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Cross Cultural Telemedicine: Sub-Saharan Africa

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Abstract

This STS report addresses the social and cultural factors at play in the use of telemedicine in Sub-Saharan Africa (SSA) in order to inform an understanding of the interaction between technology and society in that region. This research is a review of existing technologies, rather than a report on new technologies. The socio-cultural dimensions of telemedicine are important to consider because telemedicine is a socio-technical system reliant on socio-cultural factors rather than a strictly technical based system. Actor Network Theory is relevant to analyzing this problem and provides insight into the ways that human and non-human players interact and the resulting consequences. Literature review is used to collect data about socio-cultural factors intrinsic to telemedicine and telemedicine's place in healthcare. I find that collective viewpoints, traditional medicine, and perceptions of illness are interrelated factors that will especially affect the cross-cultural interaction that telemedicine introduces. SSA patients especially value equal treatment and being valued as patients; ultimately, communication will be a vital tool for addressing concerns about treatment and overcoming differences in understanding.

Keywords: telemedicine, Africa, healthcare, socio-technical systems

Introduction

Both urban and rural communities of the developing world often suffer from poor access to high-quality healthcare, which in turn has a direct effect on the quality of life and development in those communities (Afarikumah & Kwankam, 2013). The World Health Organization's (WHO) 2006 Quality of Care report outlines six dimensions that constitute quality healthcare: "effective, efficient, acceptable/patient-centered, equitable, safe" (WHO, 2006, p. 9–10). Access to quality healthcare is impeded by such factors as geographic barriers that distance people from treatment, socio-economic barriers that prevent people from proceeding with treatment, or limited capabilities of available clinics (WHO, 2010). This creates a population that cannot always get timely or effective treatment.

It is no surprise that since healthcare has a direct effect on people's lives, improving the population's health is vital to reducing poverty and supporting the development of a country (Afarikumah & Kwankam, 2013). Currently, both rural and urban communities of developing countries are negatively affected by poor access to diagnostic and treatment advances in technology and research and often from inefficient healthcare systems that suffer from such issues as limited follow-ups (Pradhan, 2004). Rural communities are more affected by distance barriers that prevent them from being close to clinics or by the difficulties of effectively serving a population that is geographically spread out (WHO, 2010).

Ideally, there would be no barriers blocking access to "accessible, cost-effective, high-quality healthcare services" (WHO, 2010, p. 6). Telemedicine provides a technological solution that breaks down both geographic and information barriers. Telemedicine can improve the accessibility and effectiveness of the healthcare system while also directly and positively impacting people's ability to carry out healthy and productive lives and continue to contribute to their communities. On a larger-scale impact, telemedicine could provide a crucial step forward in alleviating poverty and help to contribute to the growth of developing countries by improving the effectiveness of their healthcare systems. This research uses an outside perspective to explore the role that telemedicine plays as a technological artifact within a healthcare system by analyzing the way telemedicine interacts with people and telemedicine's inherent socio-cultural dynamics.

Telemedicine

Telemedicine is an extension of healthcare delivery that integrates innovation into the current system. Telemedicine relies on currently existing Information Communication Technologies (ICT), which is a broad term for any sort of communication technology system: such as video communication, satellite systems, or radio communication (WHO, 2010). ICTs are very commonly used and recommended by the UN as a

means to bridge the 'digital divide' between developed and developing countries (Unwin, 2009).

Healthcare systems in SSA include a mix of private and public clinics, but social and especially geographic barriers prevent people from pursuing treatment at those locations. Many clinics lack resources and are not always equipped to properly treat all patients. People in rural areas are especially underserved due to resource-deficient clinics and poor accessibility to clinics (Afarikumah & Kwankam, 2013).

Telemedicine is a technological solution to improving healthcare systems by integrating ICTs into the healthcare system as a means of breaking down geographic barriers and improving the sharing of information. Telemedicine uses ICTs to exchange information about and for: diagnosis, treatment and prevention of diseases and injuries, research and evaluation, and the continuing education of healthcare providers, all in the interest of advancing the health of individuals and their communities (WHO, 2010, p. 9).

While telemedicine utilizes existing ICTs, ICT devices are also being designed specifically for use in telemedicine—such as video consultation devices. The applications and technologies are classified as either synchronous: real time communication; or asynchronous: store-and-forward communication (Currell *et al.*, 2000; Wootton, Menzies, & Ferguson, 2009). Telemedicine continues to adapt new technologies and evolves as users' needs and telemedicine's scope expands, making it a dynamic and flexible practice (WHO, 2010).

