete brief screening questions; if they meet the criteria, I will tell them about my study and the focus group, and then ask if they would be willing to participate. They could ask me questions about it before committing. If they agree, I will send them a confirmation e-mail with directions to the group session.

I would be very grateful if you could help me. Please let me know if you have questions.

Thank you!

Debra Winter

Telephone Screening Questionnaire

Interviewee Name_____Date_____

Telephone_____

E-mail Address_____

Recommended By_____

Hello, my name is Debra Winter. I'm a doctoral candidate in the Texts and Technology Program in the UCF Department of English. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. As part of my dissertation work, I'm conducting a focus group about how students seek information about graduate school. This focus group, however, is not sponsored by Graduate Studies.

_____ recommended you as a possible participant in this focus group because of your experience in looking for a graduate school and graduate program. The information gathered in this focus group will provide a richer picture of this information-seeking process and help me formulate interview questions, which is the next step in my dissertation study.

I would like to ask you a few questions. The questions will take less than 2 minutes. Is it OK to begin?

Are you a UCF student? YES (continue) NO (end)

Are you 18 years of age or older? YES (continue) NO (end)

Are you thinking about getting a graduate degree? YES (continue) NO (end)

Are you actively looking for a graduate program and graduate school? YES (continue) NO (end)

I would like you to participate in this focus group along with five or so other UCF students. This is strictly a research project and your participation will be confidential.

The focus group is on March ____. It begins at ____p.m. and will be over no later than ____p.m. Refreshments will be provided, and you will receive a $20 Barnes & Noble gift card at the end of the focus group session. Will you be able to attend?

___YES (confirm name, e-mail address)

___NO (thank you and end call)

[IF YES]

I will be sending you an e-mail in a couple of days confirming this meeting. If you need any help with directions or if you need to cancel, please call me at 407-823-3567. Thank you and good-bye.

Sample Initial E-mail Invitation

Dear _____,

Hello, my name is Debra Winter. I'm a doctoral candidate in the Texts and Technology Program in the UCF Department of English. As part of my dissertation work, I'm conducting a focus group about how students seek information about graduate school. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. This focus group, however, is not sponsored by Graduate Studies.

_____ from the_____ [office] recommended you as a possible participant in this focus group because of your experience in looking for a graduate school and graduate program. The information gathered in this focus group will provide a richer picture of this information-seeking process and help me formulate interview questions, which is the next step in my dissertation study.

I would like you to participate in this focus group along with five or so other UCF students. This is strictly a research project and your participation will be confidential.

The focus group will meet only one time. I have two possible dates for the meeting:
Wednesday, March 26, 2008, from 2:30 p.m. to 4:00 p.m., in Computer Center I, second floor room
Thursday, March 27, 2008, from 2:30 p.m. to 4:00 p.m., in Computer Center I, second floor room

Refreshments will be provided, and you will receive a $20 Barnes & Noble gift card at the end of the focus group session. Will you be able to attend? Please let me know which date you prefer or if you would be able to attend either date.

Sincerely,
Debra Winter
Doctoral Candidate in Texts and Technology, UCF Department of English
dwinter@mail.ucf.edu or 407-823-3567

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

Sample E-mail of Invitation to Focus Group

(Date, name and e-mail address of participant)

Dear _____,

Thank you for accepting my invitation to attend the focus group on January ____. The meeting will be held in _____ and will begin at _____p.m. The meeting will end by _____p.m.

Since I am inviting a limited number of students, the success and quality of the focus group discussion is based on the cooperation of the students who attend. Because you have accepted my invitation, your attendance at the session is anticipated and will contribute to the success of my dissertation work.

The discussion you will be attending will be a focus group session on how students engage in information seeking, particularly when seeking a graduate school. As you know, there are a variety of resources for students to use in finding a graduate program. There are also a variety of ways that students look for information to help them make a decision about graduate school. I would like to hear about your experiences in seeking a graduate program and graduate school. The information gathered in this focus group will provide a richer picture of this information-seeking process and help me formulate interview questions, which is the next step in my dissertation study.

The session will be audio-taped. Only I have access to the tape, which I will personally transcribe, removing any identifiers during transcription. The tape will be erased after transcription is complete. Your identity will be kept confidential and will not be revealed in the final manuscript. At the beginning of the focus group session, you will be asked to sign an Informed Consent Form.

Refreshments will be provided, and I will give you a $20 Barnes & Noble gift card at the end of the session.

If for some reason you find you are not able to attend, please call me to let me know as soon as possible. My phone number is 407-823-3567.

I look forward to seeing you on January _____.

Sincerely,

Debra Winter

Doctoral Candidate in Texts and Technology
UCF Department of English
dwinter@mail.ucf.edu or 407-823-3567

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

Informed Consent Form

Informed Consent Form

Please read this consent document carefully before you decide to participate in this study. You must be 18 years of age or older to participate.

Project title: Information-seeking Strategies of Early Doctoral Students

Purpose of the research study: The purpose of this study is to learn about how early doctoral students engage in information seeking, particularly when seeking a graduate school. I am Debra Winter, a doctoral candidate in the Texts and Technology Program in the UCF Department of English. This focus group is part of my dissertation work. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. This focus group, however, is not sponsored by Graduate Studies.

What you will be asked to do in the study: Students will be asked to participate in a focus group lasting about 90 minutes. You will not have to answer any question you do not wish to answer. In a group interview such as this, it is very important that everyone express themselves openly. There are no right or wrong answers. I just want to know what you think. With your permission, I would like to audiotape this discussion. Only I have access to the tape, which I will personally transcribe, removing any identifiers during transcription. The tape will be erased after transcription is complete. Your identity will be kept confidential and will not be revealed in the final manuscript.

Time required: 90 minutes

Risks, compensation, or benefits: There are no anticipated risks to you as a participant in this interview. At the end of the session, you will receive a $20 Barnes & Noble gift card as compensation for your participation.

Voluntary participation: Your participation in this study is voluntary. You are free to withdraw your consent to participate and may discontinue your participation in the focus group at anytime without consequence.

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the

Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

____I have read the procedure described above.
____I voluntarily agree to participate in the focus group.
____I agree to be audiotaped during the focus group session.
____I agree to be contacted by phone or e-mail by the principal investigator to clarify questions related to the focus group discussion.
____I do not agree to be contacted after the focus group discussion.

_____/_____
Participant Date

_____/_____
Principal Investigator Date

Moderator's Guide

[When participants arrive, greet them, invite them to help themselves to the refreshments, and show them to their seats. Show them the Informed Consent Form so they may review it.]

Preamble (10 minutes)

Thank you so much for agreeing to participate in this focus group today. I am Debra Winter, a doctoral candidate in the Texts and Technology Program in the UCF Department of English. This focus group is part of my dissertation work. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. This focus group, however, is not sponsored by Graduate Studies. I will be your moderator for this session and _____ is assisting with this session. _____ is _____.

Each of you has been selected because of your experience in looking for a graduate school and graduate program. As you may know, there are a variety of resources for students to use in finding a graduate program. There are also a variety of ways that students look for information to help them make a decision about graduate school. The information gathered in this focus group will provide a richer picture of this information-seeking process and help me formulate interview questions, which is the next step in my dissertation study. One of the goals of my research is to help identify ways that graduate institutions can improve Web resources for prospective and current doctoral students.

In a group interview such as this, it is very important that everyone express themselves openly. There are no right or wrong answers. I just want to know what you think. I am tape recording the session in order to ensure accuracy when compiling the report. However, your responses will not be linked with your name in any way and I am the only person, as the researcher, who will hear or obtain the tapes. In my reporting the results will be completely confidential. I ask that you respect the confidentiality of this session and that you not share any comments or information outside of this session.

Because we are using a recording device, I may remind you occasionally to speak up and to talk one at a time so that you can be heard clearly when the session is reviewed later.

