Telemedicine: Its Effects on Health Communication

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This article analyzes *telemedicine*, the use of distant communication technologies within the context of clinical health care, and the effects it has on health communication. The main effect is that telemedicine has the capacity to substantially transform health care in both positive and negative ways and to radically modify personal face-to-face communication (Turner, 2003). This has tremendous implications for health communication scholars in that they can extend the telemedicine debate by integrating fresh insights into more acceptable approaches that will refine and humanize mediated channels of health communication. There are several key areas of telemedicine that need to be discussed (i.e., e-health services, clinical encounters, etc.), all of which are identified in this article. In addition to describing the past and current applications of telemedicine, this article provides a better understanding of unique needs, resources, problems, and opportunities germane to telemedicine services.

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Web-based services, telemedicine creates serious questions that obstruct or threaten its growth and implementation in various ways. Whereas Turner (2003) identified a variety of challenges that endanger the advancement and success of telemedicine, we consider four that dominate the rest, and we clarify these in more detail than have been provided in earlier research: (a) licensing and legal issues, (b) challenges to patient privacy, (c) resistance from health insurance companies, and (d) limited knowledge and expertise in telemedicine. Finally, this article examines one particular negative aspect of the use of telemedicine that has often been overlooked: the subtractive communicative effects that it has on both health care practitioners and patients. Our goal here is to extend and solidify previous studies (Roback & Herzog, 2003; Short & Saindon, 1998) that have indicated that the use of telemedicine can make communication and social interaction reduced to such a point that this practice is arguably deemed as dissocializing and dehumanizing. This article ends with a section that includes a discussion and suggestions for future directions for health communication scholars.

WHAT IS TELEMEDICINE?

Telemedicine is the use of advanced communication technologies, within the context of clinical health, that deliver

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care across distance (Turner, 2003; Turner, Thomas, & Reinsch, 2004). As such, it facilitates the delivery of tele-health care for the direct benefit of patients (Perednia & Allen, 1995; Wootton, 2001). Those distant communication technologies range from the telephone to state-of-the-art equipment that allows physicians, nurses, and other allied health professionals to provide health care hundreds or even thousands of miles away from the point of service (Conrad, 1998). Besides, not only is telemedicine a practice that can be applied in multiple medical settings, but it also facilitates and accelerates communication (viz., interchange, correspondence, and dialogue) between medical practitioners and their patients. It does so between locations of clinical practice for the purposes of relief and/or education (Ausseresses, 1995). The broad range of applications for telemedicine consists of patient care (Street, Wheeler, & McCaughan, 2000), training, research, administration, and public health to diagnose, provide care, transmit health information, examine X-rays, provide services, and train health professionals (Conrad, 1998). Telemedicine nowadays even includes Internet-based services such as WebMD.com, an on-line service that provides rich and readily accessible medical and pharmaceutical information that may significantly reduce the need for actual consultation with medical practitioners and pharmacists.

PAST APPLICATIONS OF TELEMEDICINE

The history of distant medical assistance through communication and technology stretches back as far as to the times when electronic devices were first introduced to society. In the past century, the use of telegraphy, telephony, radio, television, and wireless communication have assisted in physician–patient communication (Wootton, 1998). Although there has been much debate regarding the first official usage of telemedicine services, the first cited telemedicine application, according to Perednia and Allen (1995), took place in 1959. A study was conducted to show the benefits of a unique form of telemedicine in the telepsychiatry setting. As such, the use of a two-way closed-circuit microwave television system provided successful telemedicine communication, training, and research between the Nebraska Psychiatric Institute and Norfolk State Hospital in Nebraska (Turner, 2003; Wittson & Benschoter, 1972).

Later, the National Aeronautics and Space Administration (NASA) played an important role in further developing telemedicine when astronauts first began flying in space. The physiological conditions of the crew were reported via communication satellites from both the spacecraft and the suits that the astronauts wore during missions. These improvements in space were applied to rural medicine in the early 1970s through the Space Technology Applied to Rural Papago Advanced Health Care program (Ausseresses, 1995), as well as distant areas, isolated communities lacking

medical care (i.e., in mountainous areas, islands, open plains, and arctic regions), and developing and Third World countries (Wright, 1998). Telemedicine became significantly more important in the 1980s, when costs decreased for many of the information and communication technologies on which the efforts depended.

TELEMEDICINE TODAY: FOUR TYPES OF APPLICATIONS

Today, numerous research studies have shown that telemedicine, in its various forms and applications, is a medical practice that is increasingly used for medical treatment and services (Mair & Whitten, 2000). According to Balas et al. (1997), studies focusing on telemedicine in clinical settings demonstrate that this communicative modality offers enhanced performance, propitious results, and meaningful advantages. Telemedicine can be classified into various approaches or applications based on the particular niche of healthcare. According to Grigsby (1997), there are four suggested types of telemedicine applications: (a) management of specific diseases, (b) use within specific specialties, (c) classification according to technology, and (d) types of clinical problems.