Telemedicine offers an intriguing solution because it vastly increases people's ability to spread access to healthcare-related expertise and information. Additionally, telemedicine has a higher potential for success because it meets Sarewitz and Nelson's (2008) three criteria for technological fixes in healthcare: the technology has a direct connection to meet the need of distant consultation and information sharing, it is intended to be integrated into the existing healthcare system, and its outcome will be able to be measured unambiguously via increased access to healthcare services—especially among specialty services and in rural areas (WHO, 2010).

Since telemedicine breaks down both geographic and information barriers, the poorest and most remote communities will see the most immediate effects because they have the least immediate access to health services (Craig & Patterson, 2005). Patients will have improved treatment due to greater access to diagnostic and treatment expertise (Froelich *et al.*, 2009). The overall system of healthcare service could improve through greater interconnectedness and effectiveness due to the increased interchange of information (Pradhan, 2004). Furthermore, telemedicine benefits the participating healthcare providers—and in turn the patients—by providing a means to more educational and professional opportunities (Jennet *et al*., 2003).

Background Literature: Socio-Technical Aspects of Telemedicine

According to Hughes (1987), a socio-technical system entails a complex interaction of multiple social, human, technical, political, legal, and other artifacts. Building on Hughes' concept, all of the artifacts in the system rely on each other in some way and constitute a diverse, complex, and evolving system that is closely tied to and influenced by innovation. Hughes (1987) concedes that many of the system's characteristics depend on the environment and that if there is a change in the system's components, then other artifacts will adjust in some way to compensate for this change.

Healthcare is a socio-technical system as previously described, while telemedicine finds itself as a distributed-system of healthcare (Carayon, 2006). Telemedicine essentially integrates innovation into the existing healthcare system in order to expand its impact, so it becomes an extension of healthcare. It follows that many of the artifacts and relationships inherent to healthcare would be relevant to telemedicine. Accordingly, since telemedicine essentially changes the relationships, structures, and actors in the larger healthcare socio-technical system, Hughes' (1987) description of a socio-technical system suggests that the system will indeed adjust to the changes introduced by telemedicine. Telemedicine's success depends on the interaction of relevant components that do not upset socio-cultural factors in ways that lead to distrust and limited interaction with the technology (Afarikumah & Kwankam, 2013).

User acceptance of a technology is an important factor in studying human-machine interaction. In order for telemedicine to enter into the healthcare network as an actor, it must be accepted by the current actors in the system (Afarikumah & Kwankam, 2013). The actual implementation of a technology relies heavily on its acceptance, especially by the primary users responsible for interacting directly with the technology (Chau & Hu, 1999). The Technology Acceptance Model (TAM) provides a framework for understanding how this works, positing that the main factors that influence the user's acceptance and intention to use a technology are his/her perceptions about the utility and attitude about the use of the technology (Chau & Hu, 1999). This perspective could be modeled as a gatekeeper to the entrance into a network of utilization.

The idea that a change of a component in a socio-technical system will result in changes in other related components is further explored in Actor Network Theory (ANT). ANT claims that a collection of physical and non-physical actors interact with each other in both material and semiotic ways (Latour, 1996). Linking the concept that material and non-material actors interact with each other on different levels and that internal changes to a socio-technical system affect the whole system, it is clear that ANT is relevant to the discussion of a socio-technical system's operations. Since telemedicine is a dynamic socio-technological system rather than a single device, it is important how telemedicine interacts with the existing healthcare system. Namely, rather than non-human actors completely

replacing a human in the existing network, telemedicine uses technology to keep and add human-actors in that network by means of non-human actors. As a result of these different networks merging, there will need to be consideration of new interactions inherent to the networks and how the socio-technical system will adjust to different changes. This is especially relevant for professionals intending to engage with telemedicine across borders. Accordingly, this study considers the cross-cultural differences through the scope of Western-SSA interactions.