When a question is asked, there is no need for everyone to respond. However, it is important that a wide range of ideas is expressed. If you would like to add to an idea, or if you have an idea that contrasts with those that have already been expressed, that is the time to jump into the conversation. You do not have to speak in any specific order. There is no such thing as "your turn" –It's always your turn!

Again, I am very happy that you have taken the time to share your ideas.

Housekeeping

In front of you there is a name card and marker. Would you please write your first name or the name you wish us to use in this session on the card? Then, place the card in front of you, so we can all see your name.

Next, you will also find a sheet of paper with the title "Informed Consent Form" on it. The UCF Institutional Review Board requires that I get your signature on this consent form. Please read this consent document carefully before you decide to participate in this study. You must be 18 years of age or older to participate.

[Moderator collects the signed forms in random order.]

Introductions (10 minutes)

Let's get started by asking each of you to introduce yourself—your name, your major, and when you plan to graduate from the program you're currently enrolled in.

Overall Approach to Information Seeking (20 minutes)

How did you begin the task of finding information to help you make a decision about a graduate program?

How will this graduate program or degree help you reach your goals?

What information sources are you using?

How did you find out about these sources?

How do you decide whether to use the sources you found?

How do you feel about your overall information-seeking process for a graduate program?

The Details of Your Information-seeking Experience (30 minutes)

Think for a moment about everything you have done to help you choose a graduate program. Also, think of those things you plan to do. I am very interested in these details of your information-seeking experience.

Please take a sheet of paper from the table. Breakdown your thinking into 10-15 steps and write them in order on the sheet of paper. Be as honest, open, and thorough as you can in describing your thinking. Remember that this study is confidential, so feel free to include personal comments or whatever comes to mind. You will have about five minutes or so to write your steps. [10 minutes; watch to see when students appear finished with the task]

How did your imagination come into play during your searching and decision making?

What surprises or unexpected things did you encounter during your information-seeking experience?

Is there anything else you would like to share about your specific experience in searching for a graduate program?

Please leave your sheet of paper on the table after this session is over. I want to see the steps you wrote down.

Closure (10 minutes)

What advice would you give to other students about seeking information about graduate school?

What would make the information-seeking process more effective?

Are there any other ideas that we have not covered?

Thank you for your participation. Your comments are valuable to this study.

[Remind participants to help themselves to the remaining refreshments. The moderator gives each student a $20 Barnes & Noble gift card.]

Focus Group Summary

The focus group was held on March 26, 2008, 2:30-4:00 p.m., in CCI room 202, as a preliminary investigation of how students engage in information seeking for a graduate program and school. Seven currently enrolled UCF students participated, and the group included junior and senior undergraduate students and master's students from engineering, sciences, arts and humanities disciplines. All students expressed an interest in attending graduate school. Some were already attending or admitted to graduate school; others were in various stages of seeking a graduate program and school.

Overall Approach to Information Seeking (20 minutes)

How did you begin the task of finding information to help you make a decision about a graduate program?

Participant F – Talking to peers, going online to the graduate school Web site, went to the graduate school office and talked to somebody who was extremely helpful and gave me some great tips; then, talking to faculty; talked to undergrad and grad coordinator; the first thing was the Web site, checking programs and looking at prerequisites and things like that.

Participant A – I spoke to my boss, who knows a lot about that sort of stuff. He gave me some ideas of where to get started. We did some Google searches, pulled up some aggregators and things like that. We pulled a list program by program; also, I pulled a list of schools and then went down the list and checked each school out. That was the first place I started.

Participant E – I did something similar, I used the Internet and went to the different school Web sites, that was the initial thing, after I got more or less focused on what I was specifically interested in then I started to contact the program itself directly through an email or the faculty in that university directly through an email, sort of tried to get a more personal interface until I got phone conversations with different people that were in graduate admissions

Participant C – I did something similar, I was interning with a company of project managers and custom engineers, I was very interested in the project management side, and all the project managers told me that the best thing to get was some kind of engineering degree, that it doesn't matter, so I decided to go for a master's degree in project management because that's what I really want to do

Participant G – I'm still undecided whether I want to get a master's degree in my program, I'm not sure if a master's degree is needed, the most important thing is having a good portfolio

Participant D – I knew I wanted to stay in Florida for my graduate program, so I mainly looked at all the graduate programs offered at all the main Florida universities, mainly through their Web sites, and contacted them for application materials and stuff, most of what I did was online

For example, what experience, event, discussion or other happening led to your considering graduate school? When did you first know you wanted to go to graduate school?

Participant F – I'm an international student, and I always heard that if you were an international student and you plan to stay in America you had to have a master's degree, I did have many questions about what concentration I should go for, so I was still undecided, that's why I'm a little behind in my application process because I'm unsure, there are many options, but I felt like I needed a master's to stay here

Participant C – in discussing with the project manager, I like what the job does, it's in the construction field, the kind of job I wanted requires a master's degree

Participant B – I looked up where I wanted to work and I could see the increase in the pay bracket for getting a master's

Participant A – journalism is a hands-on field and a lot of journalism students don't go to graduate school, they usually just go right to the workforce, I realized probably sometime last year that journalism is not for me because I'm more academic, I realized that, I think grad school would probably be a good choice for me, obviously switching majors at that point wasn't a viable option because I didn't want to stay an undergraduate for five more years, so graduate school is probably the way to go

Participant E – I got involved in a research lab at UCF doing cancer research, after a certain period of time while I was at that lab I had different family members diagnosed with cancer, so at that point I wanted to contribute more to the field of cancer microbiology, so I had an invested personal desire to pursue graduate studies, so that was the basic motivation to doing something other than just a master's degree

Participant G – if I want to teach, I will have to get a PhD or master's degree, but I'm not sure I want to teach, right now I think I'm ready to go into the work field, so I am focusing on my portfolio, may later want to get a master's

How will this graduate program or degree help you reach your goals?

Participant B – started out to get master's just for the pay increase, but now that I'm close to finishing it, actually I could get a PhD, I'm more open to what I can do

Participant F – give me an edge when I go to look for a job, I've heard you really learn so much more in grad school rather than as an undergrad, make me a stronger professional, make more money

Participant E – cancer biology, can't go into that field and publish papers if you don't have a PhD, it's a rite of passage in that field

Participant A – I just want to learn more about things that interest me, graduate school gives you the opportunity to focus on something that really gets your attention, a lot more focused than undergraduate school, I get really excited when I look at the courses, that would be really cool, it's the next level, I like to learn, I'm curious

Participant G – Graduate school for me would be able to create so much more with a lot better skills, I don't think making more money makes too much difference to me right now, I want to leave myself open to different types of graphic design, I don't want to focus too much because it might make it too difficult

to get a job, I know that if I feel that my skills are lacking in any certain way, I can go to grad school and get a master's degree

What information sources are you using?

Participant E – the event that was most effective for me was that last semester there was a graduate fair, MD/PhD component, UF had a table there, I spoke to a guy there who I found out later was actually the chair of admissions, open the door, to talk to people face to face, initial Web sites and emails were just the first step, if you don't go beyond that to get that personal interaction they won't remember you and will just see you as a name and number when your application comes in

Participant B – I don't really remember, I think that gradschools.com is one, I talked to my program director, there is a link to request more information

Participant C – I just know I want to get it, if I go back home, master's degree, good field to go into, engineering management is very interesting too

Participant G – I just basically talked to my teacher and adviser, he's the head of the department, why did he go, what his reasons were, he went by chance, I did attend the grad fair here and did check out what they have, I'm very interested in improving my skills, I basically just went to the Web site and checked it out, want to stay in-state because it's cheaper

Participant F – I'm already abroad so I'm not very interested in going elsewhere, I still went online to look at other schools, talked to my graduate director, I talked to someone in Graduate Studies and she told me a lot about it

Participant A – I want to go out of state, there's a lot more options out there, it's a big country, so my first step was a Web site where you did a search for a program and it pulled all the schools with that program, made my decision on geography, I don't want to go to Kansas, what schools are in California, what schools are in New York, what schools are around New York, and narrowed down by list based on that, and talked to my boss who knows a little bit more about it, narrowed it down to a list that includes geographies I like and the programs

How did you find out about these sources?
Skipped this question

How do you decide whether to use the sources you found?

