

How UNC Health Expanded Telemedicine in COVID-19

A Content Analysis Proposal

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Introduction:

Telemedicine as an innovation has long faced both low patient adoption rates and a regulatory healthcare system unwelcoming to its use. Patients have most often chosen the in-person care which they knew from personal experience, forgoing virtual care options either from either comfort or wariness of insurance practices that don't reimburse virtual and in-person visits equally. However, many American healthcare systems still chose to create or purchase telemedicine options for their patients' eventual use. Little did their leaders know that the sweeping disruption of COVID-19 would demand a rapid switch to prioritized telemedicine care. State and local governments, in response to the virus, recommended that patients avoid non-essential medical visits. In the absence of secure in-person visits, virtual care suddenly received mandated adoption.

Though the gradual reopening later in 2020 decreased the earliest rates of telemedicine use, its prevalence has remained at higher levels than before the pandemic. Patients have now full experience with healthcare's digital options, and they could choose in the future to use it more often. For healthcare systems during COVID-19, telemedicine use was ingrained during the rapid prioritization of its technologies. Going forward, their providers will need the support of internal resources to achieve optimal telemedicine use — meaning the provision of streamlined, equitable care to patients. This future paradigm applies to UNC Health, because both its providers and patients stand to gain from optimal telemedicine use. Careful analysis of the system's COVID-19 internal communications with providers can illuminate the strategic frames used to usher in their telemedicine adoption, and perhaps can apply to creation of the internal resources which will support future telemedicine use.

Review of Relevant Literature

My proposed study wouldn't be the first to examine telemedicine adoption, given that its technologies have been available for decades. The lack of commonplace telemedicine in medical care contexts wasn't due to its technological capability, but rather due to lacking patient adoption. To structure the study, I need to draw from literature which has already explored telemedicine adoption trends, technological adoption insights, and message framing for medical audiences. During my review, I also came to account for practitioner audiences' perceived barriers regarding innovation.

The State of Telemedicine: Overcoming Barriers to Adoption

Telemedicine, which specifies the broader “telehealth” for a medical-care application aside from mental health and substance abuse treatments, means medical care delivered via video conferences, phone calls, mobile-application modules, wearable monitoring devices, and other technological means (Hatcher, 2020). It has existed longer than our current technological capability would suggest, mostly as precursor technologies (telephones, radios, and even two-way television) that joined patients and healthcare practitioners at a physical distance. But with the advent of more efficient technologies like smart phones and wearable monitors, telemedicine has become a new cutting-edge development for patients, insurers, and providers.

Past analyses asserted that telemedicine and other technological innovation, though advanced, faced a healthcare system not conducive to their optimal use (Standing and Standing, 2008). That systemic unreadiness for healthcare innovations included legal and financial barriers which have prevented telemedicine adoption for over 40 years (LeRouge and Garfield, 2013). Those researchers’ specific survey article charted the roots of telemedicine barriers in technological, legal, financial, and business-strategic areas, along with the most current advancements on each front. Their exhaustive review of healthcare’s evolving place for telemedicine concluded that, to optimize its adoption and optimal use, healthcare stakeholders must integrate telemedicine within their daily practices. Telemedicine as a sidelined experiment would do no good for holistic care, though connecting its care to patients and its electronic health records for providers would cement our use for it (LeRouge and Garfield, 2013). In any analysis of persuasive frames for telemedicine use, a corresponding emphasis on normalized, incorporated telemedicine should become one standard to monitor.

As one can guess, telemedicine has become integrated at an unforeseen rate since 2013. Though other developments had spread its visibility and improve its technology prior to 2020, the COVID-19 pandemic has done swift and far-reaching damage to the previous barriers against telemedicine adoption. A July 2020 professional webinar on burgeoning telehealth revenue opportunities explained that COVID-19 has loosened state restrictions on patient’s telemedicine parity, meaning reimbursement from insurance providers at the same rate for in-person visits (Park and Patel, 2020). Before this year, a state like North Carolina hadn’t had restricted this parity, so that telemedicine “visits” weren’t reimbursed at the same rate as in-person visits.