Management of Specific Diseases

Within the context and scope of specific diseases, telemedicine can be defined with regard to its application in the management of various diseases, conditions, or pathologies (Turner, 2003), such as those related to dermatological (Lesher et al., 1998), cardiological (Wirthlin et al., 1998), and respiratory (Nuccio, 2004) diseases. In these situations, a specific diagnosis is made, and then the disease is treated using the most appropriate form of telemedicine services available. Past studies have demonstrated that increased access to telemedical devices has been approved and embraced among individuals with chronic and debilitating diseases (Tetzlaff, 1997).

Use Within Specific Medical Problems

Within the realm of specific medical problems and specialist primary-care consultations (Street et al., 2000), terms and practices such as *teleophthalmology*, *telepsychiatry* (Baer et al., 1995), *telepathology*, and *teledermatology* apply (Turner, 2003). Other special sectors where teleconsultations are conducted include the divisions of mental health, intensive care units, rehabilitation (Field, 2002), cardiology, surgery, and dermatology (Grigsby & Allen, 1997). In other words, the basis of specific medical problems with respect to telemedicine simply involves the integration and implementation of telecommunications devices in the context of each of the aforesaid medical areas.

Classification According to Technology

Within the frame of communication and technology, this area identifies the various forms that telemedicine can take, such as everyday electronic devices, including telephones, fax machines, video transmission (Squibb, 1999), camera light boxes, videoconferencing (Capner, 2000), multimedia, electronic mail (e-mail) services, remote monitoring systems, and interactive television units (Turner, 2003). More recently, Nuccio (2004) identified a series of newly patented telemedicine devices; these include, among others, order entry systems and smart alarms. These devices are designed to deliver medical care as an attempt to minimize the gap between the availability of expertise and services in unequipped locations. In particular, smart alarms are telemedicine systems because they are technological apparatuses that transmit vital information about a patient to medical personnel when a clinical emergency is taking place. Order entry systems are inventory control systems that communicate health-related needs between the provider and the patient (i.e., medication refills, etc.; Thames, 2003).

Types of Clinical Problems

According to Grigsby (1997), categorizing telemedicine on the basis of the specific clinical problem refers to the procedures that are used in any particular telemedicine communication. As such, in considering the forms of telemedicine such as teleradiology and telepathology, what is generally involved in these cases is the electronic transmission of diagnostic medical pictures and clinical data originating from a location of unspecialized medical service to one of highly specialized clinicians (Turner, 2003). In this type of scenario, the data, once received by the specialized clinician, can be analyzed to determine the correct medical approach to take. Once the specialist has reached a determination, an answer can be subsequently communicated back to the inexperienced practitioner seeking guidance and direction on how to handle the patient under his or her direct supervision. With this type of interfacing, it may be possible for health care facilities in small, isolated regions and, by the same token, lacking expert practitioners, to obtain guidance from specialists located just about anywhere in the world.

TELEMEDICINE APPLIED ON MILITARY GROUNDS AND IN PRISONS

Aside from the standard hospital or medical settings where telemedicine practices are applied, telemedicine has been widely used in military settings and prisons (Turner, 1999, 2003). These locations, as well as private health care organizations such as health maintenance organizations and the Veterans Administration, provide a valuable prospect for efficient and cost-effective telemedicine use (Grigsby & Allen, 1997). Especially in the military arena, telemedicine can provide immediate communicative services to individuals treating combat casualties in battlefields. Indeed, telemedicine services can circumvent the need for a physically present physician, a normal requirement for managing and caring for serious injuries (Edwards & Motta, 1997), while still treating the patient with some hope at recovery.

Similarly, patients are sometimes treated with telemedicine procedures on a prison ground. According to a research study conducted by Mekhijan et al. (1999), patient satisfaction, among the subjects, was identified with regard to the informational and relational dimensions of the telemedicine treatment. An earlier study by Allen and Hayes (1994) produced similar findings in that patient satisfaction was high as a result of the ease of access and the physician's methods of communication within the telemedicine application.

TELEMEDICINE APPLIED IN NURSING

Besides the medical doctors who oftentimes dominate in the telemedicine realm, the role of nurses has widened and has slightly pervaded into telemedicine practices as well, particularly in dialysis units. According to Turner (2003), nurses who were involved in this particular setting (dialysis units) expressed that they appreciated telemedicine applications in that department. They felt that increased control was granted to them in treating and communicating with their patients while the supervisory doctors were absent. Especially in cases of managing chronically ill patients in their homes, telemedicine can allow nurses to visit the home (Allen et al., 1996), conduct relevant examinations, and communicate whatever information is needed to the off-site physician. More important, even if a home patient suffering from a disease such as diabetes refuses or cannot access the assistance of a nurse at a certain time, that patient can directly communicate his or her diabetes-related information to the doctor through telemedicine devices and can expect an immediate response from that doctor on what to do next. In a similar vein, patients who do receive a home nurse can rely on them to convey the information to the doctor located at the clinic or hospital (Mun & Turner, 1999), and the nurses can receive feedback from the doctors and know how to proceed accordingly.