The interaction of actors from different communities will introduce new semiotic relationships mediated through different actors. Simple social factors such as language barriers and time zone differences have limited the success of previous programs (Afarikumah & Kwankam, 2013). Different expectations of the behavior, authority, and hierarchy of healthcare professionals, as well as different cultures' ideas of what constitutes healthcare delivery stand as more complex social factors that telemedicine will encounter as it shapes the network of healthcare (WHO, 2010). With the increased interaction of people across different communities, telemedicine will lead to the interaction of people across different cultures with different values and expectations (Craig & Patterson, 2005). This could, for example, take form in linguistic differences or differing views on healthcare that could both cause resistance to the uptake of telemedicine (Heinzelmann, Lugn, & Kvedar, 2005).

The people involved in telemedicine vary depending on the scenario, considering that its application is broad; however, the most prevalent users will remain healthcare professionals and patients. The most important stakeholders are those for whom the technology is designed to help—the patients. Much of the general current healthcare system will remain similar—where doctors mainly diagnose and nurses support and treat patients (WHO, 2010).

With increased interaction of the medical community as a result of telemedicine, medical workers who were previously unwilling to serve or stay in rural communities are more likely to stay to serve those communities (Mbarika, 2004). Medical consultation over a distance allows foreign healthcare workers to gain experience about diseases not prevalent in their local communities and local healthcare workers to learn from the insights of foreign doctors (WHO, 2010). Other educational opportunities for students training to be healthcare workers include professional enrichment courses conducted over a distance (WHO, 2010).

Beyond human actors and human-machine relationships, one of the most prevalent social barriers to telemedicine includes the legal consideration for the use of the technologies, especially considering the transfer of medical data: namely, the confidentiality of the data being transferred, the policies of practice across different jurisdictions, and issues with medical liability (Al-Shorbaji, 2008).

Understanding the relationships within the network of actors in the health system will be crucial to maintaining telemedicine so that it will be accepted, sustainable, and useful for the purposes of improving healthcare.

Research Question and Methods

The research asks: What socio-cultural factors of Sub-Saharan Africa are relevant to the use of telemedicine—especially in regards to cross-cultural telemedicine?

Literature review is used to uncover socio-cultural aspects of both telemedicine and healthcare in SSA. Since every situation is unique (Burke, 2015), a broad set of literature is reviewed in hopes of uncovering common or contrasting themes. Accordingly, categories are formed by overlapping and common findings. The research primarily relies on literature, but also on discussions of the topic with professionals involved in telemedicine. The research focuses on articles within the last 15 years in order to review cases that utilize more current technologies in order to gain the most relevant insight.

Telemedicine is examined with the question of how different perceptions and social factors could affect the acceptance and proliferation of this technology in SSA. Considering that telemedicine is a technological sub-system of healthcare, it is a network composed of multiple parts rather than a single unique system. This system can be integrated into ANT to conceptualize the way in which different factors and interactions influence the outcome of a telemedicine network. Through this perspective, the goal is to uncover crucial relationships between actors that impact the whole network and to critique findings by their ability to impact the stakeholders engaged with telemedicine.

Results: Perception of Illness and Respecting the Patient

Telemedicine in SSA combines human-technology interaction, culture, and healthcare. Decomposing telemedicine into parts to identify socio-culturally relevant pieces illuminates different factors that affect the whole system. Ultimately, common socio-cultural factors relevant to the application of telemedicine in SSA include the perception of illness, collective view of personhood, patients' individual feeling of being valued, and patients feeling they are being treated fairly, while good communication stands as a tool to mediate differences. Figure 1 below illustrates the process telemedicine goes through as it first meets barriers to its adoption, then interacts with several socio-cultural artifacts as it is adapted into the healthcare setting with a focus on the patient perspective.

