Anxiety, Knowledge and Help:
A Model for How Black and White College Students Search for HIV/AIDS Information on the Internet

Kim Smith

North Carolina A&T State University, Greensboro, North Carolina, USA

Using the "think aloud" protocol, which allows for the collection of data in real time, the researcher audio taped comments from 13 white college students from a predominately white university in the Southeastern United States and 15 black students from a predominately black university, as they explained how they searched for HIV/AIDS information on the Internet. A grounded theory analysis of the tapes revealed a three-stage model that students progressed through as they searched for HIV/AIDS information on the Internet. That model also revealed that all of the white students searched for general information about HIV/AIDS on the Internet, while all black students searched for general and specific information about how the disease affected the African-American community. Eighty percent of students regardless of race did not know how to properly search for online health information. The researcher discusses the need for online health information literacy training, the theories that might explain why black students searched the way that they did, and the challenges to providing culturally-sensitive online health information literacy training for African-Americans who have been historically suspicious of the United State's health care system. Key Words: Online Health Information Literacy, Grounded Theory, Think Alouds, Online Information Seeking Behavior, and Culturally-Sensitive Online Health Information Literacy Training

The spread of HIV/AIDS is likely to occur on college campuses where drugs and alcohol abuse can lead to unsafe sex, which can lead to HIV/AIDS infection and transmission (American College Health Association, 2007; CDC, 2003; CDC, 2006). Nearly half of all new HIV/AIDS cases occur in people younger than 25 (CDC, 2002).

Eleven Historically Black Colleges and Universities (HBCUs) in a southern state in the United States have struggled to deal with an increase in HIV/AIDS infections among students (Keels, 2005). A joint study by that state's public health department and the United States Centers for Disease Control and Prevention (CDC) prompted increased HIV/AIDS education efforts among the 11 HBCUs after the study revealed a spike in HIV cases among college male students statewide, from two in 2000 to 56 in 2003 (CDC, 2003). Forty-nine out of the 56 HIV cases were black male college students. Health care researchers fear the problem has or will extend to other campuses. Nationally, African-Americans, who make up 12% of the United States' population (30 million), account for 45%, or 25,000 of the new cases yearly in the United States, and are seven times more likely to contract HIV than whites (Falco, 2008). Nearly 56,300 people in the United States became infected with HIV in 2006, "which translates to about 40% more cases

than officials had estimated" (Falco, p. 1). More than half of new HIV infections occurred in homosexual or bisexual men.

College students, many of whom grew up with the Internet, have a high degree of what Bandura (1977) would describe as self efficacy: confidence at using computers and accessing the Internet from years of practice. While college students are more likely than any other segment of society (Escoffery, Miner, Adame, Butler, McCormick, & Mendell, 2005; McKillen, 2002) to seek out health information on the Internet, most of them lack the online health information literacy skills to choose HIV/AIDS Web sites wisely among the millions of Web sites on the Internet (Ivanitskaya, O'Boyle, & Casey, 2006; Nsuangani, 2003; Peterson, Aslani, & Williams, 2003; Smith, 2008). Online health information literacy is defined as an effort to "provide citizens with the skills so they can improve search capabilities and evaluate the quality of health Web sites" (Institute of Medicine of the National Academics, 2004, p. 1).

It was within the context of HIV/AIDS, its potential impact on college students, and their growing use of the Internet as a health information resource that this study was launched. Thirteen white students from a predominately white university in the Southeastern United States, and fifteen black students from a predominately black university in the same region, were given this hypothetical: "Pretend that a best friend or loved one had acquired HIV/AIDS. Where would you go on the Internet to get information?" A grounded theory analysis (Glaser & Strauss, 1967) of the recorded and transcribed "think alouds" (Shapiro, 1994) revealed a three-stage model that explained how these black and white students searched for online health information, using HIV/AIDS as a case study (Smith, 2008). These findings are presented and discussed below.

Literature Review

Concern over people's inability to discern good online health information from bad prompted the National Network of Libraries of Medicine, and the Medical Library Association to focus on online health-information literacy (National Cancer Institute, 2005; National Network of Libraries of Medicine, n.d.; The Medical Library Association, n.d.). Improving online health information literacy became part of the Healthy People 2010 campaign, which the U.S. Department of Health and Human Services launched in 2000. The campaign consisted of a set of disease prevention and health promotion objectives for America to reach by 2010 (United States Department of Health and Human Services, 2000). One of those objectives included improving online health information literacy, as more people seem to be turning to the Internet as a source of health information

Use of the Internet as a Health Resource Grows

As a resource for health information, 85% of American adults (113 million people) have searched the Internet for at least one of 17 health topics. People were likely to conduct such searches on a needs-only basis, after a health care professional diagnosed them, a friend, or relative with an illness (Osborne, 2005). While trusting physicians as a health information source, nearly 50% of those surveyed went online first, with only 10%

going to their physician first (Hesse, Nelson, Kreps, Croyle, Arora, Rimer, et al., 2005). Approximately 7.5 million people have used the Internet to get health information, less than three million consulted their doctors (Roache, 2002). Some physicians (C. Jacobson, personal communication, March 5, 2005; Gerencher, 2007) worry that students and adults who perceive that they have the skills to find good health information may become solely dependent upon the Internet as their source for making health decisions, resulting in risky and ill-informed self diagnoses. There are also financial consequences related to not knowing how to search for good online health information.

