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Roland Petcu, Roxana Ologeanu-Taddei, Isabelle Bourdon, Nicolas Giraudeau

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Roland Petcu
University of Montpellier, roland.petcu@gmail.com

Roxana Ologeanu-Taddei
University of Montpellier, roxana.ologeanu-taddei@umontpellier.fr

Isabelle Bourdon
University of Montpellier, isabelle.bourdon.pro@gmail.com

Nicolas Giraudeau
University of Montpellier, nicolas.giraudeau@umontpellier.fr

TELEMEDICINE IN DENTISTRY, LESSONS TO BE LEARNED: A CASE STUDY

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Petcu, Roland, University of Montpellier, Montpellier, France, roland.petcu@gmail.com

Ologeanu-Taddei, Roxana, University of Montpellier, Montpellier, France, roxana.ologeanu-taddei@umontpellier.fr

Bourdon, Isabelle, University of Montpellier, Montpellier, France, isabelle.bourdon.pro@gmail.com

Giraudeau, Nicolas, University of Montpellier, Montpellier, France, nicolas.giraudeau@umontpellier.fr

Abstract

Most of the telemedicine projects do not pass the pilot stage. A comprehensive evaluation of telemedicine pilot projects is needed in order to improve their success rate and to create a knowledge base for future projects. In this paper we address this issue through the study case on a pilot teledentistry project with 5 different implementation sites.

A literature review of teledentistry and telemedicine in general, points towards a rather one sided approach when evaluating these projects. The organizational aspect does not seem to be a priority in these evaluations while we consider its crucial impact on project's continuity and adoption. To support this assumption we use a healthcare information systems implementation perspective which allowed us to assess the adoption barriers for the teledentistry pilot. We make assumptions on how it could be used for telemedicine pilots and for telemedicine projects in general.

We have collected data using qualitative methods such as semi-structured interviews and non-participant observation of teledentistry activities and meetings related to the project. After drawing the dental teleconsultation process and observing that most of it turns around electronic medical records(EMR) we focused to identify all potential adoption barriers and linking them with the list of EMR adoption barriers by Paré et al. *(2014).*

We have identified 23 adoption barriers for teledentristry: 4 in 5/5 implementation sites, 1 in 4/5 sites, 6 in 3/5 sites, 2 in 2/5 sites and 10 in 1/5 sites. Out of the 23 teledentistry adoption barriers, 17 have been linked with EMR adoption barriers. By adding the remaining 6 items to the EMR adoption barriers list and adapting the items to the telemedicine context we propose a telemedicine pilot project adoption barriers list.

Keywords: telemedicine, adoption barriers, pilot project, healthcare information systems.

1 Introduction

Telemedicine has been generally considered from its early beginnings as a solution for improving access to care, reducing healthcare costs and improving collaboration and coordination of care among healthcare professionals. This promise has yet to be fulfilled as most of the research on telemedicine projects is on pilot studies and very few reach to the routine use stage (Jackson and McClean, 2012).
Teledentistry can be considered a new field of telemededicine. Teledentistry is developed to improve care quality, health outcomes, and reduced per-capita costs (Daniel and Kumar, 2014)(Golder and Brennan, 2000), especially in rural areas (Bhambal *et al.*, 2010) and for those who do not have easy access to dental care, such as elderly or prisoners (Sanchez Dils *et al.*, 2004).
Dentistry is one of the medical fields which registered a late start in telemedicine activities, with only a couple of pilot projects worldwide, which are fueled by the latest technological advances, these projects are considered as teledentistry. Mihailovic *et al.* (2011) mentions that despite advances in the field of telemedicine, the field of teledentistry remains somewhat neglected, and that there is a need for more research to better understand its potential benefits and some of the barriers to its further development.
Nevertheless, the context under which telemedicine projects are implemented is decisive and previous research highlighted the slim chances of the telemedicine projects to pass the pilot experimental stage (Jackson and McClean, 2012). We argue that a thorough evaluation of these pilot projects is needed for teledentistry but also for telemedicine in general. Moreover, pilots have to be designed as scale-up implementation and adoption projects. Thus, the evaluation of pilots has to support decision-making, organisational and technical changes in order to set implementation and to increase the chances of success of large scale implementations. The focus of the evaluation should not be only on the medical and clinical aspects or a one sided point of view. We argue that the evaluation of telemedicine projects has to take into consideration key issues related to coordination, specificity of professional organization and project management. We support our assumptions by evidence driven from a case study focusing on a teledentistry pilot in France, which we will name "Dental project". We will describe key issues faced by the project and we will highlight the case with a theoretical framework on IT implementation in healthcare. We will conclude by outlining some of the future research directions in the field of telemedicine project implementation and evaluation.