WebMD.com AS A LEADER FOR ON-LINE TELEMEDICINE SERVICES

In light of the recent increases of cyberization of health (Rusovick & Warner, 1998) and convergence to on-line health care information, WebMD.com (2005) outright declares that it ranks first in providing services that help medical practitioners, consumers, and providers navigate

the complex medical care system. More specifically, it helps these individuals interact with each other through e-mail services and supplies an abundance of health care information with respect to symptoms, assisting in the diagnostic process (although online clinical diagnostic power is contingent on state law in most cases; Stanberry, 2001), treatments, and general medical recommendations. From these provisions, it follows that WebMD.com is clearly a telemedicine service, emphasizing that "its products and services streamline administrative and clinical processes, promote efficiency and reduce costs by facilitating information exchange, communication and electronic transactions between healthcare participants" (WebMD.com, 2005). It is interesting that WebMD.com categorizes and separates its assistance into several subdomains that conveniently allow health care providers and consumers to seek information and programs relevant to their particular needs or interests at the time. Specifically, the WebMD.com site offers distinct services, such as WebMD Health (WebMD.com, 2005). Although other diverse and prominent services besides WebMD Health are available, this service is paramount and requires discussion.

WebMD Health is the foremost supplier of online information, instructional services, and communicative outlets for physicians and consumers (WebMD.com, 2005). As such, these forms of aid include disease and treatment information (i.e., diagnoses, symptoms, common treatment protocols, etc.), pharmaceutical information (i.e., side effects, prices, contraindications, warnings, etc.), and forum/interactive communities (or interface) for medical practitioners and consumers to communicate information to one another. With this particular service, more than 20 million people visit the site every month (WebMD.com, 2005). This huge number of consumers represents a clear sign that on-line communication between healthcare providers and consumers is substantially on the rise and is becoming a primary communication channel through which these individuals seek and supply health-related information (aside from visiting doctors and other medical practitioners).

HEALTH COMMUNICATION BENEFITS OF TELEMEDICINE

The previous section demonstrated that telemedicine, whether through medical practitioners or direct online channels, has been widely used and accepted as a viable option in a diversity of areas, specialties, diagnostic conditions, and applications (Hailey, Ohinmaa, & Roine, 2004; Turner et al., 2004). More important, the use of telemedicine demonstrates that health communication between the patient and the health care provider has been made more rapid and efficient. Nevertheless, we would hope and expect that telemedicine be more readily embraced as a tool by all medical specialists who desire to discover and ascertain its

maximum potential and utility. In fact, telemedicine offers a manifold of health communication benefits to both practitioners who engage its services and the health care system in general. Every individual can benefit from telemedicine, from the patient, to the community, to physicians and other practitioners. With this prospect in mind, let us now proceed to the following section, where key benefits of telemedicine applications and features are addressed and examined. These benefits of telemedicine can be classified according to five main abilities: the ability of telemedicine to (a) transcend geographical boundaries; (b) transcend temporal boundaries; (c) reduce costs; (d) increase patient comfort, security, and satisfaction; and (e) digitize health communication via Web-based services.

Ability to Transcend Geographical Boundaries

Telemedicine can alleviate the issue of imbalances in geographic allocation of resources, facilities, and personnel in the realm of health care. As such, it increases and strengthens access to health communication and services among disadvantaged, disserved, secluded, and restricted communities and citizens (Crowe, 1998). For instance, surgeons located in "remote areas" (Perednia & Allen, 1995) and who do not have the skills or experience to handle a particular surgical procedure can call on, through telemedicine technologies, the immediate assistance/guidance of another doctor located at a far physical distance. In a similar vein, a casualty of military combat could receive immediate communicative assistance in the field by linking up with a doctor through a portable telecommunications system. These two examples show that the use of telemedicine has the potential not only to save more lives but also to improve health communication. It provides a sound escape or supplemental alternative from the conventional health communication in doctor–patient interactions such as those that engage face-to-face, in-the-same-room encounters that are typical in relationships between health care practitioners, health care organizations, and practitioners and patients (Turner, 1999, 2003).