Health Information Illiteracy Expensive

Health information illiteracy (including online health information illiteracy) costs the United State's health care system up to $73 billion a year in unnecessary hospitalizations, emergency room visits, and self-treatment errors (Weiss, 2007). One out of three American adults lack "sufficient health literacy to effectively undertake and execute needed medical treatments and preventive health care" (p. 7). The problem cuts across class and race but is more acute among the poor. Low socioeconomic status African Americans who also had Internet access showed poor health outcomes because the online information was culturally insensitive or was written beyond their ability to understand it (Birru & Steinman, 2004). Low socioeconomic status is defined as a one person making less than $10,830 per year (Federal Register, 2009).

While $2.2 trillion was spent on health care in the United States in 2007 (Centers of Medicaid and Medicare Services, 2008), a study by Vernon (2007) concluded that money saved from improving people's ability to evaluate health information would cover the cost of insuring every one of the 47 million Americans who did not have health insurance in 2006. The sheer number of health-related Web sites that exist, many of which contain outdated or erroneous information (Ivanitskaya et al., 2006; National Cancer Institute, 2005; National Network of Libraries of Medicine, n.d.; The Medical Library Association, n.d.) make combating online health information illiteracy more difficult. An estimated 100,000 health-related Web sites exist (Eysenbach, Sa, & Diepgen, 1999). The 100,000 health-related Web sites are suspect because the data are more than ten years old, and using "HIV/AIDS" as a search term, one is likely to generate millions of "hits," suggesting that there are more health-related Web sites.

In terms of blacks and the use of the Internet as a health information resource, Murray, Lo, Pollack, Donelan, Catania, White, et al., (2003) noted that younger and better-educated blacks have helped narrow the gap between those who have access to the Internet to search for health information and those who do not. Regardless of race, it was typically the young and better educated who had easier access to the Internet and used it more than the older and less educated. A study of general Internet use among 3,400 African Americans 13-74 (Klores, Sach, & Traub, 2008) showed that 68% are online, with more than 90% of black teens using the Internet. Hocker (2008) noted increased Internet adoption rates among black senior citizens, high school graduates, those who did not graduate, and people making less than $30,000 a year. The increase was attributed to aggressive broadband marketing campaigns, and the reduction in prices for home Internet service. In spite of increases in general Internet use and the use of the Internet as an online health information resource among African-Americans, a deep and generational

distrust exists among many of them toward the United State's health care system, which might hamper online health information literacy efforts geared toward African Americans.

Cultural Obstacles to Online Health Information Literacy

Gamble (1997) has researched how slaves were subjected to medical experiments without their consent during the United States Civil War. These experiments continued in the 20th century with the Tuskegee Syphilis Study. Doctors, from 1932-1972, denied nearly 400 black sharecroppers treatment for syphilis so that health care professionals could learn how the disease ravaged the body (National Public Radio, 2002; University of Virginia Claude Moore Health Sciences Library, 1996; Washington, 2006). Stories about the experiments, which have been passed down through word of mouth in the black community, are the source of much of the distrust that many African-Americans have of the medical system today (Corbie-Smith, 1999; Jones, 1993), and are linked to low participation rates of African Americans when it comes to clinical trials, organ donation efforts, routine preventive care, and HIV/AIDS prevention efforts. The link between the distrust African-Americans have of the health care system and low participation rates in efforts to improve their health suggest a successful online health information literacy program for African-Americans would have to be culturally sensitive. Cultural sensitivity is defined as, "the extent to which ethnic or cultural characteristics, experiences, norms, values, behavior patterns, and beliefs of a target population, and relevant historical, environmental, and social forces are incorporated in the design, delivery, and evaluation of targeted health interventions, including behavioral change materials and programs" (Resnicow, Braithwaith, Diloria, & Glanz, 2002, p. 493).

Research Questions

Programs have been implemented to combat health information illiteracy (Chepesiuk, 2007; Masi, Suarez-Balcazar, Cassey, Kinney, & Plotrowski, 2003; Onley, Warner, Reyna, Wood, & Siegel, 2007; University Specialty Clinics, 2005). But there has been little effort to provide online health information literacy training. The nation's growing dependence upon the Internet as a health information resource (Osborne, 2005; Roache, 2002); the lack of knowledge about how to properly search for online health information (Smith, 2008); and the cost of health information illiteracy (Weiss, 2007) are some of the reasons why online health information literacy training is needed, particularly for college students. An effective health communication/promotion campaign is based on a careful analysis of data, resulting in informed decisions about how to launch such a campaign (Glanz, Rimer, & Lewis, 2002; National Cancer Institute, 1989). One of the steps needed in order to develop a theory-based online health information literacy campaign is to learn how college students search for such information. Consequently, the following research questions are offered.

RQ1: How do black and white students search for HIV/AIDS information on the Internet?

RQ2: How do searches from students who have taken online health information literacy training differ from searches conducted by students who have no training?

A Personal Note

The researcher's interest in studying online health information illiteracy stemmed from his experience from 2000-2001 in searching for brain tumor information on the Internet after the researcher's father had been diagnosed with a brain tumor. The researcher spent four to five hours per day searching for online information about brain tumors related to diagnoses, prognoses, clinical trials, and treatment options. Despite 20 years of journalism experience requiring research skills, the researcher was overwhelmed by the amount of information on the Internet about brain tumors. Lacking in online health information literacy skills, the researcher found it difficult to determine how to tell good online brain tumor information from bad. Following his father's death in 2001, the researcher began wondering if other people had had the same experience in looking for online health information. The researcher's experience with his father led to a dissertation on the subject of online health information literacy, and this research article based on the dissertation.