Participant B – gradschools.com first, just breaks it down by region, then contacted the schools for more information, I think talking to the schools and getting information from the schools is much more credible than using gradschools.com, I just trusted school information more

Participant E – life sciences database, hits of publications, hits of faculty, programs, program faculty and what they do, is the research worth the effort of me moving, if not worth the effort I'm not going

Participant B – pictures on the Web site, bios about students, if there's a beach

Participant C – some of the Web sites, I don't want to go there

Participant B – easy to use and follow

Participant A – need a human element to it, if you go to a Web site and it's nothing but text, so mechanical, you can't even put together a Web site, which should be just a basic search, it's always the first step for research, then how can you expect me to trust your program, I want to see if I'll be happy at that institution, it's that basic human element that you look for, you want to know that you'll feel at home

Participant B – having pictures of people, not just the buildings, faculty and professors' bios

Participant E – if their Web site is mechanical, if you go to a Web site and it's totally really bad, it's just like an interview, the Web site of a university is the same thing, it's the first impression of the average Joe that starts clicking on it, if they don't put forward a basic, honest overall effort to a Web site, a Web site is really not that complicated, making a curriculum, doing a graduate program, teaching, doing research, that's up there; doing a Web site is down here. if you can't put up a basic, nice Web site, boy, that's like if you're not putting any effort into this, then I'm not put so much effort into you, that's going to be the subconscious judgment, sometimes also it's misleading, sometimes you'll go to a particular Web site, even the UCF Web site is all pretty pictures but they don't show the physics building, do they?, they don't show the buildings that don't look as nice, things that really try to go around that is to try to visit the university itself, actually going there personally and comparing the pretty pictures with the actual hardcore facts, so even though you make a subconscious initial judgment sometimes it's not too accurate

Participant G – I would always visit the college before attending

Everyone visited UCF before attending it except for one student (Participant C)

Participant C – Yes, I made my decision long distance, I mainly liked the lifestyle here, I was going to FIT but it's a small town, small school, and I wanted to be in a place that had something to do, that's why I picked UCF, I applied to UF, FIT, UCF, UM but it was too expensive, LSU but I didn't really want to go to Louisiana, I wanted somewhere close to the beach and my choice was more based on lifestyle

Participant G – I go for the technology and what's new, what kinds of companies are around the city and if it's more metropolitan, so I don't have to move somewhere again, wanted a place I can settle a little bit

How do you feel about your overall information-seeking process for a graduate program?

Participant B – eager to learn about it, but I was easily bored, if it wasn't extremely compelling I would just go somewhere else, I would move on

Participant D – if the Web site didn't catch my interest in the first couple of minutes, well, forget this place, it's kind of like a commercial

Participant E – if the Web site is crappy, then I won't hang around, has to be eye-catching, interactive, aesthetically appealing, if it has some pre-information that's helpful

Participant F – pressured, very excited at some points, and then frustrated, looking at the Web site and talking to people made me want to stay here, then I felt optimistic, when I was really unsure about where I wanted to go, it was frustrating

Participant E – I guess it's kind of like a pressure, kind of like an unknown abyss, because you work so hard during your undergraduate years to get involved in extracurricular activities and get involved in research, it's hard to balance whatever you do on the outside with whatever you do in the classroom, your GPA, GRE, all these other factors you start really stressing out, am I competitive enough, am I as good as that other person, am I going to be viewed as just this number, when you realize that this could be a moment when you just might not succeed, and you've done everything you could, then that just beats the heck out of you, you feel absolutely vulnerable, you've done everything, what more could you do, what else could you do to be that much successful, it does create a sense of totally stressed out for the moment, sometimes you just forget about it, that's why it took me a while to think about what was my state of mind, if I still think about it I would still have that, the biggest thing that helps me move forward with it is having that personal face-to-face interaction with somebody who's actually going to have my application, because that gives me peace of mind/hope, that I might be good enough, I've had someone who's told me that maybe that's good enough, is it a guarantee? No, but at least I can sleep at night and can say I've done the most I can and I'll continue to do the most I can and life won't end tomorrow if I don't get it

Participant A – I'm going to sit down and figure out where I'm going to go, first questions was where are you going to go, out of state, ok, that's 1 down and 49 to go, then there's this feeling of despair, you gotta look at the quality of the program, you gotta look at what you really want to do, despair and then I find a couple of schools and apply, kind of depends on the kind of results you find, reassure yourself, gotta look at the faculty, what's he done, what's he published, what's he been up to lately, what kind of courses does he teach, then you talk yourself out of that panic, frantic what is going on next thinking … and then you have to sleep on it, yeah, if you spend 18 hours looking for grad schools you're going to psyche yourself out and say this is not going to work and say screw it I'm going to go work somewhere … but if you sleep on it and kind of think about it, rationalize it, make some notes, look at your notes the next day and they don't make any sense, so you have to sleep on it

Participant B – most people applying to grad school are undergraduates getting ready to graduate and they're doing 100 things, whatever was the easiest and most comprehensive Web site was the one I would go with because I must be lazy, I don't want to have to figure it all out

The Details of Your Information-seeking Experience (30 minutes)

Think for a moment about everything you have done to help you choose a graduate program. Also, think of those things you plan to do. I am very interested in these details of your information-seeking experience.

Please take a sheet of paper from the table. Breakdown your thinking into 10-15 steps and write them in order on the sheet of paper. Be as honest, open, and thorough as you can in describing your thinking. Remember that this study is confidential, so feel free to include personal comments or whatever comes to

mind. You will have about 15 minutes to write your steps. Feel free to ask questions about this assignment and talk during it.

How did your imagination come into play during your searching and decision making?
No comments

What surprises or unexpected things did you encounter during your information-seeking experience?

Participant E – the grad fair I went to, I didn't expect to talk to anyone there, I didn't know who the person was that I talked to, he gave me his business card and email address, I emailed him later, when you find the perfect fit, everything is easier

Participant F – one of my professors asked me to stay after class, he asked if I was interested in grad school, I was surprised by this, but it helped me begin to think about it

Participant A – I was surprised that Columbia doesn't require a GRE score for my program, there are different requirements for universities and for programs

Participant C – I have a friend who missed taking the TOEFL, which is a requirement to come to UCF, so he went to Australia rather than the U.S., this was unexpected because he thought that they would be more interested in his background and education than in a TOEFL score

Is there anything else you would like to share about your specific experience in searching for a graduate program?
No comments

Asked about their computer use habits – everyone uses a laptop so portable, everyone engages in multitasking, don't talk to others in face-to-face conversations while working on their laptops, do engage in occasional face-to-face comments with others

Closure (10 minutes)

What advice would you give to other students about seeking information about graduate school?

Participant B – Do it early

Participant C – Talk to other students, don't talk to your undergrad adviser, I don't talk to my advisers, talk to other students because they're going through it, too

There appears to be very limited guidance/advising for UCF undergrads regarding how to plan for graduate school.

Participant F – Go talk to the grad faculty or friends

Participant E – Undergrad advisers are good for overrides, that's all

Participant F – Apply by the priority deadline so you can get assistantships, make connections with grad faculty, start thinking and looking in your junior year

Participant B – I don't know how to advise someone else

Participant D – You have to actually go and visit the school

Participant B – I know a lot of grad students who work, so you need to think about where you might work while you go to school. Read, you will need to do a lot of reading in grad school, so begin reading now

What would make the information-seeking process more effective?

