

KNEE ARTHROPLASTY: SHARED EXPERIENCE IN A VIRTUAL COMMUNITY

By

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Abstract of Dissertation Presented to the Graduate School
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There is no argument that the internet has become fundamental to living in contemporary society. Information once obtained secondhand from family, friends and acquaintances—the two-step-flow of communication—can now easily be found via the internet. Social science research has indicated that in any community there are individuals to whom others look for opinions and advice on various issues. This paper examines how opinion leadership, trust, credibility, and virtual community intersect in a confidential online health community formed around potential, pending, and completed knee replacement. Knee replacement surgery, or knee arthroplasty, is the most common joint replacement procedure performed today. Strength of weak ties also informs this research as information deemed more valuable to community members regarding knee replacement came from associations formed online rather than from one's more immediate strong tie relationships.

This mixed-method case study utilized Social Network Analysis (SNA), an online survey, and phenomenological interviews to understand how members of one such online community used information they gathered there. A mixed methods approach also helped extract accounts related to how being a member of this community shaped

perceptions of an individual's condition and how they experienced the condition in and of itself.

Findings indicate that experiential proximity—impressions that the “other” has been through similar circumstances—generates perceptions of opinion leadership, trust, and credibility. Results indicate that how people use online health forums and what it is that attracts people to them is related to how effective forums are in helping users cope with a particular health condition. This study extends previous research by further demonstrating that peer-based information exchange is valued because of the experiential information available through relationships formed online. This inquiry contributes to current literature on health-related online forums by examining in more detail what motivates people to make use of these forums and linking this empirically to how effective people perceive these forums to be.

CHAPTER 1 INTRODUCTION

Computer-mediated communication, of course, is not just a tool; it is at once technology, medium, and engine of social relations. It not only structures social relations, it is the space within which relations occur and the tool that individuals use to enter that space. It is more than the context in which social relations occur (although it is that too), for it is commented on and imaginatively constructed by symbolic processes initiated and maintained by individuals and groups (S. G. Jones, 1995, p. 16).

In a world where information is freely available across multiple platforms, people are developing migratory patterns of information-seeking behavior as they are able to go almost anywhere, via technology, in the search for knowledge. Users must actively participate, as they are motivated—in some cases forced by necessity—to seek information and make connections across varying media systems, competing media economies, divergent cultures, and national borders.

More than 1.5 billion people worldwide now use the internet, both at work and in their social lives (Internet World Stats, 2010). It has changed the way people inform, amuse, educate and care for themselves, and the ways they pray, bank, work, shop and stay in touch with others (Pew internet & American Life Project, 2008). Over the past four decades, the internet has grown from an experimental point-to-point military network to a global platform for technological innovation (Rogers, 2001) and, via both wired and wireless technologies, a comprehensive point of departure for access to an incomprehensible amount of information.

To some this convergence of technology, industry, and culture leads to social change driven not by media appliances, but by social interaction among participants (Jenkins, 2006). An individual living in modern society uses information extracted from media content to, at least in part, help them make sense of their everyday lives. As

more information exists on a given topic than any one individual can retain, people are inclined to communicate through various media to exchange and accumulate information. Thus, information consumption has become a collective process; no one person can know everything, every individual knows something, and people are now capitalizing on new technologies as they pool their knowledge, skills and resources. The result is a form of collective intelligence that people may utilize in the practice of everyday life and that Jenkins sees as an alternative to traditional sources of power. When these forms of collective intelligence develop through social interaction via the internet, many are referred to as “virtual communities” (Rheingold, 1993).

This would indicate people are constructing and spending considerable time in new kinds of “places” on the internet, places not geographically bound—they are occupying cyber landscapes whose construction is achieved through social action (Carter, 2004). As a result, “place” may invite new definitions. The virtual community has become one such place where people actively seek social relationships, and these communal associations offer opportunity to create, negotiate and reproduce complex social places. Study of this particular type of place helps illustrate how people are extending themselves into cyberspace and how certain aspects of relationships constructed therein are being moved offline and incorporated into daily life.

Although connection to others through the internet is key to virtual community, the notion of a community is not applicable to all sites of online discourse (Ridings & Gefen, 2004). Some discussion groups and chat rooms, for example, are just places for people to meet without any sense of permanence or consistency among the members. Chat rooms, for example, largely cater to people looking to discuss practically any topic with

others, each room having a different mix of people each day, none returning on a regular basis. As such, and because they lack a regular basis of participation by patrons, chat rooms would not qualify as a virtual communities for many researchers (e.g., Blanchard, 2008; D. Boyd & Ellison, 2008; Q. Jones, 1997).

Ridings, Gefen, and Arinze (2002) offer a comprehensive definition of the term “virtual community” that embraces the attributes discussed above and which this research will follow: “Virtual communities are groups of people with common interests and practices that [*sic*] communicate regularly and for some duration in an organized way over the internet through a common location or mechanism” (p. 273).

Decades of social science research have indicated that in any community there is an individual (or small group of individuals) to whom others look to help them form opinions on various issues (Katz & Lazarsfeld, 1955; King & Summers, 1970; Lazarsfeld, Berelson, & Gaudet, 1948; Rogers, 1962; Rogers & Cartano, 1962; Shah & Scheufele, 2006; Weimann, 1994). The diffusion of the internet has radically expanded readily available sources for information of all types. Information that was once obtained secondhand from friends and acquaintances (i.e., the traditional two-step flow hypothesis), is now easily found via the internet. Evidence exists to support the contention that the two-step flow is mutating into a “multi-step flow” of communication (Case, Johnson, Andrews, Allard, & Kelly, 2004; Rains, 2007; Weimann, 1994; Weimann, Tustin, van Vuuren, & Joubert, 2007), especially as it relates to health-related information. As an aging U.S. population looks for solutions to increasing health concerns, it also appears that people are looking to the internet for answers to important

health questions—to both documentary sources and advice from other laypersons and professionals in discussion forums (Pew internet & American Life Project, 2008).

S. Fox and Jones (2009) found that 83% of internet users, or 61% of U.S. adults, have looked online for information about a specific disease, a certain treatment, alternative medicine, health insurance, doctors, hospitals, and ways to stay healthy. According to these researchers, of all U.S. adults who looked for health-related information online in 2008, 57% said their most recent search had an impact, either major or minor. Of that percentage, 28% said the internet helped connect them to expert or professional services, further underscoring the role the internet plays in linking people to other people in the course of decision-making; 60% said information found online affected a decision about how to treat an illness or condition; 56% said it changed their overall approach to maintaining their health or the health of someone they help take care of; 53% said it led them to ask a doctor new questions, or get a second opinion from another doctor; 49% said it changed the way they think about diet, exercise, or stress management; 38% said it affected a decision about whether to see a doctor; 38% said it changed the way they cope with a chronic condition or manage pain (S. Fox & Jones, 2009). Gone, it seems, are the days when patients simply made the obvious (and indeed perhaps only), choice of consulting their doctor.

The internet and the world wide web have changed the nature of information seeking. With 74.1% of the United States population identified as users (Internet World Stats, 2010), the internet is often the first choice for learning about an array of topics—including health topics—as well as a medium for discussing those topics with other users (Case et al., 2004); to some degree the internet substitutes for older media (Kaye

& Johnson, 2003). As a result, the emergence of the internet as an omnibus source may also have changed the nature of opinion leadership; both more authoritative (e.g., medical journals) and more interpersonal (e.g., condition-specific support groups) sources are readily available and accessible online. The frequent conclusion of past research, that most people turn to others (family members, friends, neighbors and nearby experts, such as physicians) for advice, may be in doubt.

Consistent with the concept of social community, virtual communities have been identified as facilitators to participating in common activities and sharing emotions and knowledge in an electronic environment (Preece, 2000). Members who voluntarily participate in these communities are initially strangers, but common goals and shared understandings gradually encourage members to share their knowledge with, provide assistance to, and support each other (Williams, 2006). Critics contend that these types of associations lack traditionally understood commitment and responsibility, therefore levels of intimacy and connection are insufficient for community, especially when participants can log off, shut down or walk away when they so choose (S. G. Jones, 1995). Others however, contend that engaging and cooperating online in shared practices and information exchange enhances community by fostering credibility, trust, belonging, loyalty, mutual attachment, and concern (Muniz & O'Guinn, 2001; Rheingold, 1993; Young & Tseng, 2008). As trust and credibility are crucial to both opinion leadership and virtual community, these concepts were investigated as components of this study.

Purpose of Study

This research aimed to understand how opinion leadership, trust, and credibility operate in a health-related online community. It explored how these concepts develop

and are maintained in a virtual environment, how participants experience membership in the community, and how they experience using the internet and world wide web to help them understand their condition. In addition, this study was designed to elicit discussions of how being a member of this community—BoneSmart.org, formed around potential, pending, and performed total knee replacement—shapes members' perception of the condition, and ultimately, how they experience the condition in and of itself.

Theoretical Perspectives

This study is primarily informed by two theoretical perspectives: the two-step flow of communication, still considered viable after 70 years of social science research and the inevitable introduction and proliferation of digital communications technologies; and, phenomenology, both a philosophical theory and a methodology, focusing on lived experience. Two-step flow attends to the significance of interpersonal processes in the flow of information, and through explanation, description and interpretation, phenomenological inquiry examines how people structure experiences of everyday phenomena (in this case a health-related condition) and articulate what these experiences mean from a first-person perspective (in this case expressed through written communication).

A third perspective, peripherally related to this research, is Granovetter's (1973) "strength of weak ties." This theory proposes that strangers could offer an advantage over those in one's immediate social circle in obtaining useful information. Granovetter argues that strong-tie relationships occur among people who are similar in many respects; similar people are likely to know the same things and are unlikely to know dissimilar things. When information is unavailable through strong ties, people may

obtain it through weak tie relationships, those characterized by absent or infrequent contact, lack of emotional bonds, and no history of reciprocity. Weak ties are useful, Granovetter contends, because they are more numerous, thereby increasing the probability of obtaining useful information. Numerous replies increase the range of counsel, and if the request is multifaceted, numerous replies could increase the total usefulness of contributions (Constant, Sproull, & Kiesler, 1996).

Methodology

This research utilized a mixed methods approach to answer the research questions. Fundamentally a case study, this investigation examined in-depth a singular social phenomenon: the encompassing experiences of members of a virtual community in which these members gather information and make decisions regarding knee replacement (for themselves or others). After collecting selected postings on the BoneSmart.org website (the subject of this investigation), Social Network Analysis (Wellman, 1983; Scott, 2000) was employed to observe if certain individuals were central to communication processes in the community. Using sociometric methods (Katz & Lazarsfeld, 1955) to, in part, identify opinion leaders in the community, an online questionnaire was disseminated which also included measures of trust, credibility, and homophily. In addition, results from the questionnaire revealed a wide array of knee-health experiences as they related to demographic variables, which aided in the selection of interview respondents who represented the widest possible range of conditions and circumstances in the community. Systematic analysis of online phenomenological interviews with consenting respondents then extracted the individual, interpersonal and cultural logics that these respondents employed in their communication processes within this community.

Need for Study

Opinion leadership has largely been researched within the context of traditional forms of community and social interaction. These views hold that individuals sharing geographical space engage in primarily face-to-face communication discussing politics, consumer products, popular culture, or behaviors (Katz & Lazarsfeld, 1955). Individuals may be influenced by opinion leaders, but the emergence and overwhelming popularity of the internet may be changing the nature of opinion leadership. Differences between online and offline communication are important because assigning trust and credibility in electronic communities must accordingly be made primarily on the basis of written communication. In virtual settings, the sense of social distance and the lack of social cues make it difficult for people to identify with each other and to assess mutual ability, integrity, and benevolence (Young & Tseng, 2008).

A more accurate rendering of interpersonal communication processes in today's technological environment may indicate a multi-step flow, rather than the traditional two-step flow. More research is needed to understand not only how opinion leadership operates in online environments, but how trust and credibility are assigned to other "people" in these environments. The credibility of support providers within online communities largely derives from "experiential proximity," or the perception that the provider of support has been through similar circumstances, similar problems, has engaged in similar behaviors, and has similar attitudes and beliefs about the condition he or she faces (Jin, Bloch, & Cameron, 2002; Tanis, 2008; Wright, 2000). This study attempted to determine whether that held for this virtual community. Past research has addressed trust and credibility directed at websites or online groups; however, research

has been insufficient with regard to how these concepts develop when the intended object is perceived to be another person.

Contributions to Research

The contemporary media environment is a constantly changing environment, featuring continuous audience fragmentation and affecting how individuals gather and act on information in the processes of daily life. The evolution of media has altered the logic of social order by restructuring the relationship between physical place and social place, changing the ways in which people transmit and receive information. People depend less today on traditional forms of communication and information gathering—television, radio, print, expert professionals, family and friends—and more on the internet and world wide web to inform their lives (Estabrook, Witt, & Rainie, 2007). This research adds to communications literature by demonstrating how emphasis has shifted from simply documenting the existence of virtual communities to illuminating how larger structural patterns (i.e., rapidly changing technology, access to the internet, patient/doctor relationships, instant availability of wide-ranging sources of health-related information that are less accessible offline) affect the ways in which community structures shape social production and reproduction. While each online community represents a unique set of technical features or a distinct user culture, examining leadership within them will offer greater insight into understanding user behavior, thus strengthening a general theory of online leadership and social influence.

This inquiry contributes to communication research and expands the case study method by using the internet as a research tool. This approach challenges traditional anthropological notions of field site, moving from localized space to technologically-mediated interaction, and advances communications literature by offering fresh insight

into understanding relationships that develop among participants in online spaces. This research provides new evidence for how people experience a particular phenomenon, how they gather, share, and act on information related to that phenomenon, and how traditional notions of leadership, trust and credibility are created and maintained in virtual place. This study also offers renewed commentary on what is commonly referred to as “community,” and how it develops through the concept of “experiential proximity.”

Background

The Internet and Information Seeking

While an individual’s health-related experiences—impacted by amorphous opinion leaders and online group processes—are at the core of this research, those experiences and processes are set against a backdrop of technology. Clearly, technologically-mediated communication is opening up an amazing array of information options for people to access, particularly through the internet and world wide web. But to see this as primarily about the ability to more easily access text or video files is to be somewhat shortsighted. Information access on the internet is a remarkable innovation, but the promise of digital information revolution goes far beyond web surfing.

The digital information revolution is extending to almost all aspects of daily life, all parts of society, all organizations and most nations (Morris & Ogan, 1996). Without question, many of the ways in which life and society work today are based on information—making the world intelligent with more information is the key to improved quality of life and social progress (Atkinson, 2008). In a world saturated with information, and with the tools to effectively assemble and process it, modern life is entering a new era where some say information technology is the chief driver of progress and change

not only in personal lives and society, but in human civilization (Postman, 1992; M. R. Smith & Marx, 1994).

Recent research has revealed new understandings in the basic ways people interact, offering new insights into intrapersonal and interpersonal dynamics, group functioning, the development and impact of social networks, organizational behavior, commerce, and global information sharing (Book, 2008; Constant et al., 1996; Eveland, 2003; Kozinets, 2002; Preece & Ghazati, 2001; Rafaeli & Raban, 2005). Study of the internet has reinforced some simple truths and expanded their vitality in illuminating ways: people sometimes relate better as groups rather than as individuals; people relate to one another even in the absence of face-to-face contact; people help each other with problems, because sometimes it's better to ask a stranger than a friend (Walther, Gay, & Hancock, 2005).

Ultimately the theorizing, speculation, generalization, and hypothesizing about the internet condense to how and why people actually use it. Users have increasingly come to view the internet as a utility rather than a novelty, and report that the internet has enhanced their lives in multiple ways, and has significantly improved communication with friends and family (Rainie & Horrigan, 2005). While this may solidify bonds between and among users, the internet also appears to be a bridging agent for creating and sustaining community. Pew Internet and American Life Project (2008) found that 84% of American adult internet users, or approximately 100 million people, belong to groups or communities that have an online presence (Table 1-1). Community members said using the internet this way increases opportunity to interact with people outside their social class, racial group or generational cohort.

The communal aspects of the internet are key components in this research in that one of its objectives is to understand how community members experience knee arthroplasty (or its potential) and the communication—both on and off line—surrounding it.

The internet is reshaping people's informational and social universes, but the relationship is both reflexive and ongoing, with people constantly reshaping the internet (Jenkins, 2006). The internet's availability, along with the immense and diverse array of information that can be found and shared with relative ease, makes the medium an integral part of modern life (S. Fox & Jones, 2009). It is safe to assume that the bond people have with communication technologies—at least those who are connected—will likely strengthen as connectivity increases through the use of laptops, cellular telephones, and various other personal digital devices, and the communal possibilities of digital media technologies expand.

As a communication tool, broadband technology enables people to more easily maintain a greater number of relationships due to its speed and convenience, and the control it offers in managing communication (Horrigan, 2008). People use their social networks to seek information and advice, and although the size of people's online social networks and their structures may provide access to various types of information and resources that offer help, broadband technologies make these networks more effective (S. Fox, 2006).

“Always on” makes internet access in effect instantaneous, and this feature as a component of broadband technology plays an important supporting role in the maintenance and cultivation of social networks (Rainie & Horrigan, 2002). Availability of

the technology and the proximity to information that broadband provides changes the way users find, generate, and manipulate content, such as searching for and retrieving health care information from the internet, taking an online course, or working from home. According to the Pew internet & American Life Project (2008), people create and manage online content; download, recombine, manipulate, and share content with others. They satisfy a wider range of information searches due to the presence of a high-speed connection.

While broadband's practical assets appear limitless, its theoretical implications are purported by many to be profuse. Broadband internet access is claimed by some to be essential to stimulating an information society and is professed to be a key driver of both economic and intellectual growth (Benton, 2008; Martin, 2008). The ability to share greater amounts of information at increasing speeds boosts productivity, facilitates interstate commerce, and helps drive innovation. Broadband has the potential to affect almost every aspect of life in both developed and developing countries by providing new information technology applications, improvements to existing ones, and new services, investment and job opportunities (Martin, 2008).

Broadband can also have considerable impact on everyday life, particularly with regard to telemedicine and eHealth applications, eGovernment, education, and rural development (Horrigan, 2008). Although physicians rarely make house calls today, traditional health care still relies to a large extent on the physical visit of a patient to a health care provider. But such visits are potentially inconvenient, painful, costly, or sometimes impossible, particularly for very ill, elderly, or disabled persons, or those living in rural or low-income areas where doctors and clinics are scarce. Telehealth—the

use of telecommunications technology such as broadband in the provision of health care—is changing the ways in which medical care is provided (Rintels, 2008).

Telehealth technologies now remotely monitor patients, facilitate collaboration between medical professionals, exchange medical data and images, and instantaneously provide efficient emergency service to remote areas (J. A. Schwartz, 2008). Widespread, low-cost dissemination of health information to patients and consumers and reduced travel to and among medical offices, clinics and hospitals are among other benefits of broadband.

Broadband technology is also a facilitator of social inclusion, its proponents claim, and thus has considerable impact on a great many people worldwide, including their abilities to form and experience virtual community (Horrigan & Rainie, 2002). As the U.S. and European Union (EU) continue to design and implement inclusive broadband internet policies, provisions therein will arguably have direct effects on the creation, maintenance, and likely proliferation of most forms of social media—including health-based virtual communities. Between 2006 and 2008 alone, activity on social networking sites and in online communities grew 93% (Burns, 2008).

Seeking Health Information Online

The diffusion of the internet has radically expanded the readily available sources for information of all types. Roughly 91% of Americans recognize the internet as an “important” source of information (Case et al., 2004, p. 3) and a growing number of Americans have reported using the internet and world wide web to find health information in recent years (S. Fox, 2005; S. Fox & Jones, 2009; Rains, 2007; J. A. Schwartz, 2008). Cline and Haynes (2001) cataloged some of the advantages of seeking information online: widespread access, anonymity, potential for interactivity,

social support, and the ability to tailor information to one's needs. Further, it is indisputable that a plethora of information is available online.

Health care information is an example of this expansion of important sources, since it includes not only a wide array of documents (ranging from popular to scientific), but also acts as portal to advice from a number of interpersonal sources, from laypersons to experts. Those seeking health information have historically been able to consult a variety of sources, but the internet puts a range of "offline" sources within reach via a few keystrokes (Case et al., 2004). The physician, the expert researcher and the compassionate friend are equidistant from the health information seeker's digital device. Unlike traditional media— books, journals, magazines, newspapers, television and radio—health information on the internet may not be filtered through a gatekeeper, and users are making decisions about information "directly from the source," whether the source is a pharmaceutical company page or a listserv thread (Broadway, 2005).

Twenty years ago medical information was likely obtained (if at all) directly from health care professionals, or indirectly through friends or family members who were accessible and perceived to be opinion leaders (Case et al., 2004). Now information about diseases, treatments, and prevention is readily available over the internet; consumers may bypass entirely some of the more traditional sources of health-related information.

Rains (2007) reports that a growing distrust in health care provision and with entertainment-oriented media as sources of health information has increased the potential for using the internet to satisfy one's need for health-related specifics. Previous

research (S. Fox, 2005; S. Fox & Jones, 2009; Pew, 2008) has suggested that online health seekers were often motivated to search out information relating to actions they may need to take for specific medical issues in their lives. In many cases, online health seekers were action-oriented and highly purposeful due to a pressing medical issue for them to address—either for themselves or for another (Table 1-1).

Reliance on the internet is so prevalent for today's health seekers that Google® has become the de facto second opinion for patients seeking further information, particularly after a diagnosis (S. Fox, 2008). A Google® search for a certain disease or malady will summon a Wikipedia entry and information sites from major hospitals, drug companies and other providers. Adding “community” to that search displays pages filled with sites that connect patients, information seekers, vendors, sufferers—and their proxies. Once connected, community website users learn as much or more from each other than from sites offering information alone. This shift is viewed by many as the democratization of health care (J. R. Schwartz, 2008). These expanded capabilities allow people to easily share information, challenging the traditional top-down flow between doctors and patients.

It is inarguable that health-related sites on the internet and world wide web are abundant. According to J. R. Schwartz (2008), these sites can be grouped into five broad, but often overlapping, categories:

- **GENERAL INTEREST.** Websites like WebMD (webmd.com), Discovery Health (health.discovery.com) and The New York Times (nytimes.com/health), provide health news, lifestyle advice, and information about disease, as do medical institutions like the Mayo Clinic (mayoclinic.com).
- **MEDICAL RESEARCH.** These offer access to the published work of scientists, to studies and to portals into continuing research. Examples include PubMed (ncbi.nlm.nih.gov/pubmed) from the National Library of Medicine; clinicaltrials.gov,

which tracks federally financed studies; PsycInfo (apa.org/psycinfo), a trove of psychological literature; and the National Center for Complementary and Alternative Medicine (nccam.nih.gov), the government's registry on alternative medicine research.

- **PATIENT SITES.** Websites for groups and individuals are proliferating, so much so that they are increasingly used by researchers to find patients for studies. These sites include the Association of Cancer Online Resources (acor.org) and e-patients (e-patients.net), as well as Patients Like Me and Trusera (trusera.com), both of which provide Facebook-style social connectivity for users, along with the ability to share stories in clinical, data-laden detail.
- **DISEASE-SPECIFIC.** These sites focus on a particular condition and are often sponsored by major organizations like the American Heart Association (americanheart.org), the American Cancer Society (cancer.org) and the American Diabetes Association (diabetes.org). Smaller groups, however, can put together extensive resources as well, with sites like breastcancer.org and Diabetes Mine (diabetesmine.com), which calls itself the “all things diabetes blog,” and BoneSmart.org, the subject of this investigation.
- **WEB TOOLS.** Such sites designed to help people manage their conditions: Sugarstats.com for diabetes, [Destination Rx \(drx.com\)](http://DestinationRx.com) for comparing drug prices, and YourDiseaseRisk.com, a service of the Washington University School of Medicine that helps patients determine their risk for various problems.

One concern the medical establishment expresses about online health seekers is whether they are self-diagnosing and/or self-medicating based on information they find online—and without consultation with medical experts (S. Fox, 2006). While it is probable that people do not discuss every book, magazine article, or health-related conversation they have with their doctor, interest in the typical online health information session persists due to what the medical establishment sees as the largely unfiltered/unedited nature of that information. In addressing this, S. Fox (2006) found that 33% of health seekers talked with a doctor or other health professional about the information they found online after their most recent internet search.

Later, S. Fox (2008) found that, at least for health, the impact of an online information search was more likely to be helpful than harmful. Thirty-one percent of

online health information seekers said they or someone they know had been helped by following medical advice or health information found on the internet. Just 3% said they or someone they knew had been seriously harmed by following advice or information they found online.

This sheds some light on the subject of principal sources of health information. While research indicates that medical professionals are the dominant source for urgent health questions (S. Fox, 2005, 2006; S. Fox & Jones, 2009; Pew 2009), evidence continues to mount demonstrating that consumers are taking advantage of the convenience of the internet as an initial source of disease information, and reliance on information from other sources—at least at the outset of an information search—appears to be falling (Case et al., 2004; S. Fox, 2010; Hesse, Moser, & Rutten, 2010). In theory, this should have implications for the concept of opinion leadership as it pertains to health care and the internet.

It is not just convenience that draws health information seekers to the internet, but the positive experiences they have with online research and interaction. The kinds of health information sought and found online are different from what people can glean from most traditional sources, and this translates into much more than doctor-patient communication (S. Fox, 2010). The internet is a medium that health seekers can tap into wherever and whenever they need it, connecting with whatever source they believe will help them at that moment. Today, that source is not always a doctor, or even a health professional.

Joint Replacement

Around the world, millions of people have conditions that affect bones and joints. Because people are living longer, medical conditions that affect these parts of the human anatomy, like arthritis and osteoporosis, and which arise from injury, genetics and/or aging, have a great impact on costs of care and quality of life (Losina et al., 2009). The knee is the largest joint in the human body as well as one of the most vulnerable. Normal knee function is required to perform most everyday activities; the knee joint must bear the weight of the upper body as well as the stresses and shocks carried upward through the feet when a person walks or runs (Righthhealth.com, 2010). Knee replacement surgery, or “knee arthroplasty,” the most common joint replacement procedure today, is a surgical procedure most often performed to relieve the pain and disability from degenerative arthritis—mainly osteoarthritis—but it resolves other arthritides as well (Kurtz, Ong, Lau, Mowat, & Halpern, 2007). Knee arthroplasty has two primary purposes: pain relief and improved functioning of the knee joint.

The U.S. Department of Health and Human Services (2009) reports approximately 547,000 knee replacement operations are performed each year in the U.S. Although about 70% are implemented in people over the age of 65 (joint diseases account for more than half of all chronic conditions in the elderly), a growing number are being done in younger patients. Currently over 11,000 knee replacement procedures are performed annually on U.S. patients 15-44 years of age (DeFrances, Lucas, Buie, & Golosinskiy, 2008). Reasons for this trend include improved surgical techniques and innovations in the design and construction of knee prostheses since the first knee replacement was performed in 1968 (U.S. Department of Health and Human Services, 2009). Moreover, people's attitudes toward aging and their expectations of an active life are changing.

Fewer are willing to endure years of discomfort or resign themselves to restricted levels of activity (Grindrod et al., 2010).

With one-third of Americans obese, coupled with an aging population, the prevalence of osteoarthritis is expected to increase, contributing to a growing demand for joint replacement procedures (U.S. Department of Health and Human Services, 2009, p. 76). By 2030, the demand for total hip replacements is estimated to increase by 175% and the demand for total knee replacements is projected to grow 600% (Kurtz et al., 2007).

This investigator's interest in knee arthroplasty goes beyond the mere fascination of replacing human body parts with man-made simulations that actually work and enhance quality of life for recipients. The experience of how one journeys from initial recognition of the condition through diagnosis, reference group interaction, information search, introspection, family deliberation, and eventual decision, is worthy of study alone. Yet when forks in the cognitive road on that journey are undertaken through computer-mediated interaction, much can be learned about patterns of human communication as solutions to one's problems are sought. Open to question are how variants of these processes might operate for not just the elderly, but for example, cheerleaders, firemen, snowboarders, grandparents, athletes, single working mothers, and construction workers. And further, how might technology shape these individuals' perception of their condition?

The internet has inarguably become an important source for health-related information. At this writing, a Google® search for "health" returned over nine million hits, and over 1.5 million for "knee health communities." In addition to seeking health-

related information or advice on the internet pages of professional health care organizations, or seeking professional advice in the form of online consults, people increasingly make use of online discussion forums organized around health-related topics (S. Fox & Jones, 2009). In these forums, also referred to as self-help groups, social support groups, or in some cases virtual communities (Rheingold, 1993), people can exchange information, ask for help, discuss problems, and tell stories to others who, at least to some extent, have experienced or have an understanding of what others here are going through.

Whereas one's offline network largely consists of family, friends and colleagues, online forums may facilitate contacts more diverse in their social, cultural, or geographical backgrounds (Wright & Bell, 2003). Thus, a greater diversity of relationships (from close friends to total strangers) may provide people with relevant and potentially more diverse information since these sources would be less accessible (or inaccessible) offline (Rice & Katz, 2001; Wellman, 1997). This information can be useful to expand a person's knowledgebase, provide people with more control and reduce uncertainty, which in turn can help people in coping with their particular situation. Having first-hand experience with the topic at hand, many users in these forums are "experiential experts," which increases their potential for influence (Tanis, 2008). Newer members in these communities glean information about how to behave or cope with the situation they face, modeling the experts by way of social comparison (Davison, Pennebaker, & Dickerson, 2000).

This topic was chosen because: 1) 83% of American adult internet users (61% of all U.S. adults) have searched for health information online (Pew Internet & American

Life Project 2008), which makes it important; 2) knee arthroplasty is a major investment—in one’s health, in time (recovery and therapy), and possibly money—which calls for informed research; and 3) knee replacement is not life-threatening, which creates conditions whereby members may not feel as pressured to remain in the community, as if they would in, say, a virtual community formed as a cancer support group. This may allow for a more wide-ranging and open exchange of information, including off-topic discussions.

BoneSmart.org

This community was chosen because it had a diverse population of users that has remained relatively stable over its eight-year existence. Given that a wide variety of information sources exist within the boundaries of this community to help members discern information quality and facilitate interaction with other participants in meaningful ways, individuals here seek real solutions for real problems and are concerned with presenting themselves in ways which convey the identity that instigated his or her membership, rather than inventing new ones—a research concern in many virtual communities (Turkle, 1995). The BoneSmart® Community offers an opportunity to research how members here gather and make meaning of not only information they share on wide-ranging aspects of knee injury and potential replacement, but also on anything members feel may be important enough to share.

BoneSmart.org is an orthopedic implant and joint replacement consumer awareness website established in 2002. The primary goal of the BoneSmart® Community Forum is to “foster communication between persons who may need joint replacement surgery and those who have had one or more of their own joints replaced.” The site encourages experienced users to help “mentor” new patients, and provide a

nurturing environment of support and knowledge through the community forum (BoneSmart.org, 2010). While the site also supports a Hip Replacement Forum, BoneSmart's Knee Forum, claiming 2,481 members, offers comprehensive information regarding knee pain, injury, replacement and surgery recovery, and provides a network for its members to discuss a variety of on-topic issues. This site also provides webcasts, links to reference and video libraries, and step-by-step preparation guides for any and all forms of knee surgery. Only members can post information (registration is required).

BoneSmart's parent foundation, FARM (Foundation for the Advancement in Research in Medicine, Inc.) is a 501(c)(3) non-profit public benefit entity. A 12-member Founders Group (which serves as FARM's Board of Directors) provided initial funding for FARM, and sustainable funding for the site comes from annual network fees, corporate sponsorships, individual contributions and fundraising activities. BoneSmart® is the public awareness arm of FARM Orthopedics, described as "a comprehensive national campaign to make consumers aware of new advances in orthopedic treatment." FARM Orthopedics enters strategic alliance partnership arrangements to provide products and services to its network; BoneSmart® supporters include manufacturers of medical devices, research and development institutions, physicians, professional organizations, hospitals, clinics and private individuals. FARM Orthopedics also provides development funds and marketing resources to various entities that support research, professional development, product innovation and consumer awareness programs. FARM's strategic alliance partners, which include The Swiss Colony, MassMutual, and Canyon National Bank, contribute a portion of consumer

purchases to the Foundation in the form of donations. Sponsor advertising is apparent on BoneSmart's home page, but does not appear in patient forums.

In addition to questions of opinion leadership and influence, other important questions to ask in this investigation might be: How do community members situate communication technologies in their daily lives? How do these members evaluate the information they glean from virtual community? How are the tools of new media changing communicative practices? How might new technologies alter novice-expert relations—in this case as between community members and the medical establishment? This research helps to understand the ways in which people incorporate new communication technologies into existing communicative routines, and how these technologies influence new and emerging cultural practices.

Further Chapters

Chapter 2 describes scholarly research relating to the theoretical underpinnings of this study, exploring the strength of social ties, virtual community, opinion leadership, the two-step flow of communication, trust, credibility, and homophily. The chapter also poses the research questions this study sought to answer. Chapter 3 details the methods used, which include Social Network Analysis, an online questionnaire, e-mail interviews, and explains procedures and methods of data analysis. Chapter 4 summarizes data resulting from these mixed methods procedures and resolves the research questions, while Chapter 5 draws conclusions and offers interpretations based on findings. Chapter 5 also discusses the study's limitations and proposes areas for future research.

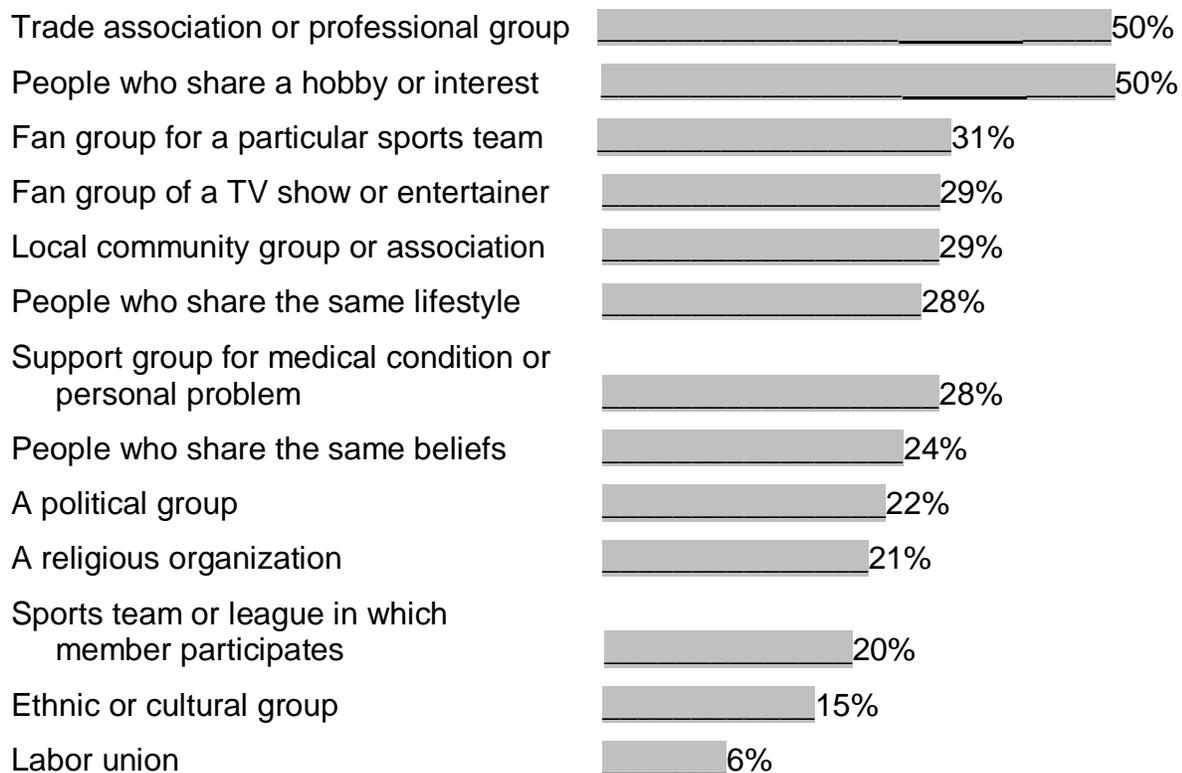


Figure 1-1. Percentage of American adult internet users who say they belong to this type online group.

Note: Data in figure 1 are from Pew Internet and American Life Project 2008, latest trends, updated July, 2008).