2 Literature review

Before proceeding with the description of the applied methodology, we consider it important to present some of the literature considerations which led us to our approach. First used a wider angle namely, what has been done in similar telemedicine projects in general and then we focused specifically on teledentistry projects' evaluation.

2.1 Evaluation in telemedicine

Like in the teledentistry case, approaches in telemedicine assessment have considered a single evaluation perspective (Ekeland *et al.*, 2010), even though telemedicine often requires the creation of healthcare networks which involve governments, healthcare providers, general practitioners and patients in a multidisciplinary and cooperative context, implying different points of view (Masella and Zanaboni, 2008). The use of multiple assessment dimensions would imply the use of multiple collection and analysis methodologies which will identify the most useful and cost-effective criteria to design and assess a telemedicine application(Masella and Zanaboni, 2008).
The local context should be included in the telemedicine evaluation as it could provide important insight and also improve generalizability of previous evidence to the local setting (Mitchell *et al.*, 2010);(Romanow *et al.*, 2012).

The telemedicine practice seems to be more influenced by the organizational aspects then the technology itself (Sorensen *et al.*, 2014) which also points towards the needed multidimensional approach when assessing telemedicine projects.
MAST (Kidholm *et al.*, 2012) a three steps model for deciding whether or not to implement telemedicine services in healthcare systems and help decision makers in choosing the most efficient technologies to be used in the most cost-effective way could also provide some insight into how to properly assess pilot telemedicine projects (Ekeland and Grøttland, 2015). However, although the model is comprehensive, some of the evaluated domains cannot/are difficult to assess: maturity of the application, legislation and reimbursement policies. Scientific standards and guidelines as basis of assessment seem to be rather difficult for some specific areas because such knowledge is not available. Moreover, the MAST model applied in pilot projects evaluation revealed some areas that are not covered such as: process studies, technological usability, responsible innovation, health literacy, behaviour change, caregiver perspectives and motivational issues of professionals (Ekeland and Grøttland, 2015).The required multidimensional approach into identifying the potential barriers to telemedicine/teledentistry adoption represents the starting point for choosing our methodology in the specific context of our study case.
Nevertheless, these evaluations do not distinguish pilot and scaling-up projects while pilots are actually designed as a first step for making decisions related to scaling-up. Moreover, pilots for new health services make sense only if there is an "after plan", if the scaling up of the new service is considered in the design phase of the pilot (Kohl and Cooley, 2003). The scaling up thinking provides important and concrete assessment areas for the pilot itself upon which the envisioned deployment can be revised and improved (Paina and Peters, 2012).

2.2 Evaluation in teledentistry

Teledentistry has highly diverse applications in both context and methods used ranging from tele-education, tele-diagnostic, teleconsultation or a combination, to tele-monitoring, tele-support, tele-treatment (Marino and Ghanim, 2013).When evaluating teledentistry projects the literature is mostly medical, namely published in dental and telemedicine journals (Marino and Ghanim, 2013), so it is with no surprise that the focus of these evaluations is oriented towards: clinical outcomes, efficacy, patient satisfaction, therapist satisfaction, healthcare utilization and costs. Although there is heterogeneity between studies in terms of design, settings and outcomes measured, there is a trend for supporting the efficacy and effectiveness of teledentistry (Daniel *et al.*, 2013) which can also be a measure of the relatively new area of teledentistry (Khan and Omar, 2013). Very few research papers focus on identifying adoption barriers beyond the above mentioned criterion, as teledentistry implementation requires a full comprehension and consideration of the healthcare environment and also a commitment to completely integrate teledentistry within that environment (Patel and Antonarakis, 2013). We note that Rogers' diffusion of innovation theory is one of the few multidimensional models used to explain the challenges faced by teledentistry projects. The approach is valid, but not complete because it is difficult to measure what exactly causes the adoption of an innovation (Damanpour, 1996) and it can never account for all variables, especially in healthcare (Plsek and Greenhalgh, 2001). So we needed to go further and since we have exhausted the existing literature on teledentistry, we have considered next the more general field of telemedicine, but on similar projects.