Participant D – I would do it differently if I decided to do another grad degree because of what I have learned, the first time I just didn't care that much

Participant A – I didn't build the relationships with faculty that I could have, I wish I had built more one-to-one relationships with faculty so when the time comes, I can ask them for help

Participant E – Being part of an undergrad research program like RAMP helps a lot

Do you have suggestions for interview questions that I could ask to help reveal the hidden details of information seeking for a graduate program?
No comments

Are there any other ideas that we have not covered?
No comments

DETAILS COLLECTED

Participant A

Determine where—NOT FLORIDA
Narrow it down—West Coast, Northeast, Southwest
Pick a program—American Studies/Culture
Compare programs—Courses? Requirements for graduation? Do I have options? Faculty size? Size of department? How many courses offered per semester?
Faculty—What are they into? Bios? Interests? Background? What's on the resume? The CV? What sort of relationship do they have with their students? Anything weird?
Program requirements—Do I have choices? Are there a lot of electives? Is there a specific focus or point of view/bias in the course curriculum? Do I care? Will I be able to do research? What sort of research? Will I be free to pursue a topic directly relevant to my interests?
Pick a top 10
Determine credentials—How old is the program? How many similar programs are there across the United States? I this school's program unique? Is the research produced here going to be used by someone?

Auxiliary organizations—Journals? Scholarly periodicals related to my program?
Pick a top 5
Look at admissions data—Deadlines, requirements, documents, fees?
How would you compare? Are they out of your league? Could you make it work? What is the profile of current students?
Order top 5 in order of preference
Would you be happy here?
Can you afford it?

Participant B

Do I want to go to Grad School? What do I want to study?
Where do I want to study? (Northeast? South? West? United States?)
What schools offer the program I'd like to enroll in, WHERE I'd like to study?
Contact the school(s), ask for them to mail information to me.
Search for anything appealing in the brochure. Analyze cost and requirements.
Fill out applications, pay fees.
Meet with faculty in the program before making decisions. Visit the schools.
Make decision.

Participant C

Talk to professionals in different fields.
Look at programs and schools online.
Talk to my parents and find out from their experiences what would be best for me or for the situation I want to be in, in a few years.
Look to see if it is worth the time and effort.
What would I really learn by going to grad school and what it will bring me back.
Salaries
Talk to faculty members to see what is available for what I want to become.
Talk to co-workers.
Find out what are the requirements to enter grad school.
Look at cost of school and financial aid available.
Find out what is in high demand on the working market, what companies are looking for.
How it would benefit me in the long run, would it help find a job easier, especially as an international student.

Participant D

First, I had to ask myself if I really wanted to go to a grad program right after getting my bachelor's, which I did.
I talked to other people—friends, family members—already in grad school to hear about their experiences and advice.
While I was doing step 2, I also started doing Internet searches.
Looked at a few out-of-state schools, but determined that financial and location-wise it was best to stay in Florida.

Specifically explored grad options at FSU, UF, USF, and UCF (ruling out UM because of cost)—just looking at the programs offered via school Web sites—course info was most important.
Asked schools to send more info about programs I was interested in. Explored financial options more here, too.
Figured out USF, UF and UCF only schools that had the program I wanted.
Actually applied to UCF—filled out UF application but didn't send it because wanted UCF as first choice.
Got in to UCF.
Accepted the offer and here I am.

Participant E

Volunteered at a research laboratory on campus.
Personal family experience with cancer.
Applied to McNair/RAMP Program at UCF.
Received support for undergraduate research.
Tried on my own to develop a research project with faculty mentor to see if I could see myself to have what it takes to get a PhD, because in my field you need to be able to develop novel ideas and write about them for grants.
Went to Rutgers University for Undergraduate Summer Research Program. Spent one day working at the lab I was in from 10 a.m. to 8 a.m. of the next day just to see if I would burn myself out or if I got sick of doing research. This was not the case and so it fueled me to continue to pursue graduate studies.
Graduate Fair at UCF. Being able to talk to a real person (from UF) about my experience, and really getting rooted into the idea of an MD/PhD graduate program with a focus in translational medicine. ("Back to Bedside" research)

Participant F

Three most important requirements:
Financial assistance
Research and quality of the program
Location
Steps involved into looking for grad school:
Talk to graduate director of my program at current university.
Visit Web site at university I was interest in.
Talk to faculty in my undergraduate program.
Search for graduate assistantships.
Talk to different people in the field and decide what concentration is best for me in my program.

Participant G

Find out what area of graphic design that I am most interested in.
Complete a final project at end of BFA that pertains to my area of interest.
Talk to my adviser to see if my work is graduate school worthy. What else do I need to work on to make my portfolio stronger to apply with?

Ask my adviser why they decided to get a master's degree. Is it necessary for me in my field? Will it truly help my portfolio or should I get a job and start getting actual printed pieces first and honing my skills that way?
Look for an area of interest—city, state, etc.
Look for certain colleges in those areas of interest.
Go to their Web sites, look at the professors who teach there.
What is each professor's area of interest? Does it correspond with my area of interest? Can I learn what I need to learn from them?
Visit as many colleges as I can and interview professor and/or heads of the department.

APPENDIX B. INTERVIEW

Sample E-mail of Invitation to Interview

From: Debra Winter
To: Student
Date: TBD
Subject: Interview Invitation

You are among a group of first-year doctoral students at the University of Central Florida who have been selected to participate in a confidential interview of information-seeking experiences, particularly as they relate to your search for a graduate school and program. Your participation and honest answers are important to this study, which will provide a richer picture of this information-seeking process and help identify ways that graduate institutions can improve Web resources for prospective and current doctoral students.

I am a doctoral candidate in the Texts and Technology Program, UCF Department of English, and this interview is part of my dissertation work. For your participation in this study, I will give you a $25 Barnes & Noble gift card at the end of the 90-minute interview session, which will be held at a convenient location on the UCF campus.

The session will be audio-taped. Only I have access to the tape, which I will personally transcribe, removing any identifiers during transcription. The tape will be erased after transcription is complete. Your identity will be kept confidential and will not be revealed in the final manuscript. At the beginning of the interview session, you will be asked to sign an Informed Consent Form.

Please let me know what times you would be available for this interview during the week of May X-X. As soon as I hear from you, I will let you know which date and time we will meet and the location. I look forward to talking with you.

Sincerely,

Debra Winter
Doctoral Candidate in Texts and Technology
UCF Department of English
dwinter@mail.ucf.edu or 407-823-3567

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

Informed Consent Form

Please read this consent document carefully before you decide to participate in this study. You must be 18 years of age or older to participate.

Project title: Information-seeking Strategies of Doctoral Students

Purpose of the research study: The purpose of this study is to learn about how doctoral students engage in information seeking, particularly when seeking a graduate school. I am Debra Winter, a doctoral candidate in the Texts and Technology Program in the UCF Department of English. This interview and post-interview survey are part of my dissertation work. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. This interview and post-interview survey, however, are not sponsored by Graduate Studies.

What you will be asked to do in the study: Interviewees will be asked to participate in an interview and a post-interview survey lasting about 90 minutes. You will not have to answer any question you do not wish to answer. Your interview and post-interview survey will be conducted in a face-to-face meeting at a location on the University of Central Florida campus. With your permission, I would like to audiotape this interview. Only I have access to the tape, which I will personally transcribe, removing any identifiers during transcription. The tape will be erased after transcription is complete. Your identity will be kept confidential and will not be revealed in the final manuscript.

Time required: 90 minutes

Risks, compensation, or benefits: There are no anticipated risks to you as a participant in this interview and post-interview survey. At the end of the session, you will receive a $25 Barnes & Noble gift card as compensation for your participation.

Voluntary participation: Your participation in this study is voluntary. You are free to withdraw your consent to participate and may discontinue your participation in the interview and post-interview survey at anytime without consequence.

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

____I have read the procedure described above.
____I voluntarily agree to participate in the interview and post-interview survey.
____I agree to be audiotaped during the interview.