Table 1-1. Percentage of internet users who look online for specific health topics

%	Health topics
66	a specific disease or medical problem
55	certain medical treatment or procedure
52	exercise or fitness
47	doctors or other health professionals
45	prescription or over-the-counter drugs
38	hospitals or other medical facilities
37	health insurance, including private and Medicare or Medicaid
35	alternative treatments or medicines
33	how to lose weight or how to control weight
28	depression, anxiety, stress, or mental health issues
26	any other health issue
20	experimental treatments or medicines
12	how to stay health on an overseas trip

Note: 83% of internet users (61% of American adults) have looked online for information about at least one of these topics. Source: Pew Internet & American Life Project, The Social Life of Health Information 2009, p. 11.

CHAPTER 2 REVIEW OF THE LITERATURE

This chapter provides an overview of literature pertinent to an investigation of how people seeking information for a specific health condition experience “community” through technologically-mediated interaction and how first-hand experience using online forums shapes one’s perception of the quality and usefulness of information they gather online. Also relevant is literature pertaining to how patterns of influence operate in virtual communities and how the social processes that create and maintain these communities function.

Strength of Weak Ties

As digital media technologies continue to transform mass communications, there is mounting evidence that the communications revolution is also changing the ways in which humans interact (Gillmor, 2006; Jenkins, 2006; Luders, 2008). The communication technologies that make use of the internet and world wide web offer both possibilities and constraints for communicative practices and social interaction, and provide a context for emerging forms of communication in the nexus of psychology, sociology, technology and science.

Rooted in sociology, Granovetter’s (1973, 1982) strength of weak ties theory has implications for this research in that its premise—relative strangers could offer an advantage over friends and colleagues in obtaining useful information—takes on added significance in a new media environment. Granovetter argues that strong tie relationships occur among people who are similar in many respects; similar people are more likely to know the same things and less likely to know dissimilar things. When information is unavailable through strong ties, people may obtain it through weak ties:

relationships characterized by infrequent contact, lack of emotional closeness, and no history of reciprocity. Weak ties serve as information bridges across cliques of strong ties and can offer people access to resources not found in their strong tie relationships. “The strength of a tie is a combination of the amount of time, emotional intensity, intimacy (mutual confiding), and reciprocal services that characterize the tie” (1973, p. 1361).

In a labor market study of professional, technical, and managerial job changers in a Boston suburb, Granovetter (1973) found that of those finding a job through interpersonal contacts, 16.7% reported that they saw their contact often at the time they sought employment, 55.6% said occasionally, and 27.8% rarely (p. 1372). This would indicate the successful contact was someone only marginally included in the job seeker’s network of contacts, fitting Granovetter’s conception of a weak tie relationship, such as an old college friend or a former work-mate or employer, someone with whom only sporadic contact had been maintained. From an individual's point of view, then, weak ties are an important resource for social mobility. Seen from a macro perspective however, weak ties would appear to play a role in affecting social cohesion. When someone changes jobs, she is not only moving from one network of ties to another, but also establishing links between them. These links are often of the same kind which facilitated her own movement (p. 1373).

Subsequent research has lent support to the strength of weak ties theory. In a study on the diffusive nature of suicidal thoughts in the friendship networks of adolescents, Baller and Richardson (2009) found that "at-risk" respondents—those with certain behaviors, statuses, and experiences that create psychological predispositions

to suicide—are more likely than those deemed not at-risk to seriously think about committing suicide when a friend-of-a-friend attempts suicide. Looking at peer effects, network structure, and juvenile delinquency, Patacchini and Zenou (2008) found that increasing the number of weak ties in the network induces more transitions from non-crime to crime, resulting in an increase in the crime rate. These researchers reported that as the number of weak ties increases, as measured through friends of friends (including both delinquents and non-delinquents) the crime rate rose.

Relating the strength of weak ties theory to computer-mediated communication, Constant et al. (1996) used a computer network in an organizational setting to draw on weak ties linking people across distance, time, country, hierarchical level, and organizational subunit. Information seekers sought out technical information or referrals to solve technical problems; the researchers found that information providers gave useful advice and solved the problems of information seekers despite both a lack of personal connection to the seekers and organizational motivation. While the diversity of ties as well as the resources of information providers contributed to whether or not seekers' problems were solved, expertise contributed both to the usefulness of advice and to problem solving. The researchers concluded these ties were useful to the degree they put people in touch with those offering superior resources, but they were not useful nor did they have a greater likelihood of solving the information seeker's problem when they were simply greater in number.

Further investigating the strength of weak ties and the internet, Kavanaugh, Reese, Carroll, and Rosson (2005) found that the internet helps to increase the number of weak ties across social groups. Focusing on social cohesion in a mid-sized

community with high internet penetration, surveys and interviews helped these researchers determine that people with a greater number of weak ties across groups have higher levels of community involvement, civic interest, and collective efficacy than people with fewer. Moreover, heavy internet users with more weak ties had higher social engagement, used the internet more for social purposes, and attended more local meetings and events since going online than did heavy internet users with fewer weak ties. Kavanaugh and colleagues concluded that in this context, by enhancing the flow of information across diverse members of the community, the internet raises awareness, educates interested citizens about complex local issues or concerns, and sometimes mobilizes individuals and groups for collective action (p. 129). They also contend it is the usual suspects, community leaders and active participants, who are using the internet to distribute information of civic interest, a finding that has implications for one concept under study in this research—opinion leadership.

Arguments have been proposed for why weak ties are useful. One is that weak ties comprise more numerous potential helpers than do strong ties; if weak ties are more numerous than strong ties, then calling on weak ties increases the probability of acquiring useful information (Friedkin, 1982). Yet perhaps it is not the number of people giving advice that makes weak tie contacts useful, but the range or diversity of those ties. Burt (1983) points out that if all of a person's weak tie contacts are themselves members of the same strong tie group, then the expertise offered by those ties will be redundant. Burt suggests it is the extent to which weak ties tap diverse groups that makes them useful. Group diversity could also increase alternative solutions (people offer different answers) or provide pieces to a multi-part solution (people offer partial

advice that can be combined into a solution). If one's goal is to expand the range of available help across a variety of topics, greater advantage may be realized by increasing one's number of weak ties than by expanding one's strong ties.

Prior to the internet, weak tie networks for most people consisted of neighbors, service providers, acquaintances and other lower-intensity relationships that a person might turn to for information or support when closer ties (e.g. friends and family members) were unavailable (Granovetter, 1973). The internet has greatly expanded the number of contacts that could potentially become weak tie support networks for people with health concerns. According to Wellman (1997) weak tie networks in computer-mediated environments tend to be more heterogeneous than strong tie networks, and weak ties are usually better connected to other, more diverse social circles, and hence more apt to be sources of new information. Closer ties tend to be more homogenous because people tend to form relationships with others based upon proximity, demographic background and attitudinal disposition (J. C. McCroskey, Richmond, & Daly, 1975). In terms of weak ties on the internet, Wellman (1997) argues, "the relative lack of social presence online fosters relationships with people who have more diverse social characteristics than might normally be encountered in person" (p. 191). Social presence is limited by reduced non-verbal cues (physical and social) in the computer-mediated environment, which allows relationships to develop on the basis of shared interests rather than be cut short at the onset by perceived differences arising out of face-to-face contact.

Granovetter's (1973) strength of weak ties theory has implications for this research in that the internet now helps people develop and maintain weak ties within and across

large and diversified networks. Rather than relying on a single community for information, advice, and resources, people have success when they actively seek out a variety of appropriate alternatives in different situations. The macro view reveals how the personal experiences of an individual are bound up with larger-scale aspects of social structure; how the relative strength of interpersonal ties in and across groups work to form macro patterns in society, patterns that reveal how people search for information, how they use the internet, how they solve their health problems, and how they create community in virtual space.

Virtual Community

Rising numbers of people are spending considerable time in virtual space, space that does not occupy a geographical locale, but is wholly mediated through technology by way of a material object. Intimacies with machines are creating a world in which it makes sense to consider a new state of the self. As people become more “wired” into social existence via technology, the new spaces they inhabit suggest a revised placement of the human subject (Wellman, 1997; Wellman & Gulia, 1999).

“Virtual community” encompasses an assortment of notions, including how people perceive online space (how an individual’s historical, geographical, practical and spatial understanding of community shapes their perception of virtual community), which kinds of gatherings constitute community in cyberspace, and the nature of shared commonalities. Factors that affect whether and how one identifies oneself as a member of a virtual community include trust and commitment, intensity of the social relationships that develop out of online interaction, and whether an individual relates to the social environment as “place.” People also seek social support in online community, and while early internet research revealed instances of identity manipulation, recent studies show

that people are now more interested in frank online representation, particularly in health-related environments. These notions of community, commonality, identity, space and place, social support, and online health community will therefore be explored in this section.

Community

Markham (1998) suggested that internet users frame their experiences of computer-mediated communication along a continuum of connection of self, and generated three themes along this continuum to help understand online experiences. First, computer-mediated communication is a “tool” that facilitates communication itself (a decidedly materialistic observation); second, cyberspace is a “place to go” to be with others; and third, computer-mediated communication is a “way of being” that is inseparably woven into lived experience. These notions have implications for “where” individuals see themselves performing online actions.

According to R. Park (1936), the essential characteristics of a community are: 1) a population territorially organized; 2) said population more or less completely rooted in the soil it occupies; 3) a population in which its individual units live in a relationship of mutual interdependence (p. 3). Since Park’s definition, the concept “community” has been continually redefined and remains extraordinarily slippery. A more recent interpretation refines Park: “Community is constituted by: identification with a specific geographic area, common ties through identification by residents with one another and with that area, and substantial social interaction among the residents,” (Lyon, 1999). When considering virtual communities, conceived and practiced in amorphous cyberspace, the first factor in Lyon’s definition is particularly important. The notion of a community rooted in the soil may seem outdated in a modern society, but traditional

ideas of community that identify with place remain strong (Grannis, 1998; Molotch, Freudenburg, & Paulsen, 2000). Identification with geographical place would seem to exclude virtual community from these definitions.

The term community, when used to describe virtual communities, is contentious. A virtual community might be defined as “a group of people who form associations through computer-supported social networks within a social structure in cyberspace after prolonged discussions” (Driskell & Lyon, 2002, p. 375). If the medium is a computer network, as this definition implies, the community can be called an “online community.” Virtual communities are usually (but not always) dispersed geographically and are therefore not communities under earlier definitions. Associations of “pen pals” are print-based virtual communities; although ephemeral, a film crew may be considered as such, as it gathers in a physical location to perform a specific task, displays the character of a place-based community for a length of time, and once the task at hand is complete it disperses and gathers elsewhere—possibly on the other side of the planet.

Some online communities are linked geographically and are known as community websites. However, if one considers communities to simply possess boundaries of some sort between members and non-members, then a virtual community is certainly a community. The idea of neatly-bounded communities is also being critiqued, since communities are just as fluid as they are static, with members joining and leaving, even being part of different communities simultaneously (Wellman & Gulia, 1999). The term virtual community stems from the title of a 1993 book by Howard Rheingold, in which the author chronicles his adventures in a number of computer-mediated communication

and social groups. In its pages Rheingold offered what he considered the potential benefits of belonging to such groups, describing what these benefits may mean both for him personally and for society at large.

Today the terms virtual community and online community are used for a variety of social and professional groups interacting via the internet. It does not necessarily hold that there are strong bonds among members, although Rheingold (1993) mentions that virtual communities form "when people carry on public discussions long enough, with sufficient human feeling, to form webs of personal relationships" (p. 51). An e-mail distribution list may have hundreds of members and the communication which takes place may merely be informational (questions asked, answers posted), but members may remain relative strangers and membership turnover rate could be high. This is in line with a liberal use of the term community.

Commonality

The internet certainly provides opportunity for associations based on all genres of shared interests. Yet some researchers (i.e., Etzioni & Etzioni, 2001; Galston, 2000) contend that newsgroups, mailing lists, fan clubs or chat rooms do not constitute community because a true community must have more in common than a narrowly defined topic. Common ties require commonalities; groups of individuals should have a bond, a measure of commitment, a set of shared values, a culture, a history, a shared identity (Wellman & Gulia, 1999). Cyberspace communities may foster specific communities of interest rather than communities of multi-interests, the type which would generate and support personal connections and broad familiarity among members.

Although associations with others through the internet are key to the concept of virtual community, "community" is not apt in describing all sites of online communication

(Ridings & Gefen, 2004). Some chat rooms and discussion groups, for instance, are but places for people to congregate without a sense of permanence or consistency among the site patrons. And chat rooms largely cater to singles looking to meet other singles, each room containing a different mix of people each day, none necessarily returning on a regular basis. Such chat rooms and groups, because they lack a regular basis of participation by their patrons, do not qualify as virtual community (Q. Jones, 1997). Ridings et al. (2002) offer a definition of virtual community that will be utilized in this research: "Virtual communities are groups of people with common interests and practices that [sic] communicate regularly and for some duration in an organized way over the internet through a common location or mechanism" (p. 273).

Kozinets (1999) defined virtual communities as affiliative groups whose online interactions are based upon shared enthusiasm for—and knowledge of—a specific consumption activity or related group of activities (p. 254). Meta-analyses of computer-mediated communication indicate that group members generally progress from initial social information gathering to increasingly affiliative social activities (Walther, 1995). At first, potential members may merely browse information sources, lurking (inconspicuously reading, but not posting) to learn about an activity or interest. An internet user with a knee condition might Google® "knee replacement," or "knee replacement surgery" and be guided to websites that offer general information on this subject. As this user becomes more sophisticated in her internet use and more knowledgeable about the topic, she will begin to visit sites that offer more specific information, and eventually make online contact with other consumers of knee replacement/surgery information. Reading about others' experiences may lead her to

query individuals, or pose questions to the entire community. Her level of interest in accumulating this information and whether she is gratified in obtaining it from this source will dictate whether she becomes a frequent or occasional participant in group discussions. In general, a virtual community member will progress from being a visitor to an insider as she gains online experience and discovers groups whose activities satisfy her needs (Kozinets, 1999).

Identity

How one identifies him or herself as a member of a virtual community depends largely on two interdependent factors. First is the relationship the individual has with the activity or subject in question. The more central the activity to the person's psychological self-concept, the more important this particular subject is to the person's self-image, the more likely the individual will pursue and value membership in a community (virtual or face-to-face) formed around this topic (Muniz & O'Guinn, 2001). Second is the intensity of the social relationships one develops with other members of the community. The quality of social interaction is highly dependent on trust and intimacy; virtual communities may lack this psychological closeness as many features of virtual community do not promote interpersonal knowledge, trust or commitment (Galston, 2000). While members in a traditional, local, place-based community will have a degree of social responsibility, the virtual community ostensibly requires no commitment beyond one's own interest. Further, anonymity allows people to communicate online in ways they probably would not in either face-to-face or physically proximate circumstances (i.e., telephone or videoconferencing) (Turkle, 1995).

Self-representation is and has always been an issue in the study of the computer-mediated communication. While the influence of the internet on self-representation has

been under investigation for almost two decades, most early studies focused on anonymous environments such as MUDs (multi-user dungeons), chat rooms, and user groups (Rheingold, 1994; Turkle, 1995). These studies found that individuals tended to act as being someone else or act out their underlying negative impulses in the online world and pointed to the opportunities a nascent cyberspace offered for becoming a “lab of identities,” or a way to perform the postmodern subject (Turkle, 1995). Others offered a “reduced social cues” theory (Lea & Spears, 1992), arguing that online identity emerged through potential for anonymity in a context of text-based interaction that circumvents basic identity cues (such as race, gender, age) represented by the body. Both these approaches incorporate properties of technology and the absence of a corporeal body in the interaction into explanations of how and why people play with identity.

As detailed empirical, ethnographic and biographical studies began to emerge, different conceptualizations of internet identity now appear on the theoretical landscape. More recently, researchers have shifted their attention to self-presentations in less anonymous online environments such as internet dating sites (R. Jones & Ortlieb, 2006) and health information users groups (T. Lewis, 2006; Tanis, 2008). Results here suggest that people presented themselves and acted differently in such environments than they did in other online settings. These and similar findings (Kennedy, 2006; Preece & Ghazati, 2001; Wright, 2000; Wright & Bell, 2003) indicated that the online world was indeed not monolithic, and online identity construction varied according to the nature of the setting. With the emergence and widespread use of the world wide web as a display technology, presentation of the self could now include more defining elements

of identity such as photographs, audio and video files, and links to others sites for verification—which suggests that some displays of online identity point toward a more rigid and static use of the internet and world wide web. Carter (2004) concluded that despite claims as to multiple and fluid identities in virtual space, residents of her “Cybertown” worked to initiate, foster, and maintain trust and intimacy.

The internet and world wide web user population is far different than what was revealed in the early landmark studies (i.e., Lea & Spears, 1992; Rheingold, 1994; Turkle, 1995). A more equitable gender split and increased racial diversity are apparent (Pew, 2008) and the demographic shift in the user population has been accompanied by drastically reduced interest in online role playing as a percentage of the total internet use (Kennedy, 2006). Today users go online for many different reasons and online identities are likely to be extensions of offline identities because for most people, internet use enhances, extends, and supplements what they do offline (Rainie & Horrigan, 2005). This suggests that rather than inventing new identities, the majority of those who use the internet and world wide web hold on to those identity components that are most important to them, while searching the web for information or answers to their problems.

Space and Place

So for virtual community the question remains: Does geographic place still matter? Confining community solely to spatial parameters neglects the relational elements—common ties and social interactions—necessary for community, but some observers argue that just because people are neighbors does not necessarily mean they are friends (Fischer, 1982). Local place is not always sufficient to produce community, but is it necessary?

A debate developed within earlier research on internet communication about whether online, virtual, or otherwise computer-mediated communities were real or imagined (Bourdieu & Coleman, 1991; Markham, 1998). At issue was whether these sorts of communities were too ephemeral to explore as communities per se, or whether the nature of the communication medium made them radically different from what had heretofore been thought of as communities. While face-to-face contact may be considered “normal,” the plethora of technology-enabled communication channels has diminished this traditional method of social interaction (Dwyer, 2007, p. 2). Increasing use of cellular telephones, text messaging, instant messenger, e-mail and social networking sites indicate that digitally-mediated communication is an important factor in the management of interpersonal relationships, and it is out of these relationships that virtual communities congeal into “place” (Carter, 2004). Thus the distinction between real and imagined or virtual community may be less concrete than it seems, regardless of the ways in which community members interact. What remains elusive is how people generate a sense of place that is different from the spatial logic of physical space.

Familiarity with any virtual community produces the notion that it is a specialized place within a landscape that contains any number of recognizable social spaces. As such, it is a place that allows members to invest in social interaction in ways similar to how they would in other social spaces with which they are familiar. If, as Lefebvre (1991) argues, space is produced through social action rather than being a priori, then the “place” that is a virtual community (or social network) becomes a social product. Hence, when users discuss “going there” or “being there” or even “meeting friends there,” they are actively producing a social space. It becomes a lived-in space where

collective and individual practice creates “place.” As such, it is not a technological construct but a cultural construct, mediated through experience rather than through technology (Carter, 2004, p. 113).

Tilley (1994) brought space further into phenomenological inquiry by contending that space has no fundamental essence in itself, only relational significance created through relations between people and specific spaces. These social spaces, rather than homogenous and static, consist of varying densities of human experience, connection and participation. They are contextually constituted, and provide particular settings for involvement and the creation of shared meaning (Tilley, 1994, p. 11). Hence “space” is transformed into “place.” This transformation is key to understanding how space—virtual space for this study—becomes place for subjects of this research.

Places are created out of space by groups or individuals through shared symbols, common experiences and common meanings (R. Jones & Ortlieb, 2006). Place is both internal and external to a human subject, at once both a center for personally embedded meanings and physical action. Basso (1996) contends that place is primary to the creation and maintenance of personal and group identities and through the act of naming, places become invested with meaning and significance for individuals and groups. Naming is a component of familiarity with a place—people routinely draw on their stocks of knowledge in the places in which they act, to give meaning to their lives and significance to the place. The act of naming transforms the physical into something that is historically and socially experienced. The bestowing of names helps to create place out of space (Basso, 1996).

Places, however, possess the capacity not only to trigger acts of self-reflection, but also lead to thoughts of other entities—places, people, times, objects—whole networks of associations generated by the place itself (Tilley, 1994). As place stirs the thoughts and feelings of those in them, these same thoughts and feelings animate these inhabited places through the attention placed on them (Basso, 1996). This process illustrates that familiar places are experienced as meaningful, their significance and value residing in the form and arrangement of their observable characteristics. People continually perform acts that reproduce and express their sense of place, acts which are inextricably tied to their own understandings of who and what they are (Basso, 1996, p. 57).

It has been argued that the world is not external to human action waiting for beings to enter it, it is through human action and interaction that beings bring about the world they are then in; they create so that they may be “in the world” (Heidegger, 1977; Richardson, 2007). How people adapt and react to distinctly different circumstances and surroundings depends on the interaction between them and the material aspects of each particular set of circumstances.

When people enter a physical space, they begin constructing situations defined by their interpretive responses to the material aspects of the setting. When people are engaged, when they are incorporating the material setting into the situation, they are constructing a reality that will be different from other realities they construct when confronted with a different material setting (Richardson, 2007, p. 88). This is surely the case when people sit at their computers, log on to the internet, and interact with friends, strangers, and entities in places they have created out of ungrounded cyberspace,

facilitated through a material object. Richardson's take on Heidegger's (1977) "being-in-the-world" helps illuminate the phenomenological aspects of this study.

The proposition that nonspatial (in the traditional sense) virtual communities can replace local place and shared community space is questionable. It appears to Driskell and Lyon (2002) that internet relationships can complement aspects of community found in local place and shared space, but they are poor replacements for social relationships among individuals based on shared identity, common values, psychological connections, and kinship. Communities still exist most readily, most naturally and most often when people identify with place—the neighborhood, the church, the school or the workplace—and the personal face-to-face interactions that occur within boundaries of a geographical area (Driskell & Lyon, 2002, p. 388).

Others however, (Carter, 2004; Heidegger, 1977; R. Jones & Ortlieb, 2006) contend that people need a place in which to be before they can act and interaction at any level in a specialized place establishes the connections that prime relationships, which then initiate the communal ties that transform into community. As virtual community has no universal definition, the argument might just be the degree to which relationships become personal.

Functioning as information neighborhoods, virtual communities offer members congenial environments, places where information in which they are interested is likely to be found even if they do not have explicit queries. Because virtual communities function within a general context of shared interest, participants tend to be aware of information that would be of potential interest to others, and thus can share that information without necessarily going through the formalities of querying an information

retrieval system. Additionally, because virtual communities are situated within the broader information environment of the internet as a whole, information related to the interests of participants can be either embedded within the community by posting or offered to the community through hyperlinks (Burnett, 2000). And while these environments may lack the face-to-face interactions of more traditional communities, they provide considerable opportunity for socializing, for giving and receiving support, and for other types of interaction that supplements the exchange of information.

Social Support

To give and receive support is an important aspect of social interaction, and since the internet and world wide web have become so integrated into modern-day life, it is no surprise that social support is increasingly exchanged online (Preece, 2000; Tanis, 2008). While features of digital communications media affect how people interact online—how they compose and receive messages, form and maintain relationships, organize and structure groups—online communities formed to help others with specific issues or problems offer members some unique characteristics compared with face-to-face groups in dealing with the topic at hand. The anonymity and text-based nature of community exchanges allow for physical place and time independent interactions that increase the possibilities for members to expand these supportive connections (Wilson & Peterson, 2002).

While there are any number of reasons why people engage the world wide web and the internet, one certainly is for social support (Eichhorn, 2008; Preece, 2000). Individuals can associate with others who may share some similarities or who may have an understanding of their specific situation, anywhere in the world at almost any time (Book, 2008; S. Fox & Jones, 2009; Preece & Ghazati, 2001). Online communities can

therefore provide members with support and advice from a virtual forum of “experiential experts” unrestricted by geographical distance or time constraints that may precede, supplement, or in some cases replace, that of health care professionals (McKinlay & Marceau, 2008).

In online communities such as support groups, professional groups, and activity-based and topical groups, people interact with various others: those who find themselves in comparable circumstances, share a mental or physical condition, have suffered a similar traumatic experience, or at least share a topic of interest. This perceived similarity combined with relatively easy access to large numbers of others can provide one with a communal sense of universality that is not likely to be found offline (Preece & Ghazati, 2001; Wright & Bell, 2003), leading to a notion of group membership and an emergent social identity. Preece and Ghazati also found that in online communities where social support was the main focus, suspicion was virtually non-existent, interactions displayed few emotional negative remarks, high levels of emphatic communication were observed, and representations of self went overwhelmingly unchallenged.

Online Health Community

A virtual community in health care refers to a group of people (and the social structure they collectively create) founded on telecommunications with the purposes of collectively conducting activities related to health care and education. Such activities can include actual delivery of health care services, staff or patient education, a platform for providing support, discussing health and treatment related issues and problems, sharing documents, consulting with experts and sustaining relationships beyond face-to-face events (Demiris, 2006, p. 179).

The BoneSmart® knee community, subject of this research, represents a particular type of non-anonymous, or onymous, online support forum; a virtual community oriented specifically to foster communication among persons looking for information about joint replacement surgery or who have had one or more joints replaced. This forum also encourages experienced users to help mentor potential and new patients, and aim to provide a nurturing environment of support and knowledge. The critical nature of health information and the design of these type entities—accessible, easy to navigate, welcoming websites coupled with voluntary membership in common-interest groups that expect and rely on peer education and support for health issues—comprise a special orientation and affect the ways in which users present themselves in these communities.

Opinion Leadership

The importance of personal influence—that close social ties play a part in the flow of information from media to mass—became apparent to social scientists after several mid 20th century studies revealed that people received a great deal of their information from other people. The concept of opinion leadership emerged from this acknowledgment, along with recognition of some of the variables that made it a viable notion: an individual's characteristics and experience, group dynamics and processes, social cognitive theory, social power, and, the two-step flow hypothesis, as well as the hypothesis' later permutations.

In the 1940s and 1950s a small group of researchers framed a theory of public opinion formation that sought to reconcile the role of media influence with the growing realization that in a variety of decision-making scenarios, ranging from political to personal, individuals may be influenced more by exposure to each other than to mass

media sources (Katz & Lazarsfeld, 1955; Lazarsfeld et al., 1948; Merton, 1949).

According to this group's theory, a small minority of "opinion leaders" act as intermediaries between the mass media and the majority of society. Because information, and thereby influence, was envisioned to "flow" from the media through opinion leaders to less media-active segments of the population, Lazarsfeld et al. (1948) called their hypothesis the two-step flow of communication, in contrast to what at the time was referred to as "mass society" or "hypodermic needle" theory, which treated individuals as defenseless objects of media influence (Baran & Davis, 2000).

Studies of personal influence and the two-step flow contributed significantly to communication research, as "the part played by people" (Katz & Lazarsfeld, 1955) came to be recognized as an important mediating variable in the social flow of information and influence from media to mass. Findings from this and similar studies (e.g., Hovland, 1951; Klapper, 1960; Lewin & Grabbe, 1948) added to a growing belief among communication scholars of the time that the hypodermic needle theory—messages propelled from an all powerful direct effects media—could no longer be supported by newer data.

In the decades after the introduction of the two-step flow, the concept of opinion leaders became central in the literatures of the diffusion of innovations (Rogers, 1995; Valente, 1995), communications research (J. O. Brown, Broderick, & Lee, 2007; Davis, 2006; Weimann, 1991, 1994), marketing (Chan & Misra 1990; Kozinets, 1999, 2002; Myers & Robertson, 1972), and now health (D. K. Kim, 2008; Maloney-Krichmar & Preece, 2005; Valente & Pumpuang, 2007). By the late 1960s, the hypothesis had been hailed as one of most important formulations in the behavioral sciences (Arndt, 1967),

and by the late 1970s the two-step flow had become the “dominant paradigm” of media sociology (Gitlin, 1978, p. 207).

Katz and Lazarsfeld (1955) originally defined opinion leaders as “the individuals who were likely to influence other persons in their immediate environment” (p. 3), and this definition remains in use, more or less unchanged (Shah & Scheufele, 2006). It is important to note that leadership comes in many forms. Most noticeable are official leaders of formal groups—heads of corporations, labor unions, government entities, universities and the like. Informal leadership, however, is less visible. It occurs when people need information, advice, or interpretations and turn to others with whom they have some connection and feel they can trust. These “opinion leaders” possess some special expertise or wisdom regarding the topic about which a decision must be made (Lowery & De Fleur, 1995). Their influence is direct and derives from their informal status as individuals who are informed, respected, or simply “connected.”

Numerous studies, including that of Katz and Lazarsfeld (1955), suggest that opinion leaders and followers alike are exposed to a mix of interpersonal and media influence (Watts & Dodds, 2007; Weimann et al., 2007) and that differences in influence are more appropriately described on a continuum rather than dichotomously (Lin, 1973). J. J. Brown and Reingen (1987) found that even in a relatively small population, 90% of recommendation chains extended over more than one step and 38% involved at least four individuals, which illustrates the notion that people have multiple—partly distinct and partly overlapping—groups of acquaintances (Cooley, 1902; Granovetter, 1973; Watts, Dodds, & Newman, 2002).

The Primary Group

Katz and Lazarsfeld's research reinvigorated a longstanding interest in the work of sociologists (e.g., Cooley, 1902, 1909; Hovland, 1951; Lewin & Grabbe, 1948) in studying "primary groups"—the face-to-face relationships (family, friends, neighbors, acquaintances) that are such an important influence on human behavior. If it were possible for the proverbial (and overworked) man from Mars to take a fresh look at the people of Earth, he might be impressed at how much time they spend doing things together in groups. He would note how they cluster in small groups under the same roof satisfying biological needs, rearing children and mutually caring for each other, how they enjoy themselves engaging in recreational sports of various kinds, how they spend time in little groups talking, planning, and conferencing, and how the education and socialization of children tends to occur in larger groups like schools, churches, or other social institutions. He might also be saddened to find groups of men engaged in warfare. In short, if he wanted to understand what might be going on here, he would have to carefully examine groups. Understanding how individuals relate to groups, how groups relate to larger society, under what conditions groups (and networks) form and dissolve, and what makes them grow and effectively function, are keys to understanding human behavior (Cartwright & Zander, 1968).

Primary group research led to the development of theories that rested on the assumption that small groups have a profound influence on nearly every aspect of social life, including how people directly and indirectly attend to messages in the flow of information from media to mass (Cooley, 1909; Lewin, 1948). As advances in technology broadened theoretical ground in the study of human communications, middle-range theories from other disciplines impacted communication research. Social

cognitive theory (Bandura, 1986), based on observational or vicarious learning, contends that an individual can gain knowledge by watching others or by processing information given to them by others (or by media). By modeling behavior or performing actions based on shared meaning, people transcend the bounds of their immediate environment. Not only is modeling an important mechanism for diffusing ideas, values and styles of conduct within societies, it also influences transcultural change (Bandura, 1986, p. xii).

Social cognitive theory plays a part in this research through modeling that occurs in the BoneSmart® community. Opinion leaders in this community, according to his or her experiences, pass on information to other members, who may then base potentially life-changing decisions on that information. When the information advocates an activity that requires an investment of time and/or resources, and failure can be costly (very costly for this condition, and not in just monetary terms) people seek verification from multiple sources before they act. These activities might include, among others: contemplating the pros and cons of knee replacement surgery, or choosing a novel prosthetic, an innovative surgical method, or an inventive form of therapy.

In this way, not only are ideas about knee arthroplasty communicated, but modeled ideas, values, norms and notions concerning social conduct are also diffused throughout the network. Technology has thus expanded the range of social influence and transformed the social diffusion process as it was originally conceptualized (Rogers, 1962). Models, in the form of opinion leaders, motivate, inform, exemplify and legitimate innovations, and serve as advocates for innovations by encouraging others in a group or network to adopt them (Bandura, 1986). People are initially reluctant to

undergo unfamiliar procedures that involve costs and risks until they assess the advantages or disadvantages that models provide.

Social Power

Leadership—opinion or otherwise—cannot occur in a vacuum. Heterogeneous individuals must be present in groups or networks to allow for interaction between and among them. From the outset in the study of group dynamics, it has been assumed that morale, group effectiveness, and leadership are all intimately related to one another (Cartwright & Zander, 1968). Despite the complexity of these relations, the nature of a group or network's leadership makes a difference to many aspects of its functioning. Leadership consists of such actions by group members that move the group toward its goals, improve interaction among members, build cohesiveness, and make resources available to the group or network. As specific members perform these functions, they may be seen as leaders, which translates into social influence, which then translates into social power (Cartwright & Zander, 1968).

Any realistic description of group, organization, alliance, federation, or network dynamics must recognize that leadership inevitably involves the ability to influence other people in some way (Dahl, 1957). Even in highly informal, voluntary networks, leaders are recognized by their ability to affect the course of events within the association. It follows then, that if social power consists of the ability to influence other people by whatever means, leadership clearly involves the use of power (Cartwright, 1959; Lasswell & Kaplan, 1950).

Although there are undoubtedly many possible bases of social power, French and Raven (1968, p. 263) identify five which they deem to be common and most important:

- Reward – based on B's perception that A can mediate rewards for B

- Coercive – based on B’s perception that A can mediate punishment for B
- Legitimate – based on B’s perception that A has the right to prescribe behavior for B
- Referent – based on B’s identification with A
- Expert – based on the perception that A has some special knowledge or expertise

Although referent power could overlap here in that B may well desire to identify with A’s post-operative healthy state, most relevant to this research is expert power, wherein the strength of A’s power stems from the knowledge or perception that B attributes to A’s expertise in a given area. A may have had knee arthroplasty and B may be contemplating it. For expert influence to occur, it is necessary for B to think that A really knows about knee arthroplasty and is being honest in imparting information about it.

Defining Opinion Leadership

As the internet continues to evolve as a milieu for social interaction, the reemergence of interest in opinion leadership calls for a review of the concept’s operational definitions. Earlier research conceived of opinion leadership as an individual characteristic with relational implications, that is, a person’s status in social interactions (Shah & Scheufele, 2006). Katz (1957) explained that an opinion leader is a person who exerts influence on the opinions of others, and can be distinguished from others via three criteria: 1) who one is—the personification of certain values; 2) what one knows—competence; and 3) whom one knows—strategic social location. Opinion leaders “are to be found on every level of society and presumably, therefore, are very much like the people they influence,” (Katz, 1957, p. 63). After reviewing decades of research on the concept while updating his theories on diffusion, Rogers (2003) identified six generalizable characteristics of opinion leaders that differentiated them from their followers: 1) greater exposure to mass media; 2) more cosmopolite; 3) greater contact

with change agents; 4) greater social participation; 5) higher socioeconomic status; 6) more innovative. Rogers also argued that when a social system's norms favor change, opinion leaders are more innovative, but when norms do not, opinion leaders are not especially innovative (pp. 316-318).

While operational definitions of opinion leadership measurement have varied among studies, some variation of the four key methods utilized in earlier research continue to be employed in today's digital media environment. Lazarsfeld et al. (1948) originally suggested that "the opinion leaders of a community could be best identified and studied by asking people to whom they turn for advice on the issue at hand" (p. 49). This approach came to be known as the sociometric method, and emphasizes the associational element of this individual disposition. Group members are asked whom they go to for advice or information about a given issue (*Who is your leader?*). Without a full census of the population under study, however, gaps in the network structure might lead to inaccurate assessments of opinion leadership. This method is most applicable to a "design in which all members of a social system are interrogated than to one in which a relatively small sample within a larger universe is contacted" (Rogers & Cartano, 1962, p. 438). (Although Rogers [1995] notes it is possible to locate sociometric leaders through snowball sampling.) In order to address the problems identified in the sociometric method for studies with larger populations, key informants can be interviewed and asked to identify opinion leaders (*Who are the leaders in this system?*) (Weimann, 1994).

Self-designation measures an individual's perception of his/her leadership in the group or network (*Are you a leader in this system?*). This method is open to challenge

from a number of perspectives, primarily due to dependence on the accuracy of respondents' self-report. Opinion leaders can also be identified through observation. In this design, an observer monitors a group's activities, the main actors, and the flow of information. Before the proliferation of online forums—where all active members leave recoverable text-based trails through posts—the shortcoming of this method was self-evident: It was “limited to only small social units (a class, a village, a military unit, etc.), and required a relatively longer time than . . . other methods” (Weimann, 1994, p. 46). The scope of the observation method has been widened by the potential the internet provides.

Opinion leader identification techniques differ on their ability to capitalize on each of Katz's (1957) “who one is, what one knows, whom one knows” dimensions. For example, self-designation may provide a good measure of a leader's values and traits, whereas sociometric methods may provide a better measure of social position. Thus, one factor that influences the selection of an identification method is the importance of each of these dimensions to the research project (Valente & Pumpuang, 2007).