Methodology

The researcher received Institutional Review Board approval from both of the universities to conduct the studies in June and August of 2007. The predominately-black university was located in a large, urban southeastern city. A convenience sample of 15 undergraduates from that university's journalism department participated in the "think alouds," and received extra class credit for doing so. "Think alouds" are a data collection method designed to capture "what actually goes through a person's mind as he or she performs a task" (Shapiro, 1994, p. 1). Taking advantage of a person's short-term memory, "think alouds" are a way of learning what subjects are thinking in almost any communication task, from listening to a persuasive message, "watching television, deciding which newspapers to read, or carrying on a conversation" (Shapiro, p. 3). It is a way of collecting data in "real time." The researcher gathered "think aloud" data by recording students' comments as they searched for HIV/AIDS information on the Internet during one-on-one audio taped sessions between September and October of 2007. The researcher was present at all sessions and took notes as students participated in the study.

The sessions lasted 30 to 45 minutes, and occurred in a room with a computer that was connected to the Internet. All of the students were African-American. Eight of them (53%) were female, seven (47%) were male As a part of the study, students also filled out a four-item pre and a 27-item post "think aloud" survey, to gather information beyond the "think alouds."

Fifteen undergraduate students in the journalism department from a predominately-white university located in a large Southeastern city also participated in

the "think alouds," and received extra class credit. Thirteen of the students (87%) were white; one black student and one Asian student (13%) accounted for the remainder of the "think aloud" participants. The Asian and African-American students' "think aloud" results were excluded from the study because of such a low turnout of the two races. In terms of gender, 12 (80%) were female, and three (20%) were male. The one-on-one audio taped "think alouds" also took place in a vacant room with a computer with access to the Internet. The sessions lasted 30-45 minutes. The researcher conducted the audio taped "think alouds" at the predominately-white university between November and December of 2007, using tape recorders supplied by the researcher. The 30 to 45 minute one-on-one sessions occurred in a vacant office, with a computer and Internet access. The researcher was present at all sessions and took notes as students participated in the study. Students also filled out the same pre and post "think aloud" surveys that were distributed at the predominately-black university. Beyond the fact that the sample of college students was convenient, their knowledge gained from years of experience working with computers and the Internet, the fact that they were among the segment of society most likely to use the Internet to look up health information, and their propensity to engage in sexual activity that put them at risk for acquiring HIV/AIDS made them good candidates for this study (American College Health Association, 2007; CDC, 2003; CDC, 2006; Escoffery et al., 2005; Oblinger & Oblinger, 2005). After collecting and transcribing the "think aloud" data, the researcher analyzed the data using grounded theory.

Grounded Theory

Glaser and Strauss (1967), in their well-known book *The Discovery of Grounded Theory,* described the mostly qualitative methodology as generating theory from data. It differs from the traditional laboratory-based hypothetic-deductive method used by quantitative researchers. In grounded theory, transcripts from interviews and focus groups are analyzed and categorized into a hierarchal series of abstract terms. In this case, these terms were derived from the transcribed "think alouds." From this analysis, a theory/model emerges from the data. As the data change, so does the theory. It is an inductive approach, as opposed to a deductive one. The interrelationship between the data and the emerging theory is, perhaps, grounded theory's greatest strength. The theory that emerges fits that particular data perfectly (Glaser & Strauss). The process the researcher conducted in this study is detailed below.

Step 1. The researcher collected and transcribed the data. In this case, the data consisted of 28 "think aloud" interviews.

Step 2. The researcher employed open coding in analyzing the data. Open coding refers to constructing terms (codes) that "open up the text and expose the thoughts, ideas, and meanings contained within" (Strauss & Corbin, 1998, p. 102). In open coding, the researcher came up with a term that labeled and summarized events that occur in the data. The coding term answers the question, "What is happening here?" Open coding was the first level of analysis, often a descriptive account of an event(s) found in data. Data can be open coded line-by-line, sentence-by-sentence, paragraph-by-

paragraph, or document-by-document (Strauss & Corbin). The "think aloud" transcriptions were open-coded paragraph-by-paragraph, versus line-by-line or document-by-document. The researcher constructed the open-coded terms by pulling these terms directly from the "think alouds." These common terms used by a majority of the participants were called "in vivo codes" (Strauss & Corbin). The researcher incorporated these "in vivo codes" into the newly constructed category(ies). The use of "in vivo codes" in open coding helped establish credibility because they were the terms the majority of the participants used.

Step 3. Category construction and Axial coding. One can think of category construction as the second level of analysis. The researcher constructed categories by reassembling data "fractured during open coding" (Strauss & Corbin, 1998, p. 12) to expose deeper meanings. From these abstract categories came concepts, which played a crucial role in theory development (Shoemaker, Tankard, & Larosa, 2004; Wimmer & Dominick, 2003). Axial coding established a conceptual link between open coding terms, helped to unlock the core category, and formed the foundation of the emerging theory/model (Strauss & Corbin).

Step 4. Selective Coding/Emergence of the theory. Selective coding is defined as "the process of selecting the central or core category, systematically relating it to other categories, validating those relationships, and filling in categories that needed further refinement and development" (Strauss & Corbin, 1998, p. 116). The core category identified by the researcher in this study was "knowledge," which linked "anxiety" and to "help." Selective coding represented the culmination of the work done from data collecting, open coding, construction of categories/ axial coding, leading to creation of the theory or model. The researcher took all that had emerged from open coding, selection of categories and axial coding to come up with hypotheses, which were linked to form a theory or model that explains the phenomenon under study (Strauss & Corbin). Table 1 shows how the model developed, using open coded terms, axial and selective coding terms and categories (note: Read table from the bottom).