_____/_____
Participant Date

_____/_____
Principal Investigator Date

Interview Protocol

Pre-interview Briefing

Introductions

Purpose of study: The purpose of this study is to learn about how doctoral students engage in information seeking, particularly when seeking a graduate school.

Informed Consent Form – code the form to maintain confidentiality; give time to read, ask questions, and sign; put in folder before beginning interview

Remind subjects that they are helping me investigate questions about information-seeking

Remind subjects that I am recording them on audio tape

Describe overview of the session

Do you have any questions? Let's begin.

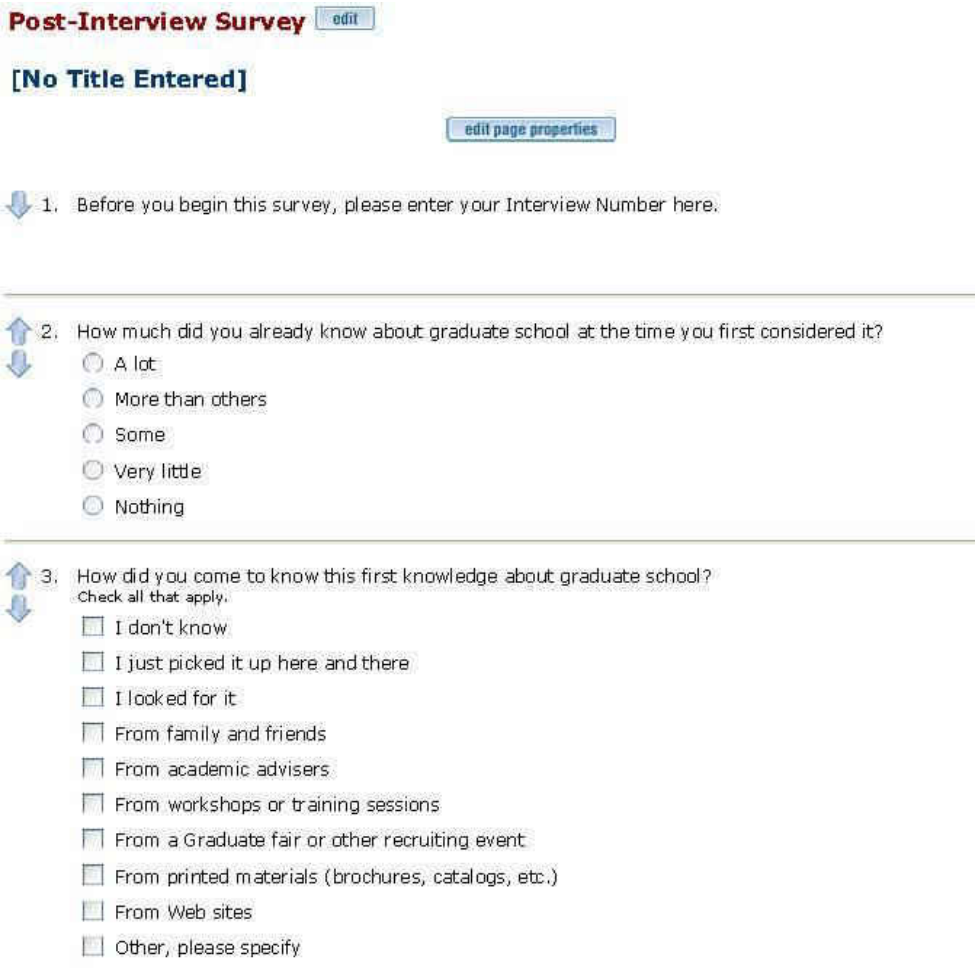
Interview

1. When did you first think that you may want to go to graduate school?
2. What experiences brought this idea to your mind?
3. How much time did you spend selecting a graduate program and school?
4. When did you begin your search for a graduate program?
5. When did you make a final decision about your graduate program?
6. What were the major steps in selecting your graduate program and school?
7. At what points in the process did you use the Web? (When did you use the Web to help you with these steps?)
8. What was your concern or need? (What information were you looking for?)
9. How did the Web help you?
10. At what points in the process did you use other sources (non-Web)? (When did you use other sources to help you with these steps?)

11. What was your concern or need? (What information were you looking for?)
12. How did these other sources help you?
13. Please show me some of the Web sites that you used.
14. When you (first) entered a site, what did you notice first?
15. How did you find what you are looking for on the site? (How did you go about finding information on the sites?)
16. What parts (information) of the sites were most helpful to you?
17. What did you not use or ignore?
18. What was least helpful (or missing or unclear)?
19. When you were using (looking for information on) the sites, how often did you use the search function?
20. What were some of the words or phrases you used in searching?
21. What were your reasons for using these search words or phrases?
22. How satisfied were you with your searching? (How successful was your searching?)
23. How did you decide what search results were most relevant?
24. How did you use the search results?
25. Please describe any problems you experienced during the information-seeking process.
26. Did you have a major misunderstanding or experience confusion? If so, what were they and how did you deal with them?
27. Did you have unanswered questions or were you unable to find certain information? If so, what were they and how did you deal with them?
28. At what point were you satisfied? (stopped looking for more information and focused on decision making)
29. How did you determine what program was the best fit for you?
30. Do you have anything else you would like to share about your information-seeking experience?

Post-interview Survey

This concludes the interview portion of the study. Please complete this brief survey, which collects additional information about your information-seeking experience. Feel free to ask me any questions you might have about the survey questions.



4. How much help did you have during the overall information-seeking process for graduate school?

- ○ A lot
- ○ More than others
- ○ Some
- ○ Very little
- ○ None

5. How did you request and receive help?
Check all that apply.

- ☐ In person
- ☐ By telephone
- ☐ By e-mail
- ☐ Through a request form (online or paper)
- ☐ By instant messenger or chat service
- ☐ By postal services (regular mail)
- ☐ Other, please specify

6. Rate the contribution of each source to your overall knowledge of graduate school on a scale of 1 to 5.
With 1 being the least contribution and 5 being the most contribution.

	1	2	3	4	5
Family and friends	○	○	○	○	○
Academic advisers	○	○	○	○	○
Workshops or training sessions	○	○	○	○	○
Graduate fair or other recruiting event	○	○	○	○	○
Published guide to graduate school	○	○	○	○	○
University graduate school websites	○	○	○	○	○
College websites	○	○	○	○	○
Graduate program websites	○	○	○	○	○
Other websites	○	○	○	○	○
Printed materials	○	○	○	○	○

7. Do you own or have access to a computer that you can use?

- ○ Yes
- ○ No

8. What type of computer do you have access to?

- ☐ Desktop
- ☐ Notebook

☐ Both desktop and notebook

9. Are there any limitations on using the computer you described above?

○ Yes
○ No

10. If you answered "Yes" to the previous question, what were the limitations on your computer use?

11. Where is the computer that you use most often in order to access the Internet?

☐ Home
☐ Office
☐ Various locations (I have a Notebook)
☐ Library, lab, or other designated study area
☐ Other, please specify

12. How often do you use these options when using the Internet?

	Very often	Frequently	Occasionally	Sometimes	Never
Printing	○	○	○	○	○
Saving to my computer	○	○	○	○	○
Adding bookmarks to Favorites in my browser	○	○	○	○	○
Searching	○	○	○	○	○
Following links on the webpages	○	○	○	○	○
Site indexes	○	○	○	○	○
Help	○	○	○	○	○
Chat	○	○	○	○	○
Instant messenger	○	○	○	○	○
Blogs	○	○	○	○	○
Podcasts	○	○	○	○	○
Discussion boards or forums	○	○	○	○	○