Opinion Leadership in a New Age

As rapidly as communications technology has changed in recent years, so have the ways in which people form social networks, disseminate information, and exert influence within those networks. Since a chief component of being an opinion leader is communicating with others, changes in the communication environment have noteworthy implications for opinion leadership. According to McQuail (2000), the internet, the most prolific representative of new media, can be seen as a virtual substitute for interpersonal communication, interactive play, information search and collective participation. Research focusing on the emotional nature of social computer-

mediated communication (e.g., Lea & Spears, 1992; Parks & Floyd, 1996; Walther, 1995; Walther, Anderson, & Park, 1994), based on principles in social cognition and interpersonal relationship development from social psychology, suggest that given enough time, individuals can create fully formed impressions of others based solely on the linguistic content of written electronic messages. Despite limited social cues, social resources such as emotional support, leadership, companionship, a sense of belonging, and group identity are visibly exchanged online between individuals who do not know each other in the offline environment (Haythornthwaite, 2002).

In an environment that proffers reduced social cues, other psychological comparisons, such as an inclusive mind-set (Blanton, 2001) or shared group identity (Brewer & Webber, 1991) are more important to enhancing communication effects than is structural similarity—the shared social characteristics such as gender, age, ethnicity, physical similarity, occupation or socioeconomic status (Wellman, 1997; Kollock & Smith, 1999). Most vital to enhancing communication in an online health community, however, is “experiential proximity”—the knowledge or perception that those with whom one engages have a certain degree of experience or understanding of their own situation (Maloney-Krichmar & Preece, 2005; Tanis, 2008). Weak ties and expertise are crucial because opinion leaders often base their remarks on acquired knowledge or firsthand experience in their area of expertise, thus their advice reduces perceived risk or anxiety inherent in a seeker’s search for information in a given area. That opinion leaders provide both favorable and unfavorable information adds to their credibility (Jin et al., 2002).

Several recent studies have attempted to determine how opinion leadership is demonstrated in various online contexts. Referring to their model as an “influence model of opinion leadership” in a study of Web-based political discussion, Rhee, Kim, and Kim (2007) identified online opinion leaders as those who received more postings and produced more positive reactions than the negative reactions in the portal-based discussion plaza. Online opinion leaders were found to be 11% of the sample, predominantly male, educated, and slightly older than the online general public. The researchers also found these leaders to be more competent in internet communication than the general public in the sample.

In a marketing study utilizing both quantitative and qualitative data, J.O. Brown et al. (2007) referred to online information exchange as word-of-mouth theory and found that respondents evaluated the credibility of information both in terms of the individual source and the website used, which ultimately affected the value of that information. With websites themselves acting as social proxies for tie strength and homophily identification, leadership in this context was dominated by the website; respondents commonly mentioned themes which displayed variations of social affiliation with websites whose content, rather than the characteristics of individual members, demonstrated similarity of interests with the user. Here, content refers to the actual textual content (i.e., the information content) of the website, rather than who actually provides that information (i.e., the individual users).

Researching social interaction in an online forum focused on knee replacement, Maloney-Krichmar and Preece (2005) discovered that participation patterns emerged centering around a group of key community members. Some of these key members

participated in leadership capacities for long periods of time, some had high participation rates for sporadic and shorter periods of time, and some had been active participants but left and came back to help new members. These patterns indicated there were newly injured individuals frequently joining the community who needed information, advice, and support, and there were long-term members—the opinion leaders—who possessed the knowledge and experience to meet these needs and desired to do so. The researchers concluded that the success and vitality of this community was made possible by a stable core of long-term members who provided guidance to newer members.

Whereas the current study utilized Social Network Analysis, an online questionnaire, and online interviews in a health context to identify opinion leaders, Rhee et al. (2007) and Brown et al. (2007) determined leaders by numerically valuing political postings and website content, respectively. Rhee et al. identified leaders through observation according to predetermined criteria (high number of postings and high number of positive responses to postings). Leadership emerged for Brown et al. through participant consensus after analysis of interviews and postings. Similar in subject matter to research conducted for this study, Maloney-Krichmar and Preece (2005) also looked at knee health, yet they sought to help health care professionals find ways to build and maintain health-related support forums. These researchers identified opinion leaders via observation and subsequent categorization of participants according to predetermined external criteria: group membership role analysis, developed by Benne and Sheats (1948).

Social Network Analysis

More recent studies of interaction on the internet have explored opinion leadership in online contexts utilizing Social Network Analysis (SNA) (Hanneman & Riddle, 2005; Lewin, 1936; Moreno, 1934; Scott, 2000; Wellman, 1983; Wellman & Berkowitz, 1988), a theoretical perspective and set of methods for analyzing social structure. While SNA is rooted in psychology, social psychology and anthropology, it is well-known in communication studies (Haythorthwaite, personal communication, July, 2010) and is being employed more frequently in mass communication research (Caiani & Wagemann, 2009; Clouston, Verdery, Amin & Gauthier, 2009; M. G. McGrath, 2009; Prell, 2003). As flows of information and opinion leadership are inarguable mechanisms of social structure, these concepts can be analyzed in terms of the relational ties and the patterns of ties that link members of a social structure—in this research, a social structure in the form of a community created and maintained in virtual space.

One of the most potent ideas in the social sciences is the notion that individuals are embedded in thick webs of social relations and interactions. Social network theory and analysis provides answers to questions that have occupied social philosophy since the time of Plato, namely, the problem of social order: how autonomous individuals combine to create enduring, functioning societies (Borgatti, Mehra, Brass, & Labianca, 2009). SNA also has the potential to provide explanations for numerous social phenomena, from individual creativity to corporate profitability (McCarty & Bernard, 2003).

SNA focuses on patterns of relations among actors; any theoretically meaningful unit of analysis may be treated as actors: individuals, groups, organizations, communities, states, or countries. (Streeter & Gillespie, 1992; Wasserman & Faust,

1994; Wellman, 1983). Social network analysts seek to describe networks of relations, tease out prominent patterns in such networks, trace flows of information (and other resources) through them, and discover what effects these relations and networks have on units of analysis (Garton, Haythornthwaite, & Wellman, 1997). The use of computer software (UCINET6® in the current study) allows the researcher to generate various social network maps visually depicting communicative relationships among members of a social system, providing realistic rather than probabilistic results. These maps illustrate not only the direction of relationships, but their strength as well. The visualizations enable researchers to analyze social structure; opinion leaders in a social system can also be identified via maps. Depending on research goals, the focus of visualization and social mapping can be on identifying opinion leaders through interpersonal communication, excluding the influence of external media, a major variable in traditional studies of opinion leadership (D. K. Kim, 2008). Common measures utilized in SNA are centrality, distance, degree, density.

In a study of logic-based programming, M. G. McGrath (2009) explored a website focused on consumer-generated content formed around an Australian Football League. Interested in members' attitudes toward each other on a particular issue, McGrath analyzed several hundred posts from what he determined to be the 20 most significant contributors in this social network. Attitude scores were assigned to posts among actors and averaged for each pair of actors. The resulting sociogram and matrix demonstrated that; a) participants were divided into two distinct cliques, connected by a bridge anchored by two particular actors who attracted significant direct negative comment, and; b) a clique of like-minded individuals formed around two other participants.

Mathematical procedures produced measures of centrality—indicators of leadership and influence—for each participant. After revising the analysis to exclude negative comments, McGrath established that two actors in the clique of like-minded individuals were most influential, thus any external attempts to sway the thinking of members of this website on this issue should focus primarily on these two actors. McGrath's ultimate conclusion was that in the bigger picture of consumer internet use, organizations are recognizing that it may prove fruitless to compete with peer networks and instead must work with (and within) them. To do this, organizations must understand relevant network structures; particularly influence hierarchies and key influence actors.

Utilizing SNA and UCINET6® (Borgatti, Everett, & Freeman, 1992, 1996, 2006) and looking for opinion leaders in a study for an international business firm, X. Zhang and Dong (2008), investigated an online real estate forum with over 5,000 members. These researchers found that because of largely anonymous communication and mutual weak ties among participants, the key informant and self-identification methods of identifying opinion leaders did not work in this online context. Through observation of postings and subsequent measures of centrality, the researchers identified 20 opinion leaders—the most active in providing real estate advice. Citing past success in the application of diffusion theory, the researchers recommended the firm target these 20 and incentivize them through firm-related empowerment and experience.

In a diffusion study in India, D. K. Kim, Chitnis, Vasanti, and Singhal (2007) explored the communication networks of 225 farmers in 14 villages, identifying opinion leaders in what they found to be four socially networked groups. The study's aim was to identify opinion leaders through SNA and analyze the attributes of opinion leaders in the

diffusion of agricultural-related information delivered via internet kiosks, or e-Choupal centers, placed in villages throughout Central India. Between 2000 and 2007, the number of e-Choupal centers increased 361%, expanding from 1,800 covering 8,000 villages to 6,500 covering 38,000 villages. The e-Choupal consists of a computer with multimedia features connected to the internet by a dial-up or via a VSAT connection. The e-Choupal center is installed in the house of a community member trained to use the technology, who then provides farmers with information about current market prices, provisions to sell crops directly to buyers, and up-to-date information on weather, farming practices and insurance policies. The researchers' survey showed that while mass media sources of information were available via the e-Choupal, farmers' decision making during adoption processes was determined more by their personal contacts with opinion leaders, even though mass media functioned as a source of new knowledge.

While measures of centrality can be used to identify opinion leaders, D. K. Kim et al. (2007) argue in the e-Choupal study that opinion leaders who are the key players in accelerating diffusion are not just those who have higher centrality measures, but also those who are strategically positioned to reach everyone in the network. As expected, three of the four e-Choupal trained community members in the initial 14 villages were found to be opinion leaders.

However, "even though the opinion leaders were identified as major information sources, a substantial number of other farmers who were not opinion leaders were cited as information sources as well" (p. 357). The researchers concluded that while new innovations were also introduced to farmers by non-opinion leader peers, these farmers

still felt the need to confirm adoption decisions with opinion leaders and not with those who were the initial source of information about the innovation.

While McGrath (2009), X. Zhang and Dong (2008), and D. K. Kim et al. (2007) all utilized SNA to seek out opinion leaders, McGrath, and X. Zhang and Dong sought to advise organizations, and D. K. Kim et al. conducted only face-to-face interviews with targeted respondents. While suitable for those researchers, these distinctions differentiate those studies from the study proposed herein, in both aim and method.

Social Network Analysis in Mass Communication

While not exploring opinion leadership explicitly, a number of studies conducted in mass communication have utilized SNA as perspective and method (Haythornthwaite, 2000). Although it has been used in other disciplines, only recently have scholars employed SNA to understand relationships in mass communication environments, such as, for example, social network sites (SNS) like Myspace, Facebook, Cyworld, and Bebo. These networks are populated by millions of users, a large number of whom have incorporated SNSs into their daily practices (Boyd & Ellison, 2008). In what they termed a “quantitative ethnography,” Clouston et al. (2009) created an original associational network dataset from Facebook users of an undergraduate university (enrollment 16,000). These researchers saved pages for each person in their random sample and captured the actor’s complete social networks, as privacy settings permitted (on Facebook, users may view each others’ complete profiles, unless a user has specifically chosen to deny permission). This data indicated ties and attributes of those connected by gender, faculty/school, class levels, country of origin, and graduating year. Data also included information about organizational affiliations (workplaces and regions) to which each “friend” belonged. The attribute variables were coded based on actor’s profile

information, with matrices constructed to indicate if two individuals in the sample shared the same categorical qualities.

Among findings, Clouston et al. (2009) noted that the average number of “friends” an actor had in their sample was 176, and that men were more connected than women on-campus, though they found no gender differences in off-campus ties. Year of expected graduation was the strongest correlate of being connected, while gender was weakest. What is noteworthy about this study is that social network sites can potentially provide considerable network data in a cost-effective and efficient manner. Studies that explore associational ties of individuals in large social groups often rely on resource intensive procedures to gather associational data, such as multiple interviews and/or reliance on social actors’ perceptions of associates’ relations. This study suggests that with even with limited resources, large and fairly complete social network data can be gathered which can illuminate the social interactions of individuals in a virtual society; a less-demanding method of gaining insight into the ways in which “friends” cluster.

Caiani and Wagemann (2009) applied SNA to a study of communication networks within the Italian and German extreme right. Using Web links between organizational websites as proxies, these researchers found that extremist groups increasingly use and abuse the internet for propaganda and recruitment, as well as for internal communication. Using the most common measures offered by SNA—distance, degree, density and centralization—the investigators were able to determine whether these organizations operated cohesively or were disjointed. They found the Italian network to be fragmented, highly diversified, and difficult to coordinate across entities, and the German network denser and more concentrated on a few central actors (resembling

star structure characteristics of social networks). Treating the Web links as indicators of closeness, instruments for reciprocal help in attaining public recognition, and as potential means of coordination, the study concentrated on connections between the micro and macro dimensions of this issue. By focusing on the level of individual organizations, examining which types of organizations occupy a central position and which are more peripheral, the research explored the formation of specific alliances of communications between the various extremist groups, looked at their composition (e.g. their homogeneity or heterogeneity) and at the relations between and among them; conflict and consensus were factors, as were how segmented or centralized these virtual networks appeared to be. In this context, Caiani and Wagemann found that the structural properties of these networks provide the websites with opportunities to become substitutes for empirical organizational structures.

SNA researchers focus on the structure of social networks and see this structure as an indicator that social capital exists. Although SNA scholars agree that structure is an indicator of social capital, differences in perspective exist as to which structures act as the best indicators. Prell (2003) investigated the social aspects of a community network by concentrating on how the representatives of local non-profit youth agencies and community leaders communicate with one another, share resources, and locate trust in each other. Concentrating on the development of one component of a community network, a youth services database, Prell's study focused on the concept of social capital, defined as "the trust and resources found in the social networks of relations within a community" (p. 3). Surveying a cross-section of non-profit youth agency representatives, faculty from a local private research university, city government

employees, and administrators from the local school districts, and utilizing SNA and UCINET®, Prell measured the social capital concepts of frequency of communication, trust and exchange of resources. Interested in determining centrality as it relates to network structure and social capital in this context, the study evaluated both in-degree (number of an actor's incoming messages) and betweenness (measuring where a particular actor lies between other actors in a network) centrality. Actors who receive information from many sources are considered prestigious, actors with high betweenness scores often serve as gatekeepers and resource brokers (Diani, 2003).

Prell's (2003) data showed that many of the same actors dominated the network in both in measures of centrality and, interestingly, that most of the popular actors were also employees of government agencies—the same agencies that circulate funding resources among non-profits organizations. Thus, funders in this network seem to hold a large amount of social capital. The data also indicated that in-degree scores for social interaction had significant positive correlations with trust and resource exchange—an actor's popularity (high in-degree) coincides with others' nominating that actor as one who gives funding and is trustworthy. Prell's conclusion was that since non-profit organizations have traditionally lacked both funds and staff, they tend to focus energies on serving clients, not on connecting with actors outside their organizational settings. An exception, however, are actors whose organizations provide needed resources—such as funding. More specifically, government agency employees were the most popular and powerful actors in this network. Prell argues that these results also show that in certain scenarios, in-degree and betweenness centrality are virtually synonymous with one another.

Clouston et al. (2009), Caiani and Wagemann (2009) and Prell (2003) all utilized SNA to analyze communication patterns, however, unlike the current study, SNA was used as the primary method of investigation and several mathematical procedures were employed to obtain results. These studies were also conducted in contexts notably different than the health-related environment herein, and none specifically investigated opinion leadership, one of this study's principal objectives. These studies, however, demonstrate SNA's potential for understanding how relationship ties help illuminate social interaction.

Two-Step to Multi-Step

Despite criticism by later researchers directed at its oversimplification, the two-step flow hypothesis has remained relevant to communication study (Weimann, 1994). Given the literature reviewed for this study, it is apparent that the process of influence is more complex than opinion leaders simply glean information from mass media messages and passing their opinions on to passive followers. People who influence others are themselves influenced by others in the same areas of interest, resulting in an exchange. Thus, opinion leaders are both disseminators and receivers of influence (Weimann et al., 2007). The proliferation of digital media technologies and the diffusion of the internet have now radically expanded access to readily available sources for information of all types. Much of the information once obtained secondhand from friends and acquaintances—the traditional two-step flow—is now easily found through the internet and world wide web utilizing any number of digital communications protractors (Case et al., 2004). This, and accepting that opinion leadership does not occur in a vacuum, generates a different account for human interaction; a more accurate depiction of

modern communication flow, then, would include the recognition of a multi-step process.

With few exceptions (some noted above), the concept of opinion leadership has been researched within the context of traditional forms of community and social interaction (Nisbet & Kotcher, 2009). The customary view holds that individuals sharing geographical space engage in primarily face-to-face communication discussing news, politics, consumer products, popular culture, or behaviors. Yet in today's networked society, personal interaction is no longer dominated by physical proximity, relatively strong interpersonal ties, and face-to-face conversation, but rather is shared with geography-spanning digital interactions that involve many loose ties (Boase, Horrigan, Wellman, & Rainie, 2006).

The increasing use of internet sources for information can be seen as a further mutation of the two-step flow hypothesis. It is obvious the internet and world wide web have changed the nature of information seeking, as the internet is often the first choice to inquire about a host of topics, and serves as a conduit for discussing those topics with other internet users (S. Fox, 2010; Hesse et al., 2010; Kaye & Johnson, 2003). Rains (2007) reports that those who used the internet for health information rated information they obtained from family and friends to be significantly less useful than information obtained from the internet, while those who did not use the internet rated information they obtained from family and friends to be more useful. (p. 670)

Although knee, hip and joint replacement are becoming more routine, it could be that circumstances surrounding knee arthroplasty or its potential are new enough to where involved individuals are hard pressed to find someone in their immediate circle

with knowledge sufficient in this context to be considered an opinion leader. This could be also be an aspect of a broader trend that A. Shapiro and R. Shapiro (1999) refer to as “disintermediation,” or the capacity of the internet to allow the general public to bypass experts in its quest for information, products, and services. Perhaps, faced with the wide array of information sources now available, the average person is more interested in gathering facts and less interested in being convinced or persuaded by “traditional” experts—in this case, the medical establishment. The internet and world wide web, in their accessibility, anonymity and potential interpersonal authoritativeness, may now act as substitutes for the classic two-step model, supplanting interpersonal networks traditionally based on the dynamics of social and physical proximity. Case et al. (2004) contend that the rise of technology coupled with the decline of the American nuclear family has resulted in less reliance on family members for information, and may account for some of these changes in source preferences.

Another prime variable in past studies falls under the collective “leader attributes.” Although Rogers’s (2003) generalizable characteristics of opinion leaders (greater exposure to mass media, higher socioeconomic status, etc. [see above]) are widely reported as important variables in the search for opinion leaders, and while these normative and overarching attributes provide a researcher with a general sense of who opinion leaders might be, it is difficult to actually identify opinion leaders in a social system employing these general attributes because all social systems have their own particularity and uniqueness. This research determines how opinion leaders can be identified among people in “this” system, rather than relying on who opinion leaders are based on traditional generalized attributes.

Antecedents of Effective Communication

Scholars out of the Chicago School were instrumental in early sociological research, with studies concentrating on individual differences that characterized the people who composed audiences for mass communication and how those differences shaped their psychological and overt responses to the media (Lowery & DeFleur, 1995). Later, Lewin (1936, 1948) initiated a shift to the study of group communication; how social category memberships among members of an audience influenced patterns of attention and response. Katz and Lazarsfeld's (1955) research on personal influence represents the first clear and intensive focus on social relationships and their role in mass communication processes. Ties between and among people were seen as more important factors, rather than the structure of messages, perceived characteristics of sources, or the psychological makeup of the message receiver (Lowery & DeFleur, 1995). Over the years however, communications research has consistently advanced knowledge about how an individual's perceptions—specifically a message receiver's perceptions of sources—affect interpersonal communication and vice versa, a critically important component in the human communication process (L. L. McCroskey, J. C. McCroskey, & Richmond, 2006). "Messages are interpreted through the receiver's impression of the source. Perceptions of the source, therefore, determine perceptions of the message," (J. C. McCroskey & Richmond, 1996, p. 104).

Virtual communities are sources of and for information and are typically emergent, they arise as a natural consequence of people coming together for any number of reasons; e.g., to discuss a common hobby, medical affliction, personal experience, or to develop relationships around a lifestyle or consumer product (Ridings et al., 2002). The rapid growth of virtual communities on the internet and accompanying surge in interest

by researchers (Hine, 2000; Kozinets, 2002; Preece & Ghozati, 2001; Rafaeli & Raban, 2005; Wellman, 1997; Wellman & Gulia, 1999) raises questions as to what encourages members to interact in virtual communities; what makes them initiate contact, attend and respond to messages, revisit, and in many cases, remain in these communities. This study suggests that trust, credibility, and homophily (similarity) are elements generated by individual perception that help promote voluntary online cooperation among strangers in virtual communities.

Differences between online and offline communication are important because member trust in electronic communities must accordingly be made in most cases on the basis of written communication only. Face-to-face interaction is fundamentally different from written communication in that it allows for an exchange of verbal and non-verbal information (Hiltz, 1984; Rheingold, 1993). Additional meaning perceived in face-to-face communication and carried via inflections of voice, gestures, dress, tone, posture, and other indicators, is missing in written communication so that messages remain open to multiple interpretations (Sproull & Kiesler, 1991).

Trust

While trust and relationships borne out of it have been topics of research in many disciplines since the 1950s, it is rooted in the concept of ethos—trust in, or credibility of, the source of a message. Ethos, along with pathos (emotional appeal), and logos (logical appeal), are components of what the ancient Greeks termed “rhetoric;” the art of effective communication. Streams of research on trust can be found in the fields of philosophy, sociology, psychology, management, marketing, ergonomics, industrial psychology, and e-commerce (Corritore, Kracher, & Wiedenbeck, 2003) and when considering these various disciplines together, the literature on trust is

quite extensive. While trust has been studied in a variety of disciplines, each has produced its own concepts, definitions and findings. Even within a given field, there is often lack of agreement on its nature (Lewicki & Bunker, 1995).

Reasons for multiple definitions of trust in the literature are likely twofold. First, trust is an abstract concept and is often used interchangeably with related concepts such as credibility, reliability, or confidence (Y. Wang & Emurian, 2005). To define the term and differentiate the distinction between trust and its related concepts has proved challenging for researchers. Second, trust is a multi-faceted concept that incorporates cognitive, emotional, and behavioral dimensions (D. Lewis & Weigert, 1985). In a critical analysis of trustworthiness as a component of security, Nissenbaum (2001) stated, “Trust is an extraordinarily rich concept, covering a variety of relationships, conjoining a variety of objects. One can trust (or distrust) persons, institutions, governments, information, deities, physical things, systems, and more” (p. 104). There is, then, a lack of uniform premises by which to define trust and its manifestations.

The meaning of trust is dependent upon the situation in which it is being considered, another factor contributing to the complexity of a definition (D. Lewis & Weigert, 1985; Luhmann, 1979). In a virtual community, one can be conversing with one or two other individuals, thus trust can be understood in the context of interpersonal relationships, i.e. trust between people (Rotter, 1967). At the same time, because these same posts are seen by the general audience, trust is at the generalized, collective level, and notions of interpersonal trust are applied to collective entities (Jarvenpaa, Knoll, & Leidner, 1998), including networks like these (Ridings et al., 2002). Others, however, contend it is too difficult to assess the trustworthiness of remote entities,

because computerized communication media are increasingly removing familiar styles of interaction (Jøsang, Ismail, & Boyd, 2007). Jøsang et al. argue that physical encounter and other traditional forms of communication allow people to assess a much wider range of cues related to trust than is currently possible through computer-mediated communication.

While again there are many definitions of trust, only a few will be noted here. Deutsch (1958) provided an early general definition of the concept: “An individual may be said to have trust in the occurrence of an event if he expects its occurrence and his expectation leads to behavior which he perceives to have greater negative motivational consequences if the expectation is not confirmed than positive motivational consequences if it is confirmed” (p. 266). Rotter (1967) also focused on the attitude of expectation in his definition. Trust is “an expectancy held by an individual or group that the word, promise, verbal or written statement of another individual or group can be relied on” (p. 651). Rotter also noted that an attitude of confident expectation is a psychological state of the trustor. Mayer, Davis, and Schoorman (1995) defined trust as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (p. 712), a definition which incorporates risk. Mayer et al. argue there is no need for trust if there is no risk in a situation. Abrams, Cross, Lesser, and Levin (2003) simply offered “interpersonal trust can be defined as the willingness of a party to be vulnerable” (p. 65) and suggested two dimensions of trust: benevolence (you care about me and take an interest in my well-

being and goals) and competence (you have relevant expertise and can be depended upon to know what you are talking about).

Sabel (1993) argued that the perception of possible exploitation of one's vulnerability must also be present in any definition, offering that trust is an overriding confidence that no party to an exchange will exploit another's vulnerabilities. Vulnerability implies that the trustor must be exposed in some way. In the online environment, the trustor could be exposed through a lack of knowledge or expertise, or an inability to acquire something without the assistance of others. Trust encompasses the perception that one has vulnerabilities and that those vulnerabilities could be breached or capitalized upon (Sabel, 1993). Some e-commerce researchers have defined trust as a belief in an "attribute" of the trustee (McKnight, Choudhury, & Kacmar, 2002), whereas others have defined trust as a "trustor-based willingness" to believe the trustee (Fung & Lee, 1999).

Much scholarly research on trust has supported the assertion that the concept is multidimensional, although studies vary on what comprises those dimensions. Many researchers contend that trust consists of three distinct dimensions: ability, benevolence, and integrity (Blau, 1964; Butler, 1991; Giffin, 1967; Mayer et al., 1995), although often these are intertwined (Y. Wang & Emurian, 2005). Each dimension has been shown to be relevant in the case of online communication (Jarvenpaa et al., 1998).

Ability corresponds to a belief or perception held by the trustor in the skills or competencies of others which enable those others to have influence in a certain area (Ridings et al., 2002). In the environment of a virtual community, participants perceive

sources to be more reliable and informed when they trust those sources' abilities. This perception may be based on the source's reputation in the community or on the belief that the source has experienced problems or circumstances similar to one's own (Tanis, 2008). This applies to virtual communities because they are almost always centered around a specific mutual interest, hobby, life event, or occupation, and perceptions about the abilities of others with respect to mutual concerns are important to interaction (Ridings et al., 2002).

Benevolence is the expectation that others (trustees) will have a positive orientation or desire to do good to and/or for the trustor (Wu & Tsang, 2008). In a virtual community, trustees respond to requests for information or make general posts with appropriate advice, support, discussion and such, contributing to the ongoing interactions with intention to help, support, and care for others. Benevolence is important here, particularly in a health environment, because without positive reciprocation a nascent network would not be in existence long enough to become a virtual community. Benevolence is initially difficult to ascertain, but in a health-related virtual community, there is generally no material transaction taking place so someone looking for information has time to build trust in others providing it (J. Boyd, 2003).

Deutsch (1958) considered integrity to be a component of personal responsibility in arguing that personal integrity is related to such personal characteristics as the strength of internalized values with regard to responsibility, the ability to prevent or resolve conflict in responsibilities, and the ability to realize the goals of others as goals of one's own (p. 268). In the online environment, Jarvenpaa et al. (1998) assert that integrity is the expectation that others will act in accordance with socially accepted

standards of honesty or a set of principles (both tacit and stated) that all within the community ostensibly accept.

Research has identified several additional antecedent factors conducive to trust-building. Disposition to trust, responsiveness, the disclosure of personal information, a desire to exchange information, reputation, and identification-based trust, all have bearing on the establishment and evolution of trust, and all are applicable in online environments.

Disposition to trust is defined as a general propensity based on socialization to depend on others (McKnight et al., 2002), and has been found to be related to initial trust (McKnight, Cummings, & Chervany, 1998). If one is willing to trust others in general, then this same willingness should apply to others in the virtual community. Disposition to trust may be especially effective when interacting parties are as yet unfamiliar with one another (Mayer et al., 1995; Rotter, 1971), as might initially be the case in a virtual community where any and all members can reply to a post. Initial trust (McKnight et al., 1998) refers to trust in an unfamiliar trustee, a relationship in which actors do not yet have credible, meaningful information about, or affective bonds with, each other (Bigley & Pearce, 1998). Information may be deemed credible after parties have interacted for some length of time. Initial trust also reflects assumptions about how trust forms. The cognitive-based literature on trust posits that trusting beliefs may form quickly (before actors have meaningful information about each other) via perceptions of social categorization, reputation, disposition, institutional roles and structures, or out of the need to immediately cooperate on a task (McKnight et al., 1998; Meyerson, Weick, & Kramer, 1996). The knowledge-based trust literature (Blau 1964; Deutsch, 1958),

however, indicates that trust develops gradually through experiential social exchange (Lewicki & Bunker, 1995; D. Shapiro, Sheppard, & Cheraskin, 1992).

A member who posts messages in a virtual community most often expects responsiveness—some type of reasonably timely response. If no responses appear, trust in others will not develop (Ridings et al., 2002). If others respond quickly and often, it may be that they have the skills and competencies that afford them to exchange accurate and helpful information, which increases positive perceptions of their abilities. Greater responsiveness indicates a willingness to help other community members, which also increases the reciprocal nature of the community itself. Responsiveness has been associated with increased perception of cooperative intentions (Gefen & Ridings, 2002) and indicates both benevolence and integrity as it illustrates behavior according to accepted social rules and adherence to norms.

People have been found to be comfortable disclosing personal information via computer-mediated interaction (Sproull & Kiesler, 1991). If members post personal information about themselves, they make themselves appear to be more than just strangers, and are demonstrating that they trust others with sensitive information. Earlier research on social behavior indicates that by confiding and making oneself more vulnerable in the process, people induce others to trust them more (Blau, 1964; Crosby, Evans, & Cowles, 1990). By disclosing gender, age or perhaps personal problems, or by posting otherwise sensitive information, members in a virtual community are behaving in a trusting manner and become less like strangers and more like acquaintances or friends (Ridings et al., 2002). Additionally, since many communities form around a common interest or topic, disclosing personal information about oneself

reveals some connection to the topic of interest and may increase others' trust in one's ability about the topic. For example, in a virtual community focused around knee replacement, revealing that one has had double knee replacement or is a transitional physical therapy nurse helps build member trust in one's ability to converse on those specific topics. The development of benevolence and integrity are also influenced by divulging personal information. Knowing more about other members makes it easier to shape beliefs regarding their standards and principles, contributing to increased trust; trust is enhanced when the trustee behaves as expected (Luhmann, 1979; Blau, 1964).

Trust determines, at least to some degree, the nature of interpersonal relationships (Blau, 1964; Jarvenpaa et al., 1998), and thus influences the desire to exchange information. In a trusting environment people are more inclined to help others and to request others' help, while in a less trusting environment people are reticent about providing help (Blau, 1964; Luhmann, 1979). When trust exists among individuals, they are more willing to partake in shared activity. In a virtual community environment, this shared activity is in the form of cooperative information exchange, and is usually text-based (Ridings et al., 2002).

The concept of reputation is closely linked to trust, but there is a clear and important difference (Jøsang et al., 2007). Reputation is the estimation in which a person or thing is commonly held—whether favorable, unfavorable, or indifferent. This definition corresponds with the view of social network researchers that reputation is a quality derived from the underlying social network, visible to all members (Freeman, 1979; Marsden & Lin, 1982). As an example, the difference between trust and reputation can be illustrated by the following plausible statements:

(1) I trust you because of your good reputation

(2) I trust you despite your bad reputation

Assuming the two statements relate to identical transactions, Statement 1 reflects that the trustor is aware of the trustee's reputation, and bases her trust on that.

Statement 2 signals that the trustor has some private knowledge about the trustee (e.g. through direct experience or intimate relationship) and these factors override any reputation the person in question might have (Jøsang et al., 2007, p. 620). These distinct observations reveal that trust ultimately is a personal and subjective phenomenon and is based on various factors or evidence, and that some of those carry more weight than others. Personal experience typically carries more weight than secondhand referrals or reputation, but in the absence of such, trust often has to be based on referrals from others (Xiong & Liu, 2005).

Last in this truncated list of factors antecedent to trust-building is identification-based trust, a more relationally-based concept extending beyond that which can be explained by contextual analysis. The basis for this perspective is consistent with social identity theory (Tajfel, 1974, 1978; Tajfel & Turner, 1981), which emphasizes the perception of oneness with, or belongingness to, another. Research in social identity theory suggests that individuals define themselves partly in terms of salient group memberships, such as organizational affiliation, religion, shared interests, etc. Such a shared sense of identity among actors may promote a deeper understanding of others' thoughts and actions and thereby enhance communication. In addition, shared identity can create a sense of empathy and concern for outcomes pertaining to others (Naquin

& Paulson, 2003). A shared sense of identity essentially yields more trusting relationships (Lewicki & Bunker, 1995).

In an investigation of online group dynamics, Sassenberg (2002) made a distinction between “common-bond” and “common-identity” groups. Common-bond groups were found to be grounded in personal bonds and interpersonal attraction among group members, whereas common-identity groups share an identity and members are attracted to this identity without that attraction being grounded in interpersonal relations. Sassenberg also found that while common-bond groups show greater interpersonal attraction, common-identity groups exhibit greater collective conformity to group norms and stronger social identity.

Researchers agree that trust provides a mechanism to decrease complexity in a complex world by reducing the number of options one has to consider in a given situation (Luhmann, 1979; D. Lewis & Weigert, 1985). Trust can also be viewed as a kind of social capital that makes coordination and cooperation between people possible (Corritore et al., 2003). Since trust can mitigate risk, fear and complexity in the offline environment, it is likely to do the same in the online environment. Likewise, since trust is social capital that can create cooperation and coordination in the offline environment, it too is likely do the same online.

Credibility

Credibility has also been conceptualized and studied utilizing a variety of methods and approaches. While research has been directed primarily at the concept’s various sub-dimensions—source, message, and medium credibility—studies show considerable overlap between and among these dimensions (Chaffee, 1986; Kiouisis, 2001; Slater & Rounder, 1996; R. G. Smith, 1978). Past credibility research suggests that a range of

theoretical dimensions and empirical measures may be relevant to assessing credibility. These dimensions include safety, qualification, and dynamism (Berlo, Lemert, & Mertz, 1969) authoritativeness, sociability, character, competence, composure, and extroversion (J. C. McCroskey, 1966; J. C. McCroskey & Young, 1981). The relationship between receiver and source has also been identified as an important factor in determining the degree of credibility accorded a source (Aune & Kikuchi, 1993; O'Keefe, 1990). In addition, perception and measurement of source credibility may differ depending upon the type of source being evaluated and the context in which evaluation occurs (Cronkhite & Liska, 1976; Delia, 1976; Gass & Seiter, 2002; Gunther, 1988; Stamme & Dube, 1994).

Traditionally, credibility research focuses on questions of what makes message sources believable and persuasive. Although notions of ethos date back to ancient Greece, an early and important theoretical formulation divided source credibility into two dimensions: expertise and trustworthiness (Hovland, Janis, & Kelly, 1953). For these researchers, expertise is defined as a communicator's qualifications and/or ability to know the truth about a topic. Trustworthiness relates to a judgment about the communicator's motivation either to tell the truth about a topic, or to bias information for self-serving motives (such as commercial gain).

J. C. McCroskey and Richmond (1996) also divided source credibility into two dimensions, yet for them, competence replaced expertise, while trustworthiness was defined in terms of character. In defining competence, these researchers argued that a message receiver's perception of a source's competence exists along a continuum from completely incompetent to completely competent. The perception was mediated,

however, by how competent the receiver perceived themselves to be—if one deemed the source to be more competent than oneself, the source’s opinions and advice would likely influence the receiver. The researchers also contend that competence is usually the first judgment people make regarding a source’s credibility (p. 107).

Perceptions of a source’s character are obviously important for communication, because people discount the validity and honesty of messages from sources perceived to be untrustworthy. Although a source may be perceived to be competent on a topic, credibility may not follow if a receiver feels the source is not generally honest. Even if messages sound plausible, if a source is thought to be untrustworthy a receiver then questions the source’s credibility and therefore the accuracy and reliability of the message (J. C. McCroskey & Richmond, 1996).

Both expertise and trustworthiness are reflected in online communication. Studies show that users rely on experts to answer questions, get advice or find useful information (Wasko & Faraj, 2000). To appear credible, an individual’s messages must appear informed and knowledgeable, perhaps even well written. In addition, these sources must be considered trustworthy. Trustworthiness is enhanced when the source appears embedded in the group and dedicated to its success (Tanis, 2008). Many virtual communities emphasize this aspect by providing additional information about members, such as the length of membership (i.e., “Member since 2002”) or user status (i.e., “Super User”), both of which distinguish an individual with exceptional tenure in the community. Even if these attributes are not directly available, users can usually determine how long someone has been in the community based on the time-stamps associated with posts (Huffaker, 2009).