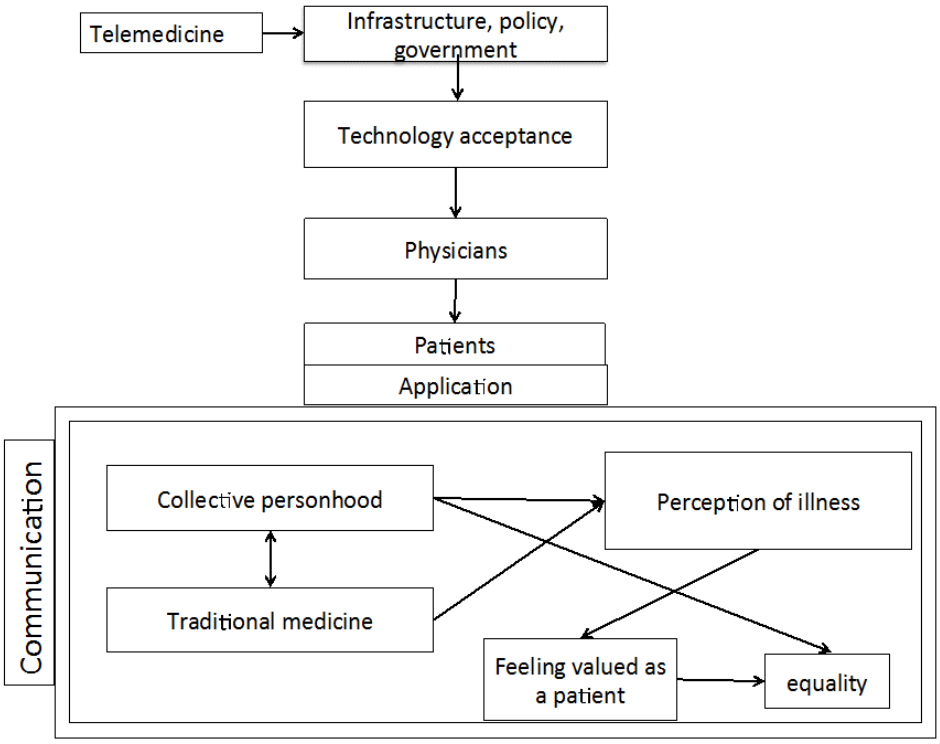

FIGURE 1. Flow of telemedicine based on gatekeeper factors, user acceptance, and socio-cultural factors that impact the stakeholders (mainly patients) and its place in the broader healthcare system.

Results: Barriers to the Adoption and Use of Telemedicine

These results can be framed through the lens of the TAM in which a user's intention and readiness to use a technology can be analyzed through his/her perceptions about the technology's utility as well as varying social influences (Malhotra & Galletta, 1999). An unsurprising finding about the acceptance of ICTs in SSA indicates that younger users are more prone to accept the new technology (Nwabueze *et al*., 2009; Okun, 2011; Venkatesh & Davis, 2011). Education, familiarity, perceived accessibility, and prospective fear of technology were main factors that contributed to the acceptance of ICTs and telemedicine by patients (Nwabueze *et al.*, 2009; Okun, 2011; Kifle, 2006; Saliba *et al*., 2004; Xue *et al*., 2014; Meso, Musa & Mbarika, 2005; Isabalija *et al*., 2011; Mathieson, Peacock, & Chin, 2001; Bagchi & Udo, 2010; Hwabamungu & Williams, 2010; Averweg, 2008). SSA patient interactions and acceptance of telemedicine and other ICTs relied more on how fast the users adopted to the technology rather than if they would or not, and interestingly enough the users became more accepting once engaged with the technology (Nwabueze *et al*., 2009; Mathieson, Peacock, & Chin, 2001; Malhotra & Galletta, 1999; Bagchi & Udo, 2010). This does not pose an alarming case for the user interaction with the technology because apprehension to usage

is mitigated over time as users become more familiar with the technology, while the main challenge is getting users to try out the technology.

Physician and healthcare professional resistance is one of the most significant factors preventing information systems from successfully being implemented in clinical settings (Poon *et al.*, 2004). User resistance from healthcare professionals stems from uncertainty about value, potential hindrance on communication, stubbornness to change, and concern about change in workplace structure and flow (Kifle, 2006; Xue *et al*., 2014; Bagchi, 2006; Bhattacherjee & Hikmet, 2007; Poon *et al*., 2004). This follows the TAM in that perception of utility is a main factor for the user's acceptance of telemedicine. Accordingly, technological acceptance of telemedicine should focus around doctors because they are ultimately the gatekeepers of the technologies. Since patients seek out health advice from the professionals, the patients' concern with the technology is mitigated by health professionals' acceptance-filters through which the technology reaches practice.

The research suggests that telecommunication systems have the best impact when they are implemented after basic human needs are accounted for (Musa, Meso, & Mbarika, 2005; Sankar, 1994). This includes using the technology to directly address needs of the community as well as giving priority to more pressing needs, when applicable. This is in accordance with TAM, which posits that the main variables for a user's acceptance and intention to use a technology stems from the perception of usefulness that the technology provides (Chau & Hu, 1999). In this case, the usefulness is understood as fulfilling a pressing need of the community—reasonable access to healthcare. Accordingly, telemedicine projects should apply the same principle and push to meet the needs of the community.