However, the pandemic and its social-distancing policies ushered telemedicine use into the public consciousness as a safer way to receive medical care. Another barrier to adoption, the restricted bandwidth of rural communities who can't rely on fast Internet to obtain virtual visits, also received a blow during COVID-19. On August 3, President Trump issued the "Executive Order on Improving Rural Health and Telehealth Access," which specifically directs improved bandwidth capabilities to those communities which historically haven't had them. This technological disadvantage has not yet been wholly solved, but it will likely no longer remain at the same restricted level as in the past (LeRouge and Garfield, 2013).

Corresponding to this weakening of telemedicine's barriers is increased adoption from both patients and providers, joined by reported satisfaction in those publics. Through a sample-based review of patients and physicians, an article published in September 2020 found self-reported satisfactions from both groups to be exceptionally high (Rizzi et al, 2020). The surveys distributed to patients who had received virtual visits and to the physicians who had led them reported high satisfaction from each group: 92.9% of patients reported they would complete another telemedicine visit. In their view of telemedicine's integration with in-person medical visits, the doctors surveyed said they believed a virtual visit successfully replaced an in-person visit 78.4% of the time. In all 612 telemedicine visits which this study reviewed between March and May of 2020, responding patients and physicians reported some level of satisfaction. That large amount of visits also signals the increased adoption which the North Carolina Healthcare Association had reported (Park and Patel, 2020). Increased adoption, paired with reported satisfaction, will likely keep telemedicine as an integrated feature of healthcare services in need of careful application.

As of September 2020, states in the U.S. have begun to reopen businesses and healthcare clinics to a greater extent. Accordingly, telemedicine visits have decreased as in-person care has again become available (Ross, 2020). But experts in both medical care and technological investment expect that telemedicine use and adoption will remain common after the pandemic, despite the initial drop-off in virtual care (Stead et al., 2020). This likelihood of telemedicine use remaining more relevant than prior to COVID-19 requires analysis of its implementation, especially in the large healthcare systems which serve so many Americans. While the literature concerning telemedicine has covered patients' use, the practitioner publics who will coordinate

telemedicine use each day deserve that same careful attention. Their reception of the innovation should provide a basis for analysis of the communications which reach them.

Technological Adoption: Telemedicine as Innovation for Practitioners

Because telemedicine for practitioners presents a burgeoning example of technological innovation, my study of its acceleration in the healthcare landscape will need to draw from earlier literature on technology acceptance. Chau and Hu had first explored telemedicine as a technology to be accepted by physicians in 1999, and their findings suggested that the broader technological acceptance model reasonably depicted physicians' intentions to use telemedicine innovations (Chau et al., 1999). Their early finding referenced the original technology acceptance model, which initially sought to understand and classify users' intentions, perceived barriers, subjective norms and other predictors of computer use (Davis et al., 1989). That initial research problem, which the original abstract called "resistance to end-user systems by managers and professionals," led the researchers to develop systems of user determinants of technological adoption. Davis later examined technological acceptance to point out the central role of *perceived usefulness* (Davis, 1989). Its citation from Chau and his team of researchers in 1999 speaks to the continued influence of the technology acceptance model, specifically how it helps researchers understand the determinant factors of whether an innovation is accepted by audiences, in this case providers considering telemedicine use. Doctors and nurses form the key professional audiences of the content analysis, and as Davis referenced centrality of perceived usefulness, that predictor should become a key element of analyzing internal communications regarding telemedicine use.

In turn, deepening this study's reference of medical practitioners means returning to Chau and Hu's updated, exploratory study of technology acceptance in 2014. Their study dealt specifically with physicians' acceptance of telemedicine, and their subsequent results highlighted how physicians, as one group among other professional groups, tended to value pragmatism of the technological innovation the most, along with its compatibility to their existing medical practices (Chau and Hu, 2014). These findings draw from the audiences whose communications concern my analysis, and the consistent appearance of perceived usefulness of technology (for both generalized professional audiences and physicians in particular) can inform my analysis of the communications messaging which doctors and nurses received. Namely, a communicator

highlighting the usefulness (the convenience and efficiency) of telemedicine could reach the existing preferences of those audiences.