Ability to Transcend Temporal Boundaries

Telemedicine has demonstrated its capability to improve health communication by alleviating constraints induced by time (Bloom, 1996). In fact, not only does a telemedicine task not need real-time interaction, such as in the case of a remote expert consultation (Della Mea, 1999), but it also decreases patient anxiety caused by having to wait a long time for a health care provider. Besides, still pictures over a phone line, amplified by direct oral communication, are user friendly and have proven to be useful in the pre-health care arena. Compact audiovisual technology enables fast, immediate, and personal visual and audible interaction with the patient. Now the doctor can perform auscultation and fundoscopic exams carefully and in real time.

Ability to Reduce Costs

Telemedicine has been shown to be such an effective medical practice in several instances that its growth and application in the health care industry have risen tremendously. What should be emphasized here is that telemedicine in many cases can minimize the escalating and draining costs of health services to all who benefit from it (Bloom, 1996; Crowe, 1998). We all know that the costs involved in health care and the resources necessary to transport patients to other states or even countries can be enormous to some people. Therefore, expeditious access to telemedicine can save both time and money. By the same token, it may be seen as an economical tool for bringing international health care dollars to the United States (Perednia & Allen, 1995; Turner, 2003). One of the reasons for patient satisfaction with telemedicine, according to Gutske et al. (2000), is a reduction in waiting time, travel time, and the time involved in arranging appointments. The absence of all of these issues can facilitate health communication by eliminating many of the burdens involved in standard health care.

Ability to Increase Patient Comfort, Security, and Satisfaction

Another positive aspect of telemedicine addressed by researchers and patients alike is that some patients appreciate the presence of several medical practitioners working on them concurrently. In this sense, according to Callahan, Hilty, and Nesbitt (1996), many patients who underwent telemedicine treatments felt more comfortable and assured with their cases while in the company of many collaborating doctors. Theoretically speaking, these higher levels of comfort and confidence among patients could be attributed to what media richness theory (Daft & Lengel, 1986) describes as an *enriched social presence* from several attending physicians (Turner et al., 2003). This multidoctor presence—that is, several attending medical personnel collaborating and interfacing on one medical issue at hand—can relieve or diminish the uncertainty and fear by the patient regarding his or her disease. These researchers also found that the collaboration of doctors in these telemedicine settings in fact improves the reliability of the diagnoses. This, in effect, reduces the number or frequency of diagnostic mistakes. In addition to this increased diagnostic reliability, the multiple parties involved have expressed that the experience is a type of educational enrichment, as several sources (i.e., doctors and other medical technicians) are exchanging information at one time (Whitten, 1995) and can communicate a rich pool of valid opinions on the medical case at hand. Beyond telemedicine's general effectiveness, patients' opinions of how telemedicine has positively affected them are readily apparent from research studies focusing on patient satisfaction concerning telemedicine (Mair & Whitten, 2000). According to Gutske et al. (2000),

studies conducted by this team have revealed high levels of satisfaction among patients subjected to telemedicine applications. Another area of patient satisfaction emerges from the use of videoconferencing (Bashshur, Sanders, & Shannon, 1997).

Ability to Digitize Health Communication Via Web-Based Services

Because telemedicine embodies and engages a sort of virtual domain, where the practice of health communication or services occurs in a virtual world (Turner, 2003; Turner et al., 2004), conducting medical procedures and interfaces within the limitations of time and space no longer presents serious issues in the face of telemedicine technologies (Turner & Peterson, 1998). In particular, with the advent of Web-based medical and pharmaceutical companies (e-health sites) that provide an enormous amount of information on nearly every condition, drug, and treatment, individuals can turn to these services to conveniently and rapidly obtain information that could otherwise be obtained by physically visiting and communicating with medical practitioners or pharmacists.

In the same train of thought, Web-based health care services (i.e., pharmaceutical companies, physicians' services, diagnostic information, etc.) offer substantial quantities and varieties of health information to Internet surfers. Plus, e-mail can be used as a communicative conduit by which medical practitioners can provide direct correspondence and advice to patients who choose to stay at home versus hauling themselves to clinics or hospitals for treatment purposes (Allen et al., 1996; Bloom, 1996). Studies have shown that by taking these popular and inexpensive health communication services into account, recent demand and utilization of these services have increased significantly (Anderson, 1999). Even more amazingly, a study conducted by the Cyber Dialogue Health Practice (2002) anticipated that by the end of 2005, 88.5 million adults would be seeking health information and communication via e-health services. With this rapid and enormous elevation in Internet-based health care communicative services, one would logically expect that the demand for medical practitioners in clinics or hospitals would noticeably decrease in the near future, if in fact this has not already happened.