If done correctly and logically, a story emerges from the data in a grounded theory study. It is a story that "must be told at a conceptual level, relating subsidiary categories to the core categories" (Moghaddam, 2006, p. 8). Since it allows theory to emerge from data, grounded theory is a methodology best suited to learn more about an overlooked phenomenon or a phenomenon that researchers have given superficial attention (Moghaddam). Furthermore, grounded theory, because of its systematic and logical approach, meets the requirements of "good" science: "significance, theory-observation, compatibility, generalizability, reproducibility, precision, rigor, and verification" (Strauss & Corbin, 1998, p. 27). The story that emerged in this study is presented in the description of the study's results below.

Table 1. Sample Open-Coding, Axial and Selective Coding Terms and Categories

Selective Coding/Theory or a model, where one refines the theory/model (Highest level of abstraction)	**Categories** *Stage 1* **<u>Anxiety</u>** Anxiety leads to knowledge	**Categories** *Stage 2* <u>Knowledge:</u> The Core Category Knowledge leads to help, and links anxiety with help	**Categories** *Stage 3* <u>Help:</u> Coping mechanisms are a type of help
Construction of categories that form the base of the theory/model Axial Coding (Mid-level abstraction)	Threat: Risk factors/transmission, symptoms, prevention are types of threat	Knowledge comes from information foraging/filing/African-American information foraging/filing	Coping Mechanisms: Online/offline emotional/psychological support represent coping mechanisms
Open coded term (s) (Low-level abstraction)	Risk factors, transmission, symptoms, prevention (in vivo codes)	Information foraging/filing, African-American Information foraging/filing	Online/offline, emotional/psychological support
Raw Data (transcripts) No abstraction here	Data	Data	Data

Results

Demographic Information

The data from the pre and post "think aloud" surveys revealed that 19 students (63%) were female; 11 (37%) were male. Fifteen (50%) were African-American, 14 (47%) were Caucasian. One student (3%) was Asian. In terms of years in school, 16 (53%) were juniors, eight (27%) were seniors and six (20%) were sophomores. When it came to general Internet use, 25 (83%) spent one to four hours per day on the Internet. By comparison, 74% of college students nationwide use the Internet 4 or more hours per week (Jones, 2002).

> RQ1: How do black and white students searched for HIV/AIDS information on the Internet?

The researcher developed a model he calls the Anxiety, Knowledge, Help Model, or AKH Model, of the searching process as it related to how students searched for HIV/AIDS information on the Internet (see Table 2).

Model Overview

The researcher introduced the hypothetical, which raised anxiety (see gray arrow). Anxiety sparked an initial search into "knowledge" about HIV/AIDS, and a return to "anxiety" (see dashed double arrow). A continuous interplay between "anxiety" and "knowledge" began (see solid double arrow). The more the students learned about HIV/AIDS, the more anxious they became. After about 15 to 20 minutes of going back

and forth between the "anxiety" and "knowledge" stages, students began seeking out and sharing with their hypothetical friend/family member online resources geared toward helping to ease the emotional and psychological burden of the disease. They had entered the "help" stage (see solid dark one-way arrow). Anxiety was evident throughout all of the three stages of the model (see "anxiety throughout the stages" arrow). Below is a detailed explanation of the model.

Table 2. The Anxiety, Knowledge, Help (AKH) Model

Hypothetical produces anxiety	Stage 1 Anxiety	SEARCH	Stage2 Knowledge	Stage 3 Help
Anxiety throughout all stages				
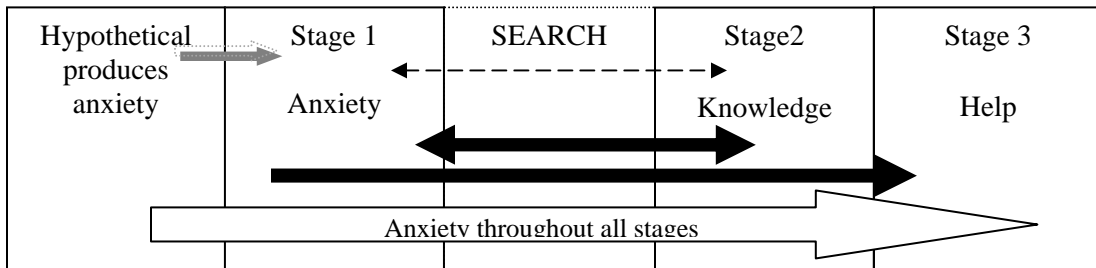
Stage 1 = Anxiety. Anxiety referred to the uneasiness students felt as soon as the hypothetical was introduced: that their friend/family member had acquired HIV/AIDS. There was a degree of anxiety and the anticipation of launching a search for HIV/AIDS information on the Internet for a friend or a loved one, even if the situation was hypothetical. There was also anxiety generated over some research participants' realization that they, too, could be at risk of getting HIV/AIDS. "I would definitely seek out information about how HIV/AIDS is transmitted, just to make sure I take the proper precautions," said one white male student from the predominately white university. A black male student from the predominately black university summed up the thoughts of at least 75% of the students when it came to the anxiety he was experiencing. He said:

> I need something (information from the Internet) short and sweet and not
> so animated that it makes fun of it (HIV/AIDS), and gives me information
> that lets me know what is going to happen to my friend, what she did to
> contract it, and how you can prevent it from yourself.