In fact, a recent case exemplifies technology acceptance via need fulfillment, in spite of prior use of the technology, in which the Southeastern Telehealth Resource Center helped to implement several telemedicine carts in Zambia through an effort with the Zambian military. This case shows that patients are happy and eager to adopt the telemedicine efforts despite the lack of any previous technology because the technology fills a lingering medical need hindered by distance (Brewer & Kesler, 2015).

However, it should be noted that broader socio-political barriers stand as the major blockades to the entry and uptake of telemedicine, namely policy, infrastructure, and government action (Saliba *et al*., 2004; Musa, Meso, & Mbarika, 2005; Isabalija *et al*., 2011; Kifle, Mbarika, & Datta, 2006).

Results: Being valued as a patient

A common theme in SSA patients' positive perception of the healthcare they received revolved around feeling that they were well-treated, that the providers took a genuine interest in their wellbeing, and that their concerns were listened to and addressed (Gilson, Palmer, & Schneider, 2005;

Modiba, Gilson, & Schneider, 2002; Tibandebage & Mackintosh, 2001; Gilson, Palmer, & Schneider, 2005; Byrne, & Sahay, 2007; van Staden, 2011; Pavlish, Noor, & Brandt, 2010; Okun, 2011; Muller & Steyn, 1999; Mutizwa-Mangiza, 1998). In some cases, this sentiment was identified as a contrast to bad experiences because patients felt a degree of disrespect or disregard—whether it stemmed from discrimination or lack of accountability of the workers (Gilson, Palmer, & Schneider, 2005; Modiba, Gilson, & Schneider, 2002; Tibandebage & Mackintosh, 2001; Gilson, Palmer, & Schneider, 2005; Byrne, & Sahay, 2007; van Staden, 2011; Pavlish, Noor, & Brandt, 2010; Okun, 2011; Muller & Steyn, 1999; Mutizwa-Mangiza, 1998). Additionally, improved working conditions, incentives, and increased accountability increased worker morale and subsequently affected patients' perception of how valued they were, which was often influenced by workers' attitudes rather than the diagnoses themselves (Willis-Shattuck *et al.*, 2008; Devarajan & Reinikka, 2004; Mathauer & Imhoff, 2006). Additionally, other ICT uses gained more impact and acceptance with the addition of face-to-face interactions (Molony, 2009). This sheds light on the value placed on individual-focused and personal healthcare treatment.

This finding highlights how the relationships between different human actors affect the perception of engagements within the system. Subsequently, technological actors that are injected into existing relationships must be designed and implemented in such a way that respects the outcome of the relationships it affects. In the case of telemedicine, a link between a healthcare provider and patient is replaced by a combination of both human and non-human actors—many times with uncommon devices or people. However, the goal remains patient-focused, so changes should be made by those actors addressing the patient-actor in a way that seeks to optimize the perception of feeling valued as the patient. This includes design of future telemedicine devices to mediate and ensure this perception and for the professionals to consider the ways in which they can convey this across the untraditional relationship introduced.

Results: Equality

Building on the theme of being valued as a patient, a common theme that permeated into SSA people's experience with healthcare related to whether they were treated equally and fairly or not. This theme also has broader context in that many political, industrial, and social structures can be heavily influenced by favoritism and patronage, so it is no surprise that patients' perception of their experiences with clinics and healthcare workers often included whether they felt like they were treated equally and fairly or not (Franco, Bennett, & Kanfer, 2002; Mutizwa-Mangiza, 1998; Okun, 2011; Gilson, Palmer, & Schneider, 2005; Gilson & McIntyre, 2007). Additionally, the economic inequalities that interact with and are exacerbated by the aforementioned social factors are strife

throughout society in SSA. Patients can thus be skeptical of being exploited—which is an extension of the inequality issue (Merten *et al.*, 2010; Schumaker & Bond, 2008; Nguyen *et al.*, 2007).