13. How long have you used a computer?

○ 0-5 years

- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ 21 years or more

14. How many hours do you typically spend each week on the following activities?

	Do not use	Less than an hour	1-2 hours	3-5 hours	6-10 hours	11 or more hours
Classroom activities and studying using an electronic device	○	○	○	○	○	○
Writing documents (word processing)	○	○	○	○	○	○
Surfing the Internet for pleasure	○	○	○	○	○	○
Creating, reading, sending e-mail	○	○	○	○	○	○
Chatting with friends or acquaintances using instant messaging	○	○	○	○	○	○
Using an electronic device (computer, Palm device) at your place of employment	○	○	○	○	○	○
Downloading or listening to music or videos/DVDs	○	○	○	○	○	○
Completing a learning activity or accessing information for a course using course management systems	○	○	○	○	○	○
Using a university library resource to complete a course or research assignment	○	○	○	○	○	○
Playing computer games	○	○	○	○	○	○
Analyzing data and creating spreadsheets or charts (Excel or other software)	○	○	○	○	○	○
Online shopping	○	○	○	○	○	○
Creating presentations (PowerPoint or other software)	○	○	○	○	○	○
Creating graphics (Photoshop, Flash or other software)	○	○	○	○	○	○
Creating Web pages (Dreamweaver or other software)	○	○	○	○	○	○
Creating and editing video/audio (Premier, Final Cut, Director, iMovie or other	○	○	○	○	○	○

software)

15. What times during the day do you typically use a computer?
Check all that apply.

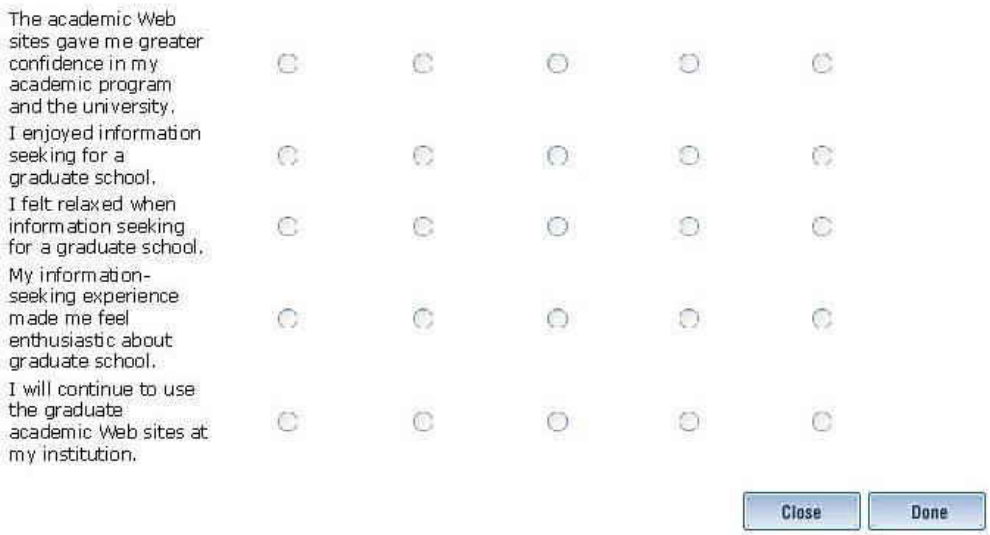
- [ ] 12:00 a.m. (midnight) to 3:59 a.m.
- [ ] 4:00 a.m. to 7:59 a.m.
- [ ] 8:00 a.m. to 11:59 a.m.
- [ ] 12:00 p.m. (noon) to 3:59 p.m.
- [ ] 4:00 p.m. to 7:59 p.m.
- [ ] 8:00 p.m. to 11:59 p.m.

16. Rate your ability to do the following tasks on a scale of 1 to 5.
With 1 being the least capable and 5 being the most capable.

	1	2	3	4	5
Find the information that I want on the Internet	○	○	○	○	○
Evaluate the information that I find on the Internet	○	○	○	○	○
Choose the graduate program that is the best fit for me	○	○	○	○	○
Overall success in finding a graduate program and school	○	○	○	○	○

17. Rate your overall information-seeking experience for a graduate program and school.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I felt stimulated when information seeking for a graduate school.	○	○	○	○	○
I felt entertained when information seeking for a graduate school.	○	○	○	○	○
I felt connected to the academic institutions whose Web sites I used.	○	○	○	○	○
I felt excited when information seeking for a graduate school.	○	○	○	○	○
The graduate academic Web sites gave me satisfaction.	○	○	○	○	○
I could rely on the graduate academic Web sites.	○	○	○	○	○
I would miss the graduate academic Web sites if they had not been available.	○	○	○	○	○



Post-interview Comments

This concludes our meeting today. Thank you for your participation. Your comments are valuable to this study.

APPENDIX C. SURVEY

E-mail Invitation to Subjects and Informed Consent

From: Debra Winter
To: Student
Date: TBD
Subject: Doctoral Student Survey of Information-seeking Strategies

You are among a group of new doctoral students at the University of Central Florida who have been selected to participate in a confidential online survey of information-seeking strategies, particularly as they relate to your recent search for a graduate school and program. Your participation and honest answers are important to this study, which will provide a richer picture of this information-seeking process and help identify ways that graduate institutions can improve Web resources for prospective and current doctoral students.

I am a doctoral candidate in the Texts and Technology Program, UCF Department of English, and this survey is part of my dissertation work. I have received permission from the UCF Institutional Review Board and the Division of Graduate Studies to contact you as part of my dissertation work.

Thank you for taking the time and thought to complete this survey. I sincerely appreciate your participation.

Information-seeking Survey LINK

Technical information before you participate:

- You must be at least 18 years of age to participate according to federal law.
- This survey is available only online, now through February 29th.
- Compensation will not be provided for participating.
- Research at the University of Central Florida is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.
- For more information, contact Debra Winter, the Principal Investigator, dwinter@mail.ucf.edu or 407-823-3567; or Dr. J. D. Applen, Faculty Adviser, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Debra Winter
Doctoral candidate in Texts and Technology Program, Department of English
University of Central Florida, Millican Hall 230, dwinter@mail.ucf.edu or 407-823-3567

Information-seeking Survey

By participating in the survey I'm affirming that I'm at least 18 years old and providing my informed consent.

Project title: Information-seeking Strategies of Early Doctoral Students

Purpose of the research study: The purpose of this study is to learn about how doctoral students engage in information seeking, particularly when seeking a graduate school and program. I am Debra Winter, a doctoral candidate in the Texts and Technology Program in the UCF Department of English. This survey is part of my dissertation work. For your information, I am also the Director of Graduate Financial Assistance and Publications in the UCF Division of Graduate Studies. This survey, however, is not sponsored by Graduate Studies.

What you will be asked to do in the survey: Participants will be asked to complete questions about how they looked for information during their search for a graduate school and program, as well as the details surrounding the information-seeking process. The study attempts to look at information seeking in a holistic way, so your help is appreciated in providing the details to enable a richer picture of the overall process.

You will not have to answer any question you do not wish to answer. Your identity will be kept confidential and will not be revealed in the final manuscript.

The results of this study will be published in the researcher's dissertation and may be published elsewhere. However, the data obtained from you will be combined with data from others in the publication. The published results will not include your name or any other information that would personally identify you in any way.

Time required: Thirty (30) minutes

Risks, compensation, or benefits: There are no anticipated risks, compensation or other direct benefits to you as a participant in this survey.

Voluntary participation: Your participation in this study is voluntary. You are free to withdraw your consent to participate and may discontinue your participation in the interview survey at anytime without consequence.

Who to contact if you have questions about this study: Debra Winter, Graduate Student, Texts and Technology Program, Department of English, UCF College of Arts and Humanities, dwinter@mail.ucf.edu or 407-823-3567 or Millican Hall 230. My faculty adviser is Dr. J. D. Applen, Department of English, japplen@pegasus.cc.ucf.edu or 407-823-2533.

Who to contact about your rights in this study: Research at the University of Central Florida is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, IRB Coordinator, University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are 407-882-2276 and 407-823-2901. The office is open from 8:00 a.m. to 5:00 p.m. Monday through Friday except on UCF official holidays.