Anxiety also was generated as students thought about what a daunting task this would be: to find information that they thought was credible and up to date among thousands, perhaps hundreds of thousands of health Web sites for someone they cared about. For at least 90% of the students, the first step in the process after hearing the hypothetical was to begin their search in the "knowledge stage," which generated even more anxiety.

Stage 2 = Knowledge. Students initially foraged for basic information about HIV/AIDS. Generally, the first questions they asked were, "What exactly is HIV/AIDS?" Where did it come from?" This search by a white female student from the predominately white university typified how 90% of all the students began their initial search. She said:

> I'm going to the Google bar and type in AIDS. I'm clicking on AIDS.org,
> which has a "What is AIDS?" page. I'll go read that. I'm reading about
> what AIDS means…. I'm reading about what happens when you have
> AIDS and how you get AIDS. There is a link to a site called how risky is
> it? What does it mean if I'm HIV positive?

After this initial foray into the "knowledge" stage, they would work between
"anxiety" and "knowledge," which lasted between 15 and 20 minutes. Students sought
answers to more in depth questions. "What are its symptoms?" "How is HIV/AIDS
transmitted?" "What is the life expectancy of my friend/loved one?" "How can I protect
against it?" One black student from the predominately black university noted after
searching for information about how the disease affected African-Americans said, "It's
pretty sad that my friend has this disease. Right now I'm trying to learn as much as I can
about this so I can help her."
As students jockeyed back and forth between "knowledge" and "anxiety,"
personal safety became a source of anxiety for at least 45% of students, as they searched
for information related to how to keep from getting HIV/AIDS. Another source of
anxiety was related to the potential social stigma their friend/family member might
experience because they have the disease. A white female student from the
predominately white university revealed in a recorded interview after the think alouds
that she had had a relative diagnosed with HIV. She commented on the anxiety and
growing anger she was feeling toward family members who have started to stigmatize
and avoid that relative. She said:

> I feel like…he's made some decisions that got him to where he is now. At
> the time he was making those, I could understand them (family members)
> being irritated with him. But at this point, he's got a terrible illness and I
> feel like the family should be able to support him. There is such a lack of
> communication.

Twenty-nine out of 30 students searched for information about risk factors,
transmission, and prevention at least once. The more they learned about HIV/AIDS, the
more anxious they became. To overcome the anxiety, it seemed that they searched for
more information to try and reduce the anxiety.

"Knowledge" Stage Reveals a Sub Theme and Different Search Strategy
for Black Students

A component of the "knowledge" stage unique to black students at the
predominately black university also emerged. In addition to "foraging" for general
HIV/AIDS information, all African-American students also searched for HIV/AIDS
information, and its affect on the African-American community. Those students did this
search on their own initiative. The researcher labeled this sub theme as "African-
American foraging." This black male student's comment typified what others said as he
searched the CDC Web site, http://www.cdc.gov, looking for HIV/AIDS and its impact
on the African-American community. He stated:

I might click on African American. It says that HIV/AIDS has hit African Americans the hardest, which is something my friend would want to know. And it gives you the real statistics on how many. And it tells you that it is the leading cause of death among African-Americans. It has a chart, which is good to see visually.

Stage 3 = Help. Help was characterized as the need to find information to assist their hypothetical friend in coping with the impact of the disease. All of the students searched for resources on the Internet to support the emotional/psychological and medical needs of their hypothetical friend or relative at least once after progressing through the "anxiety" and "knowledge" stages. As a part of "help," students searched for online and offline resources, including information about local clinics, counseling services, HIV-related Web sites, chat rooms, discussion boards, and other online social support networks to help ease the psychological and emotional burden of the disease. A black female student from the predominately black university explained what she was looking for in the "help" stage of the model. She said:

You might want to look up some clinics to go to for you and your friend to sit down and have a talk. It helps if you have that meeting. I believe that the first thing I want to research is how to cope with it first. And once me and my friend get through that part, how can I be able to assist you in keeping you healthy: What can you eat, drink? Different things like that.

A white female student from the predominately white university searched for online support to help the student and her deal with the emotional impact of coping with the disease. After visiting a number of HIV Web sites, she concluded that what she had found would help her and her friend cope with the emotional difficulties ahead. She said, "They give tips and discuss symptoms you might go through like denial and anxiety and stress. So this would help me. As my friend has just contracted HIV/AIDS, this will help me to understand what they are going through."

Another white student from the predominately white university came across what she thought was good advice on providing her friend/family member with ways to help provide emotional support. She read the following passage from a Web site:

We should encourage the person. Don't avoid the person. Include him or her in activities whenever possible. Don't be afraid to discuss the disease. Don't be afraid to touch the person. Offer to help find professional counseling if it is desired. Doctors, nurses and social workers understand the person with AIDS and your role as a caregiver. Basically encourage the person to develop a community network for the person.

Once in the "help" stage, students became empowered to share what they had learned with their family member/friend. Students felt obligated to help their friend or relative through the crisis, as much as possible. Unable to advise them about what to do from a medical standpoint, most students exhibited a high degree of emotional support for their friend or relative who had HIV/AIDS. Perhaps their most important

contribution, however, was the ear they seemed to lend to a patient dealing with the emotional and psychological burden of the disease, once they were empowered and dealt with their own anxieties.