More research into practitioners' adoption has demonstrated other key predictors of telemedicine use among those audiences, complicating the role of perceived usefulness by adding more elements to analyze. A 2012 research study sampled doctors and nurses in Barcelona to examine how the technology acceptance model informed their use of telemedicine, and its results found "perceived facilitators" to be the most important variable for their full intention to use telemedicine (Gagnon et al., 2012). This finding had come from a questionnaire which included perceived usefulness, habits, attitude, compatibility, perceived ease of use, and subjective norms. That Gagnon and her team of researchers highlighted perceived facilitators, while Chau and Hu's acceptance model found perceived usefulness to predict intention to use telemedicine, provides another plank in the basis of evaluating provider-facing communications about telemedicine expansion. In hypothetical communication copy, that could look like referencing the existing medical infrastructure which telemedicine joins, eases, and improves. To turn from purely scholarly evaluation, a 2011 synthesis of four "real-world" studies formulated and recommended a technology model for remote monitoring of elder patients' activities (Mahoney, 2012). The specific audience under examination was the elderly patients, rather than the professional providers who gave them care, but Mahoney's documentation of both the caregivers and patients applies to my understanding of predictors to adopt medical innovations. In particular, its applied contexts give insight as to how a healthcare system could best persuade practitioners to best use telemedicine in their own applied contexts. The exploration of the caregivers' perceived barriers, their need for tailored technologies, and willingness to use the system could also inform how a healthcare system should understand its practitioners' determinant views before communicating with them.

Given these insights into how the technology acceptance model has centered perceived usefulness, perceived facilitation, and integration of technology with this audience, and how researchers in the last few decades have specialized its usefulness for telemedicine as an innovation, my proposed research would use innovation acceptance as a foundation for communicating telemedicine's expansion. Technology acceptance has remained a relevant and influential theory through the years. But beyond its basis, the content analysis then needs to

specify the frames of practitioner-facing communications. Whom does telemedicine, as presented to these employees, most benefit?

Message Framing: Telemedicine as Benefitting Whom?

As with any message that reaches audiences with critical news, telemedicine adoption communications must choose how to selectively depict, or *frame*, an innovative departure from many practitioners' past experiences and experiences. Many speakers in the technology and medical fields have cited the potential of saving costs and time through integrated virtual visits (Park and Patel, 2020). Assertions that healthcare systems and their employees would benefit from telemedicine frame the need for its adoption in terms of self-interest. But the interests of patients likely matter to those practitioner audiences also, and so the review of framing literature should best inform which of these frames have been found most optimal. Indeed, framing telemedicine as an equalizing route to greater and more equitable access to care has already occurred (Hoffman, 2020). Analyzing content for these frames, whether as self- or patient-serving, would effectively evaluate how the target audiences would receive that content.

As a note on technological innovation frames overall, a 2010 study considered security technology adoption as mediated by negative framing to persuade users to utilize the devices (Shropshire et al., 2020). The specific frame in question was negative (fear-based) framing in the persuasive presentation of two security technologies, one a virus detection technology and the other a virus preventative technology. The difference between prevention and detection in security technology doesn't easily correspond to the variety of telemedicine options, but the difference mattered to the viability of fear-based framing — negative frames correlated with adoption of the detection technology. In corresponding telemedicine framing, a negative fear-based frame could include referencing the chance that lacking telemedicine will cost underserved patients the chance to receive convenient medical care. Whether these appeals to practitioner audiences would persuade them to adopt telemedicine remain unknown in the literature.

However, past scholarship does chart how medical innovation frames have emphasized ease and flexibility of use, efficiency, and secure feedback from mobile health devices (LeHoux et al., 2011). In particular, those devices' manufacturers couched their products in efficient and convenient frames while seeming to leave out their implicated changes to healthcare delivery, such as how the individual improvements of the devices would compare favorably to existing

healthcare strategies. LeHoux et al. found that the existing frames for the devices chose “valuable socio-technical goals” which resonated with healthcare stakeholders, and to evaluate telemedicine communications, I’d need to consider their identified elements as a supported choice of frames. A hypothetical internal communication between healthcare staff and doctors by this selected frame would likely explain the time those doctors would save for emergency or high-risk medical care, if their telemedicine use streamlined their everyday medical visits.