This section on the benefits of telemedicine adds to the scope of this article in that it further justifies the necessity and relevance of telemedicine in the health care system and its growth beyond its current parameters. By the same token, this section helps us re-examine communication in the health area by stressing that telemedicine does not merely reorganize this context of health communication but also reshapes its very nature by offering many advantages (i.e., instant interaction between doctor and patient; better comfort, security, and satisfaction; lower costs; and broader geographic allocation of resources). In fact, this

section should be of great interest to health communication scholars because telemedicine, as enhancing personal access to health information (i.e., WebMD.com), represents the next evolutionary phase of global health care delivery and exchange for both practitioners and patients. Truly, telemedicine offers a plethora of health communication benefits to an increasingly expanding global pool of medical knowledge (Rusovick & Warner, 1998; Turner et al., 2004). Being aware of these benefits will allow health care community members to discuss clinical decisions in an interactive way (and we all know that interactive communication is more effective than one-way communication). We hope that this will make the health care system more user friendly and allow for a truly integrated and more ideal system.

CHALLENGES TO THE DEVELOPMENT OF TELEMEDICINE

In spite of all of the promises and health communication benefits that telemedicine is capable of delivering, it also creates serious questions that obstruct or threaten its growth and implementation in various ways. Whereas Turner (2003) enumerated a variety of challenges that jeopardize the advancement and success of telemedicine, we propose four challenges that yield the greatest difficulty in telemedicine's path and clarify these in more detail than have been provided in earlier research. These four main challenges are addressed in this section: (a) licensing and legal issues, (b) challenges to patient privacy, (c) resistance from health insurance companies, and (d) limited knowledge and expertise in telemedicine. As such, we have identified and described these four challenges in detail in the following subsections (although other barricades exist that impede its progression and implementation).

Licensing and Legal Issues in Telemedicine

The first challenges—which are interrelated in many respects—that legally hinder the development of telemedicine include issues related to interstate licensing, legal liabilities, and institutional credentialing of physicians (Stanberry, 1998; Turner, 2003). Unfortunately, many of these legal matters are still unanswered and unresolved within both the U.S. health care and judicial systems. For example, in interstate medical transactions where mechanical devices are used for surgery or radiology, if there is a mechanical failure or glitch that results in harming the patient, deciding on who is responsible for that accident is debatable and can be a major headache for legal authorities. Another key issue implicit in this scenario is that these practitioners who are treating and communicating with the patient are operating out of different states. Because laws regarding telemedicine and health care certification are unique in each state, legal liability, malpractice, and jurisdiction become serious matters of concern for the judicial,

legal, and medical systems (Blair, Bambas, & Stone, 1998; Turner, 2003). For instance, in the event that an inexperienced physician located in Arizona is physically operating on a patient and is engaged in a live telemedicine communication with a specialist in New York whose guidance and direction botch the surgery and result in the patient's death, the prosecutors and legal officials in Arizona would find difficulty in placing blame and litigation on the party in New York. An issue like this one is a typical scenario in which telemedicine presents some legal and licensing issues. However, as telemedicine and its associated technology evolve, feasible solutions (i.e., legal policies and amendments) to these problems should be discovered and made available.

Challenges to Patient Privacy

Another serious impediment to the development of telemedicine includes issues related to patient privacy. According to Gilbert (1995), because multiple individuals (i.e., technicians, nurses, etc.) are generally involved in telemedicine communication, exposure of confidential records to all parties concerned becomes a threat to the privacy of that patient. Additionally, even though medical doctors accept the obligation of maintaining their patients' privacy rights, the other assisting parties involved in the telemedicine communication may not be held to the same standard (Turner, 2003). As a result of this risk to patients' privacy rights, telemedicine has struggled to gain acceptance from the legal and medical communities (Sanders & Bashshur, 1995). However, again, as time progresses and this issue is tackled by the medical and legal communities alike, solutions should be found to eliminate privacy risks to patients. Furthermore, these solutions should generate increased acceptance of telemedicine practices by all parties concerned and, likewise, should alleviate the fear and frequency of breaches to patient privacy laws.

Resistance From Health Insurance Companies

The next troublesome – and perhaps the most significant (Turner, 2003) – obstacle that telemedicine faces in gaining adoption is the difficulty of receiving reimbursement for services from insurance companies that oppose unconventional consultations, such as the ones absent of face-to-face contact. For instance, according to Brecht and Barrett (1998), the U.S. Health Care Financing Administration, a national organization in charge of major health insurance companies, stipulates that reimbursement for medical services is usually available only when direct physical communication (i.e., a face-to-face appointment) is held. However, this stipulation is not universal and required of all states. There are some states that do not demand this immediate presence in medical consultations, such as California, Texas, and Oklahoma. Plus, these states even go as far as

permitting such telemedicine services as appropriate substitutes for face-to-face appointments if recommended by the attending practitioner(s) (Turner, 1999, 2003).