In addition to the emergence of the AKH model, here are some other highlights from the study which came from the pre and post "think aloud" surveys. Twenty-five (80%) of the students began their search at a search engine. Google and Yahoo! were the most popular search engines. Only 11 (37%) of the students participating in the "think alouds" visited a specific health Web site for their initial search for health information. Twenty-three (77%) of the students said it was easier to look up health information on the Internet than to wait to see a health care professional. While self-assured that they could find good health information on the Internet, 27 out of 30 students (90%) failed to use advanced search options to simplify their searches during the recorded "think alouds." The researcher observed that after receiving so many hits, some students stared at the screen for a moment, and then chose among the first five links that appeared at the top of the search-engine hit list. It was usually the first link that appeared. Their staring at the screen was, perhaps, associated with them being overwhelmed with so many "hits." To make the point, on January 28, 2008, the researcher typed in "HIV/AIDS" in Google, the students' most popular search engine. It returned 24,000,000 hits. When the researcher typed in "HIV," the search engine returned 61,200,000 hits. Google returned 165,000,000 "hits" when "AIDS" was typed in. None of these 27 students typed in additional keywords to limit the number of "hits."

Seventeen students (57%) had spent time looking up health information on the Internet for a family member or friend who had become seriously ill. From that number, 12 students (40%) had conducted such searches one to two hours per day; five students (17%) conducted such searches less than an hour per day. Thirteen students (43%) did not answer the question.

RQ2: How did searches from students who have taken online health information literacy training differ from searches conducted by students who have no training?

Three students, trained in how to use the Internet to search for information, bypassed search engines in their initial attempts, and went directly to specific and credible health Web sites. Bypassing search engines was apparently a skill they have learned. Some of them told the researcher after the "think alouds" that they had taken courses that introduced them to how to find and evaluate health information on the Internet. Among their favorite medical Web sites were http://www.cdc.gov, http://www.Webmd.com, http://www.thebody.com, and http://www.nih.gov. These students, however, did not ignore search engines totally. They would turn to search engines after exhausting their list of specific health Web sites they could remember during the "think alouds." Additionally, when they would visit a search engine, these students would refine their search by putting in specific terms beyond HIV and AIDS, thereby reducing the number of "hits." They also used an advanced search option that would limit the years for which information would be retrieved.

Two students searched online databases that were accessible through their university libraries, where they found scholarly and popular articles on HIV/AIDS. One

had taken a course in media literacy. He spent part of the spring semester of 2007 learning how to find health information on the Internet. This student began his search for HIV/AIDS information at the library Web site of this predominately-white university, where he learned how to manipulate databases to get exact articles that he wanted. He explained how he obtained the latest information about HIV/AIDS from the database. He stated:

> What I'd like to do is try to minimize the stuff that has been written like maybe ten years before. I want to know what has happened in the past 10 years and see what I can find about it. So I pretty much type that in the database that I want.

Interviews after the "think alouds" revealed that some students had previously searched for health information on behalf of a loved one or friend who was ill. They returned to these sites during the "think alouds." Unlike students untrained in how to search, students with health information literacy experience distrusted Wikipedia because the site allowed anyone to post information.

Discussion

Students traveled back and forth between the three-stage AKH model when searching for HIV/AIDS information after they were presented with the hypothetical situation. Stage 1, "anxiety," occurred after the initial hypothetical was presented. Students exhibited anxiety in their initial search. Stage 2 was a search for "knowledge," which was characterized by the need to search for basic information about HIV/AIDS. As students searched, they switched back and forth between the "anxiety" and "knowledge" stages. It was as if the more they learned about HIV/AIDS ("knowledge"), the more "anxious" they became. The anxiety, which was consistent throughout the stages, can be linked back to: (a) the anxiety created by the initial instruction by the researcher to search for online HIV/AIDS information for a hypothetical friend/family member; (b) students' concern for their own safety as they search for online HIV/AIDS information; (c) the abundance of HIV/AIDS information on the Internet, and students' inability to evaluate the credibility of that information; and (d) the mostly negative news they discovered about the disease, which added to the anxiety. Perhaps the largest source of anxiety appeared as students tried to navigate through these HIV/AIDS Web sites without the skills to evaluate the quality of those Web sites. The problem was made worse because most students did not use advanced search options to limit the millions of "hits" in Google if one just typed in "HIV/AIDS" in the search engine.

The anxiety that students felt while searching for health information on the Internet is consistent with information overload, which is defined as "the state of an individual or system in which excessive communication inputs cannot be processed, leading to breakdown" (Rogers, 1986, p. 181). Case (2002) noted that stress and anxiety are likely to increase when one is faced with too many sources of information and uncertainty over the quality of that information. Anxiety was not all bad, however, because the AKH model suggested that anxiety and the need for more knowledge drove students back to anxiety, which eventually drove students to "help." It seemed that

confronted with all of the bad news about HIV/AIDS, students were motivated to do whatever they could to help ease the burden of a friend/family member who has hypothetically acquired the disease.   One of the most interesting stages was the knowledge stage, as it exhibited a number of interesting twists and turns.

The Knowledge Stage and Information Foraging Theory

The knowledge stage is consistent with information foraging theory, which "assumes that people, when possible, will modify their strategies or the structure of the environment to maximize their rate of gaining valuable information" (Pirolli & Card, 1999, p. 643).   Pirolli and Card use the analogy of how animals forage/hunt/search for prey in the wild to explain IFT.   Predators will attempt to maximize the success of their hunt by specifying what prey they will seek out, based on the amount of energy and time it will take to catch it, and the size of the meal.   A cheetah might hunt/forage for a wildebeest calf instead of an adult wildebeest because such a hunt will take up less energy and time, and likely will be more successful.   The goal is to use the least amount of effort for the greatest amount of gain.   Pirolli and Card suggest that those animalistic behaviors also explain how people look for information.   In order to conduct a successful hunt for information, people will specify what they will hunt for so as not to waste time and energy.