LINK TO SURVEY

Information-seeking Survey

Survey of Doctoral Student Information-seeking

How knowledgeable were you about graduate school at the time you first considered a doctoral program?

- ◯ Very knowledgeable
- ◯ Knowledgeable
- ◯ Neutral
- ◯ Somewhat knowledgeable
- ◯ Not knowledgeable

How did you acquire this first knowledge about graduate school? Check all that apply.

- ☐ Family and friends
- ☐ Academic advisers
- ☐ Workshops or training sessions
- ☐ Graduate fair or other recruiting event
- ☐ Printed materials (brochures, catalogs, newspapers, etc.)
- ☐ TV, radio, or other public media
- ☐ Web sites

Other (please specify)

When did you begin your information seeking for a graduate program?

When did you apply for graduate admission?

How much help did you have during the overall information-seeking process for graduate school?

- ◯ Very significant
- ◯ Significant
- ◯ Neutral
- ◯ Insignificant
- ◯ Very insignificant

Survey of Doctoral Student Information-seeking

Rate the contribution of each source to your overall knowledge of graduate school.

	No Contribution	Very Little Contribution	Some Contribution	Significant Contribution	Most Contribution
Family and friends	◯	◯	◯	◯	◯
Academic advisers	◯	◯	◯	◯	◯
Students in the graduate program	◯	◯	◯	◯	◯
Workshops or training sessions	◯	◯	◯	◯	◯
Graduate fair or other recruiting event	◯	◯	◯	◯	◯
University graduate school websites	◯	◯	◯	◯	◯
College websites	◯	◯	◯	◯	◯
Graduate program websites	◯	◯	◯	◯	◯
Research group websites	◯	◯	◯	◯	◯
Other websites	◯	◯	◯	◯	◯
Printed materials	◯	◯	◯	◯	◯

Other (please specify)

How long have you used a computer?

- ◯ 0-5 years
- ◯ 6-10 years
- ◯ 11-15 years
- ◯ 16-20 years
- ◯ 21 years or more

Please provide examples of any limitations on using your computer that you experienced during the information-seeking process for a graduate program.

Survey of Doctoral Student Information-seeking

How many hours do you typically spend each week on the following activities?

	Do not use	Less than an hour	1-2 hours	3-5 hours	6-10 hours	11 or more hours
Classroom activities and studying using an electronic device	○	○	○	○	○	○
Writing documents (word processing)	○	○	○	○	○	○
Surfing the Internet for pleasure	○	○	○	○	○	○
Creating, reading, and sending e-mail	○	○	○	○	○	○
Chatting with friends or acquaintances using instant messaging	○	○	○	○	○	○
Using an electronic device (computer, Palm device) at your place of employment	○	○	○	○	○	○
Downloading or listening to music or videos/DVDs	○	○	○	○	○	○
Completing a learning activity or accessing information for a course using course management systems	○	○	○	○	○	○
Using a university library resource to complete a course or research assignment	○	○	○	○	○	○
Playing computer games	○	○	○	○	○	○
Analyzing data and creating spreadsheets or charts (Excel or other software)	○	○	○	○	○	○
Online shopping	○	○	○	○	○	○
Creating presentations (PowerPoint or other software)	○	○	○	○	○	○
Creating graphics (Photoshop, Flash or other software)	○	○	○	○	○	○
Creating Web pages (Dreamweaver or other software)	○	○	○	○	○	○
Creating and editing video/audio (Premier, Final Cut, Director, iMovie or other software)	○	○	○	○	○	○

Survey of Doctoral Student Information-seeking

What times during the day do you typically use a computer? Check all that apply.

- ☐ 12 midnight to 3:59 a.m.
- ☐ 4:00 a.m. to 7:59 a.m.
- ☐ 8:00 a.m. to 11:59 a.m.
- ☐ 12 noon to 3:59 p.m.
- ☐ 4:00 p.m. to 7:59 p.m.
- ☐ 8:00 p.m. to 11:59 p.m.

Please describe your typical approach to using a website for the first time.

How would you describe your preferences for how content is presented on a website?

How often do you use these options when using the Internet?

	Never	Sometimes	Occasionally	Frequently	Very Often
Printing	◯	◯	◯	◯	◯
Saving to my computer	◯	◯	◯	◯	◯
Adding bookmarks to Favorites in my browser	◯	◯	◯	◯	◯
Finding websites by guessing at the URL	◯	◯	◯	◯	◯
Typing in the searchbox	◯	◯	◯	◯	◯
Following links on the webpages	◯	◯	◯	◯	◯
Site indexes	◯	◯	◯	◯	◯
Googling	◯	◯	◯	◯	◯
Help	◯	◯	◯	◯	◯
Chat	◯	◯	◯	◯	◯
Instant messenger	◯	◯	◯	◯	◯
Blogs	◯	◯	◯	◯	◯
Podcasts	◯	◯	◯	◯	◯
Discussion boards or forums	◯	◯	◯	◯	◯
Audio or video clips	◯	◯	◯	◯	◯

When you found information on academic websites, how did you decide whether to read it or not? In other words, what were your criteria for deciding what to read or review during your information-seeking for a graduate program?

Survey of Doctoral Student Information-seeking

How important was the visual appearance of academic websites to you during your information-seeking for a graduate program?

- ◯ Very unimportant
- ◯ Unimportant
- ◯ Neutral
- ◯ Important
- ◯ Very important

How important were photos (or other images) on academic websites to you during your information-seeking for a graduate program?

- ☐ Very unimportant
- ☐ Unimportant
- ☐ Neutral
- ☐ Important
- ☐ Very important

How many graduate schools (institutions) did you research when looking for your graduate program?

How many graduate schools (institutions) did you apply to for admission?

How many graduate programs did you apply to for admission?

Survey of Doctoral Student Information-seeking

Think about everything that you did to help you choose a graduate program. Please identify the 10-12 steps that you did, from your first thoughts of a doctoral program, through the details of your information seeking, and to the moment you decided which program admission to accept.

Type the 10-12 steps in chronological order in the boxes below. Be as honest, open, and thorough as you can in describing your thinking.

Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
Step 7
Step 8
Step 9
Step 10
Step 11
Step 12

Referring to the steps you have just listed in the previous question, please answer these questions. For each question, check all steps that apply.

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
In which steps was the Web not used?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In which steps did you only use the Web to find information?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In which steps was the Web used more than other sources of information?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In which steps was the Web used less than other sources of information?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Overall, how much did you rely on the Web during your information-seeking experience for a graduate program?

- ◯ Never
- ◯ Somewhat
- ◯ Frequently
- ◯ Very frequently
- ◯ Always

Survey of Doctoral Student Information-seeking

How would you describe your emotional state (your feelings) during your information-seeking experiences for a graduate program?

Please describe any problems (e.g., unanswered questions, could not find certain information, confusion) you experienced during information seeking on the Web for a graduate program.

Rate your overall information-seeking experience for a graduate program and school.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I could rely on the graduate academic Web sites.	○	○	○	○	○
I enjoyed information seeking for a graduate school.	○	○	○	○	○
I felt connected to the academic institutions whose Web sites I used.	○	○	○	○	○
I felt entertained when information seeking for a graduate school.	○	○	○	○	○
I felt excited when information seeking for a graduate school.	○	○	○	○	○
I felt relaxed when information seeking for a graduate school.	○	○	○	○	○
I felt stimulated when information seeking for a graduate school.	○	○	○	○	○
I will continue to use the graduate academic Web sites at my institution.	○	○	○	○	○
I would miss the graduate academic Web sites if they had not been available.	○	○	○	○	○
My information-seeking experience made me feel enthusiastic about graduate school.	○	○	○	○	○
The academic Web sites gave me greater confidence in my academic program and the university.	○	○	○	○	○
The graduate academic Web sites gave me satisfaction.	○	○	○	○	○

Survey of Doctoral Student Information-seeking

How did your imagination come into play during your information seeking on the Web for a graduate program?