Limited Knowledge and Expertise in Telemedicine

The last challenge to be addressed has to do with the limited knowledge and expertise in telemedicine as well as the need for enhanced and modified telemedicine systems. In this sense, little knowledge currently exists among medical practitioners on how to effectively and practically use various forms of telemedicine. This paucity of insight into telemedicine, in effect, hinders the creativity to explore more efficient and effective modalities of telemedicine applications. As a result, teaching medical practitioners to learn and adopt this new way of accomplishing health services, through telemedicine, has become a significant hurdle to implementation (Tanriverdi & Iacono, 1999; Turner, 2003; Whitten, 1995).

Special competence is also required before implementation of telemedicine can be allowed and render success to those concerned. In this regard, a unique term, *telecompetence*, was created to describe the required skills and credentials practitioners must have in order to carry out this kind of specialized work (Turner, 1999, 2003). Telecompetence is a must in order to be a health communication expert regarding telemedicine. In particular, according to Turner (1999), there is a three-stage process involved in such health communication aptitude. As such, telecompetence consists of (a) planning and establishing, (b) learning and use, and (c) formalizing routines. Unfortunately, achieving this level of competence could be considered a major adversary to telemedicine implementation, because considerable training and finances are not always available resources to enable this kind of campaign. To this end, in some medical settings where resources are limited, telemedicine may not be a feasible or affordable option.

In the following section, various forms of telemedicine are negatively criticized according to their subtractive effects on practitioner–patient communication. In each of the forms identified, individuals are left to communicate with computers and other forms of technology, all of which are absent or slight in physical human contact and exchange. As we argue, the social and communicative elements to these telemedicine modalities dehumanize, dissocialize, and depersonalize human behavior and contact. Additionally, we urge for a careful re-examination of whether telemedicine genuinely serves humanity in a positive and fruitful way. As we clearly illustrate, this is not always the case.

SUBTRACTIVE COMMUNICATIVE EFFECTS OF TELEMEDICINE

In the present day and age, we know that a considerable portion of world society relies mostly on technology and electronics for communications, memory storage, military operations, and medical procedures. With the advent and advancement of telemedicine—especially via the Internet—our medical and health care systems have taken a near-complete redirection in how health communication is channeled and exchanged. Humans on all sides of the health care system are now becoming digitized, virtual, and cyber (Rusovick, & Warner, 1998), also rendering subtractive communicative effects on this health care modality (Roback & Herzog, 2003; Short & Saindon, 1998). It is interesting that the subtractive communicative effects of telemedicine have often been overlooked in health communication. In addition, Turner (2003) argued that few studies have been conducted on the communicative and interpersonal implications of telemedicine. Thus, we believe that it is important to address this issue.

Indeed, e-health services represent the most interpersonally and communicatively reductive telemedicine technologies that exist today (Effertz, Beffort, Preston, Pullara, & Alverson, 2004). The reason lies in the fact that face-to-face contact and nonverbal communication are absent or absolutely minimal in this medium (Leh, 2001). As such, telemedicine services on the Internet (i.e., e-mail) deprive humans of the fundamental contact that is so essential in social interactions (Roback & Herzog, 2003; Short & Saindon, 1998). Although Walther (1996, 1997) has argued that e-mail can provide a rich social presence, others assert that e-mail services are mere exchanges of written words, absent of any facial expressions and gestures (Leh, 2001) and that they diminish interpersonal contact with others because all communication is electronic (Aragon, 2003). Also, because telemedicine can be a sort of dialogue between distant users, e-mail is oftentimes adopted as a channel to carry out such dialogue. Unfortunately, e-mail is appropriate only for asynchronous communication. In addition, the present condition of the Internet does not usually produce expeditious delivery times (Della Mea, 1999). So the question arises as to why e-mail is preferred if it is oftentimes slower than other forms of communication.

Likewise, health care information that is posted on WebMD.com does not require that the information-seekers consult with a human being or physically visit with someone in an office. For instance, health care consumers can search for pharmaceutical information (i.e., prices, descriptions, side effects, and contraindications) and diagnostic information about diseases (i.e., images, symptoms, and current and innovative treatments) on these types of sites without any personalized visits, phone calls, or any manner of communication that requires two individuals to exchange ideas. It seems that the Internet provides a user-friendly, omniscient encyclopedia of health care information, allowing doctors to be thrown on the wayside or deemed obsolete in many cases. To this end, Internet-based telemedicine services can, in many cases, erase or at least significantly reduce the need for human communication and contact.