Results: Perception of Illness, Symptoms & Traditional Medicine

Some SSA patients may hold different views of what illness means than many Western professionals who will engage with SSA patients via telemedicine. In many cases, this may include witchcraft (Sabuni, 2007), but the specifics will not be a focus of this research. It should be noted that those patients who would come to a clinic utilizing telemedicine will likely have traditional medicine influence their perception to varying degrees and not completely accept "Western Medicine." In fact, patients will seek traditional medicine in addition to Western medical treatment because they feel western medicine lacks a personal aspect and does not address underlying social concerns of harmony (Golooba-Mutebi & Tollman, 2007; Irunde *et al.*, 2005; Roura *et al.*, 2009; Merten *et al.*, 2010; Dilger & Luig, 2013, p. 9–10; Muller & Steyn, 1999; Mhame *et al.*, 2010; Benedict, 2014; Sabuni, 2007). Even so, practitioners of traditional medicine seek both the physical and metaphysical (Benedict, 2014), so there is not a complete disconnect between the two perspectives. A major influence of traditional medicine is that social conflict and disharmony are intrinsic to illness, such that "illness is given socially recognizable meanings. That is, they are made into symptoms and socially significant outcome and consequently, adequate classification on causation and therapy are designed within the sociocultural context for its management" (Benedict, 2014). As previously mentioned, this is often where the shortfalls of Western medicine to SSA patients are identified (Benedict, 2014), and it may extend to the degree that SSA patients feel there is a certain degree of distinctly African illnesses that are not understood or treated by Western medicine (Benedict, 2014). Accordingly, telemedicine presents an opportunity for cross-cultural healthcare in which these differences will arise. Thus, the differences may present themselves as factors that will limit the effectiveness of treatment through telemedicine.

Perception of illness is very interrelated with the concept of feeling valued as a patient because a patient will feel valued if their perception of illness is considered in the patient-healthcare provider interaction. Accordingly, this will also affect the relationship in healthcare delivery via telemedicine through the actions of the provider as previously discussed. Therefore, devices and practices should be designed so that they are conducive to fostering this mutual understanding.

Results: Collective Personhood

A common SSA cultural theme is the influence of community and the concept that an individual is a part of the broader community. This concept is commonly known from the African notion of *Ubuntu*—I am, because we are—as a part of "collective personhood and collective

morality" (van der Colff, 2003, p. 258). Patients from SSA may perceive themselves as a part of a broader community, and thus work to maintain their contribution to the harmony of the broader community. This spans, but is not limited to, groups such as families, tribes, social groups, and surrounding communities (Okon, 2011).

Merten *et al.* (2010) point out that "Western medicine conflicts with these social bonds by targeting the individual alone. In traditional medicine, however, where diagnosis and treatment are primarily understood in social terms, a perceived threat can be addressed collectively" (p. 30). Accordingly, a patient's view about the meaning of different diseases or symptoms may be heavily influenced by community-formed conceptions, while adherence to treatments can be influenced by a patient's perception of his/her broader social duty and place in society (Rubel & Garro, 1992; Byrne & Sahay, 2007; Ware *et al*., 2009; Merten *et al*., 2010). These findings closely match patient needs and beliefs that traditional medicine addresses and identifies the deeper roots of illness and medicine by illustrating the overlap between the concept of collective personhood and traditional medicine. This concept is a contributing factor to the stigma associated with many diseases—particularly HIV/AIDS. Accordingly, one of the largest barriers to seeking treatment for HIV/AIDS is the stigma associated with it including the status that it can broadcast to a community (Unite for Sight, 2015).

Collective personhood can be used to understand the relationships between the native SSA patients, healthcare providers, and others involved in the telemedicine network at hand. This is another important point to consider in the telemedicine network since it often brings many different cultures together. Accordingly, an outsider can learn about the SSA expectations and cultures through these relationships. Non-natives in the telemedicine network should thus understand these values when forming relationships with natives. Respecting and considering these values will work to form the best relationships and ensure the smooth functioning of the larger system.

Results: Communication

A common concern about the efficacy of telemedicine—especially for cross-cultural care—is the issue of communication barriers. Communication is not necessarily a novel finding or specific to telemedicine as opposed to in-person healthcare, but it is effectively the medium through which many of the social and relational issues exist. As Figure 1 conveys, it will be a broad tool to achieve the goals of respecting and building on cross-cultural interactions in telemedicine to achieve the most positive impact. In fact, Xue *et al*. (2014) found a trend in medical literature suggesting that "healthcare professionals have negative attitude towards telemedicine due to [the] concern that the physician-patient communications will be ineffective." It is not a surprise that patients are found to be unsatisfied and frustrated when they have trouble