3 Theoretical background

The literature review has proven to offer a rather one sided or incomplete approach when evaluating pilot telemedicine projects so we wondered how are approached pilot projects in general, in the healthcare system. Since telemedicine is considered as a new healthcare service we focused our search on this area and we found impressive similarities. In establishing new services, pilots develop new roles, new patient pathways and new ways of working (Bennett *et al.*, 2010) which are also present in

telemedicine projects. The identified barriers to success of services point towards the importance of addressing organizational issues (Bennett *et al.*, 2010).
Having as basis the definition of telemedicine, which implies the use of information and communication technologies, we focused next on healthcare information systems implementations. We assume that the evaluation of Electronic Medical Records (EMR) implementation can be used for evaluating the teledentistry pilot project and telemedicine projects in general because they are both related to technology-driven innovation in healthcare.
We considered the categorization adapted by Paré *et al.*(2014) from Boonstra and Broekhuis(2010) for EMR organizational adoption barriers. The initial list of adoption barriers is divided into 2 categories according to the phase in which they occur: initiation vs. implementation and into 7 categories according to their type: financial, technical, time, psychological, social, legal and organizational. The initiation and implementation phases used by Paré *et al.* (2014), are those proposed by Rogers(1995) in the model of diffusion of innovation. We consider that in a pilot project both phases are present and moreover having in mind the scaling up of the project, both are equally important.

4 Research context and methodology

4.1 The specific context of the pilot Dental project

In France, the deployment of telemedicine activities falls under the legal framework of decree n° 2010-1229 from 19th of October 2010 which defines as telemedicine, "all medical acts realized remotely and by means of information and communication technologies" (Simon and Pellitteri, 2012). Article R. 6316-1 also names the type of telemedicine acts: teleconsultation (TC), a doctor realizes a patient consultation remotely; tele-expertise, a doctor solicits advice from one or multiple doctors; telemonitoring which allows the doctor to remotely monitor the patient's status and take decisions regarding the patient's care; teleassistance which allows a doctor to remotely assist another doctor during a medical procedure.
According to the French legislation, teledentistry falls into the TC medical act. "Teledentistry is a combination of telecommunications and dentistry involving the exchange of clinical information and images over remote distances for dental consultation and treatment planning" (Jampani *et al.*, 2011).
In the Dental project, the participating establishments have been financed by the Regional Health Agency (RHA) after these have manifested their intention to participate in the pilot, following the agency's call for volunteer establishments. The financing included: the time the nurse spent on the experimentation, an amount/TC and the required hardware and software. The company Zeta was in charge of developing the Dental TC software for which hospital Epsilon has received specific funding. The oral TC experimentation was planned to be deployed in 16 establishments which can be categorized into 3 groups according to the type of subjects (elderly, mental and/or physical disabilities, inmates).
Establishments for the dependent elderly (12):

- 8 under the administration and supervision of hospital Alpha (1-8)
- 4 under the administration and supervision of hospital Beta (1-4)

Specialized establishments for adult patients with severe mental and/or physical handicap (3):

- 2 under the administration and supervision of association Gamma (1-2)
- 1 under the administration and supervision of association Delta (1)

A penitentiary's medical service under the administration of hospital Epsilon (1).
Hospital Alpha participated in the project following the hospital director's prior relationship with the Dental project manager and having a real wakeup call on the need to improve the oral health of the dependent elderly. Hospital Beta manifested its intention to take part in the pilot with no prior contact with the project manager. For both hospitals, Alpha & Beta, the oral TC was expected to improve the

access to a dental consultation and as a consequence to improve the oral health of their patients which needed improvement according to a study published by the French Health Authority in 2010.
Associations Gamma and Delta manifested their intention to take part in the pilot with no prior contact with the project manager and their participation in the project is related to the difficult access to a dental consultation for patients with severe mental and or physical disabilities.
The hospital department of the prison is part of hospital Epsilon and most of the important specialties are represented, including dentistry. The dentistry service is provided by 2 dentists working in shifts, on a single dental unit. All inmates should pass a full medical exam when arriving in the institution. This medical exam has to include a dental consultation. Since for the dental treatments alone there is a delay of 2 months according to the auxiliary nurse, the dental consultations for the arriving inmates can't be realized under these conditions. The TC would provide a potential solution to this situation.