Yes, telemedicine applications do inflict a significant subtractive effect on the social and communicative abilities between the doctor and the patient (Zuiderent, Winthereik, & Berg, 2003). According to Turner (2003), for some scholars in the field of communication, "the social presence provided by face-to-face interaction is more than a luxury, and provides a distinctive element to a communication encounter" (p. 524). Cegela et al (1996) went even further, adding that this conduit of physically present communication taking place in a face-to-face interaction (i.e., doctor–patient) serves as an important component in relational and informational exchanges in the health communication environment. For this reason, it makes sense that telemedicine may dissocialize and dehumanize the original and genuine purpose of a doctor–patient interaction to the extent that telemedicine may have a negative impact on the doctor–patient communication (Grigsby et al.; Turner, 2003, 2004). There are several cases showing that telemedicine can be dehumanizing and dissocializing. For instance, Akir (2005) found that telemedicine is so dehumanizing that lives can even be endangered when remote medical diagnosis and surgery cannot be performed because of a shortage of satellite links. Similarly, Bloom (1996) conducted a study on the use of telemedicine among nurses. He found that nurses viewed telemedicine as dissocializing because they missed the physical contact of touching patients.

In line with these contentions, in the case of patients with chronic pain who primarily remain at home, physical visits and face-to-face communication between the doctor and the patient can largely be avoided through the use of telemedicine services and the brief or transient aid of a nurse. For instance, patients who are physically immobile and require total care can still be helped through brief assistance of a nurse (Bashshur et al., 1997). Although the nurse must communicate with a physician regarding important decisions for the patient, the nurse becomes a mediator who primarily handles the doctor–patient communication. As a result, the patient can rely mainly on that nurse to relay the doctor's recommendations without any direct communication with the doctor. In spite of the fact that this reduction in doctor–patient contact may prove convenient in some respects, the patient and physician can lose sight of each other, and communication may just be "bounced off" another party.

Truly, do we want the future of telemedicine to lead us in the direction of completely dissocializing and dehumanizing our communication between practitioners and patients? Can our society adapt to a world that shaves off the need for human beings to provide health care services? From what we have seen here, an important disadvantage of resorting to telemedicine is that it is subtracting, and close to eliminating, our social human contact in health care settings (Zuiderent et al., 2003). This technology should not replace patient–physician communication. Instead, it should only be an accessory to the health care practitioner. Given the evidence shown by researchers (Effertz et al., 2004) that the social presence in Internet-based telemedicine technologies is minimized considerably through these channels, the continued use and increase of telemedicine technologies certainly lead us to believe that we are inevitably faced with this dehumanizing outcome. It appears that we have two choices: (a) We can either learn to adapt and accept this new course the health care industry is taking, or (b) we can limit and control telemedicine to prevent it from controlling us.

DISCUSSION

In this article we have attempted to provide health communication scholars with a better understanding of unique requirements, resources, issues, and opportunities for telemedicine services. By moving toward this goal, we have demonstrated that telemedicine has the capacity to largely transform health care in both positive and negative ways and to radically modify the personal face-to-face communication that has been the model of medical care since its inception. There are two opposite arguments regarding whether telemedicine is beneficial to the health care community and for health communication in general. On one side of the argument, telemedicine services facilitate health communication and offer a cornucopia of applications that can improve medical operations in almost all settings. On the other side of the argument, telemedicine services present several challenges and subtract or dissocialize precious human contact from the health care interaction (i.e., Roback & Herzog, 2003).

In taking a pro-telemedicine stance, telemedicine is one of the most beneficial tools that can considerably improve the medical care system and circumvent obstacles in health communication. We have entered an era where health care services can be a mouse-click away and not the inevitable drive down the street to the local clinic. There is no doubt that telemedicine has made an important impact on people's lives. Its use of distant communication technologies facilitates the delivery of tele-health care for the direct benefit of patients thanks to state-of-the-art equipment (e.g., video transmission and e-mail services) that allows physicians, nurses, and other allied health professionals to provide their services hundreds or even thousands of miles away from their workplace. In fact, the literature has shown that telemedicine, in its various forms and applications, offers myriad health communication benefits (i.e., instant interaction between doctor and patient; better comfort, security, and satisfaction; lower costs; and broader geographic allocation of resources) to an increasingly growing body of medical knowledge.

In taking an anti-telemedicine stance, the challenges mentioned earlier demonstrate that telemedicine is far from

perfect: legal and licensing issues, patient privacy, reimbursement resistance from insurance companies, and educational deficiencies in telemedicine (Turner, 2003). Although the ability to better care for patients and save lives has improved, the scope and complexity of health care also have increased greatly. This is why telemedicine opponents should open their eyes and strive to find solutions to these challenges. A few grassroots approaches to rectifying these affairs are rallying the medical and legal communities together in order to repair these issues and seek out any means necessary to demolish these obstructive elements from interfering with telemedicine's progressive course. We believe that lawyers can amend telemedicine laws to clarify and identify liability policies with regard to interstate surgical operations (when the surgery takes place in one state while a physician is located in another state).

More important, another disadvantage of resorting to telemedicine is that it is subtracting and close to eliminating our social human contact in health care settings. This concern urges health communication scholars to evaluate the specific communicative needs that have been otherwise overlooked in the literature on telemedicine. As we have seen, the social and communicative elements to these telemedicine modalities dehumanize, dissocialize, and depersonalize human behavior and contact. For example, because telemedicine can take the form of a conversation between distant users, e-mail is oftentimes adopted as a channel to carry out such discourse. Unfortunately, e-mail is appropriate only for asynchronous communication. The question arises as to whether medical technology will gradually replace patient–physician communication. We argue that it should be only an accessory to health care practitioners. Establishing a basic understanding of what this medical technology can lead to will help health communication scholars enlighten the telemedicine debate by turning unique insights into more adequate approaches that will enrich and humanize mediated channels of health communication, thereby offering remedies and clarifications for effective health care exchange and delivery.

On the basis of our review of the current literature on telemedicine, we believe that specific areas of inquiry that have not yet been investigated require tapping. First of all, it might be interesting to further compare how Internet- and technology-based communication between patients and physicians, in various specialties, differ greatly from face-to-face conversation. Grasping the effect on users and information exchange is a crucial factor in the adoption of telemedicine by opposing forces. Available research to provide reasonable explanations of the fundamental reasons for patient satisfaction or dissatisfaction with telemedicine and to analyze communication issues in any depth is still lacking. The idea is that future research on the use of telemedicine needs to be more scientifically rigorous to help policymakers reach informed decisions about the relevant use of this medical practice.

In the same perspective, methods of achieving telecompetence in medical personnel have proven to be a tough battle to win. This failure to produce widespread telecompetence suggests that researchers and think-tanks should gather and brainstorm on a feasible program to attain this end. Because telecompetence is scarce, cost-effective, and systematic, training programs could be financed and coordinated by hospital administrators and sponsors to allow for such important educational programs to occur. Another logical way to achieve general telecompetence in our health care practitioners could be targeting medical schools to incorporate such training into their curricula. Because telemedicine is becoming increasingly popular in its use in the health care industry, health communication professionals should devise methods of approaching medical schools to encourage them to integrate courses into their programs that instruct the students on the most commonly used forms of telemedicine and the forms likely to be used in the future. To this end, students would learn the most important aspects of telemedicine services and would, after receiving their certifications to practice, use these services in their everyday jobs.

Third, we strongly encourage that scholars conduct surveys on the correlation between increased telemedicine usage and decreased patient visits to clinical buildings and actual medical practitioners. As usage of health communication services on the Internet increases, the number of consultations and visitations with actual doctors and other medical practitioners should consequently decrease. In considering the current numbers (as shown on e-health Web sites) of visitors to, for instance, WebMD.com, we can expect a substantial reformation in health clinics and the advancement of Internet-based sources for health care services. By the same token, it might be important to explore whether decreased complaints of sexual harassment, malpractice, and other issues occur as a result of increased usage of e-health services. With this type of medium, nonverbal communication is eliminated, and misperceptions of practitioner conduct are minimized. This reduction is based on the fact that only words themselves are used in interactions or consultations. Unless overt sexual comments are made in an e-mail message, it is difficult to prove that plain content suggests sexual implications or innuendoes.

Finally, because of the rise of cyberterrorism, it is vital for health communication scholars to explore the potential vulnerability of telemedicine services (particularly those on the Internet) as targets for terrorism and criminal mischief. For example, pernicious hackers have been known to electronically alter and mutilate Internet sites (Dunnigan, 2003), especially those that provide health communication information. Likewise, ex-patients who are angry with certain doctors have been known to send harassing and intimidating messages to these health care providers in some situations. Additionally, there appears to be a deficiency in qualified support personnel to install the latest antivirus software

and maintain existing hardware. Because of this lack of system support, higher levels of virus and worm infections of electronic patient data may result (Rigby, 2002). In sum, telemedicine services such as the ones listed earlier are susceptible to criminal and terrorist attacks. As such, protective measures should be developed and implemented to prevent such problems.

No matter what the forthcoming decades hold, and in spite of the challenges that telemedicine faces in its developmental course, telemedicine shows considerable promise in shaping the future of medical care to a great extent. In fact, as Effertz et al. (2004) predicted, it may even become more popular and more widely used than traditional forms of health care services. As both health care providers and recipients, we are in a propitious position to more fully realize the benefits that telemedicine provides. Our mission is to shape the future of health communication. As scholars in this field, we can positively influence the destiny of telemedicine by achieving a clearer understanding of the social and relational implications of these technologies and, in doing so, we can strive to enhance the experience for all parties (i.e., practitioners, patients, e-health users, etc.) and overcome the main challenges that threaten the growth and success of telemedicine. Health communication scholars ultimately can take credit for winning this unceasing battle by shifting this controversial matter into one that does not induce such heated debate across disciplines.

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