In qualitative accounts of face-to-face support groups, participants have reported that knowing others in the group have faced similar problems and circumstances lends credibility to advice and support offered by those members (Balk, Tyson-Rawson, & Colleti-Wetel, 1993; Wright, 1997; Young & Tseng, 2008). In online environments, credibility assigned to support providers also largely derives from experiential proximity—the perception that the provider has been through similar circumstances, has had similar problems and engaged in similar behaviors, and has similar attitudes and beliefs about the condition he or she is facing—although this perception emerges through text-based interaction (Maloney-Krichmar & Preece, 2005; Preece, 2000; Preece & Ghozati, 2001; Tanis, 2008). According to Walther (1995), the amount of time an individual spends communicating with others online provides opportunity for more messages to be exchanged, thus impressions of people are modified as the number of messages increases. As messages accumulate and people learn more about their conversational partners, the additional information appears to help people circumvent the lack of nonverbal cues. As a result, relationships become similar to face-to-face interaction, providing a mechanism for assessing credibility.

Galegher, Sproull, and Kiesler, (1998) found that legitimacy and authority were the two most important factors in establishing credibility in electronic groups. Legitimacy refers to a member's demonstration in the community that his or her concern is genuine and justified, and is worthy of attention; legitimacy thus prompts advice, support and information from others in the community. Authority draws on tacit claims to the appropriateness, relevancy, or sufficiency of the content members share. These researchers found that participants often referred to medical or scientific research in

their messages as a means to establish authority. Although scientific reference is likely to be perceived as appropriate and relevant, it is not necessarily sufficient. Information based on personal experience—experiential proximity—was perceived to be more relevant to other participants but was not sufficient in and of itself to establish authority when taken in isolation (Galegher et al., 1998).

While credibility is certainly important, Z. Wang, Walther, Pingree, & Hawkins (2008) claim credibility itself is not what differentiates influential from uninfluential counsel gleaned from online communities. Homophily is what grounds credibility and drives the whole persuasive process in the context of online health advice (p. 365). For online peer discussion groups, homophily appears to promote message evaluation and likelihood to act on the advice.

Homophily

Results from earlier research of the two-step flow and personal influence demonstrated that mass media had limited effects on the American public. In the 1970s, scholars became interested in uniting what mass communication theorists and interpersonal communication scholars had in common: a shared interest in the mechanisms underlying individuals' choices of and exposure to specific messages, and a mutual concern for explaining the nature of message perception and how messages are processed (Baran & Davis, 2000). Researchers began to integrate intra-individual, interpersonal, network and organizational, and macrosocietal phenomena in order to gain a more thorough understanding of communication processes (Berger & Chaffee, 1987).

A basic principle of interpersonal communication is that source-receiver similarity, or homophily, increases the likelihood of communication attempts and

promotes communication effectiveness (J. C. McCroskey et al., 1975). While these researchers found this to be generally applicable, they claim the best example of this concept lies in the opinion leader/follower relationship most commonly observed in mass communication and diffusion research (p. 323).

Homophily is the degree of perceived similarity a receiver ascribes to a message source. Homophily affects persuasion and perceptions of otherwise unknown individuals, both offline (J. C. McCroskey et al., 1975; Sutor & Keeton, 1997; Wheelless, 1974) and online (Campbell & Wright, 2002; Wright, 2004). When people share common meanings, beliefs, and mutual understandings, communication among them is more likely to be effective, and they are more likely to develop and maintain supportive relationships with others to whom they are similar on important social dimensions (Lazarsfeld & Merton, 1954). In developing an instrument to measure perceived homophily, J. C. McCroskey et al. (1975) found four relatively uncorrelated dimensions—attitude, morality, background, and appearance—they believed would provide useful for researchers interested in this communication variable. The first three are still in use today for studying source-receiver similarity in online contexts (J. O. Brown et al., 2007; Z. Wang et al., 2008; Wright, 2004).

Earlier computer-mediated communication researchers (Hine, 2000; Galston, 2000; Turkle, 1995) mention initial concerns over reduced social cues conditions in which the lack of nonverbal cues would lead to more antisocial communication and less satisfying relationships. Walther (1992, 1994, 1995, 1996) challenged this perspective with a series of experiments that extended online interaction time. Overall, Walther found in the early studies that limited online time may have created experimental

artifacts: diminished opportunity for satisfying relationships to develop thereby creating conditions for more antisocial behavior. With these studies, Walther and other communication researchers (Lea & Spears, 1992; Parks & Floyd, 1996) consistently observed that over time computer-mediated relationships become more similar to face-to-face relationships as messages accumulate between relational partners and users become accustomed to communicating in this environment. These studies revealed that as the number of messages among users increases, relational satisfaction also increases because people spend more time online and learn more about relational partners.

Other perspectives exist however. According to the social identity/deindividuation theory of computer-mediated communication (Reicher, Spears, & Postmes, 1995; Spears & Lea, 1994), it is social identity—the elements of an individual’s self-concepts which they derive from membership in social groups—that drives online interaction. This viewpoint was echoed by researchers who found that people with similar backgrounds or similar health experiences (e.g., illness, addiction, or disability) exhibit more empathy toward each other (Maloney-Krichmar & Preece, 2005; Preece, 1999, Tanis, 2008). In a comparison of demographically homophilous versus heterophilous (dissimilar) online support groups concerning Parkinson’s disease, Lieberman, Wizlenberg, Golant, and Di Minno (2005) found that members of homophilous groups were significantly more attracted and committed to their groups, reported higher cohesiveness and satisfaction, showed greater positive changes, and derived greater benefit from group participation. Peer-to-peer discussion with similar others also helps reduce isolation, a circumstance not satisfied by consulting professionals or experts (Wright, 2000). The insight that

peers provide through online support groups is often considered to be unique and personal (Wright & Bell, 2003). As Preece (1999) noted: “Physicians can provide the facts, but other patients can tell you what it really feels like and what to expect next, in a way that only someone with personal experience can” (p. 63). Preece also noted that not many health-care providers are involved in online support groups; most online discussion occurs between and among group members who share similar health problems, and a sense of community is important to these members.

The recent rapid growth of digital media technologies has created new possibilities for people with health-related concerns to engage in supportive communication with networks of individuals who may be coping with similar problems—networks that would be difficult or impossible to form offline. This study found that several long-established principles of interpersonal communication—trust, credibility, and social similarity—still apply.

Gaps in Research

While previous studies of internet interaction have explored forms of opinion leadership, trust, and credibility in various online contexts, research investigating these concepts concurrently in a health-related online community with individuals rather than websites, institutions, or technology as targets of inquiry, is scarce. As noted, opinion leadership has been examined in diffusion of innovations, communications research, marketing, and health. With few exceptions, trust and credibility have been investigated largely in terms of how these concepts are engaged when internet users evaluate either websites themselves, the information they offer, or institutions represented by a particular site. Phenomenological interviews have been conducted to extract meaning

from individuals who use Sony Walkmans, attend church, visit online lesbian bars, teach Korean students, and facilitate hospital administrative policy.

Yet previous studies have generally overlooked the subjective experiences of those who join online communities in search of solutions for specific health-related conditions. Health-related online communities might be different in that while participants in other types of communities might be equally motivated in levels and frequency of participation, physical pain (or the physical pain suffered by a loved one) may well be the primary factor driving participation. Previous research has shown that online health communities dedicated to a particular condition are highly supportive (Tanis, 2008), as evidenced in part by numerous, quick, and directed responses relative to overall membership. Although online health community membership is represented by people of all ages, the number of health-related online communities is growing rapidly (S. Fox, 2010), a phenomenon likely due to a combination of an aging population and increasing internet access. While members of all types of online communities may well be emotionally engaged in the community, considerable emotional attachment to issues that affect future quality of life are evident in online health communities. This research is important in that it associates these concepts in ways previously unexplored.

The Nature of Inquiry

Historically, there has been heavy emphasis on quantification in science (Guba & Lincoln, 1994). This stems from early conceptions that the path to truth and knowledge must proceed through observable and measurable phenomena—a true explanation or cause of an event or social pattern can be found and tested by scientific standards of verification. As the study of human behavior emerged from its religious roots and shifted

into the domain of scientific inquiry (Babbie, 2004), it naturally fell under the control of this dominant paradigm: positivism. Positivism, which calls for measurement and quantification in order to explain cause/effect mechanisms and to generalize to larger populations while aiming to predict and control outcomes, dominated communication research until the 1980s (Lindlof & Taylor, 2002). Criticisms of positivism resulted in the rise of a postpositivist paradigm, which champions qualitative methods of inquiry, strains of which emphasize that claims to knowledge should preserve the subjective experiences and motivations of social actors as these actors strive to elicit meaning from experience (Lindlof & Taylor, 2002, p. 111).

While positivism declares reality to be singular, objective, and independent of human perception, the current study is more representative of the postpositivist approach to social inquiry. This research attempts to explain what the subjective experiences of community members mean to them in this context, and how meaning—and the patterns of interaction that give rise to it—supports or confounds the theoretical framework underpinning this study. Although subjects in this study may behave in patterned ways, the reasons they do so are assumed to be multiple, interactive and evolving. Thus, intention and experience are unique to the individual and cannot be predicted or controlled, or generalized to other populations with any hope of accuracy.

The goal here is not to generalize, but to use multiple sources of evidence (quantitative and qualitative) to describe and explain sets of data and illuminate connections among the concepts posed, the world of these members, and society at large. In so doing, later researchers may be able to extrapolate these findings to new circumstances, noting what is similar, what is different, and what the contextual

influences found here may later help explain. By providing sufficient thick description in postpositivist accounts, a researcher offers a mechanism for transferability—a means for future researchers to assess whether patterns of behavior in this context are applicable and informative of behavior in others (Lincoln & Guba, 1985).

By utilizing a mixed methods approach, this research provided at least some evidence for how people experience a particular phenomenon, and how they gather, share, and act on information about that phenomenon. This research shed light on a specific set of online circumstances involving social networks in order to advance understanding of relationship development in online groups.

Research Questions

Both the potentiality and experience of knee arthroplasty envelop a number of constituent elements. Some are directly related to information gathering: solution-oriented information seeking; exchange of narratives with others (both in and outside the virtual community); analysis of pre-op information; and acquisition/analysis of post-op recovery information (if knee replacement is chosen); assignment of trust and credibility to both information and source. Others encompass the more introspective aspects of the condition, including (but not limited to): realization of physical compromise and attendant identity issues; decision making; accompanying anxiety if total knee replacement surgery is chosen; post-operation recovery and retrospection; and anxiety associated with expectations that pre-condition lifestyle can be resumed. Looking to explore lived experience in this context, the following questions guide this research:

RQ1: How do people describe the experience of being a member of an online

community? How does a community member define his or her role in the community?

People experience the world uniquely according to his or her individual perceptions (Schutz, 1967). One's experience of and in a community is shaped by perceptions of how he or she fits into the community.

RQ2: What significance does the internet have for these community members as it relates to his or her physical (knee-related) condition?

People are stimulated by many (or few) motivations to use the internet. As Markham (1998) observed, depending on level of commitment, people have described it as a tool, a place to be, a way of life. Do these members spend time in this community to gather and compare only information related to knee health, or do they go there for casual interaction unrelated to knee health? Turkle (1995) noted that some people structure their lives around being a member of an online community.

RQ3: Does this online community generate opinion leaders? If so, how?

Opinion leadership is evident when people need information, advice, or interpretations and turn to others with whom they have some connection and feel they can trust. Opinion leaders exhibit some special expertise or wisdom regarding the topic about which a decision must be made (Lowery & De Fleur, 1995). If opinion leaders are present in this community, how are they accorded this status in a text-only environment?

RQ4: How is trust developed and maintained in this online community?

Trust among individuals has traditionally been formed via social cues interpreted through face-to-face interaction (Rotter, 1967). Computerized communication media

may be removing familiar styles of interaction, thus altering processes of trust generation.

RQ5: How is credibility accorded to sources and messages in this community?

In accounts of face-to-face support groups, participants report that knowing others in the group have faced similar problems and circumstances lends credibility to advice and support offered by those members (Balk, Tyson-Rawson, & Colleti-Wetel, 1993; Wright, 1997; Young & Tseng, 2008).

RQ6: Is information gleaned from the community otherwise verified, or taken as fact?

One may act on certain information without further corroboration if it comes from one's mother or doctor in face-to-face interaction. That same information gathered in a text-only setting may be interpreted differently. If so, are differences the result of the source or the medium?

RQ7: How do community members use the health-related information they gather in these online communities?

There is evidence that when those managing the same chronic condition share observations with each other, their collective wisdom can yield clinical insights beyond the understanding of any single patient or physician (Sarason-Kahn, 2008). Allowing patients to transport the full value of health communities back offline may hold promise for the integration of new and traditional health care services.

CHAPTER 3 METHODOLOGY

This study sought to answer the research questions utilizing a mixed methods research design. Social Network Analysis, an online survey, and online interviews are distinct methods that contribute a mix of perspectives through which the phenomena of interest are examined. A mixed methods design is appropriate for the case study undertaken here.

Mixed Methods

Mixed method investigations are becoming increasingly popular in the social sciences and are considered a legitimate, stand-alone research design (J. W. Creswell, 2008; Hanson et al., 2005; Hesse-Biber & Leavy, 2003; Johnson & Onwuegbuzie, 2004). When both quantitative and qualitative data are included in a study, results may be enriched in ways that may have been constrained by using but one form, allowing researchers to gain a deeper understanding of the phenomenon of interest. Results of instrument-based measurements may be augmented by contextual, field-based information (Greene & Caracelli, 2003).

Greene, Caracelli, and Graham (as cited in Hanson et al., 2005, p. 226) identified a number of rationales for combining data collection methods. Two, however, are applicable to this research. First, quantitative and qualitative methods can be combined to recast results from one method to questions or results from the other (they termed this initiation); second, combining these approaches can extend the breadth or range of inquiry by using different methods for different inquiry components (expansion). Mertens (2003) added that mixed methods investigations may be used to better understand a research problem by converging numeric trends from a sample of a population and

using them to identify individuals who may expand on the results through qualitative methods.

Filstead (1979) contends the most important aspect of integrating these two forms of data is that qualitative methods provide the context of meanings in which the quantitative findings can be understood, rendering substantive significance to apparent statistical associations. Lincoln and Guba (1985) suggest there are many opportunities to utilize quantitative data in a qualitative study, but the purpose of qualitative data is to maximize information, not facilitate generalization. Lincoln and Guba also propose that the use of different methods of data collection offers contextual validation, thus providing varying degrees of triangulation (p. 306). Clark (1998) asserts that triangulation of quantitative and qualitative methods in the same research indicates tacit acceptance of postpositivism, as researchers here recognize the diversity of truths reachable through different forms of inquiry, but valuing each for the contribution they can make to knowledge development.

Case Study

While there is little consensus on what constitutes a “case” and the term is used broadly (Babbie, 2004), this research certainly focuses attention on a limited number of instances of a social phenomenon. Yin (1994) defines a case study as an empirical enquiry that uses multiple sources of evidence to investigate a contemporary phenomenon within its real-life context. Case studies have been conducted in education (Hurst, 1991), AIDS prevention (K. Fox, 1991), management science (Stake, 1995), anthropology (Geertz, 1960, 1965), and health policy (Walsh-Childers, 1994).

Case study researchers may seek only idiographic understanding of a particular case, or as with grounded theory, cases can form the basis for the development of more

general nomothetic theories. This research is better described as representative of the extended case method (Burawoy et al., 1991) in that it attempts to modify existing social theory instead of simply approving or rejecting it. This study looked not only for observations that supported the theories presented herein, but also for observations that conflicted with these theories and offered opportunities to modify them.

Knee replacement surgery (knee arthroplasty), or its potential, provides a platform for an examination into how members of a specific type of online community gather and make meaning of information they share on this and other topics—as any community might. These members include (but are not limited to) those who have experienced partial or total knee replacement and wish to share these experiences with others, those gathering information to supplement existing knowledge in order to arrive at an informed decision regarding the necessity of such surgery, and those researching for a friend or family member. Unobtrusive observation, an online survey, online interviews, first-hand description of lived experience, and textual analysis of interview data will provide insight into this phenomenon. As the two-step flow and opinion leadership are inarguable mechanisms of social structure, it makes sense to explore these concepts in terms of the relational ties and the patterns of ties that link members of a social structure—in this research, a social structure in the form of a community created and maintained in virtual space.

Social Network Analysis as Method

As Social Network Analysis (SNA) is a component of this research, a description of its elements and a summary of its development in the social sciences and appearance in mass communication literature is in order. SNA is both a theoretical perspective and a set of methods (McCarty & Bernard, 2003). In terms of theory, SNA

begins with the assumption that members of a group interact more than would a randomly selected group of similar size, and the features of these relations extend and complement traditional social science by focusing on the causes and consequences of relations between people and among networks of people rather than on features of individuals (McCarty & Bernard, 2003). As Burt (1980) points out, network analysis is a potentially powerful methodology for connecting micro and macro levels of social theory.

A social network can be defined as any bounded set of connected social units. This definition highlights three important characteristics of social networks. First, networks have boundaries; some criterion exists to determine membership in the network. Second is connectedness; to be part of a social network, each member must have either actual or potential links to at least one other member of the network. Third is social unit or unit of analysis; network analysis can be easily applied to a wide range of social units (Streeter & Gillespie, 1992). They can be individuals, as in the case of social support networks, however, they can also be social service agencies, social institutions in local communities, or nations in the global economy (Scott, 2000).

SNA looks beyond the specific attributes of individuals to consider relations and exchanges among social actors, inquiring about interactions that create and sustain social relationships. Actors have a set of interdependent relationships embedded in a social or organizational system which influence behavior, and relational ties are channels for the transfer of resources. Network models focusing on individuals view the network environment as shaping individual action, and conceptualize structure as lasting patterns of relations among actors (Wasserman & Faust, 1994). The types of resources exchanged among actors can be many and varied; tangibles, such as goods

and services, or intangibles, such as influence and social support (Wellman, 1997). In a computer-mediated environment, resources are those that can be communicated to, or exchanged with, others via textual, graphical, animated, audio or video-based media (Garton et al., 1997).

SNA reflects a shift from the individualism common in the social sciences towards a structural analysis. This method suggests a revision of fundamental units of analysis, as the unit is now the relation, e.g., kinship relations among persons, communication links among officers of an organization, friendship structure within a small group (Garton et al., 1997). The interesting feature of a relation is its pattern: patterns do not display age, sex, religion, income, nor attitude, although these may be common attributes of the individuals among whom the relation exists. Wasserman and Faust (1994) argue that network patterns can reveal whether the network structure supports or limits individual action, and thus, individual outcomes.

The concept of a social network embodies a complex set of social phenomena, and studies of social networks have examined a diverse set of properties. Streeter and Gillespie (1992) however, summarized these properties and contend they can be represented by two major categories: relational properties and structural properties. Relational properties focus on the content of relationships between network members and on the form of these relationships. Studies of relational properties seek to understand why a network exists and to determine the functions performed by the relations among its members. Two prominent attributes of relational properties are transaction content, and the nature of relationships. Transaction content refers to what flows or what is exchanged in networks: basic types of exchange content are resources,

information, influence, and social support. The nature of relationships refers to the qualities inherent in the relationships between members of the network, noted by importance or significance of the relationship, and frequency of interaction (Streeter & Gillespie, 1992).

A number of diverse strands have shaped the development of present day SNA. The gestalt tradition in psychology, which stresses the organized patterns through which thoughts and perceptions are structured (Kohler, 1927), inspired Moreno's (1934) use of psychotherapeutic methods to uncover friendship choices. Using experimentation, controlled observation and questionnaires, Moreno and associates explored the ways in which people's group relations both limited and provided opportunities for their actions and, therefore, for their personal psychological development.

Gestalt theory also influenced social psychologist Lewin's research on social perception and group structure. Critical to research for this paper is Lewin's (1936) argument that a social group exists in a *space* that comprises the group together with its surrounding environment, but that this environment is not external to and independent of the group. The environment that matters to the group is the perceived environment—social meaning is actively constructed by group members on the basis of their perceptions and experiences of the contexts in which they act. Lewin proposed that the interdependence between group and environment could be explored in mathematical terms as a "system of relations."

Lewin's (1936) advocacy of mathematical models to represent group relations proved fruitful for later research. Cartwright and Harary (1956) built models illustrating the systematic interdependence between attitudes held by different individuals within a

group. These researchers outlined the basic idea of representing groups as collections of points connected by lines; the resulting sociograms, or graphs, represent the actual interpersonal relations among group members and can be analyzed, they argued, by using mathematical ideas of graph theory. While researchers were encouraged by results from small-group investigations using sociometric ideas (Roethlisberger & Dickson, 1939; Warner & Lunt, 1941), the first application of sociometrics to large-scale social systems explored the spread of disease from one individual to another through chains of contacts and aimed at the derivation of predictive epidemiological models of contagion (Rapoport, 1952).

Homans (1950) synthesized earlier work on SNA around the idea that human activities result in human interaction, with interactions varying in frequency, duration and direction, and that interaction is the basis on which sentiments develop among people. Homans introduced an updated form of matrix logic that helped illustrate the structural patterns inherent in group interaction. By separating the forms of relations from their contents, Nadel (1957) argued that the general features of structures can be described and investigated through a comparative methodology utilizing a mathematical approach. Nadel contends that social structures are structures of “roles,” and roles are defined through networks of interdependent activities.

Further deconstructing the concept of social network, Mitchell (1969) focused on individually-anchored partial networks, identifying individuals and then tracing their direct and indirect links to others. This research concentrated on particular individuals and the content of their relations—on ego-centered networks focused around particular types of relationships. Interpersonal networks, Mitchell claimed, can be at least partially

measured through concepts of reciprocity, intensity and durability, and a social network's density—derived from a translation of graph theory into sociological language—describes the extent to which all possible relations in a network are actually present.

Two later mathematical innovations helped firmly establish SNA as a method of structural analysis (Scott, 2000). First, Lorrain and White's (1971) development of algebraic models of groups led to a reconsideration of earlier work in graph theory, and advanced Nadel's (1957) conceptualization of "role" in social structure. While Nadel contended that social roles were central in social network analysis, Lorrain and White added that many roles display structural equivalence—general types of social relations maintained by particular categories of social actors exist. The idea behind structural equivalence is that once the uniformities of action that define social roles are identified, the networks of relations existing between these roles can be explored. The concept of structural equivalence is germane to the current study in that there may exist members in BoneSmart® who, although their personal knee-related experiences may differ, can be defined as opinion leaders, a category of social actor who interacts in particular ways with others.

The second innovation was the development of multidimensional scaling, a technique for translating relationships into social distances and for mapping relationships in a social space utilizing relational data (Levine, 1972). Bringing SNA current, McGrath, Blythe, and Krackhardt (1996) showed how sensitive data interpretation is to the particular visual configuration presented. These researchers concluded that if analysts wished to infer something about the sociometric properties of

the network, then the physical distance between graph points should correspond as closely as possible to theoretical distances between these points in the graph.

Online Surveys

Great advances were made during the twentieth century in the techniques and technologies utilized for survey research, from systematic sampling methods to enhanced questionnaire design and computerized data analysis (Evans & Mathur, 2005). The field of survey research has become more scientific and, over the last 25 years in particular, technology has revolutionized the ways in which surveys are administered. In the late 1980s and early 1990s, prior to widespread use of the Web, e-mail was explored as a survey mode (Schonlau, Fricker, & Elliot, 2002). As with the Web today, e-mail then offered the possibility of nearly instantaneous transmission of surveys at little or no cost. Unlike the Web, however, early e-mail was essentially static, consisting of basic text-only messages that were delivered via the internet.

E-mail surveys tended to resemble the linear structure of a paper survey and were generally limited in length (Evans & Mathur, 2005). Further, because e-mail surveys were text-based, document formatting was rudimentary at best. The only substantial advantage they offered over paper surveys was a potential decrease in delivery and response time and cost, although some observers also hypothesized that the novelty of the new medium might actually have enhanced response rates (Y. Zhang, 2000). The Web started to become widely available in the early-to-mid 1990s and quickly supplanted e-mail as the internet survey medium of choice (Schonlau et al., 2002).

As an increasing amount of communicative activity takes place through this new medium, there has likewise been a substantial increase in scholarly research on virtual

communities, online relationships, and a variety of other facets of computer-mediated communication (Carter, 2004; Flaherty, Pearce, & Rubin, 1998; Preece, 1999; Preece & Ghazati, 2001; Walther, 1996; Walther, Gay, & Hancock, 2005). In the two decades since the first electronic surveys gathered data over the internet, scholars have come to recognize both the numerous strengths and potential weaknesses of this form of research, even as the medium continues to evolve. Evans and Mathur (2005) cite several strengths of internet survey research: Global reach, flexibility, speed and timeliness, technological innovation, convenience, ease of data entry and analysis, low administration costs and ease of follow-up. Another major advantage (and critical to this research) is access to unique populations. An online survey can utilize the ability of the internet to provide access to groups and individuals who would be difficult, if not impossible, to reach through other channels (Garton et al., 1997; Wellman, 1997).

In many cases, communities and groups exist only in cyberspace (Wright, 2005). It would be difficult, for example, to find a large, concentrated group of people conducting face-to-face discussions of topics such as cyber-stalking, online stock trading, and the pros and cons of knee replacement. While people certainly discuss such issues among friends, family members, and co-workers, few meet face-to-face in large groups to discuss them. Virtual communities offer a mechanism through which a researcher can gain access to people who share specific interests, attitudes, beliefs, and values regarding an issue, problem, or activity (Tanis, 2008; Wright, 2005). Health communication researchers have studied online health-related populations, including examining how features of the computer medium help people cope with health conditions (S. Fox, 2005; Warner & Procaccino, 2007).

As with all methods of data collection, concerns exist with online surveys (Schonlau et al., 2002; Wright, 2005). Although not limited to internet surveys (yet still a concern), the validity and reliability of self-reported data can be issues (Bryman, 2001). Another major concern with online surveys is low response rate. In recent meta-analyses, response rate for Web-based surveys was found to be approximately 34%; about 11% lower than for other survey techniques (Shih & Fan, 2008; Singh, Taneja, & Mangalaraj, 2009). A commercial study found the median response rate to be 26% (Hamilton, 2009). Reasons for low response rates include: Perception as junk mail, respondent lack of online experience/expertise, technological variations (type of internet connection and configuration of user's computer), impersonal nature, and privacy and security issues. According to several meta-analyses, the salience of a topic is one of the most important factors influencing response rates in both mail and Web surveys (Fan & Yan, 2010). When the topic is of high interest to those exposed to the survey, potential respondents are more likely to respond.

A survey is a means of gathering information—it is not an end product. A survey is often conducted because it may be the only means of obtaining information (Babbie, 2004). While commercially oriented surveys are typically geared toward decision making and executive action, academic and professional disciplines most often conduct surveys to answer research questions and test hypotheses about the propensities and predispositions of people in efforts to enhance theoretical and conceptual knowledge in a given discipline (Alreck & Settle, 2004).

For the current research, a survey is the quickest, most efficient and economical way to understand what members of a unique population generally think about knee

arthroplasty, internet use, others with whom they interact in cyberspace, and what being a member of this community means to them. This survey collected original data from a unique population too large to observe directly. Results were evaluated in light of information obtained through other methods, and treated as an additional body of evidence or set of indications.

Online Interviews

According to Mann and Stewart (2000), the main tools of data collection favored by those doing qualitative research are interviewing, observation and document analysis. Interviews are often used to verify, validate, or comment on information obtained from other sources (Lindlof & Taylor, 2002). While they can take a number of forms, interviews are distinguished primarily by whether they are standardized (structured), or non-standardized (unstructured). Standardized interviews utilize uniform and unvarying questions and restrict answers to a limited set of response categories. Although considered unstructured, non-standardized interviews can employ a semi-structured format in which either an interview protocol organized into specific thematic areas is utilized, or a branching method is used whereby spontaneous probing questions arise from a small initial selection of more open-ended questions (Mann & Stewart, 2000). The main advantage of semi-structured interviews is they offer purposive topical steering (Flick, 1998, p. 106), as this format allows interviewers to track the issues within the phenomena of interest that are of most interest to them.

Also non-standardized, yet in contrast to semi-structured interviews, are in-depth interviews, which are completely unstructured and place greater emphasis on the subjective experiences of individuals (Denzin, 1989). Evoked by a broad inquiry from the interviewer, the form and content of extensive reflective responses are structured by

participants in the course of in-depth interviews. Although the interviewer provides the focus of the interview, prominence is given to the stories people tell, the voice in which stories are told, and narrator as knower of the self (Seidman, 1991).

One goal of the qualitative interview is to obtain descriptions about the lived world of the interviewees with respect to interpretations of the meaning of the described phenomena (Kvale, 1996). Another is to improve understanding of social and cultural phenomena and processes rather than to produce objective facts about reality and make generalizations to given populations (Fidel, 1993; Pettigrew, Fidel, & Bruce, 2001; Wang, 1999). Over the years, however, researchers have identified challenges associated with observation and interview methods, including cost, time, and limited access to research participants (Denzin & Lincoln, 2005; Kvale, 1996; Miles & Huberman, 1994; Patton, 2002; Strauss & Corbin, 1998; Taylor & Bogdan, 1998). Challenged with the task of identifying new methods and tools for conducting more effective research while retaining or improving quality, researchers started to explore use of the internet for carrying out qualitative research. Researchers began to use—and still use—three major internet-based qualitative research interview types: online synchronous, online asynchronous (utilized in the current study) and virtual focus groups.

Usually conducted via e-mail, online asynchronous interviews, unlike e-mail surveys, are semi-structured in nature and involve multiple e-mail exchanges between the interviewer and interviewee over an extended period of time. This type interview is also different from virtual focus groups in that the information volunteered by individual

participants is not shared with, viewed, or influenced by other participants (Schneider, Kerwin, Frechtling, & Vivari, 2002).

McCoyd and Kerson (2006) cite several advantages—for both researcher and respondent—in the use of asynchronous e-mail interviews. For respondents, the format allows for completion of the interview at his or her convenience, and with no visual cues to create judgment; it occurs without the pressures of face-to-face interaction. For researchers, the format offers extensive, longitudinal communication, and provides responses already in textual form. Additionally, the drawn out nature of e-mail interviewing (interviews typically require 8–14 interactions) allows for follow-up questions and fully complete interviews in ways that the more immediate, one shot nature of most face-to-face and telephone interviews do not (McCoyd & Kerson, 2006).

Although e-mail interviewing limits research to those with internet access, the method, on the other hand, democratizes and internationalizes research (Meho, 2006). In contrast to face-to-face and telephone interviewing, e-mail interviewing enables researchers to study individuals or groups with special characteristics or those often difficult or impossible to reach or interview face-to-face or via telephone. Asynchronous online interviews have been conducted with populations as diverse as corporate executives (Lehu, 2004), prosthesis users (Murray, 2004; Murray & Sixsmith, 1998), self-reported self-injurers (Hodgson, 2004), stroke survivors (Murray & Harrison, 2004), women with breast cancer (Høybye, Johansen, & Tjørnhøj-Thomsen, 2005), people with disabilities (Bowker & Tuffin, 2004), knee injury sufferers (Maloney-Krichmar & Preece, 2005), and members of populations who are geographically dispersed (Carter,

2004; Foster, 1994; Karchmer, 2001; Olivero & Lunt, 2004) or located in dangerous or politically sensitive sites (Meho & Tibbo, 2003).

Some researchers, however, have had less success with online interviews. Hodkinson (2002) reported that using semi-structured asynchronous online interviews lacked the fruitful mutual interaction he experienced when conducting face-to-face interviews. One result of this lack of interaction was that his e-mail interviews involved fewer exchanges and participants did not become as engaged as he had hoped or expected. Bennett (as cited in Mann & Stewart, 2000, p. 76) preferred real-time chat to either asynchronous e-mail or face-to-face interviews because she valued the immediacy of real-time responses not only for the speed at which her enquiries could be addressed, but also because chat allowed a negotiation of meaning between herself and her co-researchers while avoiding potential unease trying to discuss meaning during face-to-face interaction.

Overall, e-mail interviewing offers opportunity to access, in an interactive manner, participants' thoughts, ideas, emotions, and memories in their own words (Meho, 2006). It allows for the recording of anecdotes that participants share to enhance accounts of their experiences, and for participants to construct their own experiences through dialogue and interaction with the researcher. Semi-structured e-mail interviewing is additionally empowering to participants because it allows them, in essence, to control the flow of the interview, enabling them to answer at his or her convenience and in a manner suitable to them (Bowker & Tuffin, 2004). Meho (2006) advocates using a mixed-mode interviewing strategy when possible, however, e-mail interviewing is a

viable alternative to face-to-face and telephone interviews, especially when time, financial constraints, or geographical boundaries are barriers to an investigation.

Phenomenology

A goal of this research was to understand lived experience. People express their experiences of phenomena through language—spoken and written. Phenomenology provides for the systematic exploration and description of the essence and meaning of lived experience (Wolff, 1999). It looks at people's everyday experiences of phenomena and how these experiences are structured, focusing analysis on the perspective of the individual experiencing the phenomenon. Its ultimate aim is identification of the basic structure of a phenomenon based upon the convergence of accounts among any number of subjects, achieved through phenomenological reduction—finding emergent themes in descriptions of the phenomenon (Bull, 2001; Schutz, 1967; Willig, 2008). A central question then, becomes, “What characteristics are typical of this phenomenon?”

Textual Analysis

In this study, phenomenological inquiry relies on other sociological traditions in the quest to illuminate behavior in this context. Through textual analysis (Ryan & Bernard, 2003), SNA contributes again as it provides the connective framework to help understand the relational aspects of this phenomenon. Textual analysis itself is an analytical tool that produces concepts, categories and propositions, resembling the grounded theory approach originated by Glaser and Strauss (1967). The mechanics of the process are straightforward: produce verbatim transcripts of interviews (online interview data are already in written form); read through text; identify potential themes that arise; as analytic categories emerge, pull data (exemplars) from those categories together and compare them, considering not only what text belongs in each emerging

category but also how categories link together. Use the relationships among categories to build theoretical models, constantly checking the models against the data— particularly against negative cases. Throughout the process, keep running notes with an eye toward emergent themes and new directions for the research (Ryan & Bernard, 2003).

Some analysts suggest looking for metaphors, repetitions of words, and for shifts in content and information about how people solve problems. The object is to look for metaphors in rhetoric and deduce underlying principles that might produce patterns in those metaphors. For example, in a series of studies on American marriage, Quinn's (1982) method was to exploit clues in ordinary discourse for what they tell us about shared cognition— to glean what people must have in mind in order to say the things they do. Quinn found that the hundreds of metaphors in her corpus of texts fit into just eight linked categories, which she labeled: lastingness, sharedness, compatibility, mutual benefit, difficulty, effort, success (or failure), and risk of failure. Quinn's informants often compared marriages (their own and those of others) to manufactured and durable products (it was put together pretty good) and to journeys (we made it up as we went along; it was a sort of do-it-yourself project). Quinn saw these metaphors, as well as references to marriage as a lifetime proposition, as exemplars of the overall expectation of lastingness in marriage.

Reliability and Validity

For the traditional quantitative researcher, human phenomena are studied scientifically by converting them into numerically measurable data. For the qualitative researcher who wants to study subjective experience, restricting data to measurable variables is unnecessarily limiting (Filstead, 1979). Qualitative research assumes the

best way to learn about people's subjective experience is to ask them—people most always relate their experiences in storied form (Auerbach & Silverstein, 2003). When social scientists construct and evaluate measurements, and interpret data resulting from various methods of data gathering, attention must be paid to the concepts of reliability and validity. Whereas reliability means achieving consistent results from the same measure, validity refers to attaining results that accurately reflect the concept being measured.

Reliability and validity are important criteria for evaluating quantitative research as these concepts are intended to ensure that the measurement tools and techniques utilized are objective. For the SNA matrix and questionnaire components of this study—which utilize numerical data to indicate and summarize trends specific to this research—established measures were utilized to help ensure reliability and validity (Table 3-1).

Reliability and validity have different connotations for qualitative data. As this research employed mixed methods, one of its assumptions was based on the notion that while quantitative methods can help guide the research, they cannot fully access the phenomena in which this investigation is interested (i.e., lived experience, the nature of social interaction, respondent perspective).

Three criterion for producing justifiable, legitimate and credible qualitative research have been offered by Rubin and Rubin (1995). 1) Transparency is achieved when research is conducted and inscribed with enough rigor and detail that allow subsequent researchers to make accurate comparisons and determine if results are applicable in other contexts. Essentially this entails keeping a permanent record of each step in the research design and process, of the original data used for analysis, and of the

researcher's comments and methods of analysis. This record permits others to examine the thought processes involved and assess the accuracy of conclusions; 2) Communicability is attained when themes and constructs in the research are recognized and understood by other researchers and the study's participants. Constructs in the current study, such as opinion leadership, trust, credibility, tie strength, etc., stem from communication and sociological theories that have previously been explored in other contexts. Member checks were performed to help validate findings; 3) Coherence ensures that themes and constructs in a study are internally consistent, that they fit into an established system of beliefs or thought; "truth" is measured by logic and defensible relationships among statements (Rubin & Rubin, 1995). The major constructs in this study are indeed related: trust, credibility, and influence are components of opinion leadership, homophily is related to effective communication, which in turn is related to opinion leadership, and centrality in social contexts implies opinion leadership.

Trustworthiness is a construct offered by other scholars that overlaps Rubin and Rubin's (1995) criteria for achieving viable research. Lincoln and Guba (1985) include credibility, transferability, dependability and confirmability as criterion within their definition of trustworthiness that, when applied systematically, increase the potential for producing legitimate and credible qualitative research.

Definitions

This study explores several concepts in an effort to understand the research phenomena. Some are not measured numerically and are therefore defined nominally, providing clarification on how these terms are used in this research. Measurable concepts require operational definitions, specifying how they are to be measured (Table 3-1).

Nominal Definitions

VIRTUAL COMMUNITY. A network of individuals who register and interact on a specific website via the internet, using text and photos to discuss and act on mutual, interests, ideas, feelings and goals.

COMMUNITY MEMBER. A person who participates in website activities as a registered member of the website. For this study, persons are registered as members of BoneSmart.org.

ACTIVE MEMBERS. Registered BoneSmart.org members who have posted at least once during the past 120 days (A BoneSmart® parameter and used by many forums.)

THREADS. Text messages that are grouped together visually in a hierarchy by topic on a website.

OPINION LEADERS. Defined as active BoneSmart® community members who exert or have exerted influence on other members.

Operational Definitions

To aid in the development of specific research procedures that would result in empirical observations representing measurable concepts relevant to this research, the following operational definitions are offered:

INFLUENCE. An indicator of opinion leadership; the ability of a member of the BoneSmart® site to affect decisions made by other members. Influence was determined by combined SNA centrality measures (high number of direct connections as represented in matrices or graphs [Scott, 2000]), sociometric mapping (high number of nominations via Items 12-13 in questionnaire [Katz & Lazarsfeld, 1955]), and interview responses that specified particular members.

TRUST. The belief or confidence in the honesty, integrity, reliability, and fairness of other community members, and that the BoneSmart® website operates in the best interests of community members. This was measured by summed scores on a 14-item, 5-point Likert scale (Ridings et al., 2002) and discussion with interviewees.

CREDIBILITY. The belief a community member holds about other members' qualifications and/or abilities to know the truth about a topic, and a judgment about those members' motivations to tell the truth about it. This was measured via summed scores on an 8-item, 5-point semantic differential scale (Measure of Source Credibility, J. C. McCroskey & Richmond, 1996) and discussion with interviewees.

HOMOPHILY. The degree of perceived similarity a community member ascribes to another member—occurring through textual interaction—in terms of attitude, morality, and background. This item was measured by summed scores on a 9-item, 5-point semantic differential scale (A Four-Factor measure of Perceived Homophily, J. C. McCroskey et al., 1975) and discussion with interviewees.

CENTRALITY. Describes the condition of members with high numbers of direct connections, or ties, to other members in a constructed matrix or graph (Scott, 2000).

Network analysts are often concerned with describing the "strength" of ties. But strength can have several meanings, thus its meaning is inextricably linked to study design. One definition of strength is frequency of interaction; do actors have contact daily, weekly, monthly, etc. Another definition is intensity, which usually reflects the degree of emotional arousal associated with the relationship. Although frequency, like intensity, is a relational property in a social network, it does not identify behavioral ties (such as those in this study) which account for emotion. For this study, intensity was chosen to define tie strength, as this property best reflects the concept of opinion leadership in this context. Intensity provides a means to distinguish among several levels of interaction (e.g., general comments, asking for advice, experiential proximity) assigning value to ties, as opposed to simply counting the number of interactions between members.

Sampling and Recruitment

While quantitative studies largely employ random sampling methods to guarantee that the sample selected is representative of the population of interest, qualitative researchers are not concerned with sampling for the purpose of generalizing to other populations (Lindlof & Taylor, 2002). Instead, qualitative researchers focus on recruiting participants who are knowledgeable and experienced with phenomena under study. While this mixed method investigation utilizes both quantitative and qualitative data,

qualitative data is given priority in that the experiences of respondents can be more fully accessed and understood via interviews. Looking to describe not only what is common and patterned among community members, but also what is individual and variable within this network, this study utilized purposive sampling, selecting the BoneSmart® Knee Forum community due to the large number of active members frequently conversing on the topic of knee arthroplasty.

After approximately 18 months of periodically reading posts (no registration, no interaction, unknown to all except the forum administrator) in order to determine how research worthy the BoneSmart® community was with regard to this study's objectives, the investigator secured permission to survey and interview members with owners of BoneSmart.org and the administrator of BoneSmart's Knee Forums. Recruitment for the questionnaire occurred through a letter of introduction from the forum administrator of the BoneSmart® community and a "call to action" posted on the main page of the "Knee Forums," which then led to an explanation of the study's general objectives and a consent form. Recruitment for online interviews occurred via an invitation to participate at the end of the questionnaire.

The BoneSmart® Knee Forums claim 2,481 members (667 active) and offer comprehensive information regarding knee pain, injury, replacement and surgery recovery, and provide a network for its members to discuss a variety of on-topic issues. While this site provides Webcasts, links to reference and video libraries, and step-by-step preparation guides for any and all forms of knee surgery, members also interact on other subjects both in the three Knee Forums and in the BoneSmart® Social Room.

Registration is required in order to interact with other members and moderators on BoneSmart.org website.

Splitting the difference between response rate for online surveys of 34% (Shih & Fan, 2008; Singh et al., 2009) and 26% (Hamilton, 2009) (see above), expected N for the online survey component of this research was 200 (30% of 667 active members).

Procedures

This study utilized several methods of data collection and analysis. By observing member postings in the knee forums on the BoneSmart.org website, a matrix comprised of a percentage of active members on the BoneSmart® site employed Social Network Analysis (SNA) to determine if members were connected directly or indirectly by one or more different relationships. The online survey indicated in general and limited terms what members of a virtual community thought about knee arthroplasty, internet use, others with whom they interact in cyberspace, and what being a member of this community meant to them. Online interviews sought to capture the experience of knee arthroplasty (or its potential) and what membership in a virtual community meant to respondents.

SNA Observation

The BoneSmart.org website offers pre and post-operative knee and hip replacement patients two main forums—one for knee, one for hip—in which members can ask questions, give answers and share experiences. These forums total 4,022 members, and although participation among members between these forums is fluid, the three knee forums contain 62% of total threads. The three knee forums incorporate approximately 2,481 members, or about 61% of total members, with 667 active as of this writing. There are 1,270 threads containing 15,568 posts in the Knee-Replacement

Pre-Op Forum, the Knee Replacement Recovery Forum includes 3,002 threads with 46,066 posts, and the Robotics/Minimally Invasive Surgery Forum 23 and 346 respectively, totaling 4,295 threads (as of this writing).

To determine if certain members were more central in communication networks across the knee forums via the number of ties they have in the knee forum community, a 200 x 200 adjacency matrix was constructed (Scott, 2000). An adjacency matrix lists each member twice—one in the rows and once in the columns. The presence of a tie between members is represented by an X in the appropriate cell of the matrix. On the BoneSmart® site, threads in each forum are numbered and listed chronologically in descending order (most recent first), and postings within threads are numbered and displayed likewise. To avoid chronological bias, a random sequence generator was used to randomize numbers representing the threads in each forum. Threads in each forum were then opened sequentially in the randomized list. The number of postings in each thread (postings are numbered chronologically) was noted, and a random sequence generator again used to scramble numbers representing the posts.

The median post in that thread was copied and pasted into a separate file, and that procedure repeated until a list of 200 (30% of 667 active members) distinct screen names, associated with the originator of the post—the source of the relational tie—was generated. If an even number of posts occurred within a thread, the numeric value below where the median would have been (nearer the initial number in the list) was selected. The Knee Pre-Op Forum contained 30% of total posts across the three knee forums, with the Knee Recovery Forum holding 69% and Robotics/MIS Forum 1%. To obtain 200 screennames and accurately represent forum proportions, 30% (60), 69%

(139), and 1% (1, down from 2 to arrive at 200) of the screennames were gleaned from the Pre-Op, Recovery, and Robotics/MIS Forums respectively. The process revealed 26 overlaps between the Pre-Op and Recovery Forums, so threads and postings in those two forums were revisited using methods and percentages previously described until 200 distinct screennames completed the matrix. The Robotics/Minimally Invasive Forum contained only two posts as per the sampling process and these posts repeated information found in other Knee Forums. Since the posting members were represented in one of the two other forums and these posts would have added nothing to the research, they were ignored. The adjacency matrix is presented as an Excel spreadsheet: a cell containing an X indicates the presence of a relationship (a tie); empty cells indicate no tie between those screennames in this sample (Example in Table 3-2).

To determine ties among members within The Pre-Op and Recovery Forums separately, and also distinct from the cumulative matrix, the first 60 discrete screennames from the Pre-Op Forum, along with coded postings, were copied and pasted into an Excel file as a spreadsheet. The source and target were noted, and content of the posting, indicating tie strength, was coded as follows, based on Bales (1951) "Interaction Process Analysis:"

1 = general comments

2 = thanks/well wishes

3 = support

4 = seeking advice/information

5 = giving advice/information

6 = experiential proximity

7 = giving advice/info + experiential proximity (5 + 6)

That process was repeated for the first 139 discrete screennames from the Recovery Forum. (It must be noted here that BoneSmart's knee forums have a forum administrator and an assistant moderator who, in addition to interacting with members about knee-health, maintain these forums with regard to rules, protocol, and posted content, and serve as intermediaries between BoneSmart® staff and members on technical matters. If, during the random selection process, the post of record was from the forum administrator or assistant moderator, and that post had anything to do with the business or administrative component of the forum, it was eliminated, and the thread next in the sequence was instead retrieved. Only posts originated by the forum administrator or moderator that directly related to knee-health were included in the sample).

Those two Excel files were saved as text files (necessary for UCINET®), then imported separately into the NetDraw application of UCINET6®, resulting in two distinct sociograms—visual representations of ties among members in these forums (Figure 3-1).

Degree, a component of centrality, is a measurement that describes the location of members in terms of how close they are to the "center" of the action in a network—though definitions of what it means to be at the center differ. If a member receives many ties, they have high "in-degree" and are said to be prominent, or to have high prestige. That is, many others seek to direct ties to them, and this may indicate their importance. Members who have unusually high "out-degree" are those who are able to exchange

with many others, or make many others aware of their views. Members who display high out-degree centrality are said to be influential members. Basic measures of centrality were performed on the sociograms generated from knee forums, with results indicating certain members having high degree, or being well-connected.

Online Questionnaire

A 54-item online questionnaire was disseminated in the community after the investigator's identity was revealed as a researcher. The questionnaire was accessible to community members for a period of three weeks. (In a 2009 meta-analysis, Hamilton found that for online interviews, 96.5% of responses arrive within two weeks of introduction.) The questionnaire component for this study was designed and implemented via VT Survey, version 2.2.4. VT Survey is hosted on a secure server provided by the College.

On the Knee Forums page of BoneSmart® website, clicking on a one-line "call to action" link took members to Informed Consent. Submitting consent via an "I Agree" radio button then directed respondents to the questionnaire. In addition to demographic information (Items 44-55), the questionnaire included measures of general internet use (Items 1-4, Papacharissi & Rubin, 2000), community involvement (Items 7-11), knee health-related information gathering (Items 5-6), trust (Items 14-27, Ridings et al., 2002), credibility (Items 28-34, J. C. McCroskey & Richmond, 1996), and homophily (Items 35-43, J. C. McCroskey, Richmond, & Daly, 1975). Seeking opinion leaders, the questionnaire also asked respondents to name (via screen names) who in the community they seek out for general information (Item 13), and who they go to in the community for information about their own particular circumstance (Item 12, following

the sociometric method of determining opinion leaders introduced by Katz & Lazarsfeld, 1955). E-mail addresses were solicited for follow-up interviews.

Online Interviews

Important in this research is the range of variation in the attributes of community members. Questionnaire results guided the selection of 25 (J. O. Brown et al., 2007; Davis, 2006; Morse, 1994) follow-up respondents who volunteered for interviews and who represented the widest possible range of circumstances in the community. (J. O. Brown et al. [2007] utilized purposive sampling to achieve the widest range of demographics possible for their study, ultimately interviewing 30 respondents. Davis [2006] weighted her selection criteria to reduce interviews from 85 to 21. Both these studies utilized SNA and reported the number of respondents recruited was adequate to generate ample data. A single case may be sufficient to display something of substantive importance, however, Morse [1994] suggests using at least six participants for studies in which one is trying to understand the essence of experience. Morse also suggests 30–50 interviews for ethnographies and grounded theory studies.)

Selection of 25 respondents from among those who completed the questionnaire and volunteered for interviews was governed by variation in the distribution of individual attributes produced by the questionnaire. The investigator divulged more specific information about the nature of the research to these respondents and conducted semi-structured asynchronous e-mail interviews. This format allowed participants to enhance accounts of their experiences and to construct their own experiences through dialogue and interaction with the researcher. Semi-structured e-mail interviewing also allowed participants to control the flow of the interview to some degree. Online interviews offered opportunity to understand respondents' perspectives in this community, retrieve

past experiences as they related to knee-related health condition, obtain descriptions of events normally unavailable for observation, and to understand the circumstances under which influence occurs.

Research Questions Revisited

While e-mail interviews with volunteer respondents provided analytical depth to the research questions posed in this study, some dimensions of particular questions were answered in part by way of responses to questionnaire items and the SNA matrix. In this study, Research Questions 1, 6, and 7 were answered through semi-structured, open-ended questions whereby respondents construct narratives of their experiences as they relate to the question. Research Questions 2-5 were guided (and partially answered) either by SNA measures or responses to questionnaire items. See Table 3-1 for delineation of major concepts.

This study utilized several methods of data collection in efforts to answer seven research questions. Observation of member postings in BoneSmart.org knee forums allowed Social Network Analysis (SNA) to determine if members were connected by one or more different ties and to ascertain if certain individuals were central to communication processes in the community. An online questionnaire was designed and implemented to establish what members of the community thought about forum leadership, knee arthroplasty, internet use, and to capture demographic information along with respondents' perceptions of community membership. Online interviews, consisting of questions addressing trust, opinion leadership, credibility, and use of information, were conducted via e-mail. These interviews also included a phenomenological component, seeking to understand the experiences of community

members. Textual analysis was utilized to identify recurring themes in participants' interview responses.

Results from these procedures in this mixed method approach shed light not only on members' notions of the online other, but also revealed members' perceptions of leadership in an online environment and delineated the physical and emotional experiences common to those suffering this condition. Results from each procedure are detailed in the Findings chapter, which follows.

Table 3-1. Operational definitions of major concepts

concept	operations	answered by			reference
		SNA	survey items	interviews	
influence	SNA centrality measures sociometric mapping	X	12, 13	X	Scott, 2000 Katz & Lazarsfeld, 1955
trust	summed scores on a 14-item 5-point Likert scale		14 - 27	X	Ridings et al., 2002
credibility	summed scores on a 8-item 5-point semantic differential scale		28 - 34	X	J. C. McCroskey & Richmond, 1996
homophily	summed scores on a 9-item 5-point semantic differential scale		35-43	X	J. C. McCroskey, Richmond, & Daly, 1975
centrality	high number of direct connections with other members in matrix	X			Scott, 2000

Table 3-2. Example of SNA matrix

	S1	O2	M3	R4	M5	S6	N7	R8
S1								
O2								
M3		X						X
R4								
M5								
S6							X	
N7								
R8				X				

Note: Rows represent the source of the relationship tie, columns represent target

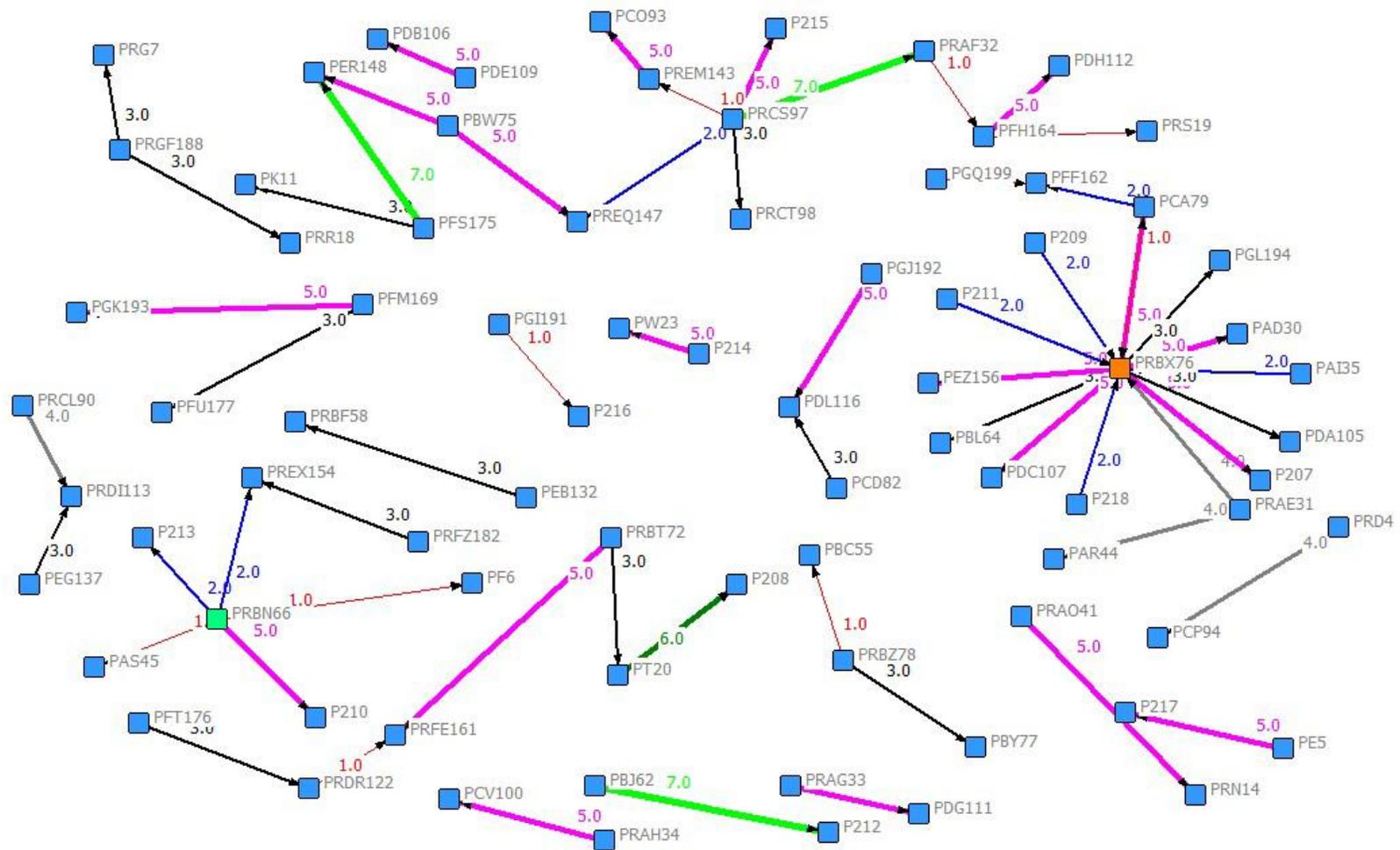


Figure 3-1. Sociogram of Knee Pre-Op Forum (partial)

Note: Tie type (1=general comments ...7=experiential proximity, etc.) is indicated numerically. Line thickness and color aid tie type recognition. Direction of arrowhead indicates direction of relation. Location of node is arbitrary.

CHAPTER 4 FINDINGS

This study investigated how the concepts of opinion leadership, trust, and credibility operate in an online community centered on knee arthroplasty, and how people here describe the experience of being a member of this community. Social Network Analysis (SNA) provided a method to observe communication patterns in the community, while an online questionnaire and e-mail interviews offered opportunities to analyze respondents' perceptions of interaction in the community. General findings are reported first, then detailed under each data collection method, followed by more specific accountings in answer to the research questions.

Through observation and SNA analysis, certain community members emerged as opinion leaders. This finding was confirmed not only by responses from members who participated in the online questionnaire, but also from responses to semi-structured questions posed to questionnaire respondents who agreed to be interviewed via e-mail.

Trust, credibility, and homophily are elements generated by individual perception that help promote voluntary online cooperation among strangers in virtual communities. While scores measuring these elements were relatively high across the board, members still claimed to verify through alternative sources the knee-related information they accumulated from community interaction, although experiential proximity (shared knee conditions or circumstances) was the most noteworthy generator of trust and credibility.

These findings also suggest that an informed patient makes for a better patient. Virtually all BoneSmart® members who participated in the e-mail component of this study said that by gathering from others in the community pertinent information relating

to his or her personal situation helped them ask more focused and relevant questions of health care professionals, which led to more prepared and ultimately healthier decision-making.

SNA Observation

In an effort to initially determine if certain members of this virtual community were central in the interactions among members—which may indicate opinion leadership—observational techniques common to SNA were employed.

An adjacency matrix was constructed to determine simply who among members in this sample had ties. The existence of a relation between two members is considered independently of whether or not the relation involves influence one way or the other. The data consists of binary (presence/absence) undirected data. Certain members (via screen names) were more prominent in the 200 x 200 adjacency matrix via degree—greater numbers of associations with other members—indicating centrality and possible leadership. Simply counting the number of in-ties and out-ties of members suggests that certain members are more central, and it appears that this network as a whole may have a few central members. In undirected data, as in this adjacency matrix, members differ from one another only in how many connections they have. This matrix revealed PRBX76 (32 ties), PRBN66 (19 ties), PRFZ182 (8 ties), PRCS97 (5 ties), and PRAE31 (5 ties) to be most prominent in terms of degree. These five accounted for 9.8%, 5.8%, 2.4%, 1.5%, and 1.5% of total posts this matrix represents.

With directed data that is valued, however, it can be important to distinguish centrality based on in-degree from centrality based on out-degree. Generally, if an actor in a network receives many ties, they have high in-degree (summed incoming ties based on tie strength compared to others) and are often said to be prominent; many

other actors seek to direct ties to them, and this may indicate their importance (Hanneman & Riddle, 2005). In this research, members with high in-degree are either those who are receiving advice about their condition or circumstance in response to a query, have recently undergone a procedure related to knee-health and are receiving various levels of well-wishes and support, or are opinion leaders on a knee-related topic and are being queried. Members who have high out-degree (summed outgoing ties based on tie strength) are those who exchange with many others and make others aware of their views. Members who display high out-degree centrality are said to be influential actors, and for this research they can be opinion leaders depending on the strength of the ties.

Using the NetDraw function within UCINET6®, valued data from both the Pre-Op and Recovery Forum Excel files were used to generate sociograms that illustrated the direction and type of tie for each forum. These visualizations enable an investigator to analyze social structure; opinion leaders in a social system can be identified in both matrices and maps, depending on the nature of the investigation. Directed ties among sampled members of the Pre-Op Forum are shown in Figure 4-1.

Figure 4-1 illustrates social structure in this sample of the Knee Pre-Op Forum. Summing outgoing ties by tie strength for each member shows that PRBX76 (orange), PRBN66 (green), and PRCS97 (yellow) are clearly central in this sample, signified by high out-degree centrality. Note that while PBW75 (gray) and PRAE31 (red) have fewer ties than the three members mentioned above, they also demonstrate high out-degree based on stronger tie strength—stronger value of their outgoing advice. PRBX76 exhibits both high out-degree and high in-degree centrality (summed incoming ties by

tie strength), indicating an influential member in this community. Note that while PER148 (black) has high in-degree based on the strength of the advice he/she is receiving, this member displays no out-degree.

Running Freeman's Degree Centrality within NetDraw displays centrality measures for the Knee Pre-Op Forum (Table 4-1). To help understand these data, it is useful to consider the standardized scores for in and out-degree measures (Freeman refers to these scores as "normalized"). The normalized score indicates how many standard deviations the individual score is above or below the mean for these data. The normalized scores for PRBX76 further confirms centrality showing that this individual's scores are more than 6 and 2 standard deviations above the mean for in and out degree respectively.

Figure 4-2 illustrates social structure in this sample of the Recovery Forum. Again, PRBX76 and PRBN66 are central, along with, to lesser degrees, RCU99 (yellow), RFG163 (aqua), and PRFZ182 (red). Also note that while RBD56 (gray) has high in-degree based on the strength of the advice he/she is receiving, this member displays no out-degree ties.

As the Recovery Forum is larger than the Pre-Op Forum, measures of degree centrality are proportionately greater for those considered central. See Table 4-2 for Recovery Forum degree centrality measures.

It should be noted that PRBX76 is the one paid forum administrator (though not the only moderator) for the BoneSmart® Forums; a circumstance that may affect the frequency and strength of messages directed to and emanating from her simply by virtue of position. As previously mentioned however, only posts originated by the forum

administrator that directly related to knee-health were included in the sample. Any post that had to do with business or forum administration was eliminated, and the post next in the sequence was instead retrieved. This research focused only on communications forming the core of this investigation: the exchange of various types of information directly related to knee replacement and recovery. While PRBX76 demonstrated both high in and out degree centrality, others in this research who also demonstrated centrality were not moderators (as of this writing). BoneSmart® conducts a vetting process to qualify those who assume forum administration and moderator positions.

In the flow of information, the structure of a social network helps determine the network's usefulness to its individuals. Observation of this social network suggests that the attributes of individuals may be less important than their relationships and ties with other members within the network.

Online Questionnaire

An online questionnaire was disseminated in the forum to determine how these members gather knee-health information, why they interact in this particular forum, and if, and to what degree, trust, credibility, and homophily are factors here. In addition to demographic data, information pertinent to this study also included measures of time spent online, how participants spent that time, how long participants had been members of the BoneSmart® community and why they joined, who they chose as leaders in the community, and how similar to themselves they feel others here are.

Descriptive characteristics of survey respondents revealed that overall, respondents were primarily older, college-educated Caucasian women, who were small-town U.S. residents, employed full-time in professional or technical occupations, and members of the BoneSmart community for three months or less (Table 4-3). Several

respondents reported, however, that they lived in other English-speaking countries. Results showed that trust among members is fairly high and that the information exchanged in the community is believed by these participants to be credible. In addition, opinion leaders evident through SNA observation were confirmed through a “nominate a leader” write-in item on the questionnaire.

Fifty-two members of BoneSmart’s Knee Forum community submitted responses to the 54-item online questionnaire. One member failed to answer over half of the 54 items and was therefore discounted in analysis. Several questions addressed internet usage using a 5-point semantic differential scale (1 = I don’t use the internet for this 5 = This is what I use the internet for). Mean hours spent online per week for any reason other than work was 24.08, weekly mean for BoneSmart® hours 4.53, and mean hours per week looking for knee-related health information not in BoneSmart® was 2.23. Highest mean score for why these participants used the internet was “research” at 4.58; “looking for health information” and “to gather other points of view” both scored high at 4.27 and 4.10 respectively, with using the internet to “get someone to do something for me” lowest at 1.24. Presented with both media and interpersonal choices on questions of how they gathered knee-health related information, the BoneSmart® website was most used at 2.0 (rank ordered; 1 most used, 10 least used, scores averaged) with “medical professional” second (2.37), “other online sources” third (2.47) and “newspaper” tenth at 4.52.

Reasons for joining the BoneSmart® Knee Community varied from “to gather post-op information” (27%) and “newly diagnosed—looking for information” (15%), to “gathering information for others with knee problems” (8%). Mean score on the 5-point

scale for how “important” participants thought this community is was 4.69, and when asked how “involved” in the community they perceived themselves to be, mean score was 3.58.

Critical to this research, however, were nominations of certain community members by other members based on these others’ perceptions of leadership in the community. Given the opportunity to list four distinct leaders—a main-source knee contact/leader, then three additional leaders distinct from other nominations (“Who are leaders in this community?”), participant response paralleled SNA observations, as depicted in Figures 4-1 and 4-2. Table 4-4 displays findings for sociometric data.

Since this study suggests trust, credibility, and homophily are elements of individual perception (J. C. McCroskey & Richmond, 1996) that help promote voluntary online cooperation among strangers in virtual communities (Tanis, 2008), results from measures of these components in this context are central to its findings.

Fourteen trust-related questions (based on Ridings et al., 2002) were measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) and assessed specific trust-related items such as perceptions of others’ willingness to divulge personal information, concern for other members, and ability to know the topic under discussion. These measures also gauged participants’ beliefs regarding trust topics in general—outside of the community. Mean for all trust responses was 4.02. As this study is concerned with how opinion leadership and influence are assessed through communication in a text-only environment, and trust is a component of effective communication, it is helpful to understand how trust is built over time in this community.

Table 4-5 displays trust item means for survey participants based on length of time as a BoneSmart® member, and shows a pattern that develops over time. Except for a decrease in seven of the ten measures in the median membership category in Table 4-5, trust generally increases across all measures the longer a participant remains in the community. The trust measure that fluctuates and yet shows a decrease from short-term to long-term membership is “get info on a topic.” That may well be because short-term members are looking for information, and long-termers have been through knee replacement and remain in the community to furnish information. Likely due to a small N in each group, differences were not statistically significant (oneway ANOVA; $F[4, 44] = 1.08, p=.377$) and trust could not be predicted by length of membership (linear regression; $F[1, 47] = 3.28, p=.076$).

Credibility was assessed by seven questions using a 5-point semantic differential scale, e.g., Unreliable = 1 5 = Reliable, (Table 4-6). Previous research shows that the relationship between the receiver and the source affects the degree of credibility accorded to the source (Aune & Kikuchi, 1993). Means for credibility measures here were fairly high (4.13), supporting the notion that credibility in this community largely derives from the perception that the source of information has been through similar circumstances, has had similar problems and engaged in similar behaviors, and has similar attitudes and beliefs about the condition he or she is facing.

When people share common meanings, beliefs and mutual understandings, communication among them is more likely to be effective, and they are more likely to develop and maintain supportive relationships with others to whom they are similar on important social dimensions (Lazarsfeld & Merton, 1954). Homophily is the degree of

perceived similarity a receiver ascribes to a message source. Homophily was assessed with nine questions based on bipolar scales developed by J. C. McCroskey et al. (1975) (e.g., 1 = Others here don't think like me...5 = Others here think like me.) While race, religion, age and sex may account for changing perceptions of homophily and heterogeneity, education is also an important variable influencing homophily (Marsden, 1988). As this questionnaire did not assess religion, and less variation exists in dimensions of race, age, and sex than in education, this study assesses homophily by comparing means of this measure according to educational subgroups.

Most participants perceived that they were communicating with people like themselves, as evidenced by the relatively high mean scores for these measures (Table 4-7). The largest perceived difference in similarity was recorded by the participant with the highest reported level of education for the variables "class," "culture," and "economic status," although with only one case in this educational subgroup this finding may not be meaningful.

Results from the online questionnaire suggest that people in this forum do recognize that certain members among them are leaders in the ways they present themselves online. These findings also show that members perceive others with whom they communicate here to be similar to them in many ways and that the information offered is credible and trustworthy.

Online Interviews

At the conclusion of the 54-item online questionnaire, participants were presented with an opportunity to take part in online interviews by offering a valid e-mail address through which interviews could be conducted. In an effort to capture the widest possible range of demographic characteristics, dispositions, and knee-health related

experiences, as well as narrow the interviewee list to 25, careful consideration was given to the thirty-four survey participants who provided e-mail addresses (one proved invalid). The final 25 selected for interviews included, for example, a high-income university professor with a doctorate and low homophily scores who had simultaneous double total knee replacement, and a lower-income skilled laborer in the community less than three months looking for information for an upcoming left total knee replacement.

By means of e-mail exchange in response to semi-structured questions, interviews were conducted to not only understand the experience of potential and performed knee arthroplasty, but also to confirm or deny the existence of opinion leaders in this community in respondents' own words. Moreover, interviews were structured to extract respondents' beliefs regarding trust and credibility—whether or not these concepts are present here and if so, how they develop and are maintained. Textual analysis revealed underlying themes associated with the physical aspects of this phenomenon, and direct responses to questions indicated that trust and credibility are developed and maintained through thematic consistency in any one individual's postings. These interviews confirmed that opinion leaders in fact do exist in this community—and are almost exclusively the same ones who became apparent both through SNA observation and nomination in the questionnaire.

Introductory e-mails were sent to those 25 (plus an additional four to allow for attrition) explaining the interview process, acknowledging their agreement to take part in the interview process, and asking them to reply if still interested, with 17 responding. So as not to intimidate interviewees with an overwhelming amount of information at one

time, interview questions were sent in three rounds, each two days after receipt of responses from the prior round. Interview questions were designed in part to help answer the Research Questions posed in this study. Round One consisted of four multi-part questions addressing online trust, opinion leadership, and credibility of information; with three multi-part questions, Round Two focused on what being a member of this online community was like and how individuals used the information they gathered; Round Three (condition questions) consisted of several questions seeking to understand how the physical changes and accompanying anxiety affected the participant's emotional state on the way from problem recognition until this written reflection (Appendix C contains full list of questions).

Of the 17 responders, 10 completed all three rounds of questions, one completed two rounds, three completed one round, and three answered no questions. Those who did not complete all three rounds were sent two follow-up reminders, which went unanswered.

Textual Analysis

Participants were coded (e.g., N10, G7) and responses from each participant for each question were aggregated into one of seven separate word files, corresponding to which Research Question the response addressed. In the process of identifying expressions that seemed important and then arranging these into blocks of related text, thematic categories emerged. Repetition is one of the easiest ways to identify themes; some of the most obvious themes in a body of data are those topics that occur and reoccur. The more the same concept occurs in a text, the more likely it is a theme (Ryan & Bernard, 2003). Others themes are more abstract and require the researcher to synthesize characteristics of participant experiences according to the researcher's

theoretical understanding of the phenomenon. To understand lived experience through the perspective of the individual experiencing this phenomenon, responses to condition questions were analyzed apart from those designed to answer specific Research Questions.

Several themes arising from textual analysis were practical and more obvious than others. One was issues associated with body weight. While apparent in our society in general, decreased mobility for several of these participants was strongly related to weight gain, especially among older women; two participants stated that they were obese. Another was assignation of leadership to a recurring set of individuals, confirming results from both SNA observation and questionnaire results (Figures 4-1 and 4-2, Table 4-4). A third practical theme linked active participation in the BoneSmart® community with becoming a better, more informed patient.

Certain themes, however, were subtle and required somewhat more abstract thinking to discern linkages among expressions. When scripting about courses of action undertaken in efforts to verify information and sources, an encompassing theme surfaced indicating that most participants put more stock in the real-life experiences of peers with regard to pain management both prior to and following surgery, and in peer-reported recovery therapies, than they did in scientific information on those subjects, even ahead of advice from health-care professionals in most cases. Another less concrete theme that emerged underscored the concept of influence. While all answered negatively to the question of whether they were directly influenced by someone in BoneSmart® to have (or not have) knee surgery, a recurring theme in the data was how members read, filtered, then followed the advice of other members on a variety of knee-

related issues, all while denying being “influenced” and stating that they made decisions independently.

Research Questions Resolved

This research offered some evidence for how people experience a specific phenomenon, and how they gather, share, and act on information regarding that phenomenon. Using research questions designed to explore these experiences, this study expanded on a particular set of circumstances involving online networks in order to advance understanding of relationship development in cyberspace. For each Research Question, selected quotes from respondents that illuminate the concept of inquiry appear, followed by a synthesis of themes extracted from all responses to that question. Remaining quotes are located in Appendix D.

RQ1: How do people describe the experience of being a member of an online community? How does a community member define his or her role in the community?

One’s experience of and in a community is shaped by perceptions of how he or she fits into the community (Schutz, 1967). In general, most participants went to BoneSmart® for information about how other members dealt with like issues. Many claimed that being a member had been a large part of their lives in recent months or years, and for those now on the “other side,” as members refer to their post-surgical life, they still participate so they can be with like-minded individuals with whom they share a common experience. Most logged on daily, some out of habit, some out of a genuine desire to connect with other members who helped see them through a tough time in their lives.

P4: I like to keep in touch with those I’ve known online for many months. I don’t want to miss things. I want to hear how people are doing, the few I keep up with now. Now I don’t usually go in for info, although I did have a

question this fall about what an x-ray showed. I do learn things, still. I go to see if there are new interesting subjects or new parts to the story of one of the members. When I first joined BS, I was desperate and worried and needed to know if anyone had ideas about what was wrong with my leg. I needed to know what was normal and what meant something was wrong with the knee. I needed them to help me.

D13: During my recovery period I was on the forum several times a day, in fact, it was the first site I visited when I woke up. I needed the support I received from the members. I wanted to ‘compare’ recovery. I did socialize now and then but the majority of my time spent there was to overcome the isolation I felt.

M9: Being a member of an online forum is a great experience. I meet people all over the world who share very similar problems as I do. Since it is on my computer, I don’t even have to change clothes – if I want to stay in my pajamas, I can. BoneSmart fits into my life easily, since I can go online anytime and read other member’s posts or write my own. I do socialize and keep up with what is going on in the ‘Social’ section. I already feel like I am part of BoneSmart’s extended family and look forward to checking on many of the members to see how they’re doing every few days.

Most noteworthy in response to the first part of this question were the ways in which members described their initial need for help and how they then found the help they sought through others in similar circumstances. Other themes included the satisfaction some felt in giving back to the community by offering their post-surgical perspective, and how being a member of this online community was an easy fit into their lives as they compared their recovery to similar others and kept track of fellow members’ progress on the road to the “other side.” That members fall along a continuum from “newbie” (usually pre-op and seeking information) to “senior” (usually past single or double knee replacement) means that a wide array of experiences can be articulated in the BoneSmart® forums, affecting how others experience the forum.

On the topic of how a participant felt he or she fit into the community, some described their role in terms of what they got out of being a community member, others

depicted themselves as “lurkers,” others explained their roles through expressions of what they felt they owed the community, and some felt they didn’t fit well at all.

T11: With Bonesmart, the time for needing help has passed, and I'm happy to try to help the others. It's a very sociable place, with a spine of frequent members, and this gives [me] a chance to develop social bonds with a lot of people.

M9: At this point, I'd say I take more from the forum than give, but I'd like to change that and start giving more.

V3: I go online to BoneSmart to read the latest threads in the knee recovery section almost every day. I go there only for knee related information. I guess I would describe myself as a lurker, mostly reading or taking information but occasionally giving some input.

In terms of assessing one’s role in BoneSmart®, the dominant theme was “giver,” through acts of giving back. Members described how they enjoyed giving advice and help to new members and how, through giving back, they grew to care about others and did what they could to help others do well. These members derived a sense of satisfaction from their role in the community. Others described their role as “taker” or “lurker,” gleaning information from the site without offering much input, yet benefitting from membership nonetheless.

A peripheral of RQ1 asked members what they perceived BoneSmart to be: Is it a “community?” Is it a “place?”

N10: A ‘place’ in cyberspace maybe, but just a group of like minded individuals who have some common experiences with knee replacemejt [sic]. I think of a community as a face to face location.

G7: I refer to it [BoneSmart] strictly as a message board. I have a disabled spouse and I can't change up too many words or use something like "community" to explain what I'm doing. There are plenty of people who do treat it as a community.

V3: I had to look up Webster’s definition of community because my first thought was no, BoneSmart is not a community. I would agree that if one

uses the definition as “a body of persons of common interests scattered throughout a larger society” then BoneSmart is certainly a community.

P4: This is a community. We give each other support and sympathy, since we totally understand what we are all going through. It's not just about the knee or hip anymore, it's about their whole lives and wanting them to get well and be able to continue with their lives in a comfortable fashion. And yes, it is a place. It's a comfy, cozy place where I always feel welcome.

A majority of members queried for this research experience the BoneSmart® Knee Forum as “community.” These members feel that this online forum not only shares a common interest, but members care about each other's knee-health progress and about each other's lives in general. They claim this is what qualifies BoneSmart® as a community. This view was not overwhelming however. Others felt BoneSmart® was merely a “place to go” to solve a problem, and what they perceived to be the transient nature of membership—member comings and goings— prohibited BoneSmart from being a community.

RQ2: What significance does the internet have for these community members as it relates to his or her physical (knee-related) condition?

There is nothing new in looking for health information online. People have going to the web for health information as long ago as the 1980s—well before search engines made it accessible to a wider audience (J. R. Schwartz, 2008). These expanded capabilities have allowed internet users to share information easily, inverting the top-down flow of information between doctors and patients. Depending on level of commitment, people have described the internet as a tool, a place to be, a way of life (Markham, 1998).

T11: I use the internet to get info, but apart from Bonesmart, I only use it as a tool to find something, like info or to buy something, or to solve a problem. It's essentially a tool to me, although I'm happy to devote some time to being sociable.

D13: The Internet was virtually my sole source for knee related information. My consultant asked me to go away for 6 months and lose some weight. I was very disheartened that I would have to spend a further 6 months in a great deal of pain and limitation. I published this online and was 'encouraged' to appeal against this decision, [he then rescinded] and there was no consultation about my expectations, possible outcomes, possible complications, so my only source for any information was the Internet, hence I 'stumbled' upon Bone Smart. I consider the Internet to be 'a way of life.' I turn to the computer for the answers to any questions.

V3: I consider the Internet as a remarkable tool. The Internet is vital to me in getting up-to-date information dealing with the ongoing problems I have with my knee. Most people may visit a site before and directly after their surgery, but when things work out well they move on with their lives. The small percentage of people that have problems continue to participate in the forum and at first glance this might suggest a higher percentage have problems than actually do. The Administrator cautions people that the number of problems reported is disproportionate to the number of knee replacements done. Thus I use the Internet for checking this against outside stats.

Members were split when describing the importance of the internet in their lives.

Just over one-half characterized using the internet as a way of life for them, that the internet played a major role as they suffered knee conditions, and online research was key for them. The way of life theme seemed particularly fitting for many members, as they were physically compromised to some degree and were not easily able to get to the doctor's, the library or other places where they might gather information related to their condition. Yet many also reported that the internet was essentially one tool among others, used to solve a problem. The library, medical magazines and the doctor's office were also thought to be tools. One member mentioned she used the internet as a tool to meet her husband on an internet dating site. Use of the internet as a tool seemed to be a more practical application of technology as opposed to the immersion of self into an ubiquitous medium.

RQ3: Does this online community generate opinion leaders? If so, how?

Opinion leadership is perceptible when people need information, advice, or interpretations and turn to others whom they can trust. Opinion leaders demonstrate expertise or wisdom regarding the topic for which information is sought (Katz & Lazarsfeld, 1955). If opinion leaders are present in this community, how does leadership develop? The SNA observation and online questionnaire components of this research (above) helped answer this in part, and responses to online interview questions completed the picture.

B12: BoneSmart opinion leaders are gifted with the ability to use words in such a way as to build relationships and gain the trust of members. These leaders have also experienced similar experiences...pain prior to surgery, prep for surgery, surgery, recovery and then return to a “normal” life. Experience is a great relationship builder. They are genuinely concerned for the member...that they have the best possible experience in their journey. PREQ147 sees the replacement process from an athlete’s point of view. He can relate well to those (men & women) who have been athletic all their lives and are facing replacement. He can by example help these folks to see that at the end of the tunnel...there is light. One can return to a normal lifestyle. He is very intelligent and by his participation over the years has gained much knowledge in the physiological aspects of the replacement. In real life he is a referee for football and baseball as well as a teacher. RGG189 sees the replacement from experience. She never offers medical advice, but offers experiential advice. Yet her manner is that of a caretaker...one who has genuine concern for others.

W8: I consider PRBX76 to be a leader in the BoneSmart group because of her expertise as a nurse.

According to these members, opinion leaders in this forum emerge primarily through experience. Members feel that certain others contribute valuable information not previously known, information that stems from prior research and knee-trauma experience. That the information resonates with their personal circumstances lends credibility to both source and message. The ability to communicate with sympathy, compassion, and understanding, combined with a willingness to recommend that people become their own advocates and not fear

distrusting the medical establishment, also contribute to the perception of opinion leadership. In a few cases, bona fide medical experience and credentials create the perception of opinion leadership as well. In this online community however, these qualities are always coupled with the experience of knee replacement itself.

RQ4: How is trust developed and maintained in this online community?

Before computers, trust among individuals was formed when people interacted face-to-face (it still happens this way). Computers seem to be changing that though. The aggregate mean for responses to the 14 trust-related items in the online questionnaire was relatively high at 4.02, however this research question attempted to address “how” trust develops. For members, how does trust in others develop in a text-only environment? Why would a member trust another member when they may never meet in person?

V3: I look for consistency in replies... if the answer to a question today is generally the same in a few days or weeks, I begin to place more weight on the person's opinion and advice. If you get a big enough sample of contributors you are bound to get someone who has experienced similar problems (or successes) to what you are experiencing.

W8: I know that there are a number of people who post on BoneSmart whose information I do not trust. I think that the trust is developed and maintained within the BoneSmart community through the longevity of some posters. Others post over a significant amount of time, and, to me, that improves their trustworthiness.

U14: I will say that you tend to trust a “site” after a while, to not allow misleading [sic] information by users. I believe if I were to throw out a misleading response to someone on Bone Smart a bunch of folks would set me straight.

The overriding theme emerging from responses to this question was consistency—not only in textual content, but also of demeanor. Members felt trust is

built over time through constant and reliable behavior in textual interaction. Many respondents stated that others must demonstrate empathy and some degree of intelligence in their posts, and seem steady, honest, supportive and caring before trust in either that source or his/her message is assigned. Members also appeared to agree that experiential proximity is a generator of trust, because the experience of knee debilitation, surgery, replacement and recovery is so intense that people are not inclined to lie about it, and imposters can be sniffed out rather easily.

RQ5: How is credibility accorded to sources and messages in this community?

Participants in face-to-face support groups report that knowing others in the group contend with similar problems and circumstances lends credibility to advice and support offered by those members (Young & Tseng, 2008). While aggregate credibility and homophily mean scores were somewhat high (4.02 and 3.45 respectively), do members perceive information coming through a computer from an amorphous source to be less trustworthy? If so, is it less trustworthy because it comes from someone (the source) they have not met and do not “know” in the traditional sense, or is it less trustworthy because the information comes from “cyberspace” through a computer (the medium)?

D13: It was only after exploring the whole site further and reading the vast range of information available assured me of people’s credibility in there. Also the fact that the site was not asking for money or subscriptions gave me confidence in the site. I explored various Orthopaedic sites and forums but felt comfortable with the people on Bone Smart.

G7: I take any information I get from an online community with a grain of salt. If I know someone else is having the same issue I am, that brings a little peace of mind.

W8: I do take with a grain of salt much of what I read on discussion boards like BoneSmart. Anecdotal information from other knee replacement patients is good in so far as it can alert the reader to what to expect after surgery or offer the reader tips on how to function once back home from

surgery. I don't accept medical advice from other patients, online or in person.

Verification was a constant theme in member responses to this question. Virtually every member stated that they checked other sources of information outside BoneSmart® (websites, people who had experience knee replacement) before making decisions with regard to their knee-health. If information gathered in BoneSmart® matched that obtained from other sources, information was then perceived to be credible. Some members stated that they do not take information available on the internet at face value, and although BoneSmart was their first choice for information, they looked elsewhere for verification before assigning credibility to the BoneSmart® information on which they based decisions. Experiential proximity also factored into the perception of source/message credibility. Several members revealed that if they believed others with whom they were interacting had experienced what they were going through, that was enough for them, and that particular other and his/her message were deemed credible without further verification.

RQ6: Is information gleaned from the community otherwise verified, or taken as fact?

One may act on certain information without corroboration if it comes through face-to-face interaction from a known and trusted source. Although information shared on the BoneSmart® website is reportedly reviewed and authenticated by an administrator for accuracy and appropriateness, virtually all respondents claimed to verify information through other sources. When prompted to rank-order sources from which respondents gathered knee-related health information, most used to least, 38% of respondents selected BoneSmart® as their first choice, followed by 32% choosing medical

professionals first and 19% opting for other internet sources first. Just 4% chose friends first, while 8% chose family. Accessibility and availability may be factors here though, since doctors are not as available as are the BoneSmart Forums.

W8: Once I knew that I was going to have my knees replaced, I read a great deal about the surgery, both online and in print sources. I don't consider information from the internet to be less trustworthy than print sources. Websites sponsored by major hospitals, for instance, seem to be pretty reliable. Having a bit of an in with healthcare professionals, I could talk to nurses, nurse practitioners, etc. My orthopedic surgeon was also a source of information for me. I took information I read on BoneSmart to be trustworthy and believable when I could verify it. Some things did not have to be verified (i.e., how to prepare the house for recovery, what sort of clothes would be easiest and most comfortable in rehab). Trusting those postings was a matter of common sense.

E17: I always check out any information that comes from the internet! There is a lot of false information running around out there!

Verification again was the dominant theme, and members here mentioned how quickly one could confirm what they found in BoneSmart® via virtually instant access to information that would have taken “weeks or months” to locate prior to the internet. Responses also indicated that the verification process sometimes included face-to-face discussions with other knee replacement patients and consultations with doctors and health care professionals with regard to the surgery itself, whereas pain management and recovery therapies were more likely to be confirmed through internet sources.

RQ7: How do community members use the health-related information they gather in these online communities?

Given prior research demonstrating that individuals consult multiple sources when seeking health information (Rains, 2007), it appears that a lack of trust in traditional sources may be one factor motivating individuals to use online forums for medical information. Evidence exists indicating that when those managing a similar chronic

condition share experiences with one another, their collective wisdom yields insights beyond the understanding of any single patient or physician (Sarasohn-Kahn, 2008). While BoneSmart® members claimed to verify information with outside sources, they also held that their decisions regarding knee-health treatments were corroborated by information exchanged in the community.

D13: I was bought up not to question a ‘doctor’ so reluctantly I just accepted his decision. The ‘kick in the teeth’ for me was that on leaving I heard him say to his understudy ‘hopefully she will have turned 50 by then and I won’t feel as guilty replacing her knees’. When I got home I posted on Bone Smart what had happened and the response was unanimous, why wait 6 months? The operation is inevitable so why suffer for a further 6 months, It was suggested that I contact him and ask him to reconsider and to go ahead with the operation, my ‘friends’ online had given me the courage to say what I had wanted to say all along. I would say the information I have received has given me more courage to not always accept everything as absolute just because it comes from a healthcare advisor, I feel more confident to ask questions if I have even a limited understanding of what is happening.

F5: I used much of the BoneSmart information to relieve pain and manage my post surgery recovery. Without BoneSmart I would not have known to use ice and elevation to reduce swelling and pain – these measures are not advocated in [F5’s country]. It has made me a much more knowledgeable patient.

The majority of responses here integrated into a theme of “better patient.”

Respondents reported that BoneSmart® information helped make them aware of product manufacturers, types of replacement materials and procedures, what the hospital experience would entail, recovery treatment, and what they could expect in terms of outcome. Familiarity with those issues reduced some of the anxiety and stress when consulting with doctors and recovery professionals. Many mentioned that empowerment is a direct result of BoneSmart® membership—they have become a more vocal advocate of their own concerns when dealing with doctors and other health care professionals.

Another prevalent theme with respect to the use of BoneSmart® information was sharing. Some said they shared with those they knew to be in similar circumstances, and that they sometimes shared pharmaceutical advice with people they knew to be in need of that information but who did not necessarily suffer a knee condition. Others revealed that they used BoneSmart® insight to open lines of discussion with family members so they could become involved in the decision-making process.

Revisiting the SNA observation component of this study (Figures 4-1, 4-2), and both questionnaire results (Tables 4-1, 4-2, 4-4) and participant interviews (primarily responses to Research Question 3), it is obvious that PRBX76 fits the definition of “opinion leader” put forth in this study. To understand how this member perceives her role in the community, an e-mail interview was conducted and her comments in response to a separate set of questions are distilled here (Full interview in Appendix D).

Learning that she may need knee replacement, PRBX76 joined BoneSmart® in early 2007 seeking to learn about recovery; as a nurse she was already knowledgeable about the procedure itself. Having spent her entire adult life in the medical profession, she was immediately concerned at the poor information members were exchanging on the site. After providing credentials to BoneSmart®, she began to address medical inaccuracies, and became a paid moderator in June of 2007 then forum administrator in November 2008. People value her opinions not only for their medical value, but also because she has experienced a right knee arthroscopy, a left knee arthroscopic menisectomy, and a total right knee replacement.

PRBX76 enjoys passing on her knowledge and skills to others, and provides anecdotal evidence as to why she thinks people consider her an opinion leader in both

her online and offline worlds. She says satisfaction is her reward, and feels this validates her sense of self-worth. She claims her leadership position provides an outlet for her natural teaching skills as she helps people face their fears, make good choices, and benefit from a less stressful recovery on their journey to the “other side.” PRBX76 is convinced the BoneSmart® Knee Forum is a community.

By all accounts, PRBX76 fits the traditional definition of an opinion leader. She is a leader in this online environment, and to some unknown degree, in her offline world as well (according to her self-report). PRBX76 does disseminate information and the knowledge she has accumulated through both personal experience and from mass media (journals, conferences, books) to other community members. Rather than a two-step flow of communication, however, a more accurate model may be a multi-step flow. PRBX76 gathers information and directs it toward one or more individuals through a medium that is both interpersonal and mass. While information originating from PRBX76 is deemed credible by other members, it is frequently verified through other sources (according to these members) before it is acted upon.

Through observation of forum postings, an online questionnaire, and e-mail interviews, this study found evidence for the existence of opinion leaders, trust, and credibility in an online environment, and found that the traditional two-step flow of communication may now well be a multi-step flow. The traditional view holds that individuals sharing geographical space engage in primarily face-to-face communication discussing topics at hand. Opinion leaders are exposed to mass media messages and pass on information to opinion followers. Yet in today’s networked society, personal interaction is no longer dominated by physical proximity, strong interpersonal ties, and

face-to-face conversation, but rather seems increasingly subject to geography-spanning digital relations that involve any number of loose ties—evident in this research.

The use of an internet source, as evidenced here, can be seen as a further mutation of the two-step flow hypothesis. The internet appears to be the first choice to inquire about knee arthroplasty, and serves as a conduit for discussing those topics with other internet users. Also revealed in this investigation were elements common to those suffering from knee conditions that ultimately brought them into the community: pain as an initial driver of community participation; the impetus, prompted by community interaction, to solicit second opinions regarding his or her condition; and a willingness to trust others based on perceived experiential similarities. The implications of these findings will be discussed in Chapter 5.

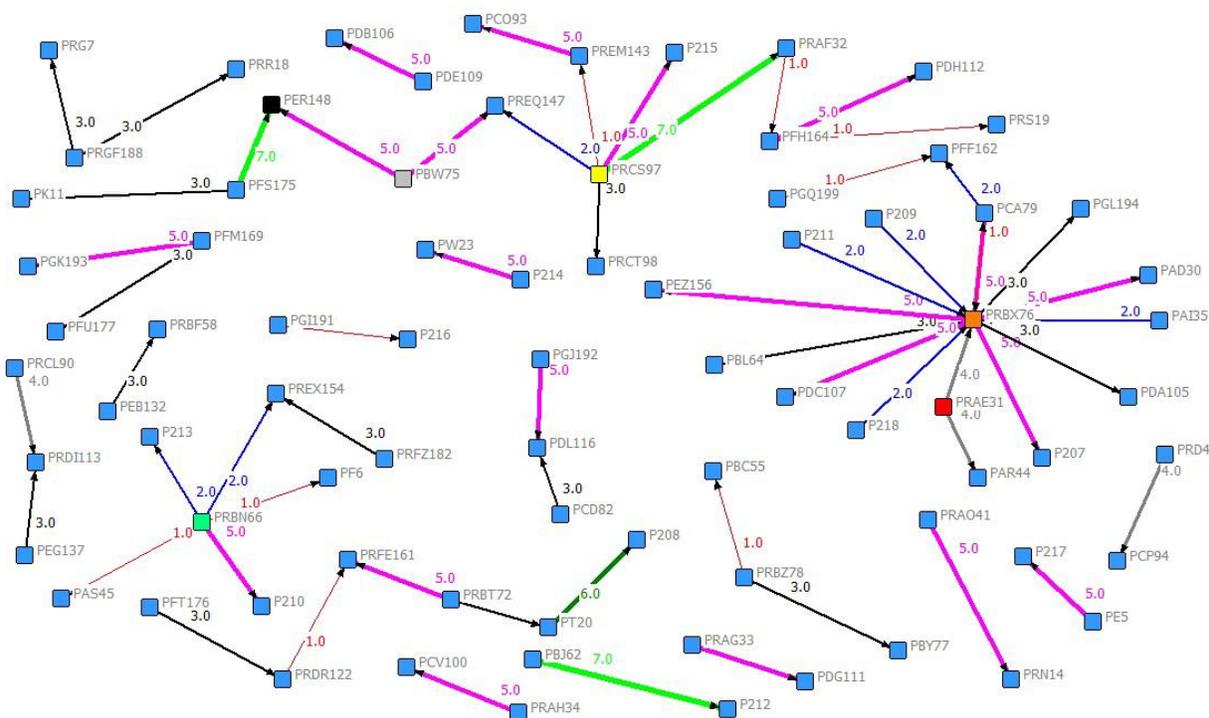


Figure 4-1. Sociogram of Pre-Op Forum members

Note: Tie type (1=general comments ...7=experiential proximity, etc.) is indicated numerically. Line thickness and color aid tie type recognition. Direction of arrowhead indicates direction of relation. Location of node is arbitrary.

Table 4-1. Freeman's degree centrality measures for Pre-Op Forum (partial)

	outdegree	indegree	nrmOutdeg	nrmIndeg
PRBX76	34.000	13.000	6.227	2.381
PRBN66	11.000	0.000	2.015	0.000
PRCS97	18.000	0.000	3.297	0.000
PBW75	10.000	0.000	1.832	0.000
PRAE31	8.000	0.000	1.465	0.000
PER148	0.000	12.000	0.000	2.198

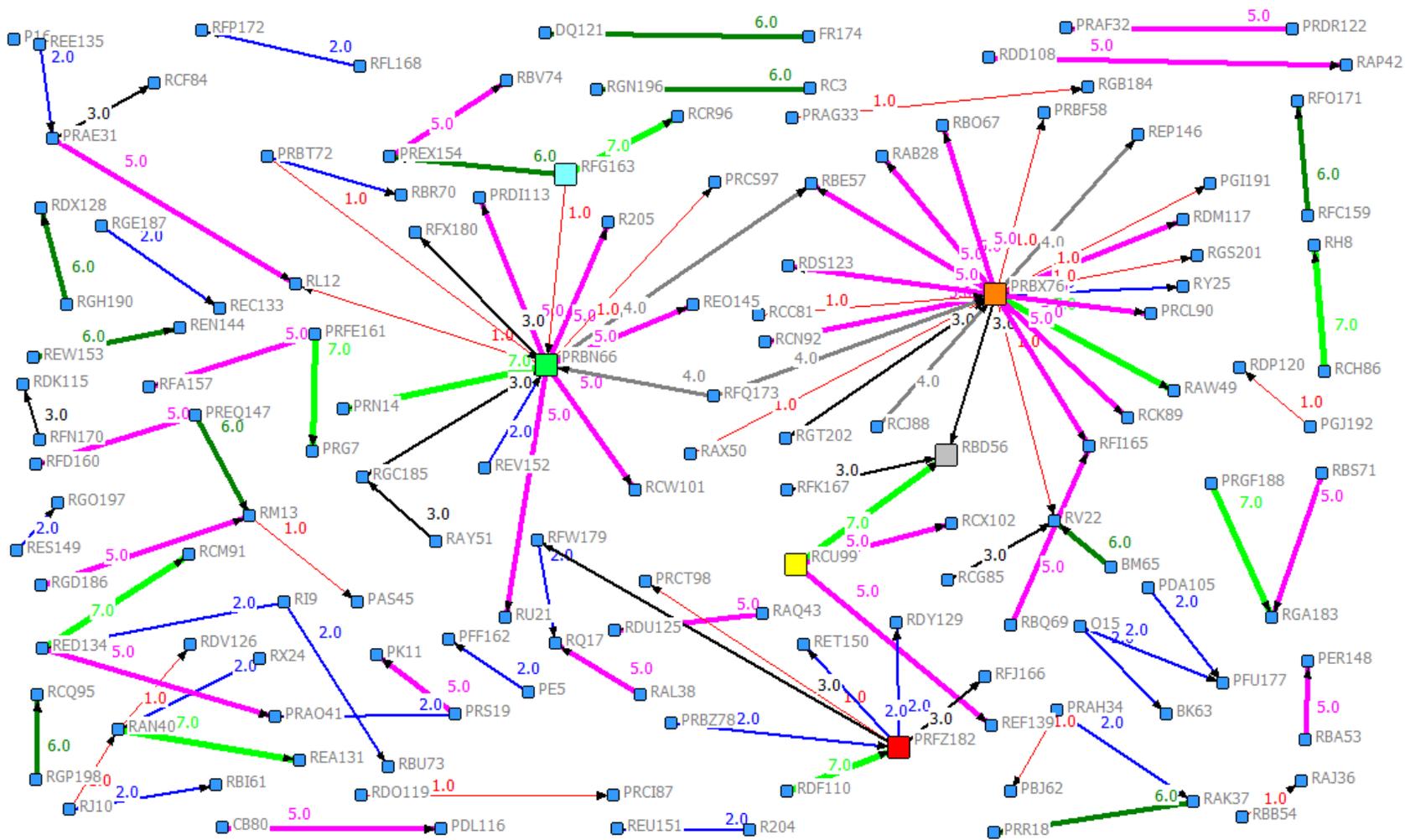


Figure 4-2. Sociogram of Recovery Forum members

Note: Tie type (1=general comments ...7=experiential proximity, etc.) is indicated numerically. Line thickness and color aid tie type recognition. Direction of arrowhead indicates direction of relation. Location of node is arbitrary.

Table 4-2. Freeman's degree centrality measures for Recovery Forum (partial)

	outdegree	indegree	rmOutdeg	nrmlndeg
PRBX76	68.000	10.000	6.110	0.898
PRBN66	44.000	8.000	3.953	0.719
RCU99	17.000	0.000	1.527	0.000
RFG163	14.000	0.000	1.258	0.000
PRFZ182	11.000	9.000	0.988	0.809
RBD56	0.000	13.000	0.000	1.168

Table 4-3. Characteristics of survey participants

Sex	%	Age	%	Ethnicity	%
male	23	18 - 29	0	Asian	2
female	67	30 - 41	8	Caucasian Hispanic	2
no answer	10	42 - 50	25	Caucasian non-Hispanic	71
		51 - 57	19	Prefer not to answer	2
		58 - 64	19		
		65+	21		
		No answer	8		
Residency	U.S. 75%	Other	25%		
Employed	%	Occupation	%	Educ (last level completed)	%
Full-time		Executive, admin,		Secondary (high school)	23
(40+ hrs wk)	38	managerial	12	University (college)	44
Part-time	15	Professional,		Advn deg (masters)	15
Not employed	15	technical	35	Advn deg (Ph.D)	2
Retired	17	Admin support	4	Prefer no ans	2
Prefer no ans	6	Sales, marketing	2	Other	10
No answer	8	Skilled labor	10	No answer	4
		Other	15		
		No answer	23		
Municipality size (pop)	%	Membership length (BoneSmart®)			%
150,000+	29	3 months or less			31
50,000 - 150,000	23	more than 3 months but less than 6 months			19
Less than 50,000	42	more than 6 months but less than 1 year			19
No answer	6	more than 1 year but less than 2 years			13
		2 years or more			13

Table 4-4. Nominations for leaders in BoneSmart® Knee Forum

MAIN KNEE CONTACT		Total nominations for main knee contact	%
	PRBX76		46.1
	PRBN66		5.7
	PFH164		1.9
	No one		9.6
	No Answer		34
LEADERS 1		Total nominations for leaders 1	%
	PRBX76		53.8
	PRBN66		19.2
	PFH164		1.9
	RFL168		1.9
	PGJ192		1.9
	My physicians		1.9
	No Answer		17.3
LEADERS 2		Total nominations for leaders 2	%
	PRBN66		53.8
	PRBX76		17.3
	PFH164		1.9
	RGG189		1.9
	PGJ192		1.9
	No answer		21.2
LEADERS 3		Total nominations for leaders 3	%
	RGG189		5.8
	PRS19		3.8
	PR219		3.8
	PFH164		3.8
	PGJ192		1.9
	No answer		65.4

Table 4-5. Trust by length of membership

	3 mo or less		>3 mo < 6mo		> 6 mo < 1 yr		> 1 yr < 2 yrs		2 yrs or more		total	
	mean	N	mean	N	mean	N	mean	N	mean	N	mean	N
get along	3.92	12	4.11	9	3.88	8	4.17	6	4.57	7	4.10	42
concerned	4.15	13	4.67	9	4.25	8	4.17	6	4.43	7	4.33	43
help others	4.31	13	4.78	9	4.63	8	4.17	6	4.43	7	4.47	43
responsive	4.08	13	4.56	9	4.38	8	4.17	6	4.57	7	4.33	43
many responses	3.23	13	3.89	9	3.50	8	4.50	6	4.29	7	3.77	43
quick responses	3.58	12	4.11	9	3.75	8	4.17	6	4.29	7	3.93	42
output private info	3.36	14	4.40	10	4.40	10	3.57	7	3.29	7	3.81	48
get info on topic	4.60	15	4.90	10	3.90	10	4.43	7	3.57	7	4.35	49
give info	3.07	15	3.00	10	3.00	10	4.00	7	4.29	7	3.35	49
share skills	2.93	14	2.50	10	2.80	10	3.57	7	3.71	7	3.02	48
general faith	4.29	14	4.10	10	4.30	10	4.57	7	4.71	7	4.35	48
general reliable	4.07	14	3.90	10	4.20	10	4.14	7	4.71	7	4.17	48
general trust	4.29	14	3.90	10	4.30	10	4.57	7	4.71	7	4.31	48
Mean of means	3.78		4.06		3.95		4.14		4.20		4.02	48

Table 4-6. Descriptive statistics for credibility measures

	N	min	max	mean	stn dev
reliable	45	1	5	4.04	1.086
informed	45	1	5	3.93	.963
expert	44	1	5	3.48	1.045
honest	45	1	5	4.31	.996
friendly	44	1	5	4.48	.976
pleasant	44	1	5	4.45	.975
selfish	44	1	5	4.27	1.020
valid N (listwise)	41			4.13	

Table 4-7. Means table: Homophily by education

Education		Homophily measures									
		Think like me	Are like me	Personalities like me	Share my beliefs	Treat people like I do	Class	Culture	Ecostat	Bg	
No level given	(N1)	Mean	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
Advn deg(Ph.D)	(N1)	Mean	4.00	4.00	4.00	2.00	2.00	1.00	1.00	1.00	3.00
Advn deg(Mast)	(N6)	Mean	3.83	3.83	3.33	3.67	3.83	3.50	3.50	3.00	3.50
		Std D	.753	.753	.816	8.16	.983	.837	.837	.894	.837
Univ (college)	(N22)	Mean	3.64	3.50	2.95	3.41	4.00	3.10	3.41	3.05	2.76
		Std D	1.09	1.10	.950	1.00	.926	1.02	.959	.999	.889
Junior college	(N3)	Mean	3.67	3.33	3.33	3.33	4.00	3.33	3.33	3.00	3.33
		Std D	.557	.557	.557	.557	.000	.557	.557	1.00	.557
Secondary (hs)	(N12)	Mean	3.58	3.58	3.33	3.91	4.27	4.00	3.73	3.58	3.00
		Std D	1.31	1.08	.985	.944	.905	1.00	1.00	1.08	1.27
Total	(N45)	Mean	3.69	3.60	3.20	3.57	4.02	3.38	3.45	3.16	3.00
		Std D	1.06	1.00	.944	.974	.927	1.05	.975	1.04	.988

CHAPTER 5 SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

In part, this research reaffirmed findings from previous studies of online interaction. This study however, unobtrusively observed online behavior and then solicited reports of behavior and lived experience, which resulted in findings that ultimately amplify, expand, yet occasionally conflict with previous research. The study revealed a variety of member perceptions in the exploration of results-oriented online behavior. This chapter will examine the theoretical and methodological implications of the study where possible, point out the study's limitations, and propose areas of future research suggested by the findings.

Summary

Computer-mediated communication is not just a tool; it is a technology and a facilitator of social relations. The internet and world wide web have changed the nature of information seeking; the internet has become fundamental to living in a modern-day world. It has changed the way people inform, amuse, educate and care for themselves, and the ways they stay in touch with others (Pew Internet & American Life Project, 2008). Information consumption has become a collective process and people are using these and other innovative technologies to pool knowledge and skills. When forms of collective intelligence develop through social interaction via the internet, loosely-knit groups are formed and are referred to as online communities. Others prefer the term virtual community, depending on level of commitment (Rheingold, 1993).

Critics argue that these types of groups lack conventional commitment and responsibility ties, therefore intimacy and connection are inadequate for community, especially when participants can disengage when they choose (S. G. Jones, 1995).

Others contend, however, that engaging and cooperating online in shared practices and information exchange enhances community. In this research, shared practice manifested itself through experiential proximity—mutual knee problems and knee-health related conditions. Experiential proximity here fostered credibility, trust, mutual attachment, concern, and in many cases, belonging. As trust and credibility are crucial to both opinion leadership and virtual community, these concepts were investigated as components of this study.

The virtual community has become a place where people actively seek social relationships. Information that was once obtained secondhand from friends and acquaintances (i.e., the traditional two-step flow hypothesis), is now easily found via the internet. This study found support for the contention that the two-step flow is mutating into a multi-step flow of communication (Case et al., 2004; Weimann, 1994). Differences between online and offline communication are important because allocating trust and credibility must be made based on written communication. Past research has examined trust and credibility directed at websites or online groups (J. O. Brown et al., 2007), however, fewer studies have been conducted looking at how these concepts develop when the intended object is perceived to be another person in a health-related context.

As a component of the two-step flow, opinion leadership has primarily been researched within the context of traditional forms of community and social interaction. People may be influenced by opinion leaders, but the internet may be changing how opinion leadership is perceived as a result of additional “steps” in the flow of information. The frequent conclusion of past research, that most people turn to others

(family members, friends, neighbors and nearby experts, such as physicians) for advice, may be in doubt.

This research sought to understand how opinion leadership, trust, and credibility operate in an online community—specifically, one devoted to health-related issues. It explored how these notions develop and are maintained in a virtual environment, how members here experience “community,” and how they use the internet and world wide web to help them understand their condition. Moreover, this study was designed to extract discussions of how being a member of a particular virtual community—BoneSmart.org, formed around potential, pending, and performed total knee replacement—shapes members’ perception of the condition, and how they reflect on the condition itself.

This topic was chosen for three primary reasons: 61% of all U.S. adults have searched for health information online (Pew Internet & American Life Project, 2008); knee arthroplasty is a major investment, which calls for research on the part of the patient; and knee replacement is not life-threatening, which creates conditions whereby those who join an online community may not feel as pressured to remain as they might if suffering a life-threatening condition. BoneSmart.org was chosen as the research site because it is an orthopedic implant and joint replacement consumer awareness website established in 2002 with almost 2,500 members in its three Knee Forums. The primary goal of the BoneSmart® Community is to “foster communication between persons who may need joint replacement surgery and those who have had one or more of their own joints replaced.”

Fundamentally a case study, this research used mixed methods to answer seven research questions. After collecting selected postings on the BoneSmart.org website, Social Network Analysis (Wellman, 1983; Scott, 2000) demonstrated that certain individuals were central to communication processes in the community. This finding was confirmed not only by sociograms generated through observation, but also by responses from members who participated in the online questionnaire, and from answers to semi-structured questions posed to questionnaire respondents who agreed to be interviewed via e-mail. The online questionnaire also included measures of trust, credibility, and homophily. Results from the questionnaire revealed an array of knee-health experiences related to demographic variables, which aided in the selection of 25 interviewees who represented the widest possible range of conditions and circumstances from the sample of respondents. Analysis of online interviews with consenting respondents then revealed the individual logics these respondents employed in their communication processes within the community.

Overall, survey results indicated that members sense other community members to be trustworthy, credible, and similar to themselves, although mean scores measuring how informed and how “expert” respondents perceived fellow members to be were lower than means scores for other trust and credibility measures. While scores measuring these elements were generally high, members still claimed to verify knee-related information through outside sources, although experiential proximity was the most noteworthy generator of trust and credibility. Survey results also showed these participants to be more interested in gathering knee-related health information from BoneSmart® and other online sources than from traditional media.