4.2 Methodology

We use exploratory case study methodology to investigate the teledentistry phenomena. Case research is known to be useful when the phenomenon is broad and complex, and when it couldn't be studied outside the context in which it occurs (Benbasat *et al.*, 1987). We have combined several qualitative data collection methods such as interviews, documentations and non participant observations to meetings and day to day activities. The description of the case study is mainly based on information collected through semi structured interviews with nurses, managers of health facilities, dentists and project manager from April 2014 until March 2016. Interview guides have been developed for each the previously mentioned persons. All interviews have been tape-recorded and then transcribed. The number of interviews followed the notion of saturation proposed by Glaser and Strauss (Glaser and Strauss, 1967). A total of 18 interviews were conducted over a period of 20 months in the 5 implementation sites. The average length of each interview is around 25 minutes. The interviews have been conducted in the early stage of the implementation, during the implementation phase for some and after the end of the pilot project. Non participant observations to project related meetings and day to day nurses' activities complete the qualitative study. For hospital Alpha sites, 3 non-participant observations have been made during days of TC activities in 3 of the 8 establishments, during 2 meetings with the project manager and 1 meeting with the RHA. For Beta1 site non-participant observations have been done during 1 training session for the second nurse, 1 meeting with the project manager and during 1 meeting with the RHA. For Gamma1 and Delta sites, non-participant observation has been done during 1 meeting with the RHA. For Epsilon site, non-participant observation has been done during 1 training session with the project manager.
To code the collected data, we used Miles and Huberman (1994) methods. We developed a database for each site containing interviews transcripts, notes, collected documents, sample description, chronological data, coding scheme and coded data.
The coding scheme is based on the 7 categories of adoption barriers identified by Paré *et al.* (2014) financial, technical, time, psychological, social, legal, organizational but not excluding other categories we might encounter and having in mind which are generally valid for telemedicine pilot projects and which are specific for the teledentistry pilot.

5 The teledentistry system

The Dental project is supported by the RHA and the public hospital. Following the agreement signature in December 2013, the planned launch was March 2014 targeting a total of 1500 TCs involving 800 subjects (100 prisoners, 100 frail people, and 600 elderly people) in 16 establishments: twelve long-term care facilities, three specialized facilities for frail people and a prison's medical department. Our exploratory study was conducted on 12 of these sites.
We will describe the different resources needed for the system to work and the actual oral TC process which led us towards the similarities between teledentistry and EMR.

5.1 The system's objective and involved personnel

The oral TC process for the Dental project is a store-and-forward; asynchronous type of telemedicine and it is composed of three steps: data acquisition/collection, data transfer and storage, data analysis. For the experimentation protocol, one step is considered as prerequisite since the patient, the family or legal guardian have to sign a consent form before undergoing the TC procedure. The consent form is in paper/physical format.

The teledentistry system, as envisioned by the project manager includes the following resources:

Intraoral camera: The Soprocare camera was selected for the pilot due to its fluorescence capabilities which allows tooth decay, dental plaque and gingival inflammation detection without using any dye solutions. The camera is connected to a laptop via the USB port.

Dental TC software: developed by company Zeta according to the requirements envisioned by the project manager. The software is client-server for the data and image acquisition part and web based for the data analysis/ dental diagnostic part. The server has been hosted on the hospital Epsilon's server in order to comply with French regulations for healthcare data hosting. The client software "Dental visit 1.0" is installed on a laptop along with the proper Soprocare camera driver and the Cisco AnyConnect Secure Mobility Client as VPN software. All client-server communications and data transfers are made through an encrypted and secured VPN connection. The client software can run both in online and offline scenarios, an internet connection being mandatory only for the client-server synchronization.

Actionable foot pedal: connected to the laptop via the USB port allows the nurse to start and stop recording with the intraoral camera without touching the laptop's keyboard.

Nurse or auxiliary nurse: the person administering the experimentation protocol has been trained for using the system and she/he is also responsible for collecting the patient's or family's consent form before any procedure related to the project can be accomplished. The training consists of 2-3 hours of theoretical and practical information about dental anatomy, Dental TC software presentation and a demonstration of how the teledentistry system works. The training also includes 1 (one) day of onsite assistance, when the project manager observes and assists the nurse during the protocol administration on actual patients. It is important to mention the fact that the nurses or auxiliary nurses do not receive this type of training as part of their education in nursing school and they are not used to performing this type of task.

Dentist: the dentists analyzing the images and putting the diagnostics have been trained on reading, analyzing and interpreting the images provided by the Soprocare camera. They were dentistry students in their final year of study and they were supervised by a hospital dentist, who is also the project manager for the Dental project.