One major problem identified in framing healthcare innovation is the wide range of stakeholders in the healthcare industry and practice, and to adapt to their divergent interests, researchers have developed a “thematic framing” model that layers solutions, scenarios, goals, and themes (Dijkstra and Van Der Bijl, 2016). That exact model drew from a “human-centred design.” From a generalized concern of which medical devices people would prefer to have, the model deepens in understanding to involve which medical scenarios they would prefer, why they would prefer those devices and those scenarios, and which personal values and meanings drive their first-level preferences. From this last level of human-centered insights, the researchers argue, corporate communicators should frame their healthcare innovations. As an existing rubric for weighing the completed telemedicine, the thematic framing model could become crucial. Did healthcare communicators appeal to the underlying values of their doctors and nurses? Or only to their topical preferences for situations like convenience and remote work? These two questions present an adequate reference point for future content analysis, as the answers should be easily found in the communications’ messages.

Lastly, the consequences of telemedicine adoption framing should draw from existing research on effective frames for inducing medical practitioners’ acceptance, such as 2018 research from Bai and fellow researchers into the attitudes of Chinese medical students. Their findings in this limited but comparable sample corresponds with the earlier negative-frame discussion: participants who experienced a loss-framed message in food safety education were more likely to accept the message than participants who experienced gain-frames (Bai et al., 2018). Personal involvement, the backbone of each frame, was found to mediate the message acceptance. Given the demonstrated emphasis which doctors have placed on pragmatism and compatibility in accepting telemedicine, a relevant evaluation for telemedicine communications could be the joint message-frame that places pragmatic tech as a self-involved benefit (Chau and

Hu, 2014). Exact physician engagement efforts should account for their values as an integrated part of the engagement, rather than placing adoption of new medical services as an opposing force which needs to overcome those values (Skillman, 2016).

Methods for Telemedicine Communications Content Analysis

To move from the conceptual basis to the actual content I plan to analyze, I'll describe the media which I propose to sample as relevant forms of telemedicine-serving persuasive messaging. To provide context for the sample and subsequent coding measures: from personal experience in professional settings and exploratory interviews, I can say that the media involve several digital avenues. Communications with members of any organization (and especially internal messaging from administration and leaders to employees) have diversified to the point that a sample must expand to fit them.

Sample

[feedback – cut out doctors' feedback from the sample? (likely not feasible)]

I will sample the internal communication materials which occurred at UNC Health between March 23, 2020 and October 3, 2020. This timespan corresponds with executive orders issued in North Carolina, given that the first stay-at-home orders took effect on March 27, while the state entered Phase 3 (the loosest COVID-19 restrictions) on October 3. Though the sample could extend into October and November of 2020, the six-month stretch also corresponds roughly to the period which UNC Health communicators and doctors needed to adjust to their expanded telemedicine use.

This temporal sampling will encompass the primary internal communications media which the UNC Health informatics and communications team used to introduce and update developing telemedicine plans to their physicians. According to preliminary research interviews, several media recurred in communicators' explained overviews: both mass and personalized emails sent to providers, recordings or notes from online meetings between communicators and hospital directors, information displayed in COVID-19 resource pages anywhere on unhealthcare.com, and any media contained in telemedicine-training resources which UNC Health providers would've received.

Coding Measures

The measures for analysis will adapt the three components of the reviewed literature: technological adoption, existing message frames, and perceived barriers to telemedicine. In particular, adapting these conceptual bases will require a measurement of how frequently their operationalized language appears in the manifest content, however the three bases interact or appear alongside one another, and how their occurrence changed over time. But these broad descriptions of adapting theories to analysis first require operationalization.

Technological Adoption

To code for persuasive messaging, we'd begin first by referring again to Chau and Hu's adaptation of the technology acceptance model to telemedicine specifically. Their work highlighted perceived usefulness along with the value of pragmatism to audiences of medical providers. Operational definitions of *technological adoption* in communications content would feature two parts: language which references the logistical steps of using telemedicine options, and language which mentions telemedicine's usefulness. Each type of messaging is expected given the context of these communications, though coding for telemedicine's usefulness and pragmatic value more closely supports the analysis's central question of the messages' persuasive framing.