Questions for online interviews were disseminated in three rounds: 1) four multi-part questions addressing online trust, opinion leadership and credibility of information; 2) three multi-part questions focusing on what being a member of this online community was like and how individuals used the information they gathered; 3) several questions designed to elicit responses regarding how participants dealt with the physical changes and the anxiety as they sought to solve their knee problems.

Interview responses confirmed and expanded upon survey results regarding opinion leadership, trust, credibility and homophily, and it appears that a lack of trust in traditional sources may be motivating people to seek medical information online. On this last point, interview replies also suggest that community members do not always trust a health care professional's opinion or advice, and on several occasions sought a second opinion after posting their original diagnosis on the BoneSmart® website. Interviewed BoneSmart® members also propose that informed patients make better patients, that gathering community information relating to his or her personal situation from others in the community aids them in asking more relevant questions of health care professionals.

By using the internet as a research tool, this investigation contributes to communication research and expands the case study method. The study design—observation, results of which were supported by survey findings then corroborated by direct contact with community members—offers fresh evidence for how people experience a distinct phenomenon, how they gather, share, and act on related information, and how conventions such as leadership, trust and credibility develop in a text-only environment. This study also comments on the notion of “community.”

Conclusions

In a new media environment, the ways in which people form social networks, disseminate and gather information, and exert influence have undergone recent and rapid change. Changes in the communication environment have important implications for the concept of opinion leadership. People are continually creating and discovering new places to discuss countless topics on the internet, and discussions are not limited to geographically proximate or even socially similar participants. This is a departure from the original conception in which an opinion leader exerts influence through and within his or her face-to-face social networks. The notion of centrality still applies, however the internet is now established as both a primary source of information and a social environment, thus the concept of opinion leadership is applicable to online activity. Findings, particularly through interviews, suggest that an association exists between online opinion leadership and the ability to effectively communicate, leading one to conclude that opinion leadership in this environment involves the perception of possessing convincing knowledge, the ability to influence others, and a tendency to be empathetic to others. While these traits are also present in traditional opinion leaders, what is different here is that the perception of these traits occurs in a text-only environment where traditional social cues are absent.

This study also found support for Granovetter's (1973) strength of weak ties theory. Questionnaire returns indicated these community members turned to family and friends far less than they did to BoneSmart® and the internet to gather information about knee-related problems. While the internet was used in more general fashion, it appeared that the ties community members formed with other members contributed substantially to knee-related information gain. This was confirmed through interviews,

with emotional support and encouragement reported to be an additional feature of these ties (although these features are also present in family/friends ties).

Several conclusions can be drawn from recognition of experiential proximity, a ubiquitous concept in this research. While trust, credibility and homophily certainly occur (or fail to occur) in offline face-to-face interaction among people who share a health (or any other) condition, these factors are also present in virtual communities and are fostered by experiential proximity. BoneSmart® members are willing to exchange information and advice, and interaction in this community is only marginally based on like mind, attitude, and background; most important is experience, as that experience relates to knee-health concerns. Some features of traditional community are attained, including relationships, common purpose, sense of identity and belonging, various norms, along with unwritten rules and the potential for rejection. This virtual community offers possibilities for motivated and interactive communication based on experiential proximity that are not available from mass media or one's immediate physical environment. Experiential proximity also appears to be a factor in why people join online forums, why they remain, and is an important generator of "community" in the online world.

Another important conclusion to be drawn from this research centers on the concept of community. Participants here feel that membership in the community improves their lives in a number of positive ways. The community provides practical information to help them deal with a debilitating knee condition, complex surgery options, selection of a potential surgeon, and long periods of therapy and recovery. Membership is also a source of comfort, support, encouragement, and various forms of

gratitude. Even those involved in the community for but a short time report their experience as constructive and positive.

Experiential proximity is an important component in the creation of this online community. The diversity of information and experience found in BoneSmart® about injuries, treatments, recovery, and specific conditions within the fairly narrow domain of knee-related health are primary attractions to the community, and as interaction occurs on these topics it expands into social and personal matters, creating conditions for communal interaction on other levels. Also important is that members know they can enter the community and, through an extensive library of multi-media platformed information related to knee health, take advantage of regularly occurring updates about surgery, precautions, rehab, and problems, along with the occasional related video and summaries of scientific and research articles. Information provided in the online library supplements that which comes from fellow community members and offers an avenue for verifying information gleaned from all sources. Knowing that credible and trustworthy resources are incorporated into the environment enhances the sense of “community.”

Community is also enhanced through continuity and stability. Members see others come and go; some stay for short periods, some persist and become “omegas” (the most senior rank-and-file members via postings), some return periodically to share overcoming their infirmity. The website is always there, 24 hours per day, seven days per week, and members take comfort in knowing that the community is too; survey participants indicated they received quick responses to their posts.

Lastly, empowerment is a theme that emerged in this research. Interacting with others in the community appears to give members a sense of empowerment that helps

them communicate more competently with their healthcare professionals. They feel they can go to their physician or specialist fortified with information about many aspects of the condition they suffer, from diagnosis through therapy and pain management, and discuss them intelligently. Through community interaction they are also able to assess the quality of care they receive compared to other members and, in some cases, seek second opinions based on that interaction.

Discussion

When comparing results of this study to those of previous research in critical areas, both common and conflicting findings emerge. Studies covering online health information seeking, the strength of weak ties, virtual community, and opinion leadership were examined, as were those investigating social network analysis, the two-step flow, trust, credibility, and experiential proximity. Certain findings from these studies are of consequence to this research.

S. Fox (2008) found that reliance on internet search engines such as Google® have become the de facto second opinion for patients seeking health information online, particularly after a diagnosis. This study supported that finding, as BoneSmart® community members reported that they searched online for information pertaining to their condition, but once they joined the community, they learned as much or more from each other as they did from sites offering information alone. These wide-ranging capabilities allow people to easily share information, which in effect challenges the traditional top-down flow between doctors and patients. This permutation can be seen in part as a democratization of health care.

In a later study, S. Fox (2010) also found that it is not just convenience that draws health information seekers to the internet, but the positive experiences they have with

online research and interaction. This research found similar results in that the kinds of health information sought and found online (in this case knee health) are different from what people garner from most traditional sources, especially in the realm of personal experience, and this translates into much more than doctor-patient communication. The internet and community that it can engender helps health seekers tap into resources wherever and whenever they need them, connecting with whatever source they believe will help them at any given moment. This research demonstrates that the source is not always a doctor, or even a health professional.

Rains (2007) reported that a growing distrust in health care provision has increased the potential for using the internet to satisfy one's need for health-related specifics. This study echoes that finding, and goes further in suggesting that a primary reason for people joining health-related support communities is to gather diverse opinions about his or her condition, and they are especially cognizant of opinions that contradict their particular diagnosis or the prevailing medical position on their particular problem. Several interviewees articulated a distrust for the medical establishment.

Granovetter's (1973) labor market study found that when information is unavailable through close, personal relationships, or strong ties, people may obtain it through weak ties—relationships characterized by infrequent contact, lack of emotional closeness, and no history of reciprocity. While Granovetter's investigation involved face-to-face contact, this research found that weak ties cultivated online can offer people access to resources not found in their strong tie relationships, since the potential for knee replacement is not likely to be common among one's strong ties. Burt (1983) suggests that weak ties tap diverse groups, which makes for a diversity of information,

which in turn makes those ties useful. While this study found support for that in theory, practically it was the diversity of physical conditions within a narrowly-defined group—an online group with knee problems—that made those weak ties useful.

An important extension of Granovetter's (1973) strength of weak ties is how the theory operates in conjunction with the concept of disintermediation (A. L. Shapiro & R. C. Shapiro, 1999). Disintermediation is generally associated with the ability to engage in direct commerce without brokers, distributors, and retailers, but the concept can be expanded to describe the way technology allows individuals to bypass resource gatekeepers and redirect power from established sources. Blogs, online forums, internet gambling, e-commerce sites, Usenet groups, and the tools of social media are but a few modes of technology the internet and world wide web have spawned that allow for information decentralization. Users of these platforms are able to bypass traditional sources of information on virtually any topic singularly, or through webs of relationships they build with dispersed sources. The theory of disintermediation is relevant to this research in that participants of online health forums, such as BoneSmart®, use these peer-to-peer networks to gather and act on information outside the purview of the medical establishment.

Ridings et al. (2002) defined virtual community as a collection of individuals with common interests and practices who communicate regularly in an organized way via the internet through a common location or mechanism. While this is an apt definition for the community under investigation in this study, more important is the relationship the individual has with the activity or subject in question. This research found, similar to Muniz and O'Guinn (2001), that the more central the activity to the person's

psychological self-concept, the more important this particular subject is to the person's self-image, thus the more likely the individual is to pursue and value membership in the community. Physical mobility is a vital component of identity for participants in this study, and frequent visits to the BoneSmart® community in the pursuit of solutions to their knee problems, or to help others with their quests, were important to these members' sense of self.

In Carter's (2004) examination of virtual community, participants discussed "going there" or "being there" or even "meeting friends there." In so stating, Carter suggested that they are actively producing a social space, making it a cultural rather than technological construct, mediated through experience rather than through technology. Participants in this research also emphasized the social aspects of this community in these ways. Carter, however, argued that hers was a "community" simply because her participants said it was. The current study could not fully support that finding, as a less-than-unanimous 70% here described BoneSmart® as a community (and for various reasons). However, several among those who disclaimed "community" were somewhat vitriolic in their denunciation of random members who they felt detracted enough from the spirit of community that it could not reasonably be referred to as one.

Katz and Lazarsfeld (1955) defined opinion leaders as "the individuals who were likely to influence other persons in their immediate environment" (p. 3), and this definition remains more or less unchanged in studies of the two-step flow of communications. Numerous studies suggest that opinion leaders and followers alike are exposed to a mix of interpersonal and media influence (Watts & Dodds, 2007; Weimann et al., 2007). Current findings indicate that participants here, while reporting that

legitimate opinion leaders do exist in this community, also utilized media sources as well as interpersonal sources (technologically mediated and face-to-face) in attempting to solve their problems. What is common to this study's findings and all other investigations of opinion leadership and the two-step flow, is that influence, in some shape or form, is the essential concept in the theory, yet many methodologies are employed to discern its presence, with the internet adding an additional layer to the mix. The major difference between conventional and network data is that conventional data focuses on actors and attributes; data generated for the SNA component of this study is network data, which focuses on community members and the relations among them.

A dimension dissimilar to that in traditional assessments of opinion leadership is that in this online environment those who may not have been recognized as opinion leaders in the past may be here due to their experiences, having equal chance for expression regardless of demographic attributes that may serve as hindrances to information exchange in face-to-face interaction. Traditionally, physical appearance or perceived social status in face-to-face interactions often function as "gates" that control human interaction. Members in this study repeatedly mentioned that experience was the attribute most sought after, and the one that had the most potential to influence.

While this study did use sociometric methods in part to identify opinion leaders, unlike traditional methods opinion leaders were also located by patterns of relations among members in the system and not by demographic attributes. Also unlike traditional methods, the type of relationship was valued, which provided a means to quantify via value both incoming and outgoing messages. Opinion leaders were identified by high in and out degree scores.

With influence still the focus, J.O. Brown et al. (2007) examined whether websites themselves acted as social proxies for opinion leadership. In that study, participants commonly mentioned that website content (textual content) projected a similarity of interests to them, detached from any perceived human affiliation. In contrast, members of BoneSmart® deemphasized other forms of content (e.g., the online library, sponsor mentions) while accentuating member interaction.

A powerful notion in social science is the idea that individuals are bound up in webs of relations and interactions (Borgatti et al., 2002). Social Network Analysis (SNA) has the potential to provide explanations for numerous social phenomena, and studies reviewed for this paper in part reveal how autonomous individuals create social order within social space. Looking at a social network formed in an online community devoted to sports, M.G. McGrath (2009) found that members there, like those in the current study, no longer preferred to act as passive receivers of information transmitted through traditional communications channels. Instead, they increasingly relied on online networks of friends, colleagues, like-minded individuals, and, in this online sports community, other members. Moreover, these members, again like those in the current study, view these networks as more trustworthy and impartial than corporate and traditional media sources. The theoretical link between these studies is the notion that alert organizations (like the corporate owner of McGrath's sports site and the parent of BoneSmart®, along with its corporate sponsors) recognize that it may prove fruitless to compete with the strength of peer networks, and must instead work with them. BoneSmart's owner, FARM, encourages user-generated content by facilitating several

user forums (the Knee Forum among them), and also sponsors clinical and scholarly research that can be accessed by members.

In an SNA study of farming practices in India, D. K. Kim et al. (2007) established that while mass media sources of information demonstrating innovative farming techniques were readily available, farmers were influenced more by their personal contacts with local opinion leaders, although mass media functioned as a source of new knowledge. Similar findings emerged in the current study, in that BoneSmart® members rely more on experiences of their fellow members than on published medical accounts or on advice from medical professionals in some cases, even as they scour the internet for information related to their condition.

Although D. K. Kim et al. (2007) analyzed social networks of Indian farmers, the study also revealed obvious elements of the two-step flow of communication (Lazarsfeld et al., 1948). The current study suggests a multi-step flow may more aptly describe the flow of information today, in accord with Rains' (2007) report that those who used the internet for health information rated information they obtained from family and friends to be significantly less useful than information obtained from the internet. Rains also reports that those who did not use the internet rated information they obtained from family and friends to be more useful. While non-internet users were not solicited for the current investigation, findings did reveal that family and friends were much less useful for knee-related health information than were internet sources for these participants.

Even though opinion leaders' opinions were highly regarded in this research, virtually all participants in this study reiterated their need to verify information gathered through the community. As put forth earlier, in a modern world the two-step flow of

communication may be in doubt. The original two-step flow hypothesis (Lazarsfeld et al., 1948) stated “ideas often flow from radio and print to the opinion leaders and flow from them to the less active sections of the population” (p. 151). Numerous examples of a multi-step flow surfaced in this research, however, most notably in responses to interview questions. Several participants (F5, M9, V3, D13, H15, W8, G7) alluded to a flow of information that originated with offline medical professionals, continued through that offered by BoneSmart® opinion leaders, and ebbed as it was filtered through the community’s experiential experts. The result of this flow was a synthesis of information that was, in many cases, discussed with the member’s medical professional, eventually leading to confident and informed decision-making (Figure 5-1).

Adhering to the concept of a multi-step flow, other communication patterns were also observed. While members are certainly not aware of how all information flows among BoneSmart®, its members, and members’ interpersonal sources, research shows that potentially influential communication did flow from media sources to an opinion leader (who infused those ideas with his or her knowledge and experience), and then into the BoneSmart® community, which users then verified both within BoneSmart and through other sources (Figure 5-1).

Trust and credibility are obvious facilitators of effective communication. Much literature on trust asserts that trusting beliefs in face-to-face circumstances may form quickly, before social actors have any sort of meaningful information about each other, through perceptions of social categorization, disposition, or out of an immediate need to cooperate on an undertaking (McKnight et al., 1998). In contrast, BoneSmart® members report that since immediacy is generally not a factor in the search for solutions

to knee problems, and interaction is text-based, trust develops over time through consistency in postings and replies. Naquin and Paulson (2003) found that a shared sense of identity among actors also promotes trust through deeper understanding of others' thoughts and actions. Findings in this study echoed that, and like Lewicki and Bunker (1995), this study found that shared identity essentially yields more trusting relationships.

In an early study of computer-mediated communication, Walther (1995) found that impressions of the "other" change as online interaction increases between communication partners. As the number of messages multiply, people learn more about their online partners, and the additional information helps people circumvent the lack of nonverbal cues. As a result, Walther contends, relationships resemble face-to-face interaction, providing a mechanism for assessing credibility. The current study supported that finding, the association again evident in BoneSmart® members' reporting that consistency in replies and postings enhanced perceptions of the credibility of the online other. This finding is important in that it illustrates the differences in how trust and credibility develop and are maintained in an environment where social cues that would be indicators of trust and credibility in face-to-face circumstances (voice inflection and tone, physical gestures, body language, eye contact, dress) are absent.

Tanis (2008) found that credibility is also generated in part when a source of information appears embedded in a group and dedicated to its success. Many virtual communities emphasize this characteristic (BoneSmart® included) by providing supplementary information about members, such as the length of membership (i.e., "Member since 2004"), or user status based on number of postings (i.e., "omega"),

attributes which distinguish an individual along a time and/or participation continuum (Huffaker, 2009). This finding is theoretically logical, yet in the current study, while community members perceived other members to be quite credible overall, this measure fluctuated inexplicably over the five length-of-membership categories. Perceptions of the credibility of other members was high for the newest members, deviated among lower scores in the middle three categories, then curiously rose to its uppermost mean score for the longest tenured members. No comprehensible pattern emerged, differences were not statistically significant, and a confounding variable might be that there were twice as many respondents in the new member category than in any other.

Galegher et al. (1998) argue that a component of credibility is authority. These researchers claim that social actors sometimes referred to medical or scientific research in their online messages as a means to establish some degree of authority, thereby enhancing credibility. Like Galegher et al., the current research found that although reference to medical research is judged appropriate and relevant, it is not necessarily sufficient for establishing credibility. Information based on personal experience was perceived to be more relevant to community members, but was not sufficient to establish authority in and of itself. BoneSmart® members verified virtually all information through other sources, and were in agreement that medical advice from other members is not credible. (A few members with medical backgrounds are present in the Knee Forum, and while the medical and scientific information they occasionally post may be credible, they urge others to further verify that information.)

In the final analysis, the most important idea to emerge from this study, a concept that may well drive future social science research in a world increasingly reliant on technologically-mediated social relations, is the notion of experiential similarity, or experiential proximity. This concept stems from the theory that similarity initiates connection. Finding others with whom one shares a similarity can be important. There are times when structural similarity—the demographic attributes of age, sex, race, ethnicity, education, socioeconomic status, and geography, often assumed to be important in explaining interpersonal relations—are of less importance than experiential proximity for individuals experiencing life-altering circumstances. When searching for similar others the online environment, it may well make it easier for people to concentrate on the issue in question when these attributes are not discernable, as they would be in face-to-face interaction.

The combination of experiential proximity and a growing pool of those who might be subject to it has consequences that might explain why people choose to make use of health-related online forums and join virtual communities dedicated to particular health conditions. At least some users of online forums are experiential experts, which makes them credible sources of information for the topic at hand. Forum participants find or ask for information and/or advice, and learn from the first-hand experiences of others. Information gathered here is useful for expanding one's base of knowledge, which in turn provides opportunity for more control and helps reduce uncertainty, which then helps people cope with their personal circumstances. Forum users find information about various types of surgery and treatment, address reports coming from established medical sources, and glean information about how to cope with the uniqueness of his or

her own condition. In many cases, restricted mobility leads to an appreciation of the opportunity to extend networks without having to leave one's house.

When people become ill, injured or infirmed, they tend to rely on health information provided by health care providers, especially physicians. People in these situations, however, also desire interaction and connection with others who share their experiences (Tanis, 2008). Under these circumstances, experiential similarity may trump structural similarity, as people often want to share information with experiential peers. This is certainly the case in the BoneSmart® Knee community. People with knee problems can be said to occupy isomorphic positions in society, and if they connect, as many do in online health forums, contexts in which homophilous relations can form are created in social space. Experiential similarity is thus a component of homophily.

Online communities can provide members with support and advice from a virtual forum of experiential peers, unrestricted by physical distance or time constraints that may, in many cases, replace that of health care professionals. Hence, online information exchange among the experientially similar may be motivated by a combination of need, convenience, shared relevance and mutual understanding.

Online health forums also provide emotional support and offer users the opportunity to share their story with others. This affective form of support is characterized by displays of compassion, reassurance, and encouragement, or at least by expressions of sympathy and understanding for what the other has gone through or may be going through. Social companionship is also evident to some degree, in that interactions occur not directly related to one's knee difficulties but that intentionally distract from those difficulties. In online forums, there are often feelings expressed

through textual communication that suggest community (Preece & Ghozati, 2001; Wright & Bell, 2003), and those feelings are present in the BoneSmart® forum, but the sense of community is not unanimous.

Those with knee problems face challenges beyond the various medical concerns. Dealing with pain and discomfort are primary, but many report fluctuating emotions, altered relationships, shifting personal roles and identities, and disturbing limitations in lifestyle due to decreased capabilities. They must also learn to manage the condition and its treatment in the context of their lives. Information gathered through experiential proximity helps people navigate aspects of the condition beyond the scope of medicine, such as choosing a surgeon, managing his or her own treatment, and dealing with problematic social situations brought on by the condition. Physicians can provide facts, but other patients can relate what it really feels like and what to expect next, in ways that only someone with personal experience can (Preece, 1999). Much of the information BoneSmart® members glean from the community is not that which one can learn from health professionals, rather it is from sufferers like themselves who possess this form of knowledge.

BoneSmart® members share personal stories about their respective experiences and, in part, this involves making medical information meaningful to others by linking medical concepts, such as prescribed medication side-effects, to personal experience. In the recovery phase, much discussion revolves around medication regimens and the success of one's treatment or side-effects. The narrative detail they apply to treatment and recovery issues makes complex information more intelligible to others. This speaks to the value of peer-based information exchange. Moreover, when strategies were

successful, others incorporated these recommendations into their ongoing health management practices. Also important, post-operative patients advise pre-operative patients, which lends support to theories of influence and opinion leadership.

Participants in this study also internalize experiences of similar others to feel good (or bad) about the ways in which they respond to their condition. Some feel that interaction with other members confirms the wisdom or fallacy of his or her own treatment and recovery strategy. Experiential proximity then, provides the mechanism to make social comparisons as challenges of the condition are confronted. Members feel their peers understand the challenges, which results in feelings of connection.

Further Theoretical Implications

A noteworthy finding of this research is that community members develop network ties with similar others despite the challenges of reduced social cues. This finding resonates with social psychological research, which has demonstrated that when people are under chronic physical stress, they are attracted to others with similar experiences, and that often becomes more important than structural similarity when forming relationships (Bandura, 1986). Thus the concept of experiential proximity described in this research is grounded in the context of an online knee-health community, yet has broader theoretical implications.

This study has relevance for future studies of opinion leadership in online environments, and for those designed to investigate the dynamics of virtual communities, especially ones formed around health topics. People are attracted to others of similar experience, and this appears to be more important than social similarity when they form new relationships online under various circumstances of physical (and likely mental) stress. This study demonstrates that members of an online community

place considerable value on the exchange of information with peers; moreover, it extends previous research by showing that participants value peer-based information exchange in large part because of the experiential information available through relationships formed via textual interaction. Further, this study supplements previous research regarding the content of experiential information; namely, that it is comprised of accrued practical wisdom and personal stories stemming from experience—traumatic in many cases.

This research also documents a form of experiential information borne of the specificity of an online community focused on knee arthroplasty: it suggests, therefore, that content of experiential knowledge may vary by setting. The experiential knowledge described in this study is firmly grounded in the context of an online community formed around a potentially debilitating yet non life-threatening condition, yet has broader theoretical implications.

This study argues that peer-based information exchange is generally an ongoing positive experience for those suffering a potentially incapacitating physical condition. People here feel rewarded in the sense that peers connect with them more deeply than others who are not faced with the physical and mental challenges this condition engenders. Online peer-based health information exchange fills an informational gap in the lives of those suffering distressing knee conditions.

This research also contributes to literature examining disintermediation, or the capacity of the internet to allow the general public to bypass experts in its quest for information. It confirms that health-related peer-based information exchange continues to challenge the top-down flow of information between doctors and patients and

demonstrates that the source of influential information is not always a doctor, or even a health professional.

This investigation adds to communications literature by demonstrating how larger patterns of social structure (e.g., information gathering, trust development, opinion leadership, doctor/patient relations) are affected by a component of homophily and by technology. This combination helps shape unique forms of community that in turn shape social production. While each online community represents a unique set of technical features and a distinct user culture, this study adds insight into understanding user behavior while adding theoretical significance to the relationships among experiential proximity, multi-step flows of information, and online leadership. Although previous research has developed the concept of experiential proximity, this study considers how sharing experiential information may be linked to the appeal of network-based peer-to-peer information exchange and the development of opinion leaders in an online environment. Recognition of this homophilic component may facilitate more useful and persuasive online health information exchange.

Limitations

Although this research has several strengths, there are also limitations, both theoretical and practical. As there are a limited number of people who have expertise with this topic and would therefore be appropriate for this investigation, the study utilized non-probability purposive sampling to research the phenomenon. In the absence of random sampling, results then cannot be generalized to other online forums, or even to other knee-health related communities. While a limitation, sufficient description exists however, and future researchers will be able to determine if results here are transferable to other contexts. Also, findings of this study compare to previous research,

thus common characteristics can be noted; future investigators may well find that results of this study resonate in other contexts.

Practically, several unforeseen limitations surfaced as a consequence of the study design. Most notable was the narrow range in demographic characteristics of responding members. The sample was overwhelmingly Caucasian, female, educated, middle-aged, and either retired or in occupations which encouraged physical inactivity. Further practical limitations are addressed below with respect to the data collection method employed.

In order to keep the data manageable in the observational phase of the study, message threads and the postings contained within those threads were randomized and the median posting was extracted for analysis. This was necessary due to the very large number of postings that comprise the BoneSmart® Knee Forum. This process did reveal certain members to be opinion leaders in the forum, however, others who may also be opinion leaders may not have surfaced due to random sampling. Although it is unlikely that an opinion leader more central to communications (via more and stronger ties to others) would have been revealed by sampling all threads and all postings in this network, it is possible that a greater number of opinion leaders may have surfaced.

Additionally, SNA as used here focuses on measures of centrality, yet some of the more complex analyses of network behaviors, such as sub-groups and cliques (Wasserman & Faust, 1994), or even advanced components found in random graph modeling, could be utilized to provide more insight into the dynamics of networks such as this.

Other noteworthy limitations were due to a dependence on entirely voluntary responses. While the online questionnaire was available to all 2,481 Knee Forum members (approximately 700 are reportedly active at any one time), just 54 responded to the invitation and but 52 completed the questionnaire in its entirety, yielding a response rate of 7.5%. In an attempt to elicit responses on a number of wide-ranging personal and theoretical orientations, the questionnaire may have been overly long and complex for some of this forum's members, so the possibility exists that for this reason many opted not to reply. It is also possible that any number of members did not visit BoneSmart® during the period the questionnaire was offered. Although the questionnaire yielded enough data to help answer the research questions posed in this study, results would likely have been more robust had questionnaire response rate been greater. A related limitation is that not all respondents answered all questions offered in the questionnaire, thus missing data had to be taken into account.

This study also proposed to conduct online interviews with 25 BoneSmart® members to be selected from among those who provided an e-mail address at the conclusion of the questionnaire. While 33 of the 52 questionnaire respondents did provide valid e-mail addresses indicating they would be willing to answer open-ended questions as part of the online interview process, only 17 responded to an introductory e-mail initiating the interview process, and just 10 ultimately completed all interview questions. Those who did not complete all interview questions did, however, provide essential data for questions they completed. Despite the fact that the number of completed interviews was fewer than proposed, participating respondents did provide rich and detailed data that proved vital in answering this study's research questions.

One solution to low response rates is to offer practical (rather than altruistic) incentives to increase rates.

Recommendations

Aside from offering solutions to the methodological problems explained above, recommendations for future research are in order. If the internet is assuming an increasingly vital role in global society, important for potential research would be to investigate in more detail, and with more qualitative tools of analysis, the role of this medium as a surrogate substitute for important face-to-face social processes. Also, examination of online social network characteristics over time would illuminate the development of networks.

Future research could explore similarities and differences among other online communities formed, like BoneSmart®, around people who also suffer serious yet non-life threatening conditions, comparing for example, those who seek solutions to deteriorating eyesight with those who need hip replacement. Comparisons of similar communities would allow researchers to determine if opinion leadership, trust and credibility are formed in the same ways. Are the characteristics and attributes of perceived opinion leaders in one community valued in another? Future research should further investigate how people make use of online health forums, and for which groups these forums hold potential benefit. This should provide deeper insight into the effects of online forums within the total array of health-related support. Ease of access combined with the positive effects these forums appear to have seems to justify such pursuits.

This research did not examine how individuals integrate online with offline information, such as that from friends and family, medical print sources or medical industry promotional material (one questionnaire item did ask participants to rank order

ten sources from a list). While this was not an objective, it does seem to be of likely importance, thus future research should look more deeply into how these various sources are integrated, as well as the relationship of message source (and content) to outcomes.

Scholarship would also benefit from further investigation into how computer and digital media intersect with the structure and functioning of social systems. Are virtual communities rebuilding social trust online, and have personal attributes become less relevant on the internet? This research would suggest so, yet Facebook and Twitter may have something to say about that. Given the network nature of digital media communication, the social network approach is a useful way to address such questions, and this study has provided some initial directions for future research.

As the U. S. population ages, it becomes increasingly important to research how health information seekers use the web and draw on interactive and social web applications for health-related purposes. What information, in its different forms, is retrieved, altered, and output in this changing online environment, and how is it further combined with information from other disparate sources in order to aid individual decision-making? Web 2.0, the current internet evolution, is associated with web applications that facilitate participatory information sharing, interoperability, user-centered design, and collaboration on the world wide web (D. J. Kim, Yue, Hall, & Gates, 2009).

Web 2.0 has implications for health care in that it creates new levels of patient participation as well as unique and unprecedented opportunities for engaging people in their health, health care, and health research, and for connecting them with informal and

formal caregivers, health professionals, and researchers. The emergence and adoption of Web 2.0 technologies coincides with the more recent advent of “health record banks,” such as Google Health®, with far-reaching consequences for patient involvement, as centrality shifts away from health care providers as sole custodians of medical data (Eysenbach, 2008). The combination of two trends—access to personal health records and social networking—may lead to a powerful new generation of health applications where people share parts of their electronic health records with other consumers and “crowdsource” the collective wisdom of other patients and professionals.

With Web 2.0, different programming languages, search functions, and applications that once stood alone (what some refer to as Web 1.0) are now increasingly (and effortlessly) integrated (Adams, 2010). For online communities such as BoneSmart, Web 2.0 technologies will allow members to create and share quality video/audio and 3D simulations, and integrate these efforts with older media such as film, television, and radio, as they interact with respect to one another’s (in this case) knee-health. Another crucial component of Web 2.0 is that it provides mechanisms to move this internet activity away from desktop computers to televisions, laptops, tablets, cellular telephones and other mobile devices. These capabilities offer a richer user experience, and combined with the openness Web 2.0 provides, should increase and enhance user participation. This is an area for future research, however.

It should be noted that Web 2.0 also creates complex privacy issues. Internet users—perceiving information they post or disclose as ephemeral—may be unaware that web information is often permanently archived and may be accessible long-term (e.

g., by future employers). Little is known about actual user awareness of these privacy issues as they pertain to Web 2.0 technologies (Zimmer, 2008).

This study contributes to what is known about health-related online forums by examining in more detail what motivates people to make use of forums, and empirically linking this to how effective people perceive these forums to be. This study also extends previous research by showing that peer-based information exchange is valued because of the experiential information available through relationships formed online. Results indicate that how people use online health forums and what it is that attracts people to them is related to how effective forums are believed to be in helping users cope with a particular health condition. These findings are important as they specify what it is that makes these forums conduits to improving quality of life for users

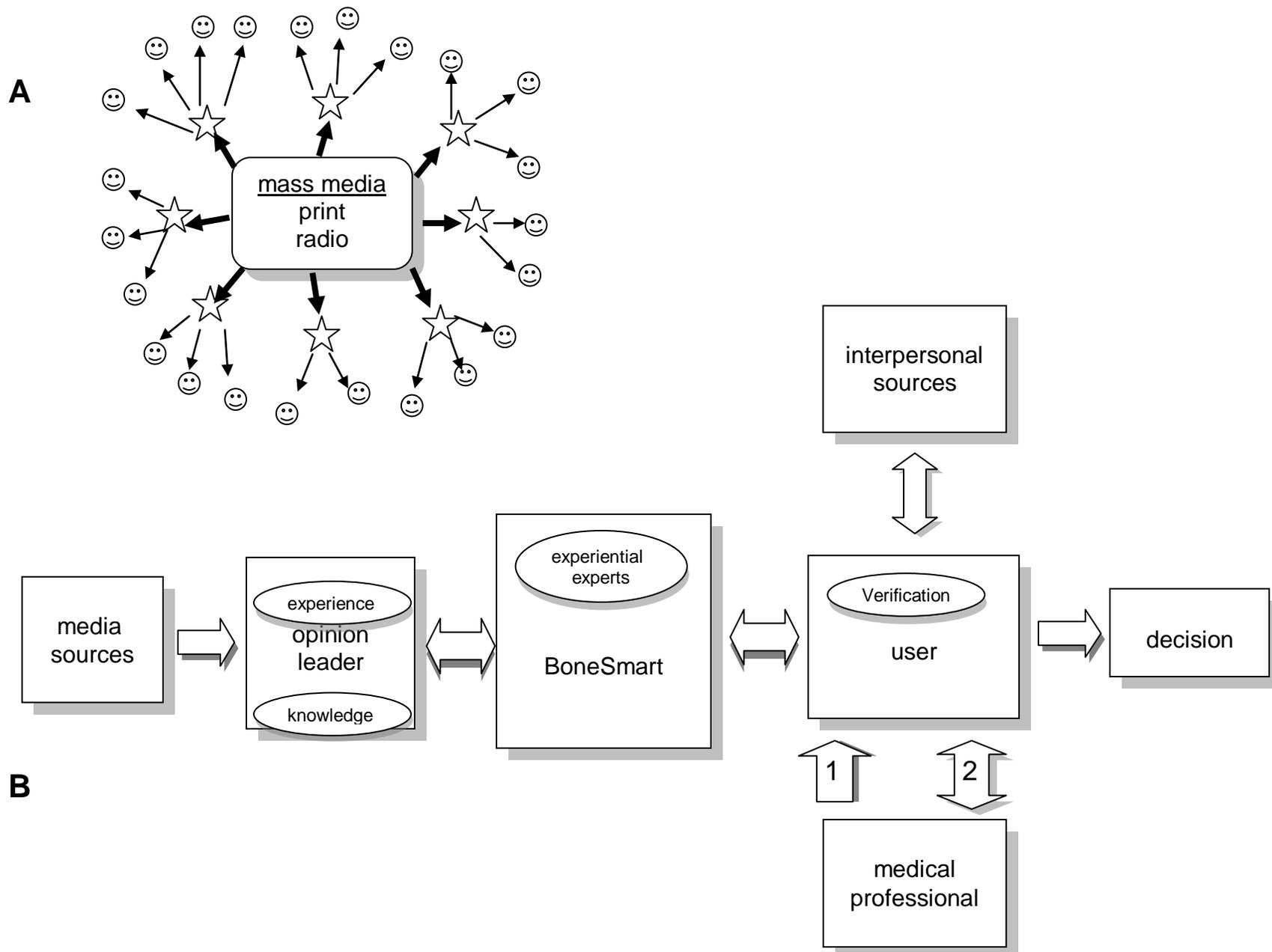


Figure 5-1. A: Original two-step flow of communication. B: Multi-step flow of influential communication in an online knee-health community.

APPENDIX A
ONLINE QUESTIONNAIRE

Shared Experience in a Virtual Community

PART 1: GENERAL INTERNET USE

1. Do you access the internet mostly from:

home work friend or family member's home public library other? please specify:

For the following items, please enter a number from the scale to indicate how much your reasons for using the internet are like these reasons for using the internet:

Not at all = 1 2 3 4.... 5 = Exactly

2. I USE THE INTERNET:

- a) to encourage others
- b) to belong to a group
- c) when I have nothing better to do
- d) to gather points-of-view
- e) to express myself
- f) to do research
- g) to tell others what they should do
- h) to escape from my daily routine
- i) because I enjoy answering questions
- j) to pay bills
- k) to get someone to do something for me
- l) to meet new people
- m) when I'm lonely
- n) to get news
- o) to download/watch movies
- p) to look for health information
- q) to shop for myself
- r) to download/listen to music
- s) to buy gifts
- t) to surf the web for fun
- u) to shop for others
- v) to play games
- w) other

Please enter a number from the scale to indicate how much you agree or disagree with the following 3 statements:

Strongly Disagree = 1 2 3 4 5 = Strongly Agree

3. I USE THE INTERNET:

- a) because it's the cheapest way to communicate with others
- b) to communicate with friends and family
- c) because it's the easiest way to communicate with others
- d) other

4. Number of hours online in a typical day - NOT WORK RELATED

PART 2: SEEKING KNEE-RELATED HEALTH INFORMATION

5. How do you gather knee-related health information? Please rank these items in order of use. Place a 1 in the box after the way you gather the most information, a 2 after the second most, and so forth. Place an X if you don't use this at all. Do not use any number more than once.

- a) newspaper
- b) medical professional
- c) magazines
- d) television
- e) radio
- f) internet - BoneSmart
- g) internet - other
- h) support group meetings
- i) friends
- j) family

6. Average number of hours spent online in a typical WEEK looking for KNEE-RELATED health information, NOT INCLUDING BONESMART COMMUNITY

7. Average number of hours spent online in a typical WEEK in BONESMART community, for any reason

8. How long have you been a member of the BoneSmart community?

- 3 months or less
- more than 3 months but less than 6 months
- more than 6 months but less than 1 year
- more than 1 year but less than 2 years
- 2 years or more

9. Choose ONE statement below that best describes your MAIN reason for joining the BoneSmart community:

- newly diagnosed w/knee-related health issue and looking for general info
- newly diagnosed and considering MIS robotically-assisted partial knee replacement
- you've had MIS w/robotics and want to share info
- to gather info for others w/knee-related health problems
- to find a surgeon
- best source for knee-related health information
- to gather post-op info (recovery or therapy)

to meet people who may be in similar circumstances
you're post-op TKR and want to share info
other? please specify:

Please enter a number from the scale to indicate how much you agree or disagree with the following 2 statements:

Strongly Disagree = 1 2 3 4 5 = Strongly Agree

10. This community is important

11. I consider myself involved in this community

Sharing information is common in communities like BoneSmart.

12. If you participate in the BoneSmart community to gather information, aside from general postings, whom do you contact most often to get the knee-related information you need? Enter one (1) screenname (same as "user name" or "handle"):

13. Not related to any specific topic, but in general, who are leaders in this community?
Enter 3 screennames:

- 1)
- 2)
- 3)

PART 3: THE ONLINE OTHER

One element of computer communications is how people relate to each other in online environments. Thinking about others in general in this community, AND YOUR MAIN CONTACT in #12 above, please enter a number from the scale that reflects your level of agreement with each of the following 6 statements. Enter a NUMBER in EACH box:

Strongly Disagree = 1 2 3 4 5 = Strongly Agree

14. Others/my main contact in this community are/is concerned about the ability of
people to get along

others
my contact

15. Others/my main contact in this community are/is concerned about what is important
to others

others
my contact

16. Others/my main contact in this community will do everything they can to help others
others

my contact

17. Others/my main contact in this community are/is responsive to my posts
others

my contact

18. I can always count on getting a lot of responses to my posts from:

others

my contact

19. I can always count on getting responses to my posts fairly quickly from:

others

my contact

Please enter a number from the following scale that reflects your level of agreement with each of the following 8 statements:

Strongly Disagree = 1 2 3 4 5 = Strongly Agree

20. Posts in this community often contain personal information

21. Others in this community seem willing to divulge private information about themselves to others

22. I come to this community to get information about a particular topic

23. I come to this community to give others information I have about a particular subject

24. I come to this community to share my skills and abilities with others

25. I generally have faith in humanity

26. I feel people are generally reliable

27. I generally trust other people unless they give me a reason not to

A factor in computer communications is what people THINK others are like even though they've never met in person and have only interacted through computers. Thinking again about OTHERS in general in this community, AND YOUR MAIN CONTACT in #12 above, please enter a number from the scale that reflects WHAT YOU THINK of others in this community. Please read items carefully and enter a NUMBER in EACH box:

28. Others/my main contact in this community are/is:

Unreliable = 1 2 3 4 5 = Reliable

others

my contact

29. Others/my main contact in this community are/is:

- Uninformed = 1 2 3 4 5 = Informed
- others
my contact
30. Others/my main contact in this community are/is:
Inexpert = 1 2 3 4 5 = Expert
- others
my contact
31. Others/my main contact in this community are/is:
Dishonest = 1 2 3 4 5 = Honest
- others
my contact
32. Others/my main contact in this community are/is:
Unfriendly = 1 2 3 4 5 = Friendly
- others
my contact
33. Others/my main contact in this community are/is:
Unpleasant = 1 2 3 4 5 = Pleasant
- others
my contact
34. Others/my main contact in this community are/is:
Selfish = 1 2 3 4 5 = Unselfish
- others
my contact
35. Others/my main contact in this community:
Don't think like me = 1 2 3 4 5 = Think like me
- others
my contact
36. Others/my main contact in this community are/is:
Unlike me = 1 2 3 4 5 = Like me
- others
my contact
37. Others/my main contact in this community have personalities:
Different from mine = 1 2 3 4 5 = Similar to mine
- others
my contact
38. Others/my main contact in this community:
Don't share my beliefs = 1 2 3 4 5 = Share my beliefs
- others
my contact
39. Others/my main contact in this community:
Don't treat people like I do = 1 2 3 4 5 = Treat people like I do
- others
my contact
40. Others/my main contact in this community are/is from:
A social class different from mine = 1 2 3 4 5 = A social class similar

to mine
others
my contact
41. Others/my main contact in this community are/is:
Culturally different from me = 1 2 3 4 5 = Culturally similar to me

others
my contact
42. Others/my main contact in this community have:
Economic status different from mine = 1 2 3 4 5 = Economic status similar to mine

others
my contact
43. Others/my main contact in this community have:
Backgrounds different from mine = 1 2 3 4 5 = Backgrounds similar to mine

others
my contact

PART 4: ABOUT YOU

44. Sex
male female prefer not to answer

45. Age on your last birthday
18 - 29 30 - 41 42 - 50 51 - 57 58 - 64 65+ prefer not to answer

The next TWO items are for U.S. residents ONLY. If you reside in Canada, skip to question 48. If you reside in the U.K. skip to question 49. If you do not reside in the U.S, Canada or the U.K., skip to question 50.

46. Ethnicity
American Indian/Alaskan Native
Asian
Black Hispanic
Black non-Hispanic
Caucasian Hispanic
Caucasian non-Hispanic
Hawaiian/Pacific Islander
prefer not to answer
other:

47. Personal annual income \$U.S.
\$0 – \$20,000
20,001 – 40,000
40,001 – 60,000
60,001 – 80,000

80,001 – 100,000
100,001 – 120,000
120,001+
prefer not to answer

48. Personal annual income \$Canadian

C\$0 – C\$20,606
20,607 - 41,212
41,213 - 61,824
61,825 - 82,424
82,425 - 103,030
103,031 - 123,624
123,625+
prefer not to answer

UNITED KINGDOM RESIDENTS ONLY

49. Personal annual income £

£0 – £13,200
13,201 - 26,400
26,401 - 39,600
39,601 - 52,800
52,801 - 66,660
66,661 - 79,200
79,201+
prefer not to answer

50. If you do not live in the U.S., Canada or the U.K., what country do you live in?

51. Are you employed?

full-time (40+ hours per week) part-time not employed retired prefer not to answer

52. Occupation

Executive, Administrative, Managerial
Professional, Technical (example: engineering, law, educators, health care, arts, IT)
Administrative Support (clerical, banking, postal, secretarial)
Sales/Marketing
Skilled Labor (example: construction trades, mechanical, drivers)
Labor (example: construction labor, helpers, sanitation, factory assembly line, fast-food)
other:

53. Is your city or town population:

150,000+
50,000 - 150,000
less than 50,000

54. Last level of education completed:

- primary (elementary)
- secondary (high school)
- university (college)
- advanced degree (masters)
- advanced degree (doctorate)
- prefer not to answer
- other:

We would like to ask follow-up questions by e-mail in the next few months about your personal experiences in gathering and acting on knee-related health information. If you agree, please provide a valid e-mail address for follow-up.

e-mail address:

Thank you very much.

Shared Experience in a Virtual Community

APPENDIX B INTRODUCTORY E-MAILS

Introductory e-mail

Thank you for participating in last month's BoneSmart Knee Forum survey. You indicated you'd be willing to answer some further questions by e-mail. These questions are not survey-type questions, they are more in-depth, asking you to think (and write) about your experience of being a member of an online forum and how you think this particular forum works for you.

I'd first like to ask if had LTKR, RTKR, partial (and which one), or both? And, if you would, provide the handle you used in BoneSmart. That would help make this research more accurate.

Looking forward to your reply. Thanks, and Happy Holidays.

Mic Brookshire
Doctoral Candidate
University of Florida

Round 1 e-mail

Okay – I know this a lot like homework, but you're really helping break new ground in understanding how online communication works. Please think these over and take your time. There are no right and wrong answers, I want to know how you personally feel about these things. Here are four questions (three are multi-part). I think three rounds would be best—these four, then three similar ones after these (finishing the nuts and bolts), then a few questions regarding your personal experiences having a knee-condition. When we get to round three, I'll pass on my personal motivation for undertaking this study (I do not, and never have, had a knee condition). If you have trouble opening the Word attachment, let me know and I'll send the questions as text in the body of an e-mail.

Thank you very much.

Just a friendly reminder about the BoneSmart questions. I know it's Christmas and all, but 8 or 10 pages in the next day or two would be great.

Just kidding. Anything you offer will help this research.

Happy Holidays, and thanks!

MB

(To those who did not respond)

Well, the holidays are over and I hope you had good ones. You indicated you'd be willing to answer a few questions after you completed the questionnaire in BoneSmart. I hope you're still on board to help with this BoneSmart research. My deadline is fast approaching.

There are three rounds of questions, these four, then three, then three more about your personal knee-related experiences. Here's the first round.

In any event, I wish you the best in the new year.

MB

APPENDIX C ONLINE INTERVIEW QUESTIONS

Round 1

1: How do you decide that the information you get in BoneSmart is trustworthy and believable?

2: Opinion leadership happens when people need information or advice and turn to others with whom they have some connection and feel they can trust. Are there opinion leaders in this forum? *How* are they opinion leaders? In the questionnaire, you chose ____ as a leader. Why? Has any one person in BoneSmart influenced your decision to have (or not have) knee surgery of any type?

3: You may act on certain information without verifying it if that information comes from a parent, loved one, or doctor in face-to-face interaction. That same information gathered in a text-only setting may (or may not) be interpreted differently. Do you check the information that comes through a website by way of a computer against other sources (other people, medical journals, newspaper, websites)? In other words, is information that comes through a computer from someone you haven't met less trustworthy? If you think it is less trustworthy, is it less trustworthy because it's coming from someone you haven't met and don't "know" in the traditional sense (the source), or is it less trustworthy because the information comes through "cyberspace" and to a computer (the medium)? (Lots of people mistrust information available on the internet, and there is potential for misleading information from online others).

4: Before computers, trust among individuals was formed when people interacted face-to-face (it still happens this way). Computers seem to be changing that a bit though. How is trust developed and maintained in this online community? For you, how does

trust in others develop in a text-only environment? Why would you trust someone you may never meet in person? Does trust for you develop immediately here?

Thanks again!

Round 2

5: Describe the experience of being a member of an online forum—how does going online and into BoneSmart fit into your life? Do you go there just for knee-related information, or are you interested in what’s happening in there? Do you socialize in there? How do you see yourself fitting in with this “group” of people? Some things to think about: Do you primarily “give” to the forum, or “take?” Is BoneSmart a “place,” and if you think it is, what does this “place” mean to you? Is there anything beyond a “knee condition” that makes this a group? Is this a “community.”

6: How important is the internet for you in dealing with your knee-related condition? (Not BoneSmart particularly, but the internet in general). How would you go about finding information about your knee condition without the internet? And more generally, how do you view the internet? A tool? A place to be? A way of life? Something else?

7: How do you use the knee-related health information you gather in BoneSmart? Do you share it? Online and/or offline? Does it change how you interact with your health care provider(s).

Condition Questions

I'd like to understand not just the physical aspects of your knee journey, but how you "felt" about the journey—the emotions you felt about the physical changes and what those meant to you in your life. And while everyone's story is unique and different, I'm trying to see if there are common elements in experiencing this phenomenon.

How is your life different from what it was prior to your knee problem(s)? What can you not do now that you could before your knee condition became a problem? Or, if you had surgery, can you now do things you couldn't do before you realized you had a knee problem? Either way, how do you feel about that? I'm trying to get at how the physical changes affected your emotional state along the way from problem recognition until now. Can you describe the anxiety you felt (if any) leading up to surgery?

What were your thoughts about whether or not you would be able to resume your pre-problem lifestyle? About whether or not you would be the same person. (I understand many people identify themselves through their physical activities—Oh, I can't be a fireman anymore; or, I can't play with my grandchildren the way I used to...etc).

Can you describe how you felt the moment you learned you might need knee-replacement?

APPENDIX D ONLINE INTERVIEW RESPONSES

RQ1: How do people describe the experience of being a member of an online community? How does a community member define his or her role in the community?

G7: I knew I'd be relatively young to the other members. At this point in my recovery (pretty much recovered) I go mostly to see if there are any new members close to my age, and offer MY perspective on some things.

F5: Being a member of BoneSmart has been a large part of my life for the last eight months. It has been an extremely helpful and comforting place to be. I think the ratio of my visits is 70% for information and 30% to follow other people's progress. I feel that I got to know some fellow members very well and was genuinely concerned about their progress/problems. I think that is because I am from the other side of the world and unfamiliar with the systems and drugs in USA & UK.

W8: I'm curious about other peoples' experiences with their surgery and recovery. I do log into the forum every day, but I think it's become more of a habit now than a real desire to find new information.

T11: I'm retired, and so time is not a constraint. I'm on other forums, and use them purely for getting help and information. But emoticons are ESSENTIAL, as we can make sure British humour can be seen by those abroad.

B12: I have a shortcut to BoneSmart on my desktop, thus making access to site easy. It is part of my daily routine to check the Staff Discussion and the New Posts. I am truly interested not only in knees, but in the general well being of members.

On the topic of how a participant felt he or she fit into the community, some described their role in terms of what they got out of being a community member, others depicted themselves as "lurkers," others explained their roles through expressions of what they felt they owed the community, and some felt they didn't fit well at all.

B12: I am definitely a "giver". I decided before my second knee replacement, that interacting on BoneSmart would be part of my ministry. I feel that I fit into the group, however each of us bring a different quality to the group (Mind you, I am always the round peg in the square whole).

P4: I think I give more than take. I'm there to offer advice and help the new people. They are the ones who need the support. We grow to care about the others and hope for them to do well.

W8: I'm a lurker in the BoneSmart forum. I've made a few postings, but I'm not big on having to continue chit-chat once a message thread has gone stale. So, no, I don't socialize in the forum. I do not feel that I fit in with the group of people who form the backbone of the forum.

G7: I don't think I do fit in all that well. It isn't just an age thing, because there are other 40-somethings there, but my tastes and interests are far different [sic] than many of the members there.

A peripheral of RQ1 asked members what they perceived BoneSmart to be: Is it a "community?" Is it a "place?"

B12 BoneSmart is a community...because communities not only have a common interest, but care about each other's lives and progress. BUT each participant chooses [sic] whether they care to be part of the group or part of the community.

T11: It is a community, and there a number of things which help it to be like this. The action of the moderators is key, where they are happy for us to temporarily zoom off topic, if we return to it soon. Even if we do we are only nudged back on course with a smile, if we don't actually meet and talk, there would always be a chance that someone will get hold of the wrong of the stick and take offence.

F5: I do think of BoneSmart as a place, a fascinating place. I also believe it is a community, a changing community of people who are drawn to it and drawn into it for the period of their recovery and rehabilitation from major surgery. I think online friendships are formed and maintained for a while and then fade away as recovery progresses.

M9: BoneSmart is definitely a 'place.' It is where I go when I have new news to share (whether it be about my knee problems or even about a personal issue). I visit to check-up on other forum members, leave comments or words of encouragement to those going through a rough time. I'd say we are a community group. The closeness of the members and moderators make it feel like a family. It goes way beyond just discussions about knee or hip conditions – it feels more like body/mind therapy.

W8: For me, BoneSmart is an online forum; it is not a community in the purest sense of that word.

D13: I believe there is a community at Bone Smart for some people but I think the majority are like myself and are transient visitors at a time of need.

U14: Yes it is a Place to Go for information, comfort and camaraderie. Yes this is a community because we all care about each other.

RQ2: What significance does the internet have for these community members as it relates to his or her physical (knee-related) condition?

B12: It was important to me because I feel that knowledge is power. I wanted to know everything about the treatment, surgery, prognosis, etc. It is definitely a way of life...when I am not connected I feel rather lost!

W8: I have done more than my fair share of web-surfing looking for information first about osteoarthritis and then about knee replacement. The internet is a tool, a source of entertainment, a supreme waste of time.

G7: I don't know how I did much of anything without the internet, honestly. At first, it was a distraction, and now the internet (and computers in general) are a way of life. During the physical therapy recovery process, reading other people's experiences and such made things seem easier.

P4: The internet is my window to the world. If I had no computer, I would miss out on so much. Information. Friendship. Shopping. Before the internet, I would buy a book with information, or go to the library. I would have had to just accept what my doctor said about my knee and hope he's right. Talking to friends who have had knee replacements helps, but when one has access to so few people, chances are they've never heard about some of the things others go through. My computer and the internet is such a great way to keep in touch with real people I never have to be bored or alone. I can find almost any information quickly about any question that pops into my head. Yes, the internet is a way of life. I get nuts when my internet is down or the computer isn't working; restless and pacing and a lost feeling.

F5: Using BoneSmart encouraged me to look elsewhere on the net for more information. I soon found that there was all I needed on BoneSmart. Without the internet I would have been entirely reliant on my surgeon and possibly the library. It is a tool and a place to be, but not a way of life now. In the past it was much more of a way of life and indeed, my husband and I met on an internet dating site.

M9: The Internet plays a large role for me with my knee conditions. I do quite a bit of medical research from many different sites online. Without Internet, I would have to go to the library very frequently and rely more heavily on my doctors, nurses, friends, and family's advice. I view the Internet as a way of life for me, especially now, going through so much and not being able to get around easily.

RQ3: Does this online community generate opinion leaders? If so, how?

S1: I place great store in the qualifications of PRBX76 an orthopedic nurse, has had joint replacement, she has credibility. She weighs in on EVERYTHING and either validates it or tosses it out. PGJ192, PFH16, RGG189 give the impression of carefully considering each post, and weighing in with care and helpful comments and postings. They always contributed information that I had not previously known. They had been through things I was currently going through, had researched the solutions and offered them to others.

G7: PRBX76 claims to (and it seems to me that she's not exaggerating) have decades experience as an ortho nurse. In her signature, she states this with a disclaimer. She's not just spouting facts she's read in a book (and if she is, she's doing a real good job faking it).

D13: I found that the 'leaders' on Bone Smart tended to offer more support than opinion and would point you in the right direction to get the information that you may require to make an informed decision. PRBX76 and PRBN66 are nearly always available.

V3: PRBX76 & PRBN66's input has influenced my decision to seek a second opinion on my particular knee problems. They regularly recommend that people become their own advocates and not accept everything that an OS [orthopedic surgeon] says when one's own body is telling you something different. PRBX76 is definitely an opinion leader. To a lesser degree, PRBN66 and PFH164. PRBX76's extensive nursing experience in the orthopedic area plus her own experience with a knee replacement allow her to have empathy with people experiencing problems after surgery.

M9: PGJ192 is very opinionated, I think, and seems like the type of person who would tell anyone the truth no matter how much it might hurt or seem improper. That is who I want to give me advice because I know he doesn't 'sugar-coat' it.

P4: RAN40 comes across as someone who is sharp and has a nice personality. He seems to be a good family man and an honest person. He's open to us and has posted pictures of his family and himself in his position as a police captain. I also believe what PRBX76 says, and she usually backs up her info with medical drawings.

E17: PRS19 is great because she is a microbiologist, she understands my problems with MRSA [Methicillin-resistant Staphylococcus aureus, a bacterium responsible for several difficult-to-treat infections in humans].

M9: If he [my orthopedic surgeon] does recommend surgery, then I will definitely discuss this on BoneSmart and listen to all the opinions given, especially PRBX76's.

T11: PRBX76 is the real opinion leader, because of her history and experience.

RQ4: How is trust developed and maintained in this online community?

M9: I trust people about the same whether its face-to-face, phone, or online. I trust people until I am given a reason to mistrust them. I think trust is developed immediately in this online community until there is reason to believe otherwise. I can't imagine why anyone would knowingly give bad advice on BoneSmart, especially since most everyone is either going to have a hip or knee replacement or just had one. I don't solely rely on BoneSmart for my information. I do trust the people on the forum for the most part since they have all been through similar surgeries and some of them also work in the medical field.

B12: I believe another thing about electronic communication is that when you see the same information being shared because "it works", then you build trust in the source. Such is BoneSmart. Perhaps part of the mistrust comes from the News media constantly talking about scams etc.

D13: I have noticed on Bone Smart that if information that is misleading or harmful is published it is generally removed or disputed very quickly by one of the moderators.

P4: I think it takes quite a lot of reading what a person has written before you can decide if you can trust them or not. They must seem constant and reliable. They need to show empathy plus intelligence in their posts. They need to let us know facts about themselves and their situation. A picture helps a lot and background info is good. They need to seem steady, honest, supportive and caring. Most people mean well in their advice....although some speak when they have no knowledge, just because they like to connect and see their words in print. If you read enough, you can eventually tell if someone is a blow bag or a reliable source of information.

H15: I do value a person's opinion based on consistency and how they might be viewed by others on an internet discussion board. How they handle different questions asked of them and their patience in dealing with the repetition of, shall we say nonsensical type questions. That would and has earned my respect.

S1: Information suggested on BoneSmart is trustworthy if it comes from an individual with a background in medicine or considerable experience with knee replacement themselves.

G7: Trust, for me, in an online setting is consistency. I didn't trust people I met online, at first. But as time went on, I found that there are people online who ARE what they say they ARE. I certainly am. I trust some of the things on BoneSmart (the informative stuff, not the social-room stuff) because the experience itself is such an intense one that people aren't much inclined to lie about it. It's a shared experience. Like crash victims - just knowing someone else is or has survived the same thing, it's a bonding experience.

F5: I have interacted with people online for more than ten years and believe I have developed a "gut feeling" for integrity and trustworthiness.

D13: I would say that this [trust] will never totally replace face to face interaction and is never as assured as with personal contact. If you asked me would I loan someone money that I had an online relationship with and trust them to repay me, then the answer would be no. If you asked me if I would accept advice from the same person, then the answer would be yes.

B12: There are several similar message boards but this one has the support of a health professional who has many years of experience in orthopedic surgery, but who has experienced total knee replacement. Primarily, commonality of Interests, ideas and experiences are important. Honestly caring for the wellbeing of the person within the community. Boundaries or Rules that are clear help to maintain the environment (Examples—No bad language, no advertising, and no derailing threads (changing the topic). I was pleased to see that regardless of how stupid a question...someone would try to answer. I weigh info presented: Does it match the expert information, is it reasonable, is it presented in an appropriate manner (trust me there are some real sleazes even on BoneSmart!!), is the person sincere, does the person have similar values, is the person receptive to help? I honestly like the fact that people post pictures of themselves or families, or even their pets or interests (does give the text world a human component).

RQ5: How is credibility accorded to sources and messages in this community?

T11: You don't rely on the first response, you wait until several people tell you the same thing. Plus I'm very good at googling [sic], so I can triangulate, I'd never take at face value the info from someone who had never had a new knee, nor from someone who appears illiterate.

P4: I don't believe what face-to-face non-medical professional people say any more than people who I know online. Some people online are repeating things they heard, not things they know as fact. It's just that I always feel I have to confirm and expand on it. Sometimes people tell you things they heard or which circulate the internet, with no evidence. I trust the non-medical things, such as good ideas for managing with a hurt leg.

V3: Personally, I initially checked a number of sites and spoke to others who had undergone the surgery. I found the BoneSmart group to mirror others experience on many issues. If I see something that seems contrary, I usually “Google” for more information from a range of sources.

H15: I'm not saying I don't trust [BoneSmart] people's opinion but I will always try and find someone else or another source or more to back up what info I'm being given, pro and con. The more sources I can get agreeing on a subject then the better I feel about my final decision. When I make that decision, it is usually very hard to sway me from it and I'll defend my decision using all the info I have gathered on it. But I'm not so bullheaded that I will not change my mind if new info on the subject becomes available. Then I'll go through the process again.

S1: I mistrust information from all sources. I would trust information from my doctor over randomly gathered information on the Internet, but I trust information from a reputable Internet source. People are people, wherever they expound on their opinions or experience. Technically speaking BoneSmart is not reputable. I decided by myself that I trust what they say because I am an educated person and it's a decision I made. It is important to keep in mind whether there is a benefit to the provider of the information.

F5: Before I found BoneSmart I already had good information from my surgeon and from other websites, however I did not actually know anyone who had had the surgery. To hear that good information again from people in my situation was very comforting. I tend to use “gut instinct” and hope for the best!

N10: We assume that people on this type of communication forum are REALLY patients, or nurses, etc. with knowledge of real patients. Therefore their opinions or statement of their experiences helped us to be aware of what to expect, good and bad.

RQ6: Is information gleaned from the community otherwise verified, or taken as fact?

H15: I had learned through all my quests for more info on any subject I was interested not to take any specific information I might get as the only correct answer. I have always sought as much info from as many different sources as I could reach in the time I had available to me. I can't remember when I had ever made a decision based on one source no matter who or what organization I got it from.

G7: I have other health problems aside from the knee issue and in the search for a proper diagnosis from a less-than-sensitive [sic] doctor, I would research online. What I did was take notes, compare them to my own

experiences, read some other people's experiences and find the best way to approach the subject with the aforementioned "doctor." I take it [BoneSmart information] with a bit of skepticism and then check things out for myself or make a note to ask my own doctor. That's how I see forums like BoneSmart - we share a similar experience, but stuff that happened to the others is based on their own viewpoint.

M9: I do not think getting information from the Internet is less trustworthy as long as other sources are researched as well.

U14: Repeat: verification, there are plenty of scammers and fools out there.

N10: We checked elsewhere for information too, many sources about knee surgeries. Internet media and people who had had knee replacement.

V3: The wealth of information that is available via the web is truly amazing. Search engines such as Google provide instant access to information it would have taken months to locate when one had to depend only on books or publications at a reference library. Verification also included interviewing other replacement patients and consulting doctors and health care professionals.

D13: I do not think that the information received by written form, whether on a forum, website, journal etc is any more or less reliable than spoken information. I accept that not everyone will verify information received.

RQ7: How do community members use the health-related information they gather in these online communities?

N10: It gave us some base to ask questions of the doctor, it also helped us to choose a doctor based on his experience doing replacement surgery. We also were aware of various manufacturers and types of replacement materials, procedures, etc. so we were familiar with those things when the doctor started telling us about the procedure he would use, materials he would use, the hospital experience, the recovery treatment, and expected outcome.

V3: As a result of using BoneSmart, I have become a much more vocal advocate of my own concerns when dealing with doctors and other health care professionals. Numerous times I have referred others to BoneSmart. Some have visited the site. I believe I have influenced some to become more vocal about their concerns when discussing things with their doctors or health care professionals and we all owe that to the contributors to BoneSmart.

P4: I share the info with local people I know who are facing a knee replacement. I gave one a great book which I found out about on

BoneSmart and told another about that book and she immediately ordered it. I think the surgeon is glad when his patient knows anatomy and what the knee replacement consists of. I know they appreciate it when the patient can find answers to most of their simple questions elsewhere. Less unnecessary questions.

B12: I share the information mostly off line. I believe that the information I have gained helps me to ask appropriate questions and advocate for myself and my family.

U14: YES, I have learned things that I have challenged my doctor about, knowledge is very empowering.

G7: I do share it. In fact, there are at least six people I've sent the [BoneSmart] link to who were going through a knee or hip replacement. [With my doctor] I know how to word things properly or ask things the right way.

M9: I just shared some knee-related information I discovered on BoneSmart with a neighbor, online with a few friends through Yahoo messenger, and my family at home. I also used some of the comments that PRBX76 had typed to me, when speaking to my orthopedic doctor. It does change how I interact with health care providers because I won't allow them to persuade me into doing anything I don't feel comfortable with or that I already have tried and know does not work for me. For instance, the doctor tried to convince me yesterday to have a cortisone shot in my knee. I have had about 15 of these shots in the past and not one time have they helped me any. I told him that it was a waste of my insurance's money to have the shot, when I know it will not help. If I hadn't been speaking to BoneSmart members about speaking up for myself, I know I would have allowed the doctor to give me another useless shot.

W8: Before I had surgery, I was able to mine the BoneSmart site and put together a list of questions that I asked my doctor. I have mentioned it to people who were facing knee replacement surgery.

Revisiting the SNA observation component of this study (Figures 4-1, 4-2), and both questionnaire results (Tables 4-1, 4-2, 4-4) and participant interviews (primarily responses to Research Question 3), it is obvious that PRBX76 fits the definition of "opinion leader" put forth in this study. To understand how this member perceives her role in the community, an e-mail interview was conducted and her comments in response to a separate set of questions were distilled.

Why did you join this forum?

PRBX76: Simply because I had just learned I needed a replacement and though I knew knee replacement in detail from being a theatre [operating room] nurse, I didn't know much about the recovery. So I started looking around and BoneSmart was the first forum I came upon. I was immediately struck and very concerned at the poor information members were passing around.

You would be considered an "opinion leader" in this forum. Why do you think others look to you for opinions and advice?

PRBX76: Well, basically, I have spent almost my entire life working in this field and as you can imagine, over the years I've absorbed a awful lot of skills and information. One of the joys in my work was to pass on this knowledge and these skills. It's been the benchmark of my career, if you like. If I hadn't had at least one chance to explain something to a junior (or even a senior) nurse, and sometimes doctors, I'd feel my day was wasted.

One of the great problems with researching anything on the net - anyone on a forum can spout advice which is totally off the wall and even say they are qualified in that area. You may have noticed that a few members have the legal disclaimer in their signatures. This is because BoneSmart has contacted them (and me) and asked them to verify their qualification by giving details of their training etc. In a forum like BoneSmart it is particularly dangerous to have 'know-it-alls' spouting off advice as if they were qualified in something and risk having naïve or desperate members following it at risk of their well being and progress.

Once a member joined who was in great pain with his knee. Doctor after doctor told him his knee was fine and he should just have more PT. This had been going on for about a year. He posted his latest xrays for me to see and I was able to tell him that one of his prostheses was loose. Why none of the several doctors he had seen didn't pick it up, I have no idea but it was quite plain to me. So he saw one more surgeon who spotted it too, he had his revision and was perfectly fine after that!

More recently a lady posted that her mother had been told her knee replacement was so badly infected the leg could only be either fused with a long metal rod or amputated! After some research I (and another) advised her to go to a certain surgeon in Texas who did some tests and announced she had no infection present, just a loose implant and did a revision for her. Whether this will be successful only time will tell, but the chances seem pretty good. I have numerous other such examples, but you get the picture.

Would you consider yourself an "opinion leader" in your offline world?

PRBX76: Well, I still am a nurse. I am still learning, still practicing, in real life I still work as an occupational health nurse but you won't be surprised to know I take every opportunity to talk about joint replacement (and a few other things) when I see someone suffering. I've lost count of the number of people coming to me and going away with information about hip/knee replacement and maybe even a recommendation to a surgeon, advice how to get around their out of date GP who tells them it's not bad enough or they are too young. I recently met one again, a manager who sprinted up some stairs ahead of me and stopped at the top with a kind of "ta-da" stance. Seems I had advised him to get his hip done, told him how to manage his GP and which surgeon to go to. He'd done it all and had it done! Don't know who was more delighted, him or me!

When I was working at the hospital, even though I was 'only' a part timer, staff still regularly sought my input and advice on a variety of issues. But then, in my time, I had been a theatre [operating room] manager for many years and also had my own business running training courses for theatre staff on orthopaedic surgery. I have also written a text book which, though I could never get it formally published, printed them off at home and sold an awful lot of them across the UK and one or two other places. Probably around 300 or so.

What you think about being an "opinion leader?" Can you put into words how that feels and what that means to you?

PRBX76: I get satisfaction from doing this, and it validates my sense of self worth. I express this through stories. I was in the theatre [operating room] one day where a hand operation was in progress. I noticed the houseman (junior doctor assisting) was wearing a gold chain around his neck. I mentioned it to him, adding that he must remove it as soon as the case was over. He bristled at this (he was an Arab chap and they famously get very indignant when instructed by a female!) and I explained what is well known, neck adornments chafed skin scales off the neck which then get caught in the plume of warm air that comes out of the gown and thereby floats down onto the wound. He fluffed me off and said he'd never heard of such nonsense whereupon the senior surgeon admonished him saying "You should pay attention to what she says. She has more years of experience that you and I put together. Besides which, she is correct!"

But being able to pass on information and skills to my colleagues was one thing; being able to care for and ensure the safety of the patients was the other and was always of paramount importance to me. I'm a nurse, first, last and always. Most nurses usually are. That's what I call a vocation. It was never just a job to me. There was nothing I liked more than having the opportunity to go the extra mile for my patients

In short, I love doing this. It gives me an outlet for my natural teaching skills, it enables me to help people in their journey, to face their fears and

make good choices, to enable a less distressing recovery. There seems to be an attitude in the US that recovery from joint replacement, particularly knees, has to be a painful battle and the patients get abused and assaulted by PTs on a regular basis as a result. Emotional blackmail is rampant with sayings like "if you don't get to X degrees within 6 weeks your knee will set like concrete and never move again" (I paraphrase, you understand!) Patients live in terror of this and it's a total lie!

Aside from your personal experience and knowledge, where do you get the information you pass along in BoneSmart? How do you keep current with information that relates to your participation in BoneSmart?

PRBX76: I have a subscription to the Journal of Bone & Joint Surgery and attend conferences because I am a nurse. I also buy text books on a fairly regular basis. I have tried picking the brains of one or two doctors I know and whose opinion I trust, but they are understandably a little cagey about it. Trouble is, every surgeon has his own ideas about things and I would probably end up with as skewed an opinion as I started with.

However, I think BoneSmart understands that there is a vast amount of knowledge and experience amongst our membership. We've had a chemist, a microbiologist and a technical engineer and we currently have a physician. But their real value is the experience they've had in their own replacements. That's a valuable resource. I also learn from them. In the works is a BoneSmarties Club where members of long standing who have consistently given good support and advice to other members will have a role in continuing to do that. Membership will be by application and closely vetted by the team. It should be a really interesting development of BS.

Is there anything beyond a "knee condition" that makes this a group? Or is it just random people with the same condition on a message board? Most importantly, is this a "community?"

PRBX76: Initially people come to the forum because they have knee problems but it's a very open door community and newcomers are welcomed without hesitation. Other people see this and join because they sense the camaraderie in the group. We've had new members comment on this time and again in their very first post. Only yesterday one member said he joined 'because of the positive vibes coming out of this place'. Not only that but people bond. They notice if a member hasn't posted for a few days and worry about them when they are having problems or going for tests.

A lot of our past members have a very tight community on Facebook, for instance. Others have made friends in real life and have travelled miles to

meet each other. There is shortly going to be such a meeting in New York and the group are then travelling on to meet another member. I think you'd call that a community, don't you?

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BIOGRAPHICAL SKETCH

Michael D. Brookshire was born in Hollywood, California, and came to higher education later in life. He was a carpenter for a number of years before graduating from Fullerton College in Fullerton, California, with an Associate in Arts Degree in 1988. He continued in the carpentry trade while attending New York University's Tisch School of the Arts on a Trustee's Scholarship, earning a Bachelor of Fine Arts in television and film in 1990. Upon graduation, he returned to the Los Angeles area and began a free lance career as a writer, videographer and video editor for various corporate, industrial, informational, training and sales video productions. Clients included Newport Beach (CA) Fire Department, University of La Verne (CA), Security Pacific Bank, North Orange County (CA) Community College District, Garden Grove (CA) Unified School District.

In 1994, Mr. Brookshire took his video production knowledge and expertise to Burlingame Industries, Inc., a diversified manufacturing and sales company in Rialto, California, where he became Video Production Manager, a position he continues to hold today. Mr. Brookshire wrote, produced and directed numerous video programs for the company while earning his Masters Degree in communications at California State University, Fullerton and teaching television studio production at Fullerton College. In 2005 he negotiated a part-time position at the company in order to pursue a doctorate in mass communications at the University of Florida.

As a graduate teaching assistant at Florida, Mr. Brookshire taught entry level, intermediate, and advanced television studio and video production courses from Fall 2005 through Fall 2010, and received his doctorate in Spring 2011. He is a permanent member of Alpha Gamma Sigma at Fullerton College, was a Trustee's Scholar at New York University from 1988 through 1990, won an Award of Excellence from The

Videographer Awards in 1999, was a Giles T. Brown Award nominee for outstanding thesis at California State University, Fullerton in 2005, and received a Grinter Fellowship from the College of Journalism and Communications at the University of Florida in 2009.