communicating with their doctor because of language barriers (Pavlish, Noor, & Brandt, 2010; Saliba *et al*., 2012). Good quality communication of information—including and beyond language—between the patient and providers will be a glue that contributes to quality cross-cultural healthcare delivery through telemedicine. Communication will allow healthcare professionals engaged with telemedicine to address the patients' concerns despite distance and discordant views on illness. Communication of intentions and interest are especially important for the settings in which consultations via telemedicine seem impersonal as an alternative to address the previously discussed requirement for displaying genuine care in the patient's wellbeing. In addition, communication is a means of linking Western views of medicine and traditional African views. For example, a physician could communicate the link between stress and suppressed immune function (Reiche, Nunes, & Morimoto, 2004), which connects the idea of social disharmony to illness, or how 'taboo' activities —especially sexual taboos—make patients more susceptible to diseases like STD's (Weitz *et al.*, 1998). Ultimately, many of the relationships between the actors are created and sustained through communication, so it makes sense that communication will help to uphold the influencing factors as discussed. The maintenance of these relationships will thus positively influence the whole system as it is the glue that connects the individual actor-relationships. The way that the design of telemedicine devices will foster relationships discussed—such as mutual understanding of perception of illness—is accomplished through communication. The design requirements that mediate the concerns discussed will thus be accomplished through communication capabilities.

Discussion: Broader Significance and the Theoretical Framework of Results

According to Hughes (1987), all the human and non-human components of a socio-technical system interact to some degree and create the overall system. Accordingly, changes in relationships or components will affect the whole system. Telemedicine is a socio-technical system composed of several artifacts that span human actors, technology, power relationships, and socio-cultural relationships that define the whole by their relationships to each other. I break down telemedicine into the subsystems that define the broader system in order to analyze them individually because it follows that, along with Hughes' (1987) concept, that analyzing the subsystems will elucidate factors that could ultimately affect the outcome. Building on the concept of ANT, I identify changes, actors, and relationships that build up telemedicine. Telemedicine is similar to an injection of a socio-technical system into the already existing healthcare network that restructures the way that patients receive healthcare (Cartwright, 2000). This creates a network in which healthcare professionals are able to act and use their power at a distance (Latour, 1987). Accordingly I study the already existing healthcare structure to

understand the factors already at play in the broader system that telemedicine is a part of. I study to find morals and cultural artifacts of SSA that could affect how people relate to both ICT and healthcare, and use them in the sense that these will be the way that actors and components interact with each other. Many of the factors identified will become more apparent after the implementation of a program because it allows time for the situations to arise that cause the conflicts. Furthermore, considerations of these factors will contribute the best healthcare delivery and engineering practice that aim to meet people's needs.

Discussion: Limitations

First and foremost, I am not from SSA. As such, I can only understand the socio-cultural factors discussed through an outsider's perspective trying to conceptualize non-concrete ideas. This can lead to misunderstandings and missing out on nuances by attempting to box in different ideas. I have also been limited by time despite having developed evolved insights and directions as I conducted the research. As far as limitations relevant to the content of the research, many case studies and reports of telemedicine contain more technical content, so it can be hard to pull socio-cultural aspects from such papers, and I did not dive into the into the policy aspects. Since telemedicine, SSA, and culture are so broad and diverse, the methods used were limited to creating observational data.

Conclusion

Different societies have developed rich and complex cultures and ways of viewing the world. As the world continues to flatten, cultures will increasingly interact in a diverse spectrum of different contexts. Telemedicine is a convergence point of different cultures in technology, illness, and healthcare. The socio-cultural factors that influence people must be accounted for so that misunderstanding does not lead to a dissolution of a useful technology. Common ground on such issues as the perception of illness and expectations of the patient-doctor interaction contributes to a sustainable and successful use of cross-cultural telemedicine. Further research can be done to investigate deeper into specific communities about more specific influencing factors—for example to what degree does traditional medicine drive intentions and why is it that way. Additionally, it would be of value to research how different factors change under different conditions throughout the lifecycle of a project. Ultimately, I found that common socio-cultural factors relevant to the application of telemedicine in SSA include the perception of illness, collective view of personhood, and being valued and treated fairly as a patient—while good communication stands as a tool to mediate between differences.

This project in some sense sought to understand a culture by ways of comparing two cultures against each other to identify prevalent factors. Although this may be a valid method of understanding a foreign culture, it

can contribute to divisive us-and-them mentalities. In an increasingly flat and pluralistic world this method seems to be less productive. This begs the question: should we continue to understand each other through our differences, or should we seek mutual understanding?

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