Let's list sample phrases which exemplify the two technological adoption codes. Language referencing the technological or logistical steps could read as, "Make sure to complete our attached training modules so that you understand the newest parts of the physician portal." Language mentioning telemedicine's usefulness could read as or similar to, "When you and your patients can't come into the clinic, these virtual steps give you both a more direct path to person-to-person care."

Benefits Framing

This measurement for the internal communications media is the central content code for the analysis, as it extends back to the aims of the study. The three frames in question when evaluating UNC Health communications are financial benefit to the healthcare system overall, convenience or safety benefit for the providers, or equitable-access or safety benefits for the

patients. Underlying these three frames and their corresponding codes are the level of personal involvement which physicians feel.

Accordingly, coding measures for each frame will correspond with language which contains or could reasonably elicit feelings related to financial, personal, or patients' benefits. Not only will the coding record the instance of this language genre's appearance, but also how often they occur in relation to one another, both in communications which doctors receive and in that which they send in reply. Markers of the frames' respective frequency would help address the original research aim of weighing these framing strategies against one another in communications with doctors.

Sample language for the financial framing could include phrases such as, "Telemedicine use for most medical visits are what UNC Health needs at this moment to keep its doors open in the future," along with citation of financial statistics ("dollars gained in revenue" or "costs saved"). Sample language which would depict the coded frame of doctors' benefits could include, "Expanded telemedicine for most medical visits is our best option to keep you and your staff safe" or "Like our other COVID-19 policies, default telemedicine use is a safeguard for you, your coworkers, and ultimately your families as well." Finally, any language in the sample would be coded as patient-framed if it names, explains, or justifies telemedicine use as a necessity or benefit for UNC Health patients: "Your patients will feel uncertain about coming in, and getting care virtually relieves them of that worry"; "Some rural patients had already faced difficulty in getting to our clinics, but thanks to COVID, we're introducing them to an easier option for medical care"; or "If patients are scared about coming in person, teaching them to use telemedicine relieves them of that COVID-19 risk."

Perceived Barriers

Like the codes meant to mark technological adoption, noting the occurrence of barriers-based messaging should remain secondary to the persuasive benefits frames. But because the system's communicators convinced their providers to adopt the expanded telemedicine during the intemperate COVID-19 context, analysis of their persuasion would be incomplete if it didn't account for the barriers doctors were expected to perceive. Coding for their perceived barriers in the provider-facing messages entails noticing the language which assumes that barriers exist and addresses them.

For instance, examples language from provider-facing messaging could include phrases like, “We understand that now might be the worst time for new training,” “you may feel that you or your patients won’t be able to figure out the best way to use this e-visit feature,” “we assure you that our technology is easily learned, and we’re here to assist you if/when you struggle to use it,” and others. In reverse, perceived barriers in the providers’ returned communications could include language like, “I don’t think my staff or my patients can learn to use all this tech, given everything” or “Virtual care won’t give me the full access I need to help my patients,” among others.

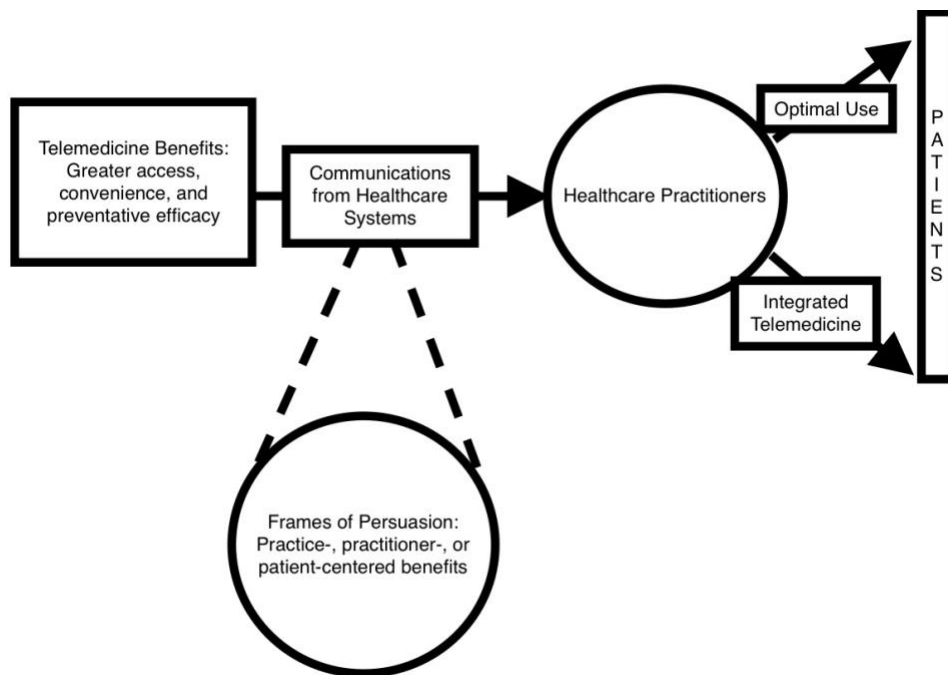
Analysis

Analysis of communication media from this sample will draw also from the three coding measures, specifically through thematic grouping of those technological adoption, framing, and barriers language. First, respective frequency counts will be taken from each theme. Once these thematic proportions have been calculated and connected to their most-prevalent users, a second analysis will attribute these thematic codes over the timespan of their use as well. It will chart at what point in the telemedicine change’s process those themed languages most often took place. This second grouping of the coding will supplement any understanding of how the communication strategies might’ve changed as the pandemic, doctors’ usage, or national policies changed.

The final step of insuring rigorous analysis standards is establishing intercoder reliability between two researchers (Neuendorf, 2017). Though the temporal sample could lend itself to a temporal split between two coders (in which the sample would divide into two overlapping segments for each researcher to code and compare), the chance for a diminished volume of internal communications over time threatens to skew the analysis. The better option for coding the sample between two coders while retaining reliability is a randomized split of the communications content into two equal segments. After each researcher codes their respective half, they will compare their thematic groupings and their averaged frequency counts for each. If the two coded halves don’t yield reliable similarities, then revised analysis methods will be created to remedy the discrepancy.

The Conceptual Model of Persuasive Frames in Telemedicine Communication

The proposed content analysis of the internal communications that swept telemedicine changes into the professional lives of providers will influence how effectively telemedicine reaches patients with its healthcare benefits. Though telemedicine is primarily viewed as technology, its use requires doctors and nurses to harness it optimally. In short, telemedicine will only bring its fullest benefits to patients when providers best understand it, and their understanding depends on the communications (and the benefits-based frames) their employers have used. The following conceptual model envisions the relationship between internal communications about telemedicine use and its optimal practice for *all* healthcare systems, though the current content analysis proposes only to examine the communication frames of UNC Health.



Discussion

The implications of this proposed content analysis extend to the future viability of virtual care at UNC Health. A careful look at the persuasive frames which the healthcare system’s communicators used when ushering in full telemedicine usage will present how well those trends performed in provider-facing communications, when paired with future study of the effects on both the providers and patients’ experience of COVID-19 virtual care. If we take the results of

this proposed content analysis at face value — as strategies responding to an unforeseen medical emergency — then their insights could lay the first stone of the larger, multifaceted foundation of future telemedicine use. As virtual care options remain viable and more common than pre-pandemic levels, healthcare systems will need to establish the best practices to support their providers in using them for patients' benefit. The specialized case of UNC Health and its internal framing strategies is one step along that longer path.

However, as I alluded to, this study's design will not account for the effects of UNC Health's internal communications about telemedicine use. The selected sample places more emphasis on provider-facing communications materials, rather than on the providers' own communications in reply to or criticism of the framing techniques. A full analysis of all UNC Health's symmetrical internal communications wouldn't be feasible nor lend itself to tightly-designed examination. And so, another study would have to emphasize the providers' replied communications, perhaps while also exploring their thoughts on their virtual care's quality. Those insights lie outside the scope of this analysis.

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