To use the predator analogy, Google and Yahoo! were where 25 out of 30 students began their hunt for HIV/AIDS information on the Internet, as they typed "HIV" or "AIDS" in the two most popular search engines to answer the questions they raised. Google and Yahoo represented the easiest and quickest way to find basic HIV/AIDS information.   Such a search, they thought, wasted little time or energy, in spite of the fact that their search exposed them to thousands and perhaps hundreds of thousands of HIV/AIDS related Web sites.   Pirolli and Card's predator analogy suggests: (a) the field where the students hunted was too large for them to be successful; and (b) the multitude of sites from which to choose helped increased student anxiety.   The "knowledge" stage of the model suggests that the anxiety experienced by students looking for online health information can be reduced if students are taught online health information literacy skills. From a grounded theory methodological standpoint, the "knowledge stage" also represented the core category that linked "anxiety" with "help," which is a crucial part of grounded theory research (Glaser & Strauss, 1967; Strauss & Corbin, 1998).

As students searched, they also filed information for future reference, which is also consistent with a part of information foraging theory and the analogy of how wild animals will hide a carcass and return to it later (Pirolli & Card, 1999).   Like those animals, students bookmarked Web site(s) they found useful so they could return to them later or share them with their friend/loved one.   One black male student at the predominately-black university bookmarked a page on *The Washington Post* Web site on behalf of his hypothetical family member who was infected with HIV/AIDS.   It was about a new drug that might help slow the progression of the disease.   He read aloud what he had found.   He stated:

Rescriptor prevents HIV from entering the nucleus of healthy T-Cells. This prevents the cells from producing new HIV and decreases the amount of virus in the body. This is something worth noting as well. This is definitely something that I would bookmark.

The racial differences in how students searched that emerged in the knowledge stage were also striking and worthy of a closer look.

Study Reveals Racial Differences in Search Strategy

While white students at the predominately white university searched for general information about HIV/AIDS, black students at the historically black university conducted a general search, and one that specifically focused on the disease's impact on the African-American Community. The researcher provided no suggestions of how either group of students should search. The researcher, however, is African-American, and that may have made it "OK" in black students' eyes to search for how HIV/AIDS affected the black community. Agenda setting (McCombs & Shaw, 1972) might have also played a role in explaining why black students searched the way they did. As McCombs and Shaw proposed, the media tell you what to think about. Agenda setting suggests that: (a) campus and other media coverage of heightened efforts at HIV/AIDS prevention and education at the predominately black university as a result of high numbers of HIV/AIDS cases among Historically Black Colleges and Universities in the state (Keels, 2005); and (b) stories about the disease's disproportionate impact on the black community in general (Falco, 2008) also helped explain why black students searched for general information about HIV and specific information related to how it affected African Americans.

One of the on-campus sources of news about the disease that help set the HIV/AIDS agenda among black college students was the student newspaper. The researcher found 27 articles about HIV/AIDS prevention/education programs, editorials advocating students attend, and op-ed pieces about the dangers of acquiring HIV/AIDS among the archives of the 36 editions of the online weekly student newspaper published between 2003 and 2007. Another source of HIV/AIDS information that helped set the agenda among black college students is Black Entertainment Television. The cable network's primary target audience is African-Americans 18-34 (AdAge: Custom Programs, n.d.), reaching 98 million households. Black Entertainment Television is also a major source of information about HIV/AIDS prevention education for black college students, between Rap Videos and Hip Hop videos. Since 1989, BET and the Kaiser Foundation have produced "Rap it Up" PSAs (Kaiser Family Foundation, n.d.), resulting in the production of 31 HIV/AIDS PSAs, which were aired 9,000 times or an average of six times per day on BET (Kaiser Family Foundation, 2004). Black Entertainment Television also brought its HIV/AIDS awareness programs to HBCUs throughout the country, including this one. Kaiser also funded the production of TV ads about HIV/AIDS and its impact on the African-American community, which aired more than 17,000 times on Viacom-owned TV networks and a host of cable networks.

In addition to agenda setting (McCombs & Shaw, 1972) another factor that might explain why black students searched as they did is collectivism. Collectivism, an integral

part of African, Asian and Latino culture that has been handed down through generations, puts the needs of others above self (Allen & Bagozzi, 2001; Markus & Kitayama, 1991, 1994). A study of collectivism among black college students at a predominately black university (Wilson, Moore, Boyd, & Easley, 2008) showed that the idea of feeling connected to others played an important role in their lives. Collectivism suggests that black students had a stronger motivation than white students to search for general HIV/AIDS information and specific information about how the disease has disproportionally affected African Americans because they might feel part of a larger group that is coping with the impact of HIV/AIDS in their communities, as well as, in some cases, within their own households.

Despite the differences in how black and white students searched for HIV/AIDS, perhaps the most important lesson from this study is the need for online health information literacy training.

Online Health Information Literacy

In terms of how students searched for online HIV/AIDS information, the results were consistent with results from previous studies (Escoffery et al., 2005; Ivanitskaya et al., 2006; Nsuangani, 2003; Peterson et al., 2003; Smith, 2008), which showed that students depended too much on search engines and did not use advanced search options to improve the search. In comparison, 27% of Americans 18 to 29 began their search as a specific health Web site (Fox, 2006), versus 80% of students who participated in this study. The results were also consistent with previous studies that revealed that 75% of Internet users between 18 and 29 nationwide started their search for health information at a search engine (Fox, 2006).