The systems allows the nurse to create a patient file, to record images/video of the patients mouth and teeth and send them to the server in order to be analyzed by the dentist, who in return provides a diagnosis and a urgency level accompanied by a proposed treatment plan. The simplified oral TC process as observed in the field is presented in Figure 1.

6 Results and discussions

By analyzing and corroborating information extracted from the semi-structured interviews, the non participant observations and the Dental project's internal and external documents, we have created Table 1 which highlights the project's planned and achieved objectives and a timeline for the Dental project deployment for each site and sub sites where it was relevant.

The first result that sets apart the Alpha site from any other site is the number of TCs, which is almost 14 times higher than in the Beta site, compared to the expected 4 times. Adding to this, the necessity to train a second nurse and no TCs realized in Beta2, Beta3 and Beta4 point towards a difficult implementation. Some of the reasons for this situation are mentioned in Table 2 in the "Beta" column.

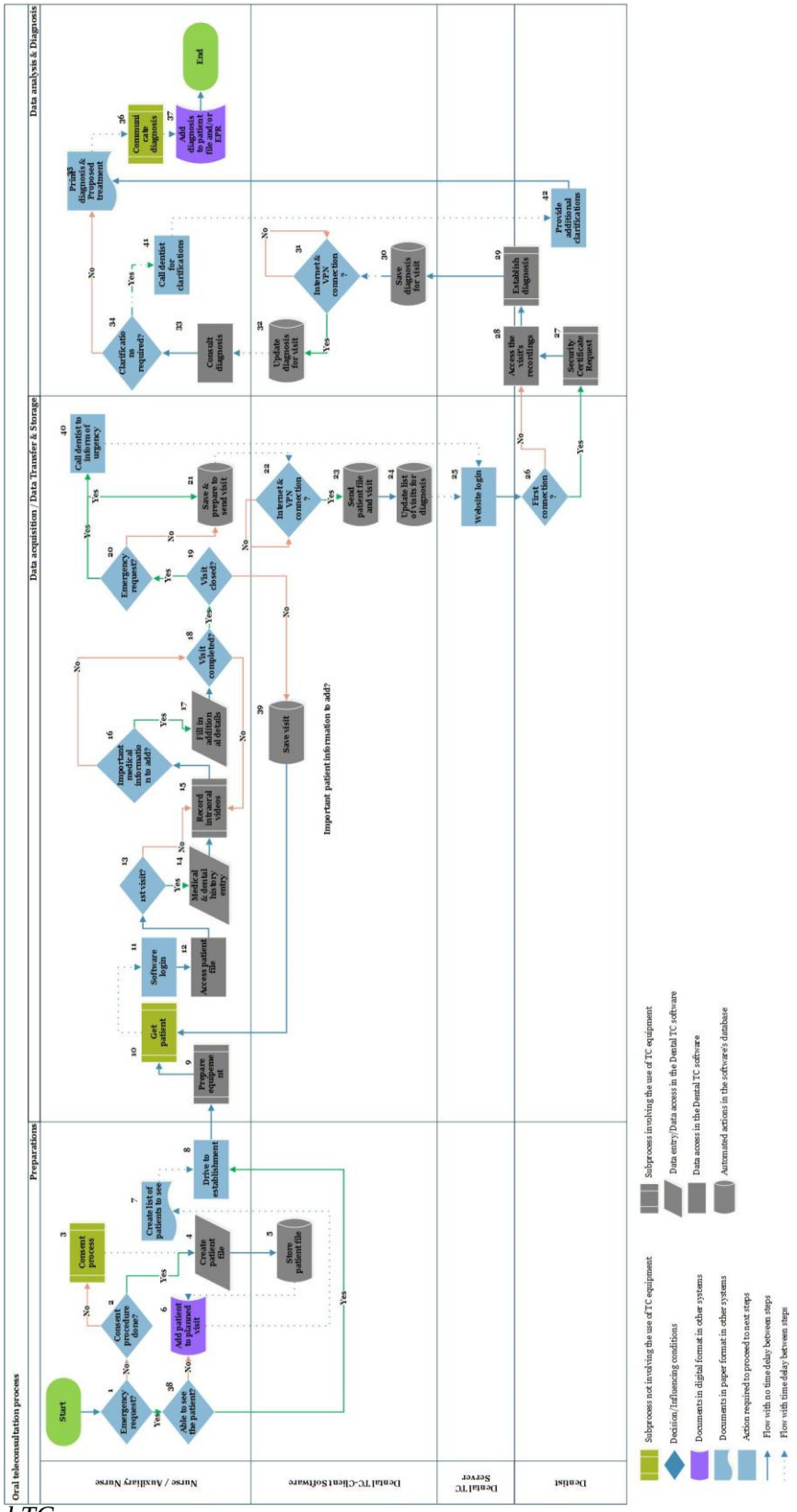

Figure 1. Oral TC process

The second result to be noted is the difference between the planned timeline for activities and when they were actually realized, namely 1, 2, 8, 9 and 13 months late for the trainings; and 1, 5, 9, 10 and 13 months late for the first TC. The planned timeframe for completing the proposed number of TCs has been exceeded by 11 months and this because the RHA considered the pilot as finalized. None of the establishments reached the preset objective.

Pilot Sites	Alpha	Beta			Gamma		Delta	Epsilon
Establishment	1 – 8	1		2- 4	1	2	1	1
Number of beds	506	140		216	40	55	45	
No. subjects targeted	400	100		100	30	30	40	100
Number of visits	2	2		2	2	2	2	1
Expected TC	800	200		200	60	60	80	100
Realized TC	507	None	37	0	29	0	20	55
Average time/TC	20-30’		45-60’		60’		60’	-
Nurses planned	1	1		1	1	1	1	1
Additional nurses			1					
Nurse time financed	10500	7000			3500			3500
Planned trainings	February - March 2014							
Realized training	Apr 2014	May 2014	Nov 2014	-	May 2014	May 2014	Dec 2014	Apr 2015
Timeline for TC	Mar - Oct 2014							
First TC	Apr 2014	Jan 2015		-	Aug 2014		Dec 2014	Apr 2015
End of pilot(RHA)	Sep 2015							
Shared personnel	X			X				
Shared Equipment		X			X			

Table 1: Planned and achieved project objectives and milestones

The third important result is that for planning the project, a “*one size fits all mentality*” has been used even though the differences between site Alpha/Beta and Gamma/Delta and Epsilon were known to the project manager and the RHA as these are clearly defined in the Dental project’s contract. This is highlighted by the financed nurse time and by the expected 80% general inclusion rate based on the number of beds. Taking into consideration the evaluation criteria considered by the RHA and the established timeline the pilot project should be considered a failure. The overly optimistic expectations, the short numbered and rather weak evaluation criteria for the pilot project could also point towards the lack of up scaling thinking during the design phase of the pilot, which according to Kohl and Cooley (2003) is close to preparing to fail. On the other hand, the fact that the quantitative evaluation does not provide as rich and accurate evaluation of what really happened during the pilot highlights the interest of using qualitative data for evaluating telemedicine pilot projects.

The fourth observation we could make is that the Dental TC software was designed and created according to the project manager’s vision and executed by company Zeta. Although the nurses, the final

users of the software could have been included in a requirements analysis starting with the design phase or for improvements proposals, this has not been the case.
When listing the adoption barriers for the dental TC system we have eliminated the sites: Beta2, Beta3, Beta4 and Gamma2 because they did not realize any TCs and the information we had so far was limited, namely that they were supposed to start after Beta1 and Gamma1 had finished the first visits for their patients. The list of barriers coded from our different sources is presented in Table 2, grouped under the same 7 categories used by Paré *et al.* (2014). Choosing to compare the dental TC system with an electronic medical records system might seem a stretch at first. Except for the specific intra-oral camera protocol for recording the videos of the patient's mouth, what is the dental project's system if not an electronic medical records system for the nurse? The nurse creates a patient file; inputs patient information; conducts and creates visits, shares information with the dentist and patients. Furthermore in all of the sites it comes as an addition to already existing EMR systems.

Category	Coded potential barriers for dental TC	Alpha	Beta	Gamma	Delta	Epsilon	No
Financial	Misuse of financial resources		x	x	x		3/5
Technical	Slow software	x	x	x	x	x	5/5
	Software bug	x	x	x			3/5
	Lack of reporting tools	x					1/5
	No printing function	x	x	x	x	x	5/5
	Lack of computer skills		x				1/5
	Minimal laptop configuration		x	x		x	3/5
	Internet access difficulties	x	x	x	x	x	5/5
Time	For consent procedure	x	x	x	x		4/5
	Patient data input	x	x				2/5
	Diagnostic input in patient file	x	x	x	x	x	5/5
	Patient to consultation room	x	x				2/5
	Install equipment		x				1/5
Social	No dedicated time from manager		x	x	x		3/5
	Patient's negative reaction				x		1/5
Organizational	Lack of personnel		x	x	x		3/5
	Delay in equipment acquisition		x				1/5
	No consultation space					x	1/5
	No water source & sink	x					1/5
Change process	Low or lack of motivation		x				1/5
	No financial reward		x	x	x		3/5
Other	Too much light/neon in the room	x					1/5
	Medical leave	x					1/5

Table 2. List of coded adoption barriers for the teledentistry system by pilot site

Putting side by side the EMR adoption barriers and the dental TC barriers we can observe the fact that barriers from both initiation and implementation phases are present in the pilot dental TC project. Table3 represents the result of combining our Table 2 with the list of adoption barriers obtained by Paré *et al.* (2014). The result of combining the two tables represents our proposition for potential adoption barriers for telemedicine projects from a health information system implementation perspective. The initiation phase and implementation phase columns represent the list of adoption barriers adapted by Paré *et al.*, (2014) which we translated for the telemedicine context. The items coded during the study can be found in the pilot phase column of Table 3.

Categories	Telemedicine adoption barriers	Pilot phase	Initiation phase	Implementation phase
Financial	High start-up costs		√	
	High ongoing costs		√	
	Uncertainty about return on investment		√	
	Lack of financial resources		√	
	Misuse of received financing(specific)	√		
Technical	Lack of computer skills of the physicians and staff	√	√	
	Lack of technical training and support			√
	Complexity of the systems on the market		√	
	Limitations of the systems on the market (lack of customizability, reliability; interoperability)	√	√	
	Lack of computers/hardware in the medical practice	√	√	
Time	Time to select, purchase and implement a system		√	
	Time to learn the system			√
	Time to enter data into the system	√		√
	More time per patient			√
	Time to convert the records	√	√	
	Time to request consent(general)	√		
	Time to move the patient(specific/general)	√		
	Time to install the equipment(specific/general)	√		
Psychological	Lack of beliefs in the systems			√
	Need for control			√
Social	Uncertainty about the vendor		√	
	Lack of support from external parties		√	
	Interference with doctor–patient relationship			√
	Lack of support from other colleagues			√
	Lack of support from the management team	√		√
	Patient's negative reaction(general)	√		
Legal	Privacy or security concerns			√
Organizational	Organizational size	√		√
	Organizational type	√		√
	Lack of support from organizational culture	√	√	
	Absent or lack of resources(general)	√		
Change process	Lack of incentives	√		√
	Lack of participation			√
	Lack of leadership	√	√	

Adapted from Paré *et al.*, 2014

Table 3. Obtained list of telemedicine adoption barriers

7 Conclusions and limitations

We argued that telemedicine projects should be considered and evaluated as health information systems implementations and not only as new medical devices projects which was also stated by Hebert (2001)and (Klecun-Dabrowska & Cornford(2001). An adapted list of adoption barriers for information systems in healthcare by Paré *et al.*(2014) can also be applied to telemedicine projects. The added subcategories, in bold in Table 3, required to complete the picture of potential adoption barriers for pilot telemedicine projects can be placed into two categories: general or specific. General means that the item is valid for all telemedicine projects and specific means that it only applies to some specific projects similar to the Dental project.

For telemedicine pilot projects, a specific case by case implementation with a thorough requirements analysis before implementation, followed by a solid project management and a consistent feedback

from the stakeholders could anticipate and/or avoid most of the technical, organizational and time related adoption barriers. Telemedicine projects fall under the definition of "*technochange*"(Markus, 2004) where both technology and change management are considered equally important for a successful project.

The specific context of our study case could represent a bias, for example in our case the financial category is not so much represented because the establishments were financed by the RHA, which covered the direct costs of the pilot. However, the financial category becomes a valid point if there is no financing for the pilot and the establishments have to support the project from their own resources. The information gathered so far at the organizational level provides a rather one sided story which with extended interviews with other actors involved in the promotion and/or supervision of the project will provide a triangulation of the information and provide a more accurate image of the implementation scenarios encountered in the field. The dentist's side for the evaluation of the dental TC system has not been developed in our study case, since the Dental project's project manager is until today the only dentist to have used the system for establishing the diagnostics.

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