What surprises or unexpected things did you encounter during your information-seeking experience on the Web for a graduate program?

Rate your ability to do the following tasks.

	Not Capable	Somewhat Capable	Capable	Very Capable	Most Capable
Find the information I want on the Internet.	○	○	○	○	○
Evaluate the information that I find on the Internet.	○	○	○	○	○
Choose the graduate program that is the best fit for me.	○	○	○	○	○
My overall success in finding a graduate program and school.	○	○	○	○	○

What is your birth year?

- ○ 1900-1946
- ○ 1947-1964
- ○ 1965-1982
- ○ 1983-1991

What is your gender?

- ○ Female
- ○ Male

Where was your previous institution (school)?

- ☐ UCF
- ☐ In central Florida but not UCF
- ☐ In the state of Florida but not in central Florida
- ☐ Outside the state of Florida but in the United States
- ☐ Outside the United States (Abroad)

Survey of Doctoral Student Information-seeking

What was your previously earned degree?

- ◯ Bachelor's
- ◯ Master's
- ◯ Specialist
- ◯ Doctoral

Other (please specify)

What is your current doctoral program?

APPENDIX D: IRB APPROVALS AND PERMISSIONS

Approval Letters from IRB

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Initial Review and Approval

From : **UCF Institutional Review Board**
FWA00000351, Exp. 5/07/10, IRB00001138

To : **Debra Winter**

Date : **February 18, 2008**

IRB Number: **SBE-08-05434**

Study Title: **Information-seeking strategies of doctoral students**

Dear Researcher:

Your research protocol noted above was approved by **expedited** review by the UCF IRB Chair on 2/13/2008. **The expiration date is 2/12/2009.** Your study was determined to be minimal risk for human subjects and expeditable per federal regulations, 45 CFR 46.110. The categories for which this study qualifies as expeditable research are as follows:

6. Collection of data from voice, video, digital, or image recordings made for research purposes.

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

The IRB has approved a **consent procedure which requires participants to sign consent forms.** Use of the approved, stamped consent document(s) is required. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Advise the IRB if you receive a subpoena for the release of this information, or if a breach of confidentiality occurs. Also report any unanticipated problems or serious adverse events (within 5 working days). Do not make changes to the protocol methodology or consent form before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at http://iris.research.ucf.edu .

Failure to provide a continuing review report could lead to study suspension, a loss of funding and/or publication possibilities, or reporting of noncompliance to sponsors or funding agencies. The IRB maintains the authority under 45 CFR 46.110(e) to observe or have a third party observe the consent process and the research.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 02/18/2008 09:12:53 AM EST

IRB Coordinator

University of Central Florida

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Review and Approval of Requested Addendum/Modification Changes

From: **UCF Institutional Review Board**
FWA00000351, Exp. 5/07/10, IRB00001138

To: **Debra Winter**

Date: **May 08, 2008**

IRB Number: **SBE-08-05434**

Study Title: **Information-seeking strategies of doctoral students**

Dear Researcher:

Your requested addendum/modification changes to your study noted above which were submitted to the IRB on 05/08/2008 were approved by **expedited** review on 5/8/2008

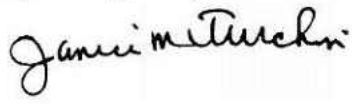
Per federal regulations, 45 CFR 46.110, the expeditable modifications were determined to be minor changes in previously approved research during the period for which approval was authorized.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

This addendum approval does NOT extend the IRB approval period or replace the Continuing Review form for renewal of the study.

On behalf of Tracy Dietz, Ph.D., IRB Chair, this letter is signed by

Signature applied by Janice Turchin on 05/08/2008 01:59:39 PM EDT



IRB Coordinator

Internal IRB Submission Reference Number: 002934

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Review and Approval of Requested Addendum/Modification Changes

From: **UCF Institutional Review Board**
FWA00000351, Exp. 6/24/11, IRB00001138

To: **Debra Winter**

Date: **July 17, 2008**

IRB Number: **SBE-08-05434**

Study Title: **Information-seeking strategies of doctoral students**

Dear Researcher:

Your requested addendum/modification changes to your study noted above which were submitted to the IRB on 07/16/2008 were approved by **expedited** review on 7/17/2008.

Per federal regulations, 45 CFR 46.110, the expeditable modifications were determined to be minor changes in previously approved research during the period for which approval was authorized.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

This addendum approval does NOT extend the IRB approval period or replace the Continuing Review form for renewal of the study.

On behalf of Tracy Dietz, Ph.D., IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 07/17/2008 02:17:25 PM EDT

Joanne Muratori

IRB Coordinator

Internal IRB Submission Reference Number: 003412

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Review and Approval of Requested Addendum/Modification Changes

From: **UCF Institutional Review Board**
FWA00000351, Exp. 6/24/11, IRB00001138

To: **Debra Winter**

Date: **July 28, 2008**

IRB Number: **SBE-08-05434**

Study Title: **Information-seeking strategies of doctoral students**

Dear Researcher:

Your requested addendum/modification changes to your study noted above which were submitted to the IRB on 07/27/2008 were approved by **expedited** review on 7/28/2008.

Per federal regulations, 45 CFR 46.110, the expeditable modifications were determined to be minor changes in previously approved research during the period for which approval was authorized.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

This addendum approval does NOT extend the IRB approval period or replace the Continuing Review form for renewal of the study.

On behalf of Tracy Dietz, Ph.D., IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 07/28/2008 12:40:31 PM EDT

Joanne Muratori

IRB Coordinator

Internal IRB Submission Reference Number: 003474

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

EXPEDITED CONTINUING REVIEW APPROVAL NOTICE

From : **UCF Institutional Review Board**
FWA00000351, Exp. 10/8/11, IRB00001138

To : **Debra Winter**

Date : **January 23, 2009**

IRB Number: **SBE-08-05434**

Study Title: **Information-seeking strategies of doctoral students**

Dear Researcher,

This letter serves to notify you that the continuing review application for the above study was reviewed and approved by the IRB designated reviewer on **1/23/2009** through the expedited review process according to 45 CFR 46 (and/or 21 CFR 50/56 if FDA-regulated).

Continuation of this study has been approved for a one-year period. The expiration date is 1/22/2010. This study was determined to be no more than minimal risk and the category for which this study qualified for expedited review is:

6. Collection of data from voice, video, digital, or image recordings made for research purposes.

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

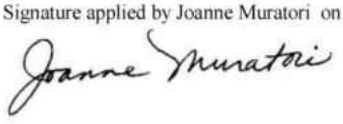
Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

All data must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Use the Unanticipated Problem Report Form or the Serious Adverse Event Form (within 5 working days of event or knowledge of event) to report problems or events to the IRB. Do not make changes to the study (i.e., protocol methodology, consent form, personnel, site, etc.) before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 01/23/2009 04:15:01 PM EST



IRB Coordinator

Permission from Dean of the College of Graduate Studies

Memorandum

~~To:~~ FROM: Patricia Bishop, Dean of Graduate Studies

~~From:~~ TO Debra Winter, Texts and Technology Doctoral Student

Date: February 20, 2008

Subject: Permission to access student records for use in dissertation study

My dissertation study, "Information-seeking strategies of doctoral students," has been approved by the UCF Institutional Review Board. I am writing this memo to request permission to access student records for use in this research, which will benefit the development of Web resources for prospective and current doctoral students and will be analyzed as part of my dissertation research. It is understood that this information will be analyzed and reported following the requirements of the Institutional Review Board (copy of approval attached).

Also, since my study includes the administration of a survey, I request permission to use the Survey Manager application in the Division of Graduate Studies to host this survey. Following Institutional Review Board instructions, the invitation e-mail and informed consent will declare that this survey is my dissertation research and is not sponsored by the Division of Graduate Studies and contact information will include the Institutional Review Board, Dr. J. D. Applen (my dissertation adviser), and me.

Patricia J Bishop 2/20/08

Approved

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