The Potential Utility of an Online Dental Research Network from the Perspectives of Clinicians, Researchers, and Policy Makers

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Abstract

BACKGROUND: An online research network was set up among 11 dentists and 2 researchers in Montreal to test the feasibility of data collection over one year. OBJECTIVES: We evaluated the pilot participants' experiences and their perspectives regarding its potential utility. METHODS: One-on-one qualitative interviews with 4 researchers, 4 dentists, and 3 policy makers. Interviews were recorded on audiotape and transcribed for coding and interpretation. RESULTS: Although feasibility of data collection was evident in the pilot results; qualitative data revealed the limitations of the pilot, the unmet expectations, and the lack of impact of research findings. In terms of potential utility; the participants expressed interest in research, online communication and continuing education. Qualitative analysis revealed differences in perspectives and shared interests among the participants. CONCLUSION: An online research network can reduce the gap between research and practice. However, to attract participants, it must consider the needs and expectations of those involved.

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<u>Résumé</u>

CONTEXTE : Un réseau de recherche en ligne a été créé entre 11 dentistes et deux chercheurs à Montréal pour vérifier la faisabilité d'une collecte de données pendant une période d'un an. OBJECTIFS : Évaluer l'expérience des participants à l'essai pilote et analyser les commentaires de ces derniers sur l'utilité d'un tel réseau. MÉTHODOLOGIE : Entrevue face-à-face avec quatre (4) chercheurs, quatre (4) dentistes et trois (3) responsables de politiques. Les entrevues ont été enregistrées sur bande sonore et transcrites pour en faciliter la codification et l'interprétation. RÉSULTATS : Même si les résultats de l'essai pilote démontrent la faisabilité d'une collecte de données, les données qualitative mettent en lumière les limites de l'essai pilote, l'insatisfaction quant à certaines attentes et l'absence d'impact des résultats de la recherche. Quant à l'utilité éventuelle du réseau, les participants ont exprimé un intérêt pour la recherche, la communication en ligne et la formation continue. L'analyse qualitative révèle des divergences de points de vue et des intérêts communs entre les participants. CONCLUSION : Un réseau de recherche en ligne peut atténuer l'écart entre la recherche et la pratique. Pour attirer des participants, il faut cependant prendre en compte leurs besoins et leurs attentes.

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Three labours of love... One thesis and two miracles... To my daughters... Lara & Maya

Chapter I: Introduction

The increase in scientific research findings and the use of conventional methods of dissemination make it difficult for healthcare professionals in clinical settings to keep in touch, verify relevant information, and transform knowledge into practice. In dentistry, the gap between research and practice is also influenced by the private nature of dental practice leading to a deficiency in communication between academic researchers and dental clinicians.

Nowadays, the widespread use of computer and Internet technologies is serving as an excellent tool for communication and dissemination of information. In the dental field, clinicians are now able to access dental literature through internet database resources and refer to various specialized web portals for clinical information and communication with other professionals.

However, facilitating the dissemination of new research evidence does not necessarily lead to practical application. In order to encourage the practice of evidence-based dentistry, there needs to be more interaction between the producers of research and its potential users. The concept of Knowledge Translation (KT) refers to the integration of research users into the synthesis and production of research and the simplification of research outcomes in order to encourage practical application.

Electronic collaborative networks are a good example of the application of information technology for facilitating KT among individuals or groups that share common interests. An electronic collaboratory uses one or a combination of internet tools such as, portals, discussion forms, and videoconferencing in order to establish links between its users.

In 2002, researchers at McGill's faculty of dentistry started planning an internet research network, the WebDentist project, which would link general dental practitioners with academic researchers. The aim of the project was to facilitate dental research through the collection of data directly from the dental practice and promote evidence-based practice by involving dentists in the research process and providing them with new information that is relevant to their practice.

The project began with a pilot network established among 11 dentists and 2 researchers in the city of Montreal. The network operated over a period of one year and involved data collection on 19 different questionnaires. In addition, the network's web portal incorporated a discussion forum to encourage communication between the network members.

The questionnaires covered various research topics, such as patients' demographics, scheduling and appointments, bleaching, and dental pain. The results of the research questionnaires were returned regularly to the dentists.

Quantitative analysis of the collected data showed a high response rate, and none of the participants had left the project after one year. The discussion forum, however, was not used as anticipated but overall, the pilot project experience was rated satisfactory and the establishment of a research network was proven feasible. This being said, one year later the network project did not materialize and the researchers remained doubtful about some aspects of the pilot network: how did the participants really feel about the project? How

did the dentists use the questionnaires outcomes? And, in the future, what would the participants want to use the network for?

This led us to consider a follow up evaluation of the pilot project using a qualitative approach. Literature shows that very little research has been conducted on information needs in dentistry, and how electronic resources can meet them. (1) So in order to progress into a second phase and establish the network on a larger scale; we decided to conduct a qualitative evaluation of the pilot project using one-on-one interviews to help us better understand how the participants perceive the network and what the pilot experience means to them in their own words.

Our qualitative inquiry is inspired by a Hermeneutic approach. Hermeneutics is the theory and practice of interpretation. (2) It entails that each of us have our own understanding of any phenomenon that we experience and that by collecting and interpreting the stories of those individuals who share a common experience, we can reach a better understanding of any experienced phenomenon.

The aims of this qualitative evaluation are to examine the potential utility of an online dental research network by exploring the perceptions of the individuals who participated in the pilot network and to provide recommendations, based on the analysis of the collected data, in order to improve the adaptability of the proposed network and optimize its services.

Data were collected through one-on-one interviews with dentists and researchers who were directly involved in the pilot project, and policy makers from the field of dentistry who were informed about the pilot and could potentially be involved in the future network

Objectives

- Gain a better understanding of the participants' individual experiences in the pilot network (researchers and clinicians)
- Evaluate the different elements of the pilot project from the perspectives of its participants
- Examine participants' views on issues such as potential uses of the network, future expectations, and concerns (researchers, clinicians, and policy makers)

Chapter II: Literature Review

The internet revolution

A major advancement in communication technology was the laying of the first intercontinental telegraphic cables in the 1860s. This was followed by the first demonstration of the telephone in 1876 and wireless communication in 1897. (3) Then the introduction of digital computers followed. The first computers were large, expensive, and isolated. In the 1960s computer researchers tried linking computers together by telephone lines, a technology referred to as packet transport. (4) The packet system created a network where several computer users could share one telephone line, through the development of an electronic highway. It allowed computers to share data and for researchers to exchange electronic mail, or email. It was something of a revolution, allowing users to send letters at the speed of a phone call. In the 1970s, rules and protocols for transferring data between different computer networks were developed. The Internet (from "internetworking") protocol, known as TCP/IP (Transmission Control Protocol/Internet Protocol), which is used today, made it possible to develop a worldwide computer network and gave it the name: Internet. The Internet is the collection of a number of regional and national networks that have been logically organized into larger groupings. (5)

Nowadays, the Internet is a pertinent information resource that allows communication, collaboration, resource sharing, and information access. "It is estimated that 1.5 billion gigabytes of information is created every year; equivalent to every man, woman, and child in the world producing a major novel..." (3)

Health sciences and the internet

In the fields of health sciences, success in clinical and basic sciences is closely related to access to current information (4) and it is well documented that health care practitioners don't have enough time to review all the large volume of new research information in their field. (6) The rate of development of research and the conventional methods of dissemination, such as printed journals, make it difficult for clinicians to keep in touch. In addition, it is often hard for clinicians to evaluate relevant articles and transform the knowledge to clinical applications. (7, 8) Nowadays, the internet is making substantial contributions to the fields of research and dissemination of health care information (9-11)

The Internet has the potential to address the special communication and information needs of the health profession in a different way than do the traditional resources such as text books, journals, and direct contact. That is mainly due to ease of access, convenience, and availability of the Internet.

In Dentistry, computer and Internet resources are being increasingly integrated into the field. By the year 2000, it was reported that around 85% of dentists in the United States had a computer in their office. Over 48% of those were connected to the Internet. (12) A Canadian survey published in 2006 reported that 90% of the surveyed dentists had a computer in their clinic and 74% had Internet access. (13)

The term Dental Informatics refers to "the application of computer and information science to improve dental practice, research, education, and management". (14) Such

applications have various benefits; dentists and dental academics are able to access relevant dental literature through internet database resources, they can communicate via Electronic mail (E-mail) and online discussion lists, they can obtain continuing education courses through instructional software or web-based conferencing, and they can take part in dental research by joining collaborative computer networks, often referred to as Collaboratories.

Online information resources

Nowadays, more and more database resources are available for dental professionals via the World Wide Web. Drug information, guidelines for diagnosis, detailed cases, and research updates can all be found on specialized websites for the various disciplines in medicine or dentistry. One such resource is MEDLINE; (15) a database of more than 7,500,000 biomedical references where a large portion of the dental literature is accessible to dental professionals. Access to dental websites allows both professionals and the public to browse any subject of interest and obtain recent information.

Problems of time and cost of dissemination of research information are now overcome by online publications and electronic distribution. For example, the British Association for the Study of Community Dentistry (BASCD) has been conducting surveys on the oral health of school children since 1985. Hundreds of dentists collect data from randomly selected schools across Britain and the data are then returned to the research center in Dundee University for the production of a final report. (16) Previously, data collection, analysis, and distribution were paper-based. Nowadays the dentists and researchers are

using computer software and internet services to collect and communicate survey results, making the process both faster and easier. In addition, the BASCD reports are now available on the internet for a world-wide audience.

Online communication

The most widespread application of the internet is the E-mail. (10) Electronic letters can reach recipients anywhere in the world within seconds allowing rapid exchange of information simultaneously among many individuals and saving on high costs of long-distance phone calls or fax transmission.

Another form of online communication is discussion lists and "chat" lines. A discussion lists archive allows new participants to browse previous discussions and participate in their topics of interest. Chat, on the other hand, offers real-time communication and the opportunity to join "live" discussions. In addition to text and audio communication, Internet users can exchange documents and picture files.

In 1998, a survey was conducted among 438 early Internet adopters in the dental field with the aim of evaluating their perceptions regarding the usefulness of the Internet for the dental practice. (1) When asked about their expectations in regards to Internet use, they rated "keeping up with new developments" and "communication with colleagues" as very important. 73% of the respondents said that participating in online discussion lists had changed their practice of dentistry through learning about new procedures or gaining knowledge about new materials and practice management. To them, some of the most

important benefits of Internet use were the reduction of professional isolation and the very small time delay between the development of new information and its dissemination.

Another studying the year 1998 found that dental professionals obtained diagnostic and product information, discussed clinical cases, and communicated with patients on the internet. (17) Around half of the 825 respondents said that they received an average of 50 email messages a week and browsed the World Wide Web more than once a day. 80% rated the Internet as a very useful resource in dentistry.

In a 2006 survey conducted among a sample of Canadian dentists, the respondents reported using the Internet mainly for obtaining product information and accessing online journals. Other reported uses were purchasing dental products and participating in continuing education. (13)

Also gaining increasing popularity as a form of online communication in the field of dentistry is teledentistry. (18) Developing since 1994, teledentistry allows both visual and audio distant interaction through advanced communication technologies such as videoconferencing. Such method of communication provides dentists in distant areas with the opportunity to perform real-time specialist consultations and allows for communication among a group of dentists in different locations without the constraints of time or space.

Yet another innovation undergoing major development is hand-held computers or Personal Digital Assistants (PDAs) such as Palm and PocketPC. These devices offer clinicians the

ability to enter and manage clinical information in order to provide higher standards of care. (19) Handheld devices can provide, through designated software, clinical diagnosis, support, drug reference, medical dictionaries, patient tracking, and contact lists, all such services in a device that can be easily carried and instantly accessed. Furthermore, the internet connectivity of handheld computers is improving the contribution they can make to evidence based medicine. For example, the National Library of Medicine customized Pubmed for handheld computers (20)and sites such as the University of Toronto's Centre for Evidence-Based Medicine also provide software for evidence based medicine that is customized for handheld computers.

Online Continuing Education

Continuing education courses help clinicians keep up with the rapid developments in their fields and refresh their knowledge on a regular basis. Continuing education is considered a vital requirement for practitioner development. (21) In many countries, such as Canada and the US, it has become mandatory for clinicians to obtain a specific number of Continuing Dental Education (CDE) credits each year.

Various dental schools and organizations still offer traditional face-to-face CDE courses for clinicians on a regular basis. In addition to the scientific benefit of these courses, dentists are usually interested in the social aspect; interaction with other clinicians and exchange of questions and consultations. The institutions organizing these events are motivated for several reasons: fulfilling the university role of knowledge creation and dissemination, enhancing the reputation of the school, giving value to the alumni, and supplementing the faculty income.

However, despite the various advantages of the traditional CDE courses, few of the institutions manage to break even in terms of the income due to expenses of providing facilities, food, and transportation to participants. (22) Thus, the idea of computerized CDE courses, with one-time setup cost is being welcomed by the concerned organizations. In addition to the financial value, online CDE courses can be easily updated as required and can reach a larger number of individuals.

Continuing dental education software and online courses are becoming increasingly popular. In the US, between 1998 and 1999, the number of online CDE courses doubled from 50,000 to 100,000. (23) In 2001, the number of users of online dental courses reached 700,000.

For clinicians, the widespread of computers and low cost of internet connection is making them more motivated to take computerized CDE courses. Online courses offer a lot of flexibility since the user is not bounded by location, time of day, length of the session, or pace of instruction which can all be controlled when using the software version. (24, 25) In 1998, a study of Internet users in Dentistry that targeted professionals who subscribed in dental discussion lists or who frequented dental web sites with high traffic, found substantial interest in online CDE. (17)

An exploratory study done in 1999, attempted to evaluate the experiences of past onlinecourses participants. (23) When asked about the most important factor that made them choose an online course, 47% answered "convenience". In addition, 60% of survey respondents agreed with the statement "The advantages of online CDE outweigh the disadvantage" However, the participants where dissatisfied with the lack of communication with peers and instructor.

Problems of lack of communication in online CDE are now being overcome by the integration of teledentistry. In 2001, a pilot project assessing the educational effectiveness of delivering continuing education to dentists in remote areas in London, via videoconferencing, showed that 90% of the participants were satisfied with the received education and were willing to join more courses in the future. The main cited advantages were eliminating the need for travel and the ability to discuss and communicate with experts. (26)

The practice of evidence

It was due to the huge increase in the amount of new research information being produced, that the concept of evidence-based practice was developed. (27) The first article on evidence-based dentistry (EBD) was published in the pages of the British Dental Journal in 1995 (28) The American Dental Association (ADA) defines EBD as "An approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and

medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences". (29)

A large gap exists between scientific evidence and practice. (30) Attempts to reduce that gap range from continuing professional education to the increasingly spreading concept of Knowledge Translation (KT).

The Canadian Institute of Health Research (CIHR) defines KT as " the exchange, synthesis, and ethically sound application of research findings within a complex set of interactions among researchers and knowledge users...KT can be seen as an acceleration of the knowledge cycle; an acceleration of the natural transformation of knowledge into use". (CIHR 2004) Under the umbrella of "research utility" many terms appear in the literature; 'knowledge utilization, 'knowledge brokering', 'knowledge transfer', and more. (IDRC 2005) Although the terms refer to similar concepts, there is a clear distinction for example between KT and knowledge transfer. Knowledge transfer is linear unidirectional process where knowledge is produced by the researchers and then handed over to the users. On the other hand, KT is interactive and characterized by interaction between the producers and the users of research and involvement of users in the synthesis of research. (31)

The implementation of EBD through KT requires increased interaction and communication between academic researchers and dental practitioners. Involving dental practitioners in research would increase their interest in and understanding of research making them more willing to adopt new ideas and change certain clinical behaviours. On

the other hand, it would allow researchers to understand the dentists' needs and conduct studies relevant to the daily dental practices.

"Bringing decision makers who can use the results of a particular piece of research into its formulation and conduct is the best predictor for seeing the findings applied" (32)

Electronic Collaboratories

Humans have collaborated on research for centuries. The traditional form of scientific collaboration relies mainly on face-to-face interactions, group meetings, and individual action. Thus, significant efforts and resources are required for purposes of coordination, communication, and information management.

Electronic collaboratories can help address these problems. A collaboratory can be defined as "an information technology infrastructure that supports cooperation among individuals, groups, or organizations in pursuit of a shared goal by facilitating interaction, communication, and knowledge sharing". (33) Several tools can be used for the implementation of a collaboratory, such as web-based workspaces, Internet discussion lists or real-time chat lines, and videoconferencing.

Electronic collaborative research networks are a very good example of using dental informatics to facilitate research and improve communication between dental academic researchers and clinicians. The gap between academic researchers and dental practitioners has been growing bigger over the years. Academics feel that dentists are reluctant to

change their practices even when they're presented with good evidence, while clinicians perceive researchers as unrealistic and out of touch with the daily realities of dental practice. (27)

Various examples of successful electronic collaborative networks, in medicine and dentistry, appear in the literature with aims that vary depending on the different groups of professionals being linked together. Those aims include knowledge transfer/ translation, facilitating communication, collecting data, and improving standards of care.

One example from the medical field is the Sentinelles-Sentiweb network; the French electronic system for surveillance of communicable diseases, which was established in France in 1984 linking general physicians and researchers through a computer network that aimed at improving sanitary surveillance of communicable diseases and developing epidemiological research in general practice.(34) The collaboration allowed researchers to follow and predict the time and space evolution of diseases, as well as, detect and alarm against regional or national outbreaks. In 2005, the network was composed of 1200 volunteer French general practitioners spread all over the French territory.

The network performs weekly collection, analysis, and real-time redistribution of epidemiological data concerning 14 different indicators commonly found in general practice, such as Influenza, Viral Hepatitis, acute Diarrhoea, Mumps, and Measles. The network's database is accessible on the Sentiweb website and is updated on a regular basis allowing the production a weekly surveillance and prediction bulletin. The website also contains epidemic charts, annual reports, and an updated publication list. In addition to Physicians, the network team is composed of pharmacists, veterinaries, clinical

research assistants, biostaticians, epidemiologists, computer scientists, sociologists, and virologists.

A study published in 1998 aimed at evaluating the effectiveness of computerized data collection, through the Sentiweb network, in monitoring Influenza-Like Illness (ILI) epidemics in France, and obtaining a rough estimate of the effectiveness of influenza vaccine. (35) Data on ILI were updated since 1984 by participating physicians and an ILI epidemic was detected when the national weekly incidence rate exceeded a seasonal threshold for two successive weeks. The Sentinelle system demonstrated adequate sensitivity regarding monitoring an ILI epidemic, which was reported from November 1995 to January 1996. Results of the monitoring and epidemic maps were readily available on the internet to increase the dissemination of information. In addition, estimates of influenza vaccine effectiveness were easily obtained. This example indicated the important role of the network in early detection and control of epidemics.

In the field of dentistry, a few examples of collaborative networks are available in the literature; one of them is the Technology Transfer Network (TTDentistry Network). Initiated in Birmingham, Britain, in 2002; the network aims at encouraging communication and interaction among the different parties involved in the production and application of dental technologies. (36) Academic researchers, dental practitioners, and manufacturers of new technologies are linked together through the network to facilitate exchange of research ideas and updates, and to test and improve new technologies that could be applicable to the dental practice. The network also aims at involving clinicians in the research process as they represent the potential users of proposed technologies and

their input and suggestions are extremely valuable for researchers and manufacturers alike.

A recent example of a dental collaborative network was initiated in the United States in 2005, through funding by the National Institute of Dental and Craniofacial Research (NIDCR). The Practitioner Engaged in Applied Research and Learning (PEARL) network. The network promotes that concept of "practice-based" research, where dentists identify clinical deficiencies and develop their ideas into full protocols in collaboration with academic researchers, then implement the studies in their offices. The participating clinicians are required to complete a training course in clinical research in order to become certified by the network as practitioner investigators.

The network studies will compare the benefits of different dental procedures, materials, and prevention strategies as well as perform anonymous chart reviews to generate data on disease, treatment trend, and the prevalence of specific oral conditions.

Studies will run on three different levels known as the PEARL Tier System. Tier 1 will include dentists practicing within a 50 mile radius from the New York University College of Dentistry (NYUCD), the main administrator of the network; those dentists will conduct the entire range of studies including randomized controlled trials. Tier 2 extends the area radius to 200 miles from NYUCD; here the dentists will be involved in observational and simple outcome studies. Interested participants from across the nation can join the third Tier, where they will receive the basic training that would enable them to engage in surveys and epidemiological studies requiring minimal monitoring. (37)

The Pearl network project is targeted towards reducing the gap between clinicians and academic researchers, by encouraging them to work together towards finding answers for everyday clinical questions that concern the clinicians. The network will also focus on the dissemination of research results in order to insure the uptake and practice of new evidence. Several methods, such as brochures, newsletters, emails, and annual meeting will be used to disseminate new findings. In addition, Dentists will be given continuing education credits towards their participation in the network. The interaction and exchange between researchers and clinicians in the PEARL network project, represent the core elements of the dynamic process of KT.

The Web-Dentist project

In 2002, researchers at Mcgill University's faculty of dentistry were interested in using the services of the internet to achieve three main goals:

1. Conduct research and facilitate the collection of data and dissemination of results

- 2. Improve communication with dental practitioners
- 3. Promote evidence-based practice.

Motivated by those objectives, and inspired by the success of the Sentinelles-Sentiweb network in France; they began planning an online collaborative network for clinicians and researchers (the Web-Dentist Project). It was a unique idea for dentistry in Canada; no such project existed in the North America at the time. Thus, the need for a pilot study was realized in order to test the feasibility of establishing and operating such a network. A sample of 11 general dental practitioners was selected from the city of Montreal. Each dentist was setup with a computer and Internet connection, and a web portal was setup to facilitate collection and exchange of data.

In terms of research, 19 questionnaires were designed covering various research topics such as patient demographics, treatment choices, treatment outcomes, patient management, stress in dentists, etc. [Appendix #1] All questionnaires were sent to the dentists for approval. Each questionnaire was sent a week in advance and data were collected on a weekly basis. Most questionnaires were used for a period of two weeks.

Results were returned to the dentists regularly, they included the results per dentist and the overall group analysis. Charts, figures and tables were provided to facilitate reading the results. [Appendix #2] In addition, small discussions were added in order to stimulate responses. Although appreciated by the dentists; the impact of the results was not determined.

In terms of communication, the dentists requested a discussion forum which was incorporated into the network's website but wasn't used as anticipated.

After one year, all 11 dentists completed the project. The project ended with a response rate of 96.7% and a few reported technical difficulties. Although the pilot succeeded in demonstrating the feasibility of establishing the network, the ultimate goal of a large-scale dental research network did not take place.

At the end of the pilot, a focus group was conducted with the participants in order to assess the project. The outcomes of that focus group left the researchers "in doubt". According to the coordinator of the pilot, some dentists were not as enthusiastic at the end as they were in the beginning, some were satisfied, while for others the network didn't meet their initial expectations. A year had passed and the network project was still on hold.

The literature indicates a growing move towards evidence-based practice. The internet is becoming increasingly useful as an information resource for medicine and dentistry, and a few examples of successful collaborations in the medical field already exist. Thus far, in the field of dentistry, no similar initiative was taken in Canada but other countries such as the United States have already launched a large-scale dental research network with similar long term objectives as our project. With the constant evolution of dental informatics, more collaborations of this sort are bound to take place. On the other hand, there's not enough literature on the information needs of health professionals and how to meet them. So we decided to conduct a qualitative evaluation of the pilot project and explore the meaning of the pilot experience to the involved participants in order to bridge gaps and overcome obstacles, if present.

Program evaluation can be defined as "the systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness, and/or inform decisions about future programming". (38) There are many types of evaluation, but the basic two categories are summative and formative. (39) Summative evaluations focus mainly on outcomes; the

consistency of outcomes with the primary objectives and the impact of the program in generating the desired outcomes.

On the other hand, formative evaluations focus on improving the effectiveness of a program by assessing its different elements and the quality of its implementation. One of the variations of formative evaluation is known as implementation evaluation, in which the evaluator gathers information about the delivery of the program to inform decisions about required improvements. In this study we assess the implementation of the pilot network from the perspectives of its participants.

By conducting a qualitative evaluation of the pilot project, we can better understand the needs of the potential users of the proposed network and provide recommendations for planning a large-scale network. We believe that such recommendations, based on the perceptions of "insiders", will contribute to the fulfillment of the aims of such a project and ensure better quality of the end product.

Chapter III: Methodology

Research Paradigm

Our qualitative evaluation of the pilot network project was conducted in the constructivism paradigm. Constructivism is a human science paradigm that can be described based on three basic assumptions: (40)

- Ontologically relativist: There is not just one reality but that reality is multiple and comes in the form of constructions that, although local and specific in nature, are often socially constructed and shared among many individuals or even across cultures.
- Epistemologically subjective: Knowledge consists of a series of constructions where any form of "truth" is a matter of consensus among the constructors.
- Methodologically hermeneutic: that individual constructions can be elicited and refined only through interaction between the investigator and respondents in order to produce a consensus that is more informed than any preexisting constructions.

Since the phenomenon under investigation (the pilot network project) was a collaborative effort among several individuals; its evaluation must therefore focus on the individual experiences in order to reach a common understanding of the network experience as a whole. The selection of a hermeneutic approach from the constructivist paradigm provides us the opportunity to address this phenomenon richly and in context. We began our inquiry expecting that different "stake-holders" involved in the network (i.e. researchers, dentists, and policy makers) would have different experiences and perceptions, all of which would be perceived as "real". By conducting open-ended

interviews, we tried to explore those "multiple realities", compare them, and interpret our findings to reach a better understanding of the phenomenon.

A hermeneutic approach focuses on interpretation and provides the theoretical framework for interpretive understanding with special attention to context and original purpose of the research. The context here is the physical setting of the pilot network (i.e. the university, the web-portal, and the dental office), its cultural setting, and its historical context (i.e. available literature). The context and purpose of research became our reference point, helping us better understand and interpret what the participants said.

Data collection

Data were collected through one-on-one interviews, with an open-ended interview guide approach. Various methods can be used to collect qualitative data such as interviews, focus groups, participatory or non participatory observation, and document reviews. (41) The choice of a method or a combination of methods depends on the purpose and context of the study. Since the idea of this study came after completion of the pilot project, observational methods were excluded. We chose to conduct one-on-one rather than group interviews in order to give each of the interviewees a chance to express themselves and expand on their own experiences, as well as give each of them the flexibility of choosing a suitable time and place to be interviewed.

All qualitative interviewing approaches are open-ended in the sense that they allow the interviewees to respond in their own words and express themselves freely. What differs is

the degree to which the questions are predetermined. In the interview guide approach, the interviewer uses a sheet that lists the issues to be covered during the interview maintaining, in the same time, the flexibility of probing and asking spontaneous questions during the course of the interview. Probes are follow-up questions that encourage the respondent to expand on particular topics. Basically, the interview guide serves as a checklist to make sure that all relevant topics were covered during the interview. [Appendix #3]

When preparing the interview guide, our goal was to draw a general outline for the intended interviews in order to direct the discussion into the areas we wanted to cover. Since this study was a follow-up to a pilot project and was intended to understand and evaluate the pilot experience, we based our interview guide on those initial objectives. We divided the guide into three main categories: Evaluation of the pilot network experience, the potential utility of the network, and future expectations for a large-scale network.

First we wanted to evaluate the pilot network experience by exploring the participants' perspectives on the following aspects of the project:

- Motivation to join the pilot
- Research questionnaires: how the topics where chosen and what they meant to the participants. How they felt about the data collection procedures and the results of the questionnaires.
- Satisfaction: in terms of the experience in general and the different elements of the network such as the discussion forum and the results of the questionnaires

Limitations: what they considered as drawbacks and what they disliked about the experience

Then we asked the interviewees about their views regarding the potential utility of an online network. For instance, what type of research can be done and what elements can be added to the network to optimize its utility. Our aim here was to highlight any differences in expectations among them and how each group would like to use the network.

Finally, the future of the network; under this category we wanted to explore the participants' personal opinions and concerns regarding the future of this form of collaboration and how to sustain it.

Those were our guidelines for the interview questions but the actual wording and order of the questions varied in each interview depending on how the interviewees directed the conversation. In qualitative interviews wordings can't be standardized because we need to be interactive and sensitive to the language used by the interviewees, draw questions from their comments in order to explore what the person says in as much detail as possible, and uncover any new areas or ideas that were not anticipated at the beginning.

Before beginning the interview, I gave a brief summary about the pilot project and an introduction about the aims of this study. I often warmed up the discussion by asking demographic questions regarding their professional and educational backgrounds. Some participants would jump immediately into the subject of the network, in which case I would leave the demographic questions till the end of the discussion. In the course of the
interview, I often used spontaneous probing questions to encourage the respondents to elaborate on their comments; "*What do you mean by*...?", "*Could you explain*...?" The participants were eager to talk about their experiences and to give their own feedback.

Ethical considerations

Because the research involves human-beings, the need for an informed consent arises [Appendix #4]. Guided by the ethical principles of confidentiality and anonymity; such a document preserves the rights of the participants and provides them legal protection. The consent form briefly explains the purpose of the research, the risks and/or benefits of participation, the purpose of the interview, and the handling and confidentiality of data. Prior to commencing each interview, I explained to the participant the information present in the consent form, ask them to read it, sign it, and provide them a copy of it.

All participants consented voluntarily to contribute to the research. Every effort was made to maintain anonymity and confidentiality throughout the research process; pseudonyms were used in transcripts, and files were kept in a safe locked cabinet at all times.

Sample

We wanted to interview individuals who were directly or indirectly involved in the pilot network. We had a list of 18 names of the dentists and researchers who participated in the pilot project and the policy makers in the field of dentistry that were informed about it

and had given their approval to the proposed project. By "policy makers" we mean members of the executive authorities of dentists associations and members of the faculty executive authority of the involved dental school.

However, we had one selection criterion; participants had to be able to conduct the interview in English because the interviewer did not speak the French language. The coordinator of the pilot study had met with all the participants throughout the pilot, so she was able to identify the individuals who are francophone and might prefer to be interviewed in French (4 out of 11 dentists). Those dentists were to be interviewed last.

In total, we interviewed 11 participants: 4 dentists, 4 researchers, and 3 decision makers. The size of the sample was determined by data saturation; the point at which no new information was observed in the data.

Sample- Pilot project

Sample- Evaluation of Pilot project

11Dentists 4Researchers

3Policy makers

4Researchers **4**Dentists In-depth interviews Л **3**Policy makers

[Figure #1]

Researchers and dentists were contacted by phone. We left messages with their secretaries or receptionists requesting an interview concerning the pilot project they had participated in. Almost all of them returned our call within 2 days, we had to call one of

the dentists again, after a week of no response, and it turned out he was intending to call but had a busy week. When they called back, the participants were briefed about the study and how it aimed at exploring their individual experiences and perspectives. They all accepted our request and mainly asked about the anticipated length of the interview in order to fit it into their schedules; we told them it was an average of 40 to 60 minutes. The impression we got is that they considered a 60 minute interview to be "long" but they all accepted it.

On the other hand, the decision makers were approached by email. In each email we included a summary of the pilot project, a description of the aims and methods of our qualitative study, a request for an interview, and an attached copy of the consent form. All of them replied with approval to be interviewed and gave their preferred time and place.

We always asked the participants to select the location of the interview in order to eliminate any intimidation and provide a comfortable surrounding. All of them chose to be interviewed in their workplace mainly during a break or early morning, before starting their work.

Data analysis

The interviews lasted between 40 and 90 minutes and were recorded on audiotapes for the purpose of transcription. Recording is a common practice in qualitative interviewing to guarantee the preservation of all data without compromising the dynamics of the interview. (42) The records were transcribed verbatim with word-to-word quotation of the

respondents and descriptions of details of the dynamics of the discussion such as pauses, laughter, body language, etc. especially when such details were relevant to understanding the intended meanings. The process of transcription is a vital element of qualitative analysis (43) representing the interaction between the researcher and participants and providing the raw data from which interpretations are drawn. In addition, verbatim transcription has been cited as "critical" to the validity and trustworthiness of qualitative research. (44)

After each interview and prior to transcription a summary contact sheet was filled. This paper contained short notes on what was discussed in the interview, any important or interesting issues that emerged, and personal reflections by the researcher. The purpose of this exercise is to have a first hand draft on the outcomes of each interview which would help the researcher in planning following interviews, and serve as a quick reference about the contents of interviews during the analysis.

In hermeneutics, analysis becomes synonymous with interpretation. The process begins with deep immersion in the text; reading and rereading carefully in order to develop a better understanding of the phenomenon. In doing so, the researcher enters the *hermeneutic circle*; a metaphorical way of conceptualizing understanding and the process of interpretation. (45)

The hermeneutic circle

It is an analytical process which aims at enhancing the understanding of a phenomenon by repeatedly and cyclically moving between the parts of the phenomenon and the whole. The circularity of understanding begins with the whole; the context of the phenomenon, then moves towards the parts, and then returns to the whole in order to contextualize the emerging interpretations of the researcher. (2)

Contrary to phenomenological analysis, the researcher in hermeneutics does not set aside his own "pre-understanding" or pre-judgment of the phenomenon but rather begins with it and repeatedly goes back and forth between the emergent interpretations of the text and the primary interpretations of the phenomenon until a sensible understanding is reached, free from inner contradictions (46)



(Inspired by Paterson 2005)

So in the case of the network, I began planning the inquiry based on my interpretations of the halted network project and my review of the available literature on the topic. This gave rise to some research questions which served as an outline for the interviews.

Then, I began to analyze the raw data from our interviews, searching for the meaning of the network experience in the words of the participants. The analysis process began with the transcription of the first interview; I was reading and rereading the transcripts, writing my own reflections, and placing theme notes in the margins where I found interesting items.

The development of themes or codes helped organize the data and make sense of the large amounts of text that result from the transcription. This step is known as data reduction (47) where the aim is not to eliminate data but rather focus and transform the raw data into manageable data. This usually results in a large list of initial codes which are then refined and reduced in number by grouping them under key themes or categories.

Our initial list of codes contained over 35 codes that were applied both deductively and inductively. Guided by the primary research questions, some of our codes were directly applied to the text; this process is known as deductive analysis. On the other hand, the immersion in the text allowed us to discover themes that were not anticipated in the beginning; known as inductive analysis.

Each code was constantly compared to all other codes in search for similarities, differences and common themes; this process is known as the constant comparison method. (48) At this stage I tried to focus on the significant parts, group together the sections that have related codes, and re-code them accordingly. This resulted in a final list of codes that were grouped under 3 main categories: [Table #1]

Categories	Codes
**1. Pilot project evaluation	 1.1. Motivation to join the pilot project 1.2. Pilot questionnaires: choice of topics and data collection process 1.3. Outcomes: the pilot experience and the results of questionnaires 1.4. Limitations of the pilot project
2. Potential utility of the network	2.1. Research potential2.2. Online interaction and specialists consultation2.3. Online continuing education
3. Future Expectations	3.1. Planning the network3.2. Funding the network

****** This category applies to interviews with dentists and researchers only as they were directly involved in the network

In the process of data reduction, I followed an inter-case analysis approach. The case here was determined by the professional background of the participants; i.e. researchers, dentists, and policy makers. Inter-case analysis means that we are comparing the perspectives of individuals across the cases rather than within each case; which is know as intra-case analysis. I chose inter-case analysis because I had found that within each case the interviews yielded homogenous responses and it was clear that it would be more interesting to compare the responses of individuals from the different groups rather than within each group.

The data reduction was performed manually by "cutting and pasting" using multiple photocopies of coded transcripts. Although time consuming and laborious; manual analysis develops an intimate knowledge of the data (49) and can be facilitated by using the various options on Word processor software. Qualitative analysis can also be

performed using special software packages that are designed to enable complex organization and retrieval of data making the process of analysis easier and more systematic, especially when working with a large sample. Regardless of the choice of tools, the researcher remains the main instrument in collecting data, structuring the analysis, and interpreting the results.

The second step after data reduction is data display. Miles and Huberman describe data display as an "organized, compressed assembly of information that permits conclusion drawing..." (47) Data can be displayed in charts, tables, or matrices that allow us to compare and contrast our findings. We designed a matrix (Table #2; see Results) that contains distilled summaries of the results and displayed our main findings in one diagram allowing us and the reader to draw final conclusions without constantly referring to lengthy texts. In the matrix table, the columns represented the three cases (researchers, dentists, policy makers) and the rows represented the ten main themes that were compared among the three groups.

The last step in the analysis process is drawing final interpretations and conclusions. Since the beginning of the analysis, interpretations were emerging and our preunderstanding of the phenomenon was beginning to shape according to the acquired information from the participants, but it is only when data collection ends that we can put together a final report. After we finished the 11 interviews, performed our inter-case analysis, and displayed our results in a matrix; we took a step back, examined the findings as a whole, and began synthesizing our final interpretations in light of the primary objectives and the acquired knowledge.

Chapter IV: Results

In this section, we report the results of our analysis. The below are the detailed results of the data reduction and inter-case analysis. The aim here is to take the reader through the thoughts and expressions of the participants which served as the basis of our interpretations. The interpretations of the results will be presented in the next section.

1. Pilot project evaluation:

<u>1.1</u> Motivation to join the pilot project

The researchers' motivations behind starting and participating in the pilot project can be divided into three main points. First, they perceived the internet network as a tool that would facilitate the research process by allowing them to access the dental offices, obtain large amounts of research data, and produce results in an easier, faster, and cheaper manner.

"I wanted to be able to send questionnaires on different research topics...to get data in an easy manner...we said with the internet it would probably be easier, faster..." [#3]

Secondly, some of the researchers viewed the dental research network as an environment that would allow them to promote the practice of evidence based dentistry among clinicians through the production of research evidence targeted at issues of relevance to the dental practice.

"My interest is very much from the perspective of getting general dental practitioners, in this particular project, to buy into the idea of using evidence...if we want practitioners to change their behavior and use evidence based practices, we have to provide them with an environment which makes it possible for that behavior to change..." [#1]

Third, the researchers were motivated by the success of a similar project from the field of medicine; the Sentinelle Sentiweb network in France. The French network has been successfully conducting epidemiological studies through online collaboration with general physicians for the past 22 years. This success inspired the researchers to test the feasibility of establishing a dental research network that did not exist in Canada and hence they started planning the pilot network.

"Another insight was a pilot project they did in France, not with dentists but with doctors...to look at what is happening in the doctor's office...even though it's not the same kind of project...the basic idea is to use something existing to do research, and with informatics now, a lot of people are doing that" [#3]

The dentists, on the other hand, expressed different motivations behind participating in the pilot project. To some, participation in the pilot encouraged them to integrate the use of the internet into their practice; they were receiving a free computer and internet connection upon participation. Two out of the 11 dentists did not have computers in their offices. The remaining dentists used their computers mainly for administrative purposes and most of them did not have in-office internet connection. "What helped me decide is that there was going to be a push towards use of computers and that was a push I needed! In the same time if I can give my time and help back then why not, it's a good win" [#5]

All the dentists expressed interest in the use of internet and informatics, and referred to it as "*cutting edge*" and "*the way of the future*" which made it more appealing to them to take part in such a new initiative.

"...if I can help create or be at the forefront of creating something in Montreal or in Quebec, or even in Canada, you know, why not?!" [#7]

Moreover, some of the dentists were motivated by the idea of keeping in touch with other dentists, and maintaining a link with their colleagues in order to stay informed, exchange knowledge, and reduce professional isolation.

"It sounded very interesting, an opportunity to listen to what other colleagues do, the materials they use, the techniques they use, you know, also the organizational management of their office...you kind of bounce questions off each other..." [#8]

"If you're in your office 5 days a week and don't have a circle of friends that are dentists then you're isolated, you have to read and who has time for that! You want to catch up, you want to know, and so using the computer you can get to others and get information quickly and more efficiently" [#6] Another factor that seemed to influence the dentists' decision to participate was the fact that it was in collaboration with an academic institute, they considered it a way of giving back to the university and were enthusiastic about taking the role of researchers.

"I liked the idea...you want to be helpful, to give back...and certainly once we started to hear more about what the project entailed...it sounded like a good idea and like something interesting to be involved in" [#5]

"I always wanted my name on an article!!" [#7]

<u>1.2 Pilot questionnaires</u>

To test the feasibility of data collection using the internet network, the researchers prepared 19 different questionnaires on various topics related to dental practice. The selection of research topics was done mostly by the researchers. According to them, they tried to get feedback from the dentists regarding the topics but did not get much. In their initial meeting, a couple of dentists suggested a few ideas but according to the researchers those ideas were either not suitable for the context of the network or were seen by the researchers as not particularly useful.

"We always sent the questionnaires to them well in advance so they could give us feedback or suggest topics, but there was virtually no feedback" [#1]

"When we were writing the questionnaires, we tried to focus on subjects that could interest them. I remember thinking and doing literature reviews on the health of the clinicians, their satisfaction at work...also the dental assistants. There were questions pain, patient's profile, and things like that..." [#3]

When I asked the dentists how they felt about the research topics that they worked with, they said they found some less relevant than others and "*not overly exciting*". Nevertheless, the dentists went ahead with the surveys because they thought it was selected to fit research requirements and the pilot project, something that they didn't mind.

"I think it was on a research angle that they came out with these questions. Of course we could have gone into other subjects but I think they maybe needed a certain type of question or subject..." [#5]

"I think a lot of the choices came from up above! But its fine, many of them you'd have to sit down and think long and hard to come up with. Some of them were less relevant but most of them were interesting" [#6]

"I think it's because it was a pilot study and so it was a random choice of topics so that was alright, but some of the stuff were not so exciting" [#8]

I often asked the dentists to give me more details about what they liked or disliked in the questionnaires and which particular topics they were referring to. Most of them told me they couldn't remember the particular topics at that point, as the project took place a year

earlier, but some mentioned that most of the questionnaires helped them feel less isolated and that they were able to get a sense of what is happening in other clinics. They also expressed interest in those questionnaires that answered day to day questions regarding issues such as number of patients, types of treatments, etc.

"They (the questionnaires) were fine. They were good in terms of practice management but in terms of materials it didn't happen" [#7]

"Through the questionnaires you could say oh, where do I fall on that bell curve? Some of them were eye openers and I don't remember which ones" [#8]

Then, I asked the dentists about the process of data collection and data entry. Most of the dentists said they had done it by themselves while some occasionally delegated the task to one of their staff. None of them complained about this issue and they all said it was not very time consuming.

"I did it myself (data collection). Sometimes I did it (data entry) on Fridays. That part wasn't difficult at all" [#7]

"Data entry was (done by) me exclusively and most of the data collection, I did almost everything, it wasn't that time consuming" [#8]

<u>1.3 Pilot project outcomes:</u>

Overall, the interviewees were satisfied with the pilot project experience. The researchers referred to the commitment of the dentists to the project and the high response rate in terms of data collection as the main positive outcomes. In that sense, one researcher said the pilot project was "*surprisingly successful*?" and another described it as "*the first step to show that it was feasible to involve dentists in this kind of data collection*". Nevertheless, all of them thought there was room for improvement in the future.

There was a similar reaction from the dentists; "somewhere between 8 or 9 out of 10; it gave me a lot", "My experience was generally very positive... certainly if we hit on the right aspects and fill a need for the general practitioner in his office, then its great..."

On the other hand, some of the researchers expressed confusion as to what they described as a reduction in the level of enthusiasm among dentists throughout the project, they mentioned that this is what they felt happened but weren't sure why it happened. The researchers themselves expressed a lot of enthusiasm about the pilot and thought that the outcomes were quite interesting. They said that some of the results could have been useful for the dentists in their decision making, such as the questionnaire on bleaching [Appendix #6]

One researcher thought such a change in dentists' attitude is anticipated; "...like everything with these sorts of things, there was a bit of excitement in the beginning...yeah, excitement, and then it became more routine and they (the dentists)

were doing it because they said they would do it ..." While another researcher believed that the dentists were positive throughout and that they found the project useful.

So, during my interviews with the dentists, I asked them to describe their experience in the pilot, and how they used the results of the questionnaires. Most of them found the results somehow interesting but not necessarily useful.

"I don't think I'm exaggerating if I say that about third of the surveys I found to be a little weak, I don't want to say meaningless, but a little weak in their content...I think I was expecting something I can take home with me a bit more..." [#8]

"To me, it's not a 100% clear what we tried to achieve and what we could get from this sort of network that we can't have with the existing structures that are there right now...I can see that type of research more interesting for (dental) organizations... to have a specific snapshot of a particular treatment or patients or whatever, but for the professional that's just a sort of a passing interest" [#6]

They also expected more interaction with the other participating dentists and became less motivated when this form of communication failed to take place.

"Another aspect of the research project was the capability for us to interact with each others and to ask questions about specific problems, that didn't really materialize" [#8]

1.4. Pilot project limitations:

Sample size:

All the researchers involved viewed the small sample size (11dentists) as an important limitation in terms of the amount of generated data and the generalizability of results. Some of them explained how this was unavoidable due to a small budget: *"There was a question of cost because we bought 11 computers and paid for the connections...we had a small budget"* [#3]

The researchers contributed the limited use of the generated data to the small number of participants:

"...it (the results) was still limited in its use because there weren't many of them, now if we had a 100 of them, we could generate a lot of data very quickly about whatever treatment they're interested in..." [#1]

The same point was made by some of the dentists:

"... I think the sample size was very small, so it's hard to generalize the findings..." [#7]

Technical issues:

The researchers also focused on limitations related to the technical aspect of the project. They felt frustrated because they had minimal experience in informatics, and pointed that some of the dentists were not familiar with the use of computers and needed some assistance. "Well, most of the frustrations were technical, you know, about computers and the links...some of the dentists were not good with computers, so I visited them to explain how it works and everything" [#2]

Another point raised was the basic web-portal that was designated for the pilot. It was a program which already existed in the university (WebCT) and they applied it for the pilot web-portal to save the time, money, and effort required to design a new site.

"We used the WebCT program, it's good and practical in order to collect data but it's not a very nice interface, it's not cozy, not personal, and not warm...we knew actually that it wasn't perfect but at the same time, it wasn't easy to build a website...this would make the cost go up..." [#1]

Some also expressed an interest in using new innovations for data collection which could have made the process faster and easier, but the question of the budget reappeared here.

"They (the dentists) could have used the PALM or the Blackberry and answer the questionnaires individually...we were behind in the technical part, we didn't use the technology that is available for us, and it changes all the time..." [#3]

Work load:

The two researchers who were responsible for designing the questionnaires spoke about the amount of hours they needed to dedicate for the project as one of the limitations. They both had other projects to work on and found that the network project required a lot of dedication.

"It was a lot of work, we submitted a lot of questionnaires, building a questionnaire is a long process, takes a lot of time...you need to see the subject, if it works or not, validate it. I remember this questionnaire about the health of the dentists, I read many articles, that was not my field...it was sometimes difficult and I felt that we needed more time to build the questionnaires" [#3]

"In the future, we might do a questionnaire for a longer period of time. If we have 100 or 200 dentists, it will be difficult to do a questionnaire every two weeks but I will be in charge of one questionnaire once in a while...we were just two researchers!" [#1]

<u>2. Potential utility of the network:</u>

2.1 Research potential:

When I asked about the future use of such a network from the perspective of the interviewees, the researchers, dentists, and policy makers saw a big potential for research collaborations. Each of them spoke about the types of research that can be conducted through the network.

The researchers believed that with adequate resources and use of recent technologies, many types of research can be performed, ranging from simple epidemiogical studies to clinical research. They saw a great opportunity to enter the dental practice, which they had difficulty accessing before, and collect various types of data directly from the dentists. They compared it to research in the medical field; where the researchers are granted access to a wide range of data through the hospital based research centers.

"you can have a lot of questions to work on with this kind of project...we don't know anything about the dental office...for example, do they use new techniques, do they have trouble with poor patients...if you can enter the dental office and have a representative sample of what's happening, you have almost everything you need to do research in the dental area. It's like in the healthcare systems, the researchers that are in the hospital. You are in the hospital, you know exactly what's happening, you can do whatever research you want..." [#4]

One researcher gave specific examples of what he described as "interesting" research that can be done through such a network. He talked about long term follow up studies and evaluations of treatment options. He also believed in the feasibility of conducting Randomized Control once the network is up and running.

"for me it would be interesting to do long term follow ups of treatment to see what works and what doesn't given a certain situation...for example a prospective observational study where you identify people coming in with fractured incisors and the dentists do what they think is appropriate and then we group them into categories and follow them for 4, 5 or even 10 years to see which of the treatments seem to work best...the idea is to make it applicable...people coming in with acute pain, broken fillings, recurrent decay, common problems, and with a network of a 100 people you could very rapidly get a lot of

cases...and once the network is running it will be entirely feasible to do Randomized Control Trials, but that's another level of network use" [#1]

All the researchers felt they could gather lots of interesting information, but in order to benefit the dentists as well, they wanted to know what topics would interest them.

"I feel, as a researcher, we could have lots of interesting information but I'm not sure they (the dentists) would find it interesting...I was interested in doing focus groups online, you have 5 or 6 people working online and we could ask questions, that's one way of doing qualitative research online" [#3]

For the dentists, interesting research meant clinically relevant data. They wanted research that would help them with their daily clinical decisions and considered such an initiative to be an attractive element of any network. Most of them often gave me the example of the Clinical Research Associates (CRA), a non profit clinical research organization, which they considered a good resource of relevant research information.

"How are they (the researchers) going to attract dentists to their network? ... Is the reward of being part of it, you know, getting more (clinical) information? Like the CRA where you get concrete studies about say a type of polymerization product, it gives all the different companies, different costs, different appreciations by clinicians...those things are great, so something like that, you're benefiting from, would McGill compete with that?!" [#5]

The topics they suggested for research were mainly clinical, describing it as "very important" the dentists focused mainly on dental material research: updates and evaluations of new materials and comparison of different types of materials. "Research is very important, especially if it's about materials, which is something constantly evolving. Materials, techniques somewhat...techniques are important as well but I think its more dependant on materials" [#8]

"I have a friend who's involved with the CRA. That would have been an interesting thing as well, if this pilot study was able to get certain materials for everyone to test them, which would have been interesting as well. The only drawback I have about this is I expect a certain standard of care for my patients...I'm sure it's not like bad stuff but still maybe I'd rather use it in the lab or something"

Some also suggested conducting research on treatment techniques: how to do certain procedures and how to handle certain patients.

"...more (future) concentration on clinical matters or even techniques, something like how you deal with a crying child in the dental chair, that to me would also be very beneficial"

In addition, one dentist talked about the need for research data on emergency dental care in hospital settings, suggesting that such collaboration would improve communication between physicians and dentists "...Also, for example, to find out more about dental emergency care, in terms of, how many patients do emergency doctors see? So we can see how to improve communication between physicians and dentists." [#7]

On the other hand, Policy makers had contradicting views in terms of the types of research suitable for such a network. One of them was totally against the idea of using the network for clinical studies and material testing. He considered it a waste of time and resources due to the commercial strategies of dental material companies and suggested that the network should focus on public health, epidemiological, and sociological research.

"Well, from what I can see, dental material research is almost, most of it is pointless; because of the way the dental industry is setup. It's not like doing pharmacological research, when somebody brings a new drug on the market it'll be protected for 10-15 years on the patent protection, after that they'll be generic drugs and the drug will be available 25 or 30 years until something better comes on. The way the dental industry is setup, first of all, dental material are grant funded so they don't have to go through rigorous testing and in fact dental companies don't want them to go under rigorous testing! That's why they change the product every year or two. So what's the point in doing a clinical study on a new composite which isn't going to be on the market in 3 years in the time when the results come up! ... It would be far better to use the network for health services research, epidemiological research, sociological research, you know, what sort of people they're treating, why are they treating those people and not others...that's more interesting than trying to use them as backyard researchers" [#9]

Another policy maker, however, had a contradicting view and encouraged the use of the network for evaluation of dental materials in order to benefit both dentists and their patients.

"...we feel now that the products that are sold to us are arriving and they haven't been tested properly, and who's paying for that? The patient and the dentist, but the companies already made their money, so we feel that if there would be a vehicle like that where you can start having a product online and people say, yes if you're interested there's a pilot project on that, and this is the protocol and how you should do I ... because the industry is becoming so powerful" [#10]

A third policy maker also encouraged focusing the network on public health and sociological research as the type of research that is needed in the dental profession and one that would require less financial resources.

"I think researchers have the time to think, they have time to evaluate. The dentists, they want to be the recipients. They don't have that much time to read to see if one technique is better than the other, they want the researchers to do it for them...I think clinical research is wonderful, you can have the best product in your office, but you might find that it doesn't work for you, but we also need people who will think, think where this profession is going, think of our needs, the dental health of the population, and this could be in collaboration with dentists...otherwise people want something clinical and I would think we don't have the money for that" [#11]

2.2 Online interaction and specialists' consultation

In response to dentists' suggestions, the researchers incorporated a chat section into the network's website. There were a few attempts to initiate discussions from one or two dentists, but the chat section wasn't successful. I asked the researchers about the reasons behind the failure of this aspect of the pilot network and the main reason they suggested was the small number of participants. They explained that the larger the number of network users, the more the chances that some of them will use the chat section.

"I'm not a user of chat lines at all, but I think you have to have a large number of people, I mean if you have a 1000 dentists in an organization, maybe 50 of them will use it regularly..." [#1]

"...chat is something interesting, but usually nobody uses it, not only in health care, except if there's a purpose and there's somebody in the chat that does the job, sending a message every two days saying I want to speak about this and that, an animator... when you have a very very large network, it's also useful for the chat, to be sure that if you send something, someone will answer..." [#4]

In addition, some researchers blamed the basic design of the website for being less inviting for the participants to use the discussion forum. While others admitted not giving that part of the project much attention.

"Maybe if the internet website, if it was different, or more easy to use, I don't know, more interesting to look at, it might have helped...they (the dentists) always said lack of time, I don't know, a lot of people say I don't have time...it's just that they don't make time" [#2]

"We didn't focus too much on the chat section, actually two dentists started using it and we could have, as researchers, involved more in the discussion but we didn't do it; we had too much work... and there was no critical mass..." [#3]

So during my interviews with the dentists, we discussed the issue of online communication. Their explanations as to why the chat section was not successful during the pilot project centered on lack of time, the small number of participants, and not being used to this method of interaction.

When I asked them if they would like to use the network for this purpose in the future; the dentists expressed a lot of interest in keeping in touch with other dentists and dental specialists in order to share questions regarding matters they encounter in their daily practice. They would like to be able to consult on difficult cases or share digital radiographs in order to exchange opinions.

"Questions that you have on a day to day basis, you've done a root canal or a surgery or whatever and you have a certain difficulty and you're wondering if anybody had ever encountered that, or you see that the patient has a lesion and it would take time to get to the specialist you know, you can take a picture and put it on the computer and ask if anyone has seen something like that..."

They also wanted to use the network to discuss office and staff management issues. A couple of dentists gave me examples of specific situations, like dealing with a pregnant hygienist or purchasing new equipment, in which they would like to know the experiences of other dentists.

"It's (the network) a center where when you're doing something, whether it's a question about a material, or even an office management type of question: hey, my hygienist is pregnant, what do I do? Do I have to give her time off? What's your experience? It could be an excellent center to bounce ideas off and communicate" [#7]

"...I give a personal example, I was looking to buy a digital camera and I went to Google and multiple websites, then I stumbled upon a wonderful site that reviewed all digital cameras and I spent a couple of hours on it and got a lot of information. That was one specific item, so I guess the same if you apply it to dentistry; I'm out to buy a piece of equipment, let's say digital radiography, and if I can go to an internet network like this one it would be interesting to see a more national thing about what people have to say about it rather than just two or three opinions of people you know" [#8]

Researchers and policy makers saw a lot of potential for online communication and specialist consultations. They mentioned that online consultations are common in the medical field and can be implemented for dentistry as well. One policy maker suggested that it would benefit both the general practitioner and the specialist. The involved

specialists will develop professional relationships with the dentists and thus an increase in referrals.

"I think that is definitely something we could probably offer, and we could probably recruit specialist from the community rather than always specialists within the university ... it may be very interesting for prosthodontics in private practice to communicate with a group of general practitioners, because for them they're always thinking they'll get referrals" [#9]

"we would like to be able to have the dentists send their x-rays or patient files to a specialist at the university for example, and then at 2 o'clock you go online with your camera, and the specialist tells you I saw your case, I would add this, and I've rated the treatment plans from 1 to 4....so we can do all this by internet...we think eventually its going to happen, it's happening in the medical field. It's the way of the future" [#4]

One of the researchers talked about using internet technologies such as video conferencing for more efficient consultations. He explained how such practice is becoming more popular in medicine allowing live interaction between doctors and patients in distant locations.

"...video conferencing, in medicine we implement it a lot, especially for hospitals that are far away. This is really interesting because you call a meeting with the patient and the doctor can see the patient and ask the questions he wishes to ask. So with the technology now we have room for that... it's not something easy, but they do it in health care..."

2.4 Online continuing education:

All interviewees saw potential for Online Continuing Education (OCE) through the research network. Researchers believe that incorporating such an element into the network structure would be very beneficial for the dentists since continuing education is a part of their career and obtaining credits through online courses would be a time saver for many dentists

"I think the network would have several elements and continuing education would be an important part of that. I think the dentists that we worked with wanted that, and it's an important part of their professional life...it's extremely useful for a dentist who lives you know, way out. They can do online courses and they can get credits and recognition for doing that" [#1]

All the dentists agreed with that and showed a lot of interest in OCE as an option that would fit well with their daily busy schedules.

"...it's definitely an interesting avenue to pursue because sometimes we're limited to how much lectures we can attend and how much we can take away from the office..." [#5]

"That's great! If it's the right courses and stuff, it's excellent for someone like me for example; not much time... I personally like to get away and interact with people, but it's definitely excellent" [#7] A policy maker in an academic institute suggested rewarding the dentists for participating in the network's research activity with university credits that would eventually give the participating clinician a university certificates or a graduate degree:

"...if we can, not only give them continuing education credit, but if we can also give them university credits for these courses, then they can eventually accumulate credits for a university certificate and then a university Masters degree...and I would think that even the work they do within the network, if it can be put together in such a way that it can be given a course number, then they could actually get credits for that work too" [#9]

However, from the perspective of another policy maker, the main problem we're facing is the number of dentists who actually use the internet as part of their daily work and for that reason we would have to motivate them to use such resources:

"The problem with the dentists now is, although they might have computers in the office, they only use it to do the management of patients' appointments and so on. We found out for example, we have in our data base here like 1600 dentist out of 4000 have an email address, we found out that most of it is at their home and they don't use it much at the office. We were looking at putting some lectures online for them but it's...we have to bring them there!" [#10]

<u>3. Future expectations</u>

After discussing the pilot project, and the potential uses of the network, I asked the interviewees about their thoughts and expectations for a future larger-scale network. The interviewees mainly focused on managing and financing the network.

<u>3.1 Planning the network:</u>

Having planned the pilot and prepared the questionnaires, the researchers told me that they now feel it would take a team effort to manage such a project and that planning and launching the network needs full dedication.

"... it's the sort of project that could completely dominate your career, cause essentially you're talking about setting a whole network, I mean, once you get it set up...you can kind of step back, but the set up will take like 5 years and it would dominate what you're doing, it'll have to be the central theme of your research" [#1]

Some of them suggested that the research part can be divided among a big team of researchers from various backgrounds. They explained that if each researcher is asked to contribute something related to his/her field of interest (i.e. epidemiological research, sociological research, behavioral research, clinical research, etc.) that could satisfy the needs of the dentists and reduce the work load on individual researchers.

"...it's a team, you need a team. The leader should be someone who has the time for this. You need people who have different skills" [#3]

"If we had brainstormed with lots of other people, I'm sure we could come up with other subject areas or data collection techniques or whatever..." [#1]

The dentists' outlook for the future focused again on getting "*clinically relevant*" data as a big incentive for them to join such a network. Some predicted that many "*competitive*" networks might emerge, and when I asked them how they would choose a network in that case, they expressed more willingness to join a network that is university based, and spreading across Quebec or Canada.

The policy makers were mainly concerned about getting a larger number of dentists to participate in a research network in the near future. One of the points they mentioned was the lack of internet access in many dental offices. A policy maker indicated that this is the reality for the time being and might present a challenge to starting the network in the near future, so I asked him what he thought was the reason behind it and he said: "*Some dentists don't want to have internet in the office because they are afraid the employees will use it in their working time*…" [#10]

The other point raised by the policy makers was the need for good incentives to encourage "busy" dentists to join the network at the first place. They gave a few suggestions such as online discussion and consultation forums, continuing education credits, and prizes.

"...I think they should have credits from the ODQ when they participate in a study, this could be a good way...what else...have prizes, like if you participate you may win this or that...but we will maybe loose people and have new ones joining, and it's good to change and you will obtain more information" [#11]

3.2 Funding the network

The researchers brought up the issue of financing the project, one researcher expressed confusion as to the means of writing a grant proposal for such a network in order to obtain a good budget. He explained that traditionally grants are written for specific research subjects, while in the case of the network we are requesting finances for a tool that facilitates research.

"...The way to write a grant, we are more used to having a specific topic. But asking for money for a tool (the web network), we're not used to it... in the same time you need to show who's going to use it, what kind of research will b done on it in the next 5or 10 months... we don't know really how to prepare such a proposal?" [#3]

On the other hand, another researcher explained with confidence how having a large-scale network with a big team of researchers justifies the required budget. He said that in order to get good funding, the network must aim at recruiting a large number of participants and determine, in principle, the areas of research that will be covered. "...I think that you shouldn't be afraid of going big, and for me if you want this project to be successful, it would have to be across Canada...you don't have to say exactly what kind of research you'll be doing in the next five years, just say that we can do research in A B C and D. You have to find researchers in fields A B and C, who would join you, and they will manage the questionnaires in their fields... then you can ask for a lot of money because it will generate a lot of research" [#4]

Finally, I asked the policy makers about the means to financing the network. They all believed that obtaining grants for the network was not a big issue but said that it was important to identify the research areas that the network will cover in order to obtain funding from interested sources:

"...You have to have a very good idea what you're going to do with this network... they should find a way to do it as a pan Quebec initiative that would include University of Montreal, Laval, and McGill. The ministry may be interested in putting money in it too, I don't know...."

"You have to decide what your research questions are going to be. You could use this as a knowledge transfer vehicle and look for knowledge transfer grants. You could be looking at health care delivery, economies of healthcare, you maybe able to use it for some epidemiological studies, some simple efficacy studies...there are various things you could do and for each one of these you may be able to find grants" [#9]
Results summary [Table #2]

		Researchers' perspective	Dentists' perspective	Policy makers' perspective
Pilot project evaluation	Motivation to join the project	 Facilitate data collection Promote evidence- based dentistry The success of other networks (sentinelle sentiweb) 	 Interest in Internet use Develop a connection with academia Establish a link with other clinicians Obtain "free" computers 	N/A
	Pilot project Questionnaires	- A lot of time and effort to design questionnaires relevant to dental practice - Not enough feed back from dentists on selection of topics	 Not "exciting" choice of topics Topics fit for research but not clinical needs Minimal time and effort required for data collection 	N/A
	Pilot project outcomes	 Satisfactory in terms of dentists' commitment and response rate Interesting and useful results of questionnaires Room for improvement in future 	 Expectations not met, i.e. communication with other dentists, useful research results Generally satisfactory experience 	N/A
	Pilot project limitations	 Small sample size/Small budget Technical difficulties: lack of technical expertise, some dentists not familiar with internet use Heavy work load 	 Small sample size: couldn't generalize results of questionnaires and weren't motivated to use discussion forum. Research questionnaires topics 	N/A
Potential utility	Research potential	- Potential for various types of research : cross sectional studies, longitudinal studies, and clinical trials	- Mainly interested in research on dental materials and treatment techniques	 Divergent opinions regarding clinical research Potential for public health research
of the network	Online interaction and specialist consultations	- An incentive for dentists	- Common interest in online chat and consultations with specialists	- A good incentive for dentists
	Online Continuing Education	- An incentive for dentists and an important element of the future network	- Interest in the flexibility of OCE : no time or travel constraints	 dentists can be given CE credits Potential for university credits and certification Applicability (?) (internet in clinics mainly used for administrative purposes)
Future expectations	Planning and financing the network	 Need for a big team of researchers to run the network Need for a Big budget 	 More focus on clinical research Make it across Quebec or Canada 	 Concerns regarding getting a large number of dentists to participate: availability of Internet in dental office and the incentive to participate Must define research areas to get financing

Chapter V: Discussion

The aims of this qualitative evaluation were to examine the potential utility of an online dental research network by exploring the perspectives of individuals who participated in a pilot network and to provide, based on qualitative analysis of the data, recommendations for a future network project.

The collected data uncovered differences in perspectives and expectations between the dentists and researchers who participated in the pilot project. Discussions regarding the potential utility of an online dental research network revealed the participants' preferences in terms of research activity, and their interest in online communication and continuing education. The in-depth evaluation of the pilot network also illuminated the limitations of the project and the unmet expectations of the dentists.

One of the limitations of this study is the fact that it was done a year after the pilot project ended. This meant that the participants weren't able to expand on some ideas because they couldn't remember certain details. Occasionally, I tried to refresh their memory by showing them documents from the pilot project, but I felt they didn't wish to interrupt the discussion to go through old documents.

Also, some selection bias may have been introduced in our sampling strategy. The criterion was the ability of the participant to conduct the interview in English. Initially, I referred to the pilot project coordinator to identify participants who would probably be uncomfortable with conducting an interview in English. I decided I would contact those individuals only if I feel the need for more data. All other participants I approached were bilingual and had no objection to being interviewed in English.

On the other hand, collecting data through one-on-one qualitative interviews allowed us to explore the personal perspectives of the individuals who were involved in the pilot network and understand what the research network experience meant to them in their own words. Such detailed information couldn't be obtained quantitatively.

Analysis of qualitative data helped improve our understanding of the phenomenon by interpretation of perspectives of individuals who experienced the network and identification of the meanings, similarities, and differences they share among them. For the next phase of the project, the outcomes of this qualitative evaluation will help structure a solid network that is based on the vision of its potential users. In addition, our findings can be a useful reference for planning any collaborative project between dental clinicians and dental researchers since it provides a detailed evaluation of personal experiences from a similar initiative.

Credibility and transferability

Credibility of qualitative research within the constructivism paradigm is measured in terms of trustworthiness of findings as opposed to the positivism paradigm where internal and external validity, objectivity, and generalizability are the main criteria. (50)

The reader of this paper may come up with certain interpretations regarding the research network, guided by his or her own understanding of such a phenomenon, and may agree or disagree with our interpretations. Our aim is not to declare our findings as the absolute truth but rather to present the best interpretations we could reach through a systematic research process.

In hermeneutics, the researcher's own understanding or prejudice is part of the interpretive process. "It is our fore-knowledge that allows us to begin to understand..." (51) Thus we don't remove our subjectivity from the research but we recognize it and acknowledge it, as it will affect how we listen and how we interpret. In this study, I began the research with my own perspective and judgments that I had formed after reviewing the pilot project documