Telemedicine: Technology mediated service relationship, encounter, or something else?

Cynthia LeRouge\textsuperscript{a,1}, Monica J. Garfield\textsuperscript{b,*}, Rosann Webb Collins\textsuperscript{c,2}

\textsuperscript{a} Dept. of Health Management & Policy, School of Public Health, Secondary appointment, Decision Sciences and IT Management Dept., John Cook School of Business, Saint Louis University, Salus Center, 3545 Lafayette Ave, Room 365, Saint Louis, MO 63104, United States
\textsuperscript{b} CIS Department, Bentley University, 175 Forest Street, Waltham, MA 02452, United States
\textsuperscript{c} Department of Information Systems and Decision Sciences, College of Business, University of South Florida, 4202 East Fowler Avenue, CIS 1040, Tampa, FL 33620-7800, United States

\section*{Article Info}

Article history:
Received 8 November 2011
Received in revised form 15 March 2012
Accepted 3 April 2012

Keywords:
Telemedicine
Service encounter
Medical video conferencing
Servicescape
Managing telemedicine encounters

\section*{Abstract}

\textbf{Purpose:} Service interactions between service providers and health care consumers happen daily in health care organizations, and can occur face-to-face or through mediating technology. We use the demanding and rich environment of telemedicine to better understand the nature of the real time service-encounter interactions among the human and technology actors engaged in the process and to inform telemedicine providers about key factors to consider in telemedicine design.

\textbf{Methods:} We conducted a case study of medical video conferencing (MVC) for the delivery of patient healthcare (a form of telemedicine) using multiple data collection and analysis techniques involving a range of telemedicine stakeholders.

\textbf{Results:} The research reveals that telemedicine requires a new kind of service relationship, an Advanced Encounter, with unique relationships between the telemedicine service providers, presenters, patients, and technology. Seven facilitating factors for the Advanced Encounter of telemedicine are identified and discussed, including the telemedicine servicescape: a set of supporting structures that are critical to telemedicine success.

\textbf{Conclusions:} Key contributions are a deep understanding of the relationships between telemedicine actors, and the organizational actions needed to deploy a technology-mediated telemedicine service.

\section*{1. Introduction}

A service interaction is a transaction between service provider and service consumer in which customers often develop indelible impressions of an organization [1]. While the term service relationship is used liberally in the service domain, not all service delivery has the objective of achieving personal (and social) continued interactions between service provider and service consumer [2], and therefore not all service interactions are designed to create a service relationship. These interactions fall along a spectrum of face-to-face encounters with singular encounters (a.k.a. arm’s length relations) at one end of the spectrum, enhanced encounter interactions in the...
center, and service relationships (a.k.a., socially embedded relations) at the other end, each with its own implied goals, characteristics, and support mechanisms [3–5]. For example, in healthcare, a Single Service Encounter interaction would be a spontaneous urgent care center service visit and a Service Relationship interaction would be constituted by a periodic visit to a trusted family doctor. Since consumer expectations and service delivery decisions made by management may greatly differ between single service encounter interactions and service relationship interactions, to call all service delivery a service relationship can lead organizations to incorrectly interpret their ties to customers, create false expectations, and lead to poor decisions about delivering service to customers [6].

“The literature on doctor–patient communication demonstrates that patient, provider and contextual characteristics influence behavior within medical interactions, which in turn is an important determinant of health outcomes” [7, p. 311]. How these relationships are established and played out can have significant impacts on both the satisfaction of the patients (and their families), their cooperation in the medical procedures and the quality of the service [8]. The growing role of empowered, consumerist patients who demand a more participatory role in healthcare and better access to health information and medical experts [9] along with the emergence of powerful and more affordable technology, have created an environment of growing importance for the use of communication technology to access or transmit health information or provide technology mediated health services [10]. We look at telemedicine as an instantiation from which to explore technology mediated service interactions in the health care context. Given current medical attention to patient-centered care, the telemedicine interaction between patient and provider provides a work phenomenon that entwines task execution and relationship building within a rich media environment. While telemedicine can deliver a wide range of healthcare services, we focus on the use of medical video conferencing (hereafter referred to as “MVC”) and its application to direct patient care (e.g., medical exam). Improved technology, declining price points, and increasing awareness have made MVC affordable and accessible, thus facilitating its use as a tool for various types of service encounters [11]. In order for such a critical service interaction to be effectively executed, additional knowledge is needed about the nature, structure, and enabling factors that lead to successful service provision. One concern is the potential effects and even breakdown in the patient/provider relationship [12]. Yet, little is known about what providers and the organizations they are affiliated with can do to manage these service interactions effectively.

Thus, we use the demanding and rich environment of the telemedicine interaction to: (1) better understand the nature of the real time service-encounter interactions among the primary actors (human and technology actors) engaged in the telemedicine service process and (2) inform those providers and organizations intending to provide such health services of factors to consider in structuring their telemedicine interactions. We use a case study of the especially rich MVC deployed at one large healthcare network, employing multiple research methodologies, to gain insight into this complex, multidimensional phenomenon [13,14].

The study draws on traditional service delivery concepts and applies them to the specific telemedicine service interaction context. This conceptual frame is used to develop four research questions, which are investigated via a multi-phase, multi-method case study. Results identify a new kind of service relationship, the Advanced Encounter, and key facilitating factors for those encounters. This study provides a deep understanding of the relationships between telemedicine service providers, presenters, patients and technology, as well as the organizational actions required to deploy a successful technology-mediated telemedicine service.

1.1. Background: traditional service delivery concepts

To support the variation in service interactions, service actors interact in different ways. The customer, service organization, and service provider make up the generally recognized service triangle. The strength of the connection between these service actors can result in either loose or tight links between the various actors. A tight link occurs when there is repeated or intense contact between service actors, whereas a loose link occurs between service actors when there are infrequent or superficial interactions. Fig. 1 illustrates the various possible models using the traditional actors and includes the landscape of the organization to emphasize organizational influence. Other representations of the interaction process may focus on the provider and customer as the direct, core actors in the service interaction as the subject of interaction study and reference the organization as the background providers of supporting structures to facilitate the process [15].

For a Service Relationship to be effective, there must be a tight link between the customer and the individual service provider [16]. Service relationship interactions may provide added value through personalization, kinship, and enhanced trust [4]. In contrast, Single Service Encounters are characterized by a loose link between the consumer and the provider as well as the consumer and the organization. In a Singular Service Encounter, the customers interact with different individual service providers each time they interface with a company and only periodically interact with specific service providers. This model is designed to provide satisfying service to a large number of customers in an efficient and effective way. These service interactions are not “mini-relationships” [17] and should not be treated as such. In fact, “faking” a relationship (known as a pseudo-encounter) can compromise customer satisfaction and the success of the service delivery [3]. Though the firm may employ pseudo-relationship efforts to personalize what are innately singular encounters, efforts toward these false relationships may be a waste of money; they erroneously emphasize a personal relationship that truly does not exist [17]. Single (or greatly sporadic) service encounter operations may provide added value through a focus on speed, reliability, and efficiency [4]. Though there are situations where these loose links are successful, organizations often target building strong relationships between their organization and the consumer. Building this strong link between organization and customer creates an Enhanced Encounter situation.
1.2. Telemedicine service interaction context

The service triangle shown in Fig. 1 depicts a traditional service delivery process that does not specifically recognize the impact on interactions of advanced communications and information technology [18–20]. When a technology is introduced to a service process, not only will the actors involved in the service delivery process change, but so too will the linkages between the actors. Technology-mediated service interactions extend the distance between the customer and the service provider leading to an interaction process that becomes potentially more complex [21] than the traditional face-to-face service interaction. It is unclear how technology impacts the strength of the desired link between customer and provider during a service interaction. To orchestrate a technology-mediated service interaction both the technological actors and “the associated social action system of persons, who are acting with the technology and other people” [22] must be well understood and managed. How customers perceive the interaction will moderate their satisfaction level and potentially the success of the service interaction and their desire to continue using the service organization.

Thus, telemedicine introduces changes to the communication process between the doctor and patient that may in turn affect health outcomes if not recognized and managed. However, most prior telemedicine research in health related journals addresses either the quality of patient care as assessed by medical outcomes [e.g., 23–25], with limited insight regarding aspects of the service delivery system (e.g., see review by [26]), or focuses on specific technological attributes such as video quality [e.g., 27,28].

MVC involves the deployment of sophisticated, high-bandwidth video conferencing and the use of technological peripheral devices to achieve patient consultation, education, and exams at a distance. MVC allows the investigation of a service interaction that demands quality consultative services as well as consumer satisfaction [29]. The delivery of patient care using MVC is affected by the technologies used, the personnel who provide customer service in these high-tech environments (e.g., doctors), the patients, and the design of the service process [30–33]. In MVC, patients assume some active role in the use of technology. The technological interface of MVC (interactive video, monitoring devices, etc.) begats a new form of patient involvement and engagement. Additional research is needed into technology’s role and its impact on the various types of intended links between the service actors that make up the relationship spectrum [3,34]. Like Froehle and Roth [15], we propose to include the technology itself as an additional actor in the service interaction and thus present technology, patient, and provider as core components to the service interaction.

Even with this addition, such representations of the core components of a technology mediated service process may be far too simplistic to be used as a means to understand, study, design, and manage modern, complex technology mediated services, like those that exist in a healthcare context. There are

Fig. 1 – Anchor points on spectrum of relationship types. Adapted from Gutek et al. [17].
additional core actors in the telemedicine context that require further consideration in managing the process. First, the MVC service interaction facilitates real-time inclusion of multiple telemedicine service providers, including doctors, pathologists, allied health professionals and pharmacists. Thus, we do not restrict the concept of service provider to one medical provider (e.g., one physician). The second potential additional actor is the presenter, who acts as the physical extension of the distant telemedicine provider. The American Telemedicine Association defines the presenter in telemedicine as an individual with a clinical background (e.g., LPN, RN), who is trained in the use of the equipment and available at the originating site to “present” the patient, manage the cameras and perform any “hands-on” activities to successfully complete the exam [35]. Though not in place for all types of telemedicine exams, the presenter is in the room with the patient and performs the physical interaction with the patient and the technology in many types of exam encounters that involve the manipulation of equipment and usage of peripherals (e.g., dermatology, neurology, etc.).

1.3. Research purpose and questions

Although literature indicates that MVC can achieve clinical success and patient satisfaction, if we are to effectively design and manage telemedicine service work, we must understand the underlying nature of the MVC interaction in relation to supporting organization structure, efforts, and design [3]. The purpose of this research is to explore the links among actors that directly participate in the service process (core actors) as a means to inform the nature of organizational efforts to support the telemedicine service process. We seek to determine where the telemedicine service process fits along the spectrum from singular encounter to relationship. To determine the position of telemedicine encounters on the spectrum, we focus on the Gutek et al. classification of the linkages among actors in a service interaction, which vary on a spectrum between loose to medium to tight linkages (as described earlier) [17].

Research question 1: Where does the telemedicine service process fit along the spectrum from service encounter to relationship?
Research question 2: What is the nature (loose to medium to tight linkages) of each link among core actors (i.e., patient, providers, technology, presenter) in a telemedicine encounter?
Research question 3: How do we best manage the linkages among actors given their nature?

It is clear there are many components that must work in harmony to orchestrate the telemedicine service process, both at the scene and behind the scene. It is not enough to understand the strength of the service delivery primary actor linkages, but organizations must also develop strong surrounding support structures that are appropriate for those required linkages. Thus, we look beyond the core actors in the telemedicine service process and propose this research question:

Research question 4: What are the supporting structures that facilitate the telemedicine service process?

2. Methods

2.1. Research design

This multi-phase longitudinal case study uses several data collection methods to provide a deep understanding of a technology-mediated service interaction and to triangulate our findings across sources to enhance research validity and reliability [36]. (Table 1 outlines our methods and identifies how data from those sources investigate the research questions.) The table illustrates that most methods of data collection related to more than one research question (with each question requiring its own analysis process) and that the data collection was iterative and expansive. Each step in the process had some overlap with other steps providing data depth within and breath across each research question. The method choice at each phase of the study reflects the multiple perspectives necessary to explore the telemedicine service interaction space. For example, since the primary work actors of a telemedicine MVC service interaction were not pre-specified, our initial methods (direct observation of telemedicine encounters, review of archival material, observatory attendance at steering committee meetings, and unstructured interviews) were employed beginning in 2003 to ensure that all possible, relevant actors were included. As the nature of the service system became clearer, more targeted methods of direct contact with key service informants (ensuing over two years) were used to obtain a greater depth of understanding. The more targeted methods included patient focus groups and semi-structured provider interviews. To holistically understand the actors of these service interactions and their links, data were collected from several sources (e.g., medical providers, telemedicine educators, technology vendors, telemedicine coordinators, support personnel, and patients), which provided both a breadth of information highlighting unique perspectives, as well as a means to triangulate collaborating information [37]. The general driving question guiding each protocol was, “What does it take for a successful technology MVC interaction to happen?”

After data was coded, research findings regarding key elements in a telemedicine process were sent to both focus group participants and interviewees in survey form to assess agreement as a validating procedure. Additional, unstructured interviews were conducted with five of the original interviewees and organizational leaders from our data site between 2006 and 2010.

2.2. Research site

The Veterans Administration (VA) was selected as the research site based on its history of providing diverse MVC services and its established presence in telemedicine [e.g., 38,39]. The VA performs over 275,000 telemedicine video conferencing service interactions per year throughout the United States and its territories. Our study focuses on one telemedicine region (VISN-8) and the data were collected from three large
hospitals within that healthcare network and seven smaller clinics. We considered this one case study of the VISN-8 network as we focused on the most active telemedicine locations and many informants spoke about the program in aggregate form. Telemedicine services include dermatology, neurology, rehabilitation medicine, mental health, diabetic care, pathology, cardiology, and audiology. Informants were collectively aware of and experienced with all of the aforementioned service lines. The clinics’ histories (newly established to on-going sites) and the providers’ experience with telemedicine were also diverse. We believe that diversity among these factors was important to the aggregations of expertise.

By limiting our study to a single (albeit large) organization, we were able to reduce organizational noise from the data, yet include a wide range of telemedicine services and sites in order to gain a more holistic look at telemedicine across specialties. Additionally, state licensure or medical insurance reimbursement issues do not affect the nature of the current services provided by the VA.

2.3. **Phase one: foundation for design and interpretation**

To develop an appropriate frame of reference, direct observation (and related archived images), review of open-ended surveys conducted by our case site (assessing satisfaction, motivation for encounters and problems noted) and unstructured interviews were used in the first phase. Direct observation occurred at several health facilities of various types and sizes. The resulting data provided the preliminary knowledge necessary to raise the researchers’ awareness of the context and informed the researchers of the general types and patterns of communication that occur during a telemedicine encounter to facilitate data interpretation and prescriptive insight. Armed with this knowledge, we worked with providers in the field to design the rest of the study.

2.4. **Phase two: expert panel interviews and focus groups**

2.4.1. **Expert panels**

We assembled an expert panel of telemedicine providers engaged in MVC in a two-round process (round one consisted of interviews discussed in this section and round two described in a later section consisted of a survey used to validate the analysis of this phase). Empirical studies in the field of health care indicate that a “well designed expert panel can closely reflect the views of practicing physicians” and incorporate a range of views [40, p. 1896]. In accordance with past studies that used expert panels, we sought a heterogeneous group of experts and preserved anonymity so as to provide a comprehensive perspective and reduce bias [41].

We identified and enlisted twelve noted telemedicine experts based on their acknowledged expertise, publications, and programs within the telemedicine domain. The panel members averaged seven years of telemedicine experience—a considerable tenure in the history of this domain. Our expert panel included representation from the following telemedicine provider roles:

- Hands-on telemedicine users (seven): Doctors, nurses, and other clinicians responsible for direct patient care and patient orientation involving MVC.
• Telemedicine coordinators (four): Responsible for the selection and installation of equipment, overseeing encounter scheduling, and general telemedicine operations.
• Telemedicine administrators (three): Responsible for the design of telemedicine policies and procedures.
• Telemedicine technical experts (three): Responsible for the design, installation, and maintenance of telemedicine equipment.
• Telemedicine educator/trainer (two): Responsible for the development and delivery of professional telemedicine training courses.
• Telemedicine researcher (two): Engaged in data collection (direct observation, focus groups, and interviews) and analysis for multiple telemedicine projects.

Letters describing our study and our interview process were sent to all participants to enable them to prepare for the interview. All interviews were reflexive and exploratory so as to solicit high quality information and not restrict the breadth of comments from the individuals. Given the varied backgrounds of the subjects, the specific language used to elicit details was customized to best match each subject’s perspective.

2.4.2. Patient focus groups
Since patient encounters may be sporadic or limited (e.g., one- or two-time occurrences), and may thus preclude the development of expertise, individual semi-structured interviews of the kind used with provider expert population were not appropriate. A viable alternative was to use focus groups to obtain patient “expertise” through collaborative construction [42] and to derive expertise from a collective patient assessment of telemedicine encounters. To develop protocols that were comparable to provider protocols, we used the expert panel interview protocol to inspire a focus group protocol suitable for a patient audience. Six focus groups were conducted with an average of six participants per group.

2.5. Phase three: unstructured interviews/discussion of findings
Between 2006 and 2010 additional, unstructured interviews were conducted with five of the original interviewees and organizational leaders from our data site regarding findings from data collected during phases 1 and 2. These subsequent interviews specifically focused on further exploration of organizational design and management insights.

2.6. Data analysis
Telemedicine coordinators and medical providers (who were not direct sources of other forms of data collection) acted as co-interpreters and analysts with the researchers. The telemedicine practitioner role in the data analysis provided contextual enrichment and determined conceptual convergence with researcher coding of the same data [43]. This form of study participant involvement complements and expands researcher capabilities and insight, facilitates validation and data analysis triangulation, and provides a way to integrate research and practice. The team used iterative coding methods (see Ref. [44]) until agreement was reached by all participating researchers and practitioners.

Following qualitative interpretations of the data sources, findings in the form of a model of the data actors, their linkages, and key quality concerns and suggestions were validated via surveys that assessed the participants’ perspectives of the interpretations’ correctness, completeness, and relevance. The surveys were completed by patients participating in the focus group as well as expert panel members. Survey results indicated that the encounter model of actors was appropriately represented and insights regarding elements of the service process identified were validated as important issues.

3. Results

In response to the research questions, we first identify those actors actively involved in the telemedicine service interaction and then discuss the links among those actors. We follow with a discussion of organizational supports to enable technology mediated service interactions.

3.1. Fit on the service interaction spectrum—strength of the ties (RQ1)

To understand the service actors’ interaction and to enable a deeper understanding of where the service process fits along the spectrum from encounter to relationship, we examined a variety of data. In our study, the telemedicine exams included one-time encounters with a specialist, telemedicine after one visit in person, a series of telemedicine visits, and a mix of telemedicine and in-patient exams. In terms of traditional service management literature, we found most telemedicine MVC encounters fell, with some varying degree, between the Enhanced Encounter and Service Relationship end of the Gutek scale. Since there is no specific reference on the existing spectrum that depicts this situation, we dub the anchor where the MVC exams fall as Advanced Encounters. Like a service relationship, our data indicated that very weak ties between the patient and telemedicine provider were not well tolerated even in single service encounter situations. One patient said: “I wouldn’t recommend using this on a first time visit at all I think. I think a first time visit with a doctor should be examined personally.” The patient does not perceive a telemedicine exam as an instance of a single service encounter. However, the tight bond between consumer and service provider that is germane to a service relationship was not necessary for success. One focus group member mentioned: “Next time I come back – it [skin spots] was gone. So, I was quite pleased. I don’t care if I don’t see her – as long as she does the job that I want done - takes care of what I got.”

In addition, the type of experience patients indicated they sought seemed to resemble many characteristics of an Enhanced Encounter—convenient hours and location, staffing and process that reduce wait time as much as possible, exciting ambience, and a unique way of presenting the service or product [34]. The perception of difference in the nature of service expectations was conveyed in comments such as, “They have a certain time to see the doctor and then you sit in the office for two hours or more. It should not be this way with a TV visit.”
3.2. **Nature of linkages and how to support them** (RQ2)

Fig. 2 depicts the strength (loose to tight) and nuances of the links among the core service interaction actors in the Advanced Encounter. Tight links refer to intensive connections expected or required for the success of the exam (either in terms of quality or meeting consumer expectations). Loose links refer to those connections that are recognized as a needed part of the service process (which may require particular attention to efficiency and reliability), but that do not need to be intensive or personalized.

3.2.1. **Patient/provider link (medium to tight link)**

For a telemedicine interaction to be successful, not only must the patient’s medical goals be met—but, to some degree, his or her expressive needs must also be met. In healthcare contexts, this is particularly important due to the stress common in healthcare interactions, and also because of asymmetries in expertise between patient and provider [45]. This suggests that patients who find their expressive expectations met in their medical interactions will evaluate their interactions more favorably, regardless of the specialty or patient conditions at play. However, we did not find that repeated interaction and tight, relationship oriented ties between patient and telemedicine provider had to be present to meet patients’ expressive expectations. Patients indicated that the providers could meet their relationship needs by engaging in some informal conversation with the patient. One focus group member said “Well, you know, she could ask you like how long have you lived here, and do you like Florida, and you’ve been in the service, what service you’ve been in, little things like that to relax the individual, you know.”

Research indicates a patient’s reliance on a medical care provider (particularly physicians) is based on the physician’s: (1) command of knowledge acquired through training and experience legitimizing the profession, (2) ability to justify his/her authority and (3) ability to evoke the client’s trust, confidence, and obedience in following prescriptions for care [46]. Our data was consistent with these elements. The trust needed for the success of the telemedicine exam seemed to rely on more of the nature in developing one’s confidence in the provider’s expertise and understanding of the patient’s condition rather than of bonding. Patients were concerned with the provider’s understanding of their condition, but found assurance when the provider showed recognition that they had access to and reviewed their medical records prior to the encounter. One patient said “what struck me was being so good about this set-up, I could go in there and she had my whole everything, prescriptions and all, and she had everything, no time was lost”. In addition, multiple patients mentioned that introductions to a new provider via MVC should include a brief overview of the provider’s credentials. One patient said it most clearly by stating “I want to hear, my name is Dr. Such and Such, and I’ve been with the VA for the last 50 years, and you know. Not her whole background, but at least to say, I’ve been working with the VA whatever it is, I trained at wherever.”

The patients also appreciated a pleasant demeanor and rapport, but explicitly stated they did not expect it to be like “speaking with a friend”, particularly for sporadic or one time interactions. When asked what was key for the communication that took place during the service interaction, one focus group participant indicated, “be honest and give us the most information we ask for”. This is consistent with work by Gremler and Gwinner [47] on rapport that showed an enjoyable interaction had a significant relationship with a patient’s reported satisfaction of their dentist, but personal connection did not have a significant relationship with satisfaction.

Thus, a “tight” linkage between patient (consumer) and provider might be too strong for a one-time service interaction and result in a “faked relationship”, a pseudo-encounter, which could actually compromise the building of trust in the provider and process. Tight relationships may require time, during which a common understanding can be developed between patient and provider. In the case of telemedicine, repeated and especially frequent telemedicine interactions could mature into a tight relationship. Interestingly, we found in the case of repeated telemedicine services with the same provider social cues were less necessary; in fact, it seemed as though there were often lapses in some social courtesies (e.g., introductory conversation or focused attention on equipment), and that the patient easily forgave these lapses when a strong relationship existed. It is interesting to consider whether this particular link between patient and provider is specific to the telemedicine encounter, and in fact in the discussion we note similarities to general patient/provider interactions. However, as emphasized by one of the providers interviewed “it’s not just a typical face-to-face session - it takes more, there’s more involved.”
3.2.2. Provider/technology link (tight link)
An overriding consideration for any organization seeking to initiate or expand to technologymediate services is that technology should not get in the way of either the physician or the patient. The provider should be able to focus on providing service, rather than figuring out technology. In this case, medical professionals need to be able to easily maneuver the equipment. Providers indicated that the present equipment is cumbersome: “Some of the equipment is quite bulky. It’s heavy to roll around if you need to move it.” Most exam rooms are small and this seems to escalate the problem.

The following quote relates to another ergonomic property, namely the physical comfort associated with equipment handling and maneuvering: Provider: “Cameras and scopes should fit into one hand and you should be able to control the camera options (zoom, freeze and position) with your four fingers on top of the camera.”

In reference to the provider/technology link, informants acknowledged that clinicians vary in their level of proficiency regarding computers and video equipment.

3.2.3. Patient/technology link (medium link)
The patient is not typically a direct user of the technology, which precludes classification as a tight link. However, his or her link with the technology should not be minimized to being classified as a loose link. Equipment handling should also be physically comfortable to the patient. The following comments demonstrate that patients have both positive and negative experiences related to the way a presenter or provider maneuvers the equipment as demonstrated below:

Patient: “That she put me in a place. And said now, you stay there, and I adjust everything to get . . . And she did . . . She adjusted everything so that I didn’t have to spend a lot of time readjusting myself. And I appreciated that. But I think she did very good. She made it a lot . . . a lot more comfortable, I think.”

Patient: “They should have multiple cameras. From my experience, they had to keep moving the cameras and me around. They were checking my knees, they were checking my head, so they kept focusing in on different parts of the body, & it took a little time doing it.”

System feedback was the single most referenced aspect of linking telemedicine technology among patients. Feedback may provide the patient with a sense of emotional security, as explained by this participant:

Interviewer: You liked seeing yourself? Patient: In effect, it put me at ease. Oh sure. It seems like I’m a part of it, I’m not talking to some stranger. I was talking to me in a way. It gives you a little personality. It’s something entirely new, that could be kind of upsetting I suppose to some people. It (referring to the picture inset) helps.

Second, patients may view the visual feedback feature as a means of facilitating communications as they relate their medical condition to the consulting provider: Patient: I showed them close-ups. I just got up, walked over to the camera, and made sure that it was in focus by looking at the insert and no problems. System feedback allowed the patient to establish a closer and more trusting relationship with the system; the patient felt more comfortable about what the telemedicine provider was seeing on his end. Some patients commented they received more confirmation through the “shared visual” than they would in an in-patient exam.

3.2.4. Presenter/technology link (tight)
The presenter (if one is present to operate equipment) is a conduit of the doctor’s arms and eyes through the technology; and thus, the presenter must have an “intensive” connection with the technology. As described by one of the patients, “Okay, the person interacting between doctor and patient must be skilled in how to use this equipment. The nurse practitioner that’s in there must be well trained to use it, and must be familiar with the doctor also.”

3.2.5. Provider(s)/presenter link (tight)
The relationship between the telemedicine provider and the presenter needed to be both synergistic and symmetric through the technology and their independent actions, thus embodying a single medical care provider for the patient. This was observed by multiple patients and is represented by multiple focus group comments, such as the following one: Patient when discussing the presenter that was in the room with him said: “we knew she was directly connected with him and she almost anticipated his next move” another patient commented that “I would . . . make them like a team. She is that doctor’s representative here and so she has to know the doctor well enough that if he does say something and it can be taken three different ways she usually knows which way he means it.”

3.2.6. Presenter/patient link (loose)
One of the hallmarks of an encounter is whether the customer knows (and cares to remember) the name of the provider. It is interesting that though the presenter was actually the person in the room with the patient and touching the patient, most focus group participants did not refer to the presenter by name. In fact, many mentioned in the course of discussion, “I don’t remember his or her name.” As implied by the discussion of the provider(s)/presenter and presenter/technology link, the presenter is seen as a conduit of the provider and technology, a “cog in the wheel.” The classification as a loose link is also supported by the fact that not every type of telemedicine exam needed a presenter. For example, the role of the presenter for a psychology exam was minimized to getting the patient and equipment situated prior to the start of the consultation. Though a strong or even medium link is not a mandate for a successful exam, basic courtesies from presenters were appreciated by patients and an enhanced link between a patient and presenter seemed to a limited degree to offset missed courtesies or weak video style presence from providers.

3.2.7. Primary provider/secondary provider(s) link (loose to medium)
Assuming that all participating providers understood how to operate equipment, much of what was observed and what patients and providers commented on was the enhancement to communication process. One patient with a chronic condition indicated that in a telemedicine service interaction more communication interconnectivity among the members of his coordinated care team occurred than he had experienced in the past through “one-on-one” interactions with each
provider. We classify this link as loose to medium as there was no particular desire or intent of participating providers to forge stronger relationships through the service process.

3.3. Organizational design and management (RQ3)

The burden of the organization is to use an understanding of the links (and hence the underlying nature of the service interaction process) to design, manage, and market the service offering. Previous sections provide insight into the MVC interaction, highlighting idiosyncrasies that should be taken into account when making organizational decisions for these Advanced Encounters. As stated by one of our organizational informants, “Patients can understand that this encounter is not going to have the same degree of personal contact with the physician, but that there are others things that we can do to augment that, I think that that is critical.”

The organization needs to find ways to facilitate the development of appropriate links that meet standards of quality or customer expectations. In addition, whether a service interaction is an encounter or relationship, fortifying organizational links (to the patient and perhaps provider) in cost effective ways seems to contribute to the success of both forms of service interactions [4,17]. In this study, we found seven facilitating factors that the organization is responsible for to facilitate the development of links to the other service actors (summarized in Table 2).

Though we do not claim generalizability (and acknowledge the limitations of data from one industry context), we assert that these facilitating factors may not be unique to the telemedicine MVC context and thus deserve attention by research and practice in other contexts.

3.3.1. Select the “right” technology

All links involving technology are medium to very tight. Managing the Advanced Encounter process begins with selection of equipment. The importance of state-of-the-art technology to providers is clearly stated in this comment: “He’s the guy actually putting his reputation and himself on the line in making a diagnosis. Obviously, in this kind of situation, I think it is imperative to have as high a resolution as we can produce to allow him to make the most accurate diagnosis. If he’s got fuzzy margins or the cells in the cell structures are not easily discernible it is going to impair his ability to make an accurate diagnosis.”

One provider indicated telemedicine technology should ultimately be another tool in the medical bag that can provide remote care. To reach this goal, the systems should be designed and architected for easy operation by clinicians at all levels of expertise after receiving reasonable training. Providers and telemedicine technology experts revealed six features that facilitate easy operation: (1) auto focus cameras and scopes, (2) intuitive software, (3) remote control devices that facilitate responsive and precise equipment navigation, (4) transparent connections, (5) autonomy in operation (minimal requirements for technical assistance to operate equipment) and (6) affordability. Affordability is a realistic constraint and goal that affects purchase. As advised by some of our organizational informants, “You might opt for something considerably simpler if you don’t have the budget.”

3.3.2. Design a service interaction process that is uniform but unique

The sporadic and one-time nature of some telemedicine interactions calls for a degree of uniformity in the service process, extending beyond that required of standard medical practice. A recent study of MVC for purposes of emergency stroke care asserted that a clear description and high grade of standardization of the whole process are crucial for widespread use of telemedicine exams [48]. However, we cannot ignore the doctor’s (or other primary provider’s) role of director and leader of any medical consultation interaction. As stated by one of the participating patients, “I think if the doctor is satisfied with telecommunications, & he’s the professional, that’s his profession, why I think there is nothing else to be said. If he can do his job through a TV, then who are we to argue.”

In response, the organization might impose greater structure and guidance in the form of protocols and training that recognize the dynamics of the patient’s unique situation and the medical provider’s expertise. In developing service interaction protocols, a balance must be struck between the predictable and repeatable actions of clinicians, technical experts with the unpredictable nature of patient’s medical situations, thus affording the appropriate degrees of freedom in the actual interaction so that the actions are structured but not limiting [49].

3.3.3. Provide specialized training for telemedicine service encounters

The need for specific telemedicine training was recognized by both patient and provider informants. Patients who did not have experience with MVC expressed intolerance with the inefficiencies they associated with the provider’s lack of skill with the technology while conducting the exam such as the need to excessively adjust cameras. As conveyed by one patient, “I’m sure it was important, but to me that was a negative. In person he wouldn’t have to adjust anything, because he would be eyeball to eyeball and he could do what he wants.”

Specific training is needed to address telemedicine nuances, as expressed by one of the patients:

Patient: “Well this is a different way of conducting medicine & it is a unique situation. Normally doctors are trained to meeting right with the patient & reach out & that doesn’t happen here.”

Provider: “Invoking training and core rationale for why we are adopting this technology is important. So not only do they get the technical training, the hands-on training, they get an overall organizational perspective as to why this technology is being adopted, and why is it critical, and what we do on a daily basis.”

3.3.4. Select appropriate providers for telemedicine

Many participants noted that some medical staff are better suited to perform telemedicine encounters than others. In fact, one of the doctors commented, “there is a way to interact over the TV that makes people feel at ease but I’m not sure how you teach that. Some people have it and probably some people don’t.”

These results indicate that there may be a certain style and flow in conducting the exam (and using the equipment) that paves the progress toward success. Comments such as the following provide some insight into the style, “They’ve also got to
be flexible and tolerant. Because things occur. You know, that this isn’t in a lot of people’s comfort zone, it’s new for therapists, it’s new for patients.” Additional remarks from both patients and providers indicated that creativity, problem solving skills and a suitable “television” personality were helpful. Participants felt that a seasoned clinician is generally best at adjusting to the telemedicine context. The expressed premise was that the seasoned provider has developed medical skills; therefore, the provider need only be concerned with the means of porting those skills to the telemedicine context. One provider commented that a new graduate would be most successful if supported by a seasoned provider.

3.3.5. Prepare patients for telemedicine encounter

Patients do play an important, participatory role in the production of telemedicine services. They are a primary actor and can contribute to strengthening or breaking links through their interactions with the technology, presenter, or provider(s). Some researchers have recommended that in such situations of heightened customer participation that service organizations view customers as partial employees, extending the traditional bounds of the service organization to include customers as temporary members of the firm that need to be prepared to participate in the service processes [50–52]. Thus, some basic patient “training” can also be an important organizational endeavor to reinforce this link. A lack of patient understanding may actually compromise the success of the exam. The provider seeks information from the patient through physical exam procedures and through the communication process. Without directives, patient communications may be inhibited or inappropriate. The following accounting exemplifies such situations:

Patient: “One thing I kind of that I had a problem with is it was kind of, my wife started laughing at me, she was in her own room, & I started talking to Dr. _ on the TV there, I was talking so loud I was blasting it out, but I thought I had to talk loud to him. Maybe I had the nurse nervous too. I am not sure what was going on.

Anyway, if I had some knowledge of what was going on, how to respond back to the doctor in a normal voice instead of yelling. I thought I had to yell out to the doctor on the TV.”

3.3.6. Design the service interaction for convenience

The appeal for telemedicine to patients is very much related to service interaction characteristics, convenience in terms of mitigating travel distance time and being able to schedule appointments with skilled providers sooner than otherwise possible. The message is clearly expressed by one of the participating patients, “My thought here is this opens us up to a whole lot more professional care because they can have the whole base team up at (the main hospital) available at that moment. I like that idea.”

There are also elements of convenience in the actual service process that can reinforce organizational links. Convenience encompasses appropriate equipment placement, easily accessed medical devices, easily accessed medical records (manual/and/or computerized systems), and an easily accessed locale. To quote one doctor: “The physician should know in advance that he’s going to conduct a (MVC) clinic. There may be several patients from several different sites. So that he can stay in one place and do his evaluations, have available the equipment that he needs, the computerized record system at his fingertips, and be able to sit there while the camera moves from patient to patient.”

Convenience also refers to the proper staging of the exam and consulting room in preparation for the encounter. Staging may begin long before the first exam is ever conducted. The hospital management exerts control regarding staging in the planning process by designating or erecting facilities suited to telemedicine. In making allocation decisions, management may want to consider the advice of one provider: “The equipment ideally is not shoved in a corner somewhere in a room that is used for 3–4 other things, it is a designated space.”

Providers remarked that equipment should be in a “ready to use” state. The objective is for the physician or medical staff member to have to perform minimal software and equipment
placement adjustments before beginning the encounter. To facilitate a “ready to use” state, exam scheduling should consider time for “recalibration” of equipment between exams.

3.3.7. Create the servicescape
In looking at the telemedicine encounter, we found it necessary for the organization to look beyond primary, direct participants (those in the inner boundary) to understand how to manage this technology mediated service process. Through patient inquiry regarding motivations for first time encounters, motivations for using telemedicine again, and related topics, we found that a tight bond between the patient and others in their healthcare network can relax the need to establish a tight bond between patient and telemedicine provider. For example, review of archived documents related to a patient satisfaction survey performed within the health network under study revealed over 22% of the patients responded to the opened-ended question, “What influenced you to accept a MVC exam?” with responses related to trust in and/or recommendations from someone within the health organization or with the health organization itself. Responses such as, “Dr. X (my primary provider) suggested it, the social worker suggested it, the VA supports it, and this was suggested by a VA representative,” were among the aggregated responses comprising the 22%. It is also noteworthy that only comments related to convenience/distance (45.89%) were more prevalent than comments related to recommendations and trust in the organization. We found that focus group discussion of motivation for first time encounters and future telemedicine encounters also often included reference to recommendations and/or overall trust in the organization. Therefore, it seems that existing “tight links” with the organization and/or organizational representatives (e.g., non-telemedicine providers) can help to mitigate the need for a strong relationship between the patient and telemedicine provider, particularly in cases of one-time or sporadic meetings.

3.4. Supporting structures to facilitate telemedicine (RQ4)
In addition, new work structures involving technology may require more than just the direct participants/users. They may also require recognizing the role of actors-at-a-distance (supporting actors) as part of a network [53]. We found that the boundaries of the telemedicine network of actors were not absolute, but rather extended as primary actors interacted with others supporting the service interaction process. Because failures of supporting actors can compromise the encounter, it is important for researchers and practitioners to consider the entire servicescape when analyzing technology-mediated service encounters and other new forms of work. We define the servicescape as the infrastructure that directly supports inner-boundary actors (i.e., service interaction participants) in the successful operation of a telemedicine system. Thus, we add an outer boundary of supporting actors consisting of: a telemedicine coordinator, a scheduler, technical support, physical room environment, and medical records to describe the servicescape. These outer boundary actors all play a central role in supporting the inner boundary actors.

Data revealed that these supporting actor roles can be performed by different professionals in different organizational situations. For example, we observed instances of the presenter doing the technical hook-ups when no IT department is at a clinic. We also found instances of multiple professionals taking on portions of an outer boundary actor’s role depending on availability. If participants are to take on multiple roles, an expanded understanding of the technology, environment, and other components of the service interaction may be necessary. To illustrate the importance of considering supporting actors in the design and management of technology-mediated service encounters, we provide evidence of ways each of these actors could affect the encounters.

Telemedicine coordinators serve as catalysts in the implementation and diffusion of telemedicine practices. These actors interface with the medical staff that take part in the telemedicine encounters but rarely with the patient (therefore the patients did not comment on them), however the providers felt they were very important to the encounter. The coordinator manages MVC experiences and plays an integral role in setting policy and procedural guidelines. Additionally, the coordinator may facilitate training or other forms of intervention to enhance acceptance of and facilitation of the equipment and MVC processes. Coordinators serve as the intermediary between the direct users, the organization’s management, and the systems developer. As one provider stated, “I think the clinic coordinator is the heart and soul of it all. If they don’t feel comfortable, and they’re not using it well, two things aren’t going to happen if they’re not using the equipment well. The specialist will never want to do a consult with them again; the doctor will never want to refer because the patient feels uncomfortable that it didn’t go well. They’re your do or die. If they aren’t doing it well, everybody’s upset. You need a person with very good people skills, customer service skills. If they’re not keeping the docs happy and the patients happy, well then, you know, it’s just not going to happen.”

MVC also needs someone who integrates the schedules of the multiple stakeholders (e.g., patients, doctors, nurses, nurse practitioners, and technical staff). A scheduler that effectively sets up and stages the logistics of a telemedicine service interaction can greatly influence the quality of the experience. There are multiple considerations that the scheduler must consider. If the patient is to schedule a future visit with the medical institution after the telemedicine encounter, the scheduler should understand the nature of the future exam and provide appropriate details to the patient. Specifically, patients wanted to know if follow-up exams were going to be telemedicine exams and whether they would see the same consulting provider again. Some patients felt a follow-up telemedicine exam should be available sooner than a follow-up exam in person. Hence, schedulers might have to realign expectations in the course of setting up future appointments.

Not only do the human actors need support, but so does technology. For a MVC to run effectively, a technical support actor must be available so that the physician and medical staff can offload technical issues. To ensure quality, technical support has to be readily accessible. Providers indicate that accessibility is a function of the way support is provided as
well as of the hours of operation: Provider: “Technical support personnel cannot adopt an “I’ll get to it” attitude . . . this is medicine now, so you have to get to it right away as far as response time and maintaining control of the telemedicine system.”

Past studies indicate the physical room environment (e.g., temperature, types of art) can affect attitudes, satisfaction, and performance in workplace and/or medical settings [54,55]. Data in the current study supports these findings. Our data revealed that there are a variety of physical settings in which telemedicine exams are conducted on both the patient and consulting physician side. The settings ranged from conference rooms to “standard” patient examination rooms to classrooms. Stakeholder comments related to physical setting were related to comfort levels (seating, lighting, temperature), patient privacy, and equipment implications. Quality privacy means that neither the exam room nor physician consulting room is available to walk-in intrusion or is accessible either visually or audibly to walk-by traffic. One provider comments: “You want to ensure privacy on the patient side so that any anxiety regarding disrobing or the discussion of emotional issues is not escalated.”

Regarding equipment, many modern technologies have a certain range of adaptive capabilities, modularity, and ability to communicate with each other [56]. The technology needs to work given the lighting of the room, the color of the walls, the size of the room, etc. Interviews with telemedicine coordinators, physicians, and telemedicine vendors indicated that the cameras used were equipped with features that enable automatic focus, lighting, and color correction. Not all correction could be addressed through the technology, which further underscored the socio-material connections among actors. We observed human intervention either before or during the service interaction to improve the interplay between technology and the physical environment. For example, we noted through observation that the telemedicine room was typically painted a neutral color, in contrast to the traditional white exam rooms found at multiple facilities. The telemedicine coordinator provided the following explanation: “The worst thing you can do is use any strong colors in the environment because colors ‘spill’ back onto the skin.” You do not want any change in hue on the patient. Color shifts may change diagnosis if the physician is examining a wound, for example. You want to stay with neutral hues (earth colors) in medium tones versus ‘real bright colors’ or ‘real dark colors’.”

Given patients desire for assurance that their medical record had been reviewed by the provider and was accessible during the exam, the patient’s medical record should also be recognized in the servicescape as an organizational consideration. Based on our data, to facilitate both the development of trust (in the form of provider competence by the patient) and quality, the organization should ensure availability of the patient’s previous healthcare data before, during and after the telemedicine encounter. As one patient said “There should be a complete record that way, something that she can look at and understand quickly, you know, without asking a lot of ridiculous questions. I think from that stand, if this specialist has something she can put her finger on right there.” Access to a computer with the computerized patient record system should be considered especially in light of current attention to the diffusion of electronic health records.

Any attempt to study or manage a telemedicine service interaction will fall short if the servicescape were not considered.

3.5. Summary of results

In this research, we found that the telemedicine service encounter interactions between multiple actors varied from loose, to medium, to tight relationships, and that if the strength of those relationships was not appropriate, it could lead to poor results. For example, if the relationship between patient and provider is too loose (when it should be medium to tight), the patient can experience increased stress, likewise if the relationship between the provider and the presenter is too loose the encounter does not flow smoothly. However, if the relationship between the presenter and patient is too tight when it needs to be more loose, then the patient may respond negatively to an attempt to create a pseudo-relationship, and the presenter’s efforts may be inefficient. Not only must the relationships be managed effectively, but the organization design is also critical to support the relationships necessary for a successful telemedicine encounter. This study identifies seven specific aspects that the organization controls to better support these encounters. Table 3 summarizes the study results: a detailed picture of what actors, relationships between actors and organizational supports are required for the advanced telemedicine service encounter.

4. Limitations

One concern with qualitative research is that subjective judgments are used to collect and analyze data, and that this unduly biases the study [37]. This concern, which challenges the validity and reliability of studies, is best addressed through rigor. The triangulation of data, investigators, and methods of data collection all contribute to validation. We utilized several methods and perspectives in our study to enhance research validity and reliability. We also used numerous sources (telemedicine practitioners and academic researchers) to code and interpret the data and to address triangulation in analysis.

Generalizability is another potential point of weakness for field research. We canvassed the current telemedicine environment to access one of the largest telemedicine providers worldwide, with multiple service offerings and locations. However, we acknowledge that the data was collected from one far-reaching agency. The inclusion of additional case study sites and/or data collection approaches in future research would broaden our gaze to include additional actors, relationships and organizational supports for TMSEs. In particular, the single site used in this study does not have to deal with state licensure requirements or medical insurance reimbursements. Future studies that focus on telemedicine should include sites that do have these issues, since additional outer boundary actors (e.g., insurance providers) may come into play.

Finally, this work only looked at telemedicine interactions and not traditional medical interactions in general. It is very possible that some of these findings can apply to traditional medical interactions. However, given the holistic view of the
Table 3 – Summary of results/lessons learned.

<table>
<thead>
<tr>
<th>Research question</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Where does the telemedicine service process fit along the spectrum from service encounter to relationship?</td>
<td>Advanced Encounter: A new type of service relationship that is in between the Enhanced Encounter and Service Relationship on the Gutek scale (shown in Fig. 2)</td>
</tr>
<tr>
<td>2: What is the nature (loose to medium to tight linkages) of each link among core actors in a telemedicine encounter?</td>
<td>In the Advanced Encounter, the linkages are:</td>
</tr>
<tr>
<td></td>
<td>Link</td>
</tr>
<tr>
<td></td>
<td>Patient–provider</td>
</tr>
<tr>
<td></td>
<td>Provider–technology</td>
</tr>
<tr>
<td></td>
<td>Patient–technology</td>
</tr>
<tr>
<td></td>
<td>Presenter–technology</td>
</tr>
<tr>
<td></td>
<td>Provider(s)–presenter</td>
</tr>
<tr>
<td></td>
<td>Presenter–patient</td>
</tr>
<tr>
<td></td>
<td>Primary provider–secondary provider</td>
</tr>
<tr>
<td>3: How do we best manage the linkages among actors given their nature?</td>
<td>Seven facilitating factors for telemedicine:</td>
</tr>
<tr>
<td></td>
<td>1. Select and support the right technology</td>
</tr>
<tr>
<td></td>
<td>2. Design a service interaction process design that is uniform but unique</td>
</tr>
<tr>
<td></td>
<td>3. Provide specialized training for telemedicine service interactions</td>
</tr>
<tr>
<td></td>
<td>4. Select appropriate providers for telemedicine</td>
</tr>
<tr>
<td></td>
<td>5. Prepare patients (customers) for telemedicine encounters</td>
</tr>
<tr>
<td></td>
<td>6. Design the service interaction for convenience</td>
</tr>
<tr>
<td></td>
<td>7. Create a strong servicescape</td>
</tr>
<tr>
<td>4: What are the supporting structures that facilitate the telemedicine service process?</td>
<td>The servicescape for the Advanced Encounter of telemedicine:</td>
</tr>
<tr>
<td></td>
<td>• telemedicine coordinator</td>
</tr>
<tr>
<td></td>
<td>• scheduler</td>
</tr>
<tr>
<td></td>
<td>• technical support</td>
</tr>
<tr>
<td></td>
<td>• physical room environment</td>
</tr>
<tr>
<td></td>
<td>• medical records</td>
</tr>
</tbody>
</table>

service encounter utilized in this study the actors in the encounter are very intertwined with one another and thus the removal of one actor (particularly, the technology) will likely impact the way all actors interact. A similar study that looks at these medical service encounters in general would aid in our understanding of ways in which we can improve our medical care system.

5. Conclusions

The limited research on technology-mediated service interactions has centered on task execution (e.g., routine customer service) rather than relationship-building (e.g., consulting/expert services) usually in a lean media environment [e.g., 33,57]. This is echoed in the telemedicine literature. However, the completion of tasks and clinical outcomes are not the only outcome considerations for telemedicine service encounters. In describing desired outcomes of the telemedicine service process, a telemedicine coordinator indicated the following test: “did both parties (patient and provider) feel an emotional level of satisfaction with the encounter. Both parties should walk away with a feeling of success.” We know from the literature on service delivery in general that there is variation in the nature of service encounters, and it is necessary to understand the relationships within actors in an encounter in order to effectively manage it. What was not known was (1) the nature of telemedicine service encounters, (2) the key relationships within actors in the encounter, and (3) the facilitating factors for managing those encounters.

By gathering data from multiple perspectives using a variety of methods in varied medical specialty telemedicine environments we were able to gain rich insight into how core actors in the telemedicine process need to relate to one another, and the types of organizational actions that will support the service process. The unique value of the technology-mediated service process is co-created through the activities of the actors involved. Customers and technology become co-creators or co-producers of technology-mediated service (along with service providers), and their experiences can result in lasting customer value.

This study contributes in two main ways. First, we provide an example of a fine-grained analysis of the actors and their relationships for a technology-mediated service interaction. The second main contribution is an understanding of two key factors that impact customers (patients’) evaluations of the telemedicine encounter: appropriate strength of inter-actor relationships and organizational supporting actions for TMSE that may be relevant in other contexts. The detailed picture for the telemedicine context should help healthcare organizations as they set expectations for relationships between actors and design organizational supporting functions for their telemedicine programs.

Authors’ contributions

Cynthia LeRouge involved in data collection, data analysis and writing the paper; Monica Garfield and Rosann Collins involved in data analysis and writing the paper.
Summary points
What was already known:

- Service encounters and service relationships exist in providing service.
- It is important to understand the nature of the service interaction to know how to best manage the service interaction.

What this study added to our knowledge:

- In depth understanding of the nature of relationships required between primary telemedicine actors, and the organizational actions needed to deploy the technology-mediated telemedicine service process.
- Identification of the telemedicine service as an Advanced Encounter.
- Identification of seven specific aspects that the organization controls to better support these encounters.

Competing interest

This research was not funded by any source and therefore none of the authors have a conflict of interest in this work.

Acknowledgement

We would like to thank the VA – VISN-8 for their cooperation and willingness to participate in this study.

REFERENCES