Perhaps more enlightening was comparing the health sites students visited to the sites MLA recommended. Health Web sites must meet certain standards in order to make the MLA list: (a) the site must be updated frequently, and the date of the last revision should be clearly posted, (b) facts should be verified through primary sources found in the professional literature, abstracts or links to those sources, (c) opinion should be clearly labeled, and (d) sponsors of the Web site should be clearly identified (The Medical Library Association, n.d.). See Table 3, which compares where students visited to recommendations made by the MLA.

The study clearly shows the need for online health information literacy training for students and perhaps others as well. They need to know how to evaluate online health information so that they can make informed decisions about health care. But such training should reinforce the need for a collaborative relationship (Glanz et al., 2002; Stevenson, Kerr, Murray, & Nazareth, 2007) between students and health care professionals when looking up health information on the Internet, to prevent self-diagnoses from health information obtained from the Internet which might lead to more serious health problems.

Table 3. Comparing where students visited to the sites suggest by the MLA[1]

Sites students visited	MLA's top 10 sites
http://www.medicine.com	Cancer.gov (http://www.cancer.gov)
http://www.Healthinfo.com	Centers for Disease Control and Prevention
http://www.Thebody.com	http://www.cdc.gov
http://www.AIDS.org	Familydoctor.org http://familydoctor.org
http://www.cdc.gov (The only match with MLA)	Healthfinder http://www.healthfinder.gov
http://www.drkoop.com	HIV InSite http://hivinsite.ucsf.edu
	Kidshealth http://www.kidshealth.org
	MayoClinic http://mayoclinic.com
	Medem http://medem.com
	MEDLINEplus http://medlineplus.gov
	NOAH (New York Online Access to Health) http://www.noah-health.org

In the post "think aloud" survey, 77% of students (23 out of 30) said they looked for health information on the Internet because of the length of time it takes to obtain a doctor's appointment. Indeed. Wait times have increased to an average 20.5 days, an increase of more than a week since 2004 (Thompson, 2009). Another reason why college students search the Internet for health information might be related to the potential stigma associated with going to the university health clinic. Barth, Cook, Downs, Switzer, and Fischhoff (2002) noted that students will delay or avoid visiting the student health center because other students might see them and wrongly conclude, perhaps, that they are going to the center to be tested for sexually-transmitted diseases, such as HIV/AIDS. Searching for health information on the Internet, despite most students' lack of online health information literacy skills, provides a stronger sense of privacy than visiting the university health clinic or discussing your health problem with a friend, loved one or health care professional.

Limitations/Implications

Ideally, students who had actually looked up information about HIV/AIDS on the Internet for a friend or loved one who had the disease would have been the best candidates for this study. However, privacy and IRB concerns, as well as the expense of trying to find such students, made that prohibitive. The results might suggest trends common among other college students related to how they search for HIV/AIDS information on the Internet. Yin (2003) referred to this as analytical generalization: the ability to take the theory that emerges from a qualitative study and generalize that theory to a similar situation.

This study, perhaps, sheds some light on how one might implement a successful online health information literacy campaign among an African-American community that has a generational mistrust of the United States health care system, dating back as far as the Civil War and as recent as the Tuskegee Syphilis Study. Suspicions about the health care system among blacks continues to be a problem, as evidenced by the fact that 58%

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[1] *Note:* The only site students visited that the MLA had approved was the Centers for Disease Control and Prevention site at http://www.cdc.gov

of blacks versus 25% of whites thought that physicians today use medications to experiment on people without their consent (Johns Hopkins Medical Institutions, 2008); 25% of blacks versus 15% of whites thought their physician would ask them to participate in a study even though the study might be harmful. With the legacy of Tuskegee still fresh, such a campaign would have to overcome that distrust through a culturally-sensitive online health information literacy effort. Culturally-sensitive health promotion campaigns have been successful, resulting in increased prostate cancer screenings for black men, healthier eating habits, and increased cervical cancer screenings for black women (Delores, 2004; Friedman & Kao, 2008; Yancey, Tanjasir, Klein, & Tunder, 1995).

But there has been no effort to provide culturally-sensitive online health information literacy training that targets African-Americans. Such a campaign might be particularly valuable for less-educated blacks in the general population who also use the Internet. It would provide them with the skills to search the Internet effectively for health information. Training would also build confidence in their research abilities, while helping to reduce the deep-seated skepticism many of them have about the American health system, which is historical in nature. Future research would be geared toward developing a culturally-sensitive online health information literacy campaign. Referring to the AKH Model, the researcher proposes that training on how to properly search for online health information would decrease anxiety, increase knowledge and help within the three-stage model.

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Author's Note

Kim Smith, Ph.D. teaches multimedia and a course on new media's impact on society in the Department of Journalism and Mass Communication at North Carolina A&T State University in Greensboro, N.C. He received his Ph.D. from the University of South Carolina in mass communication, with an emphasis on health communication. His research interests focus on new media and health communication. Correspondences regarding this article can be addressed to: Kim Smith, Ph.D., Department of Journalism and Mass Communication, North Carolina A&T State University, Greensboro, NC 27401; Telephone: 336-334-7900 ext. 3010; E-mail: Drksmith1960@yahoo.com or kcsmith1@ncat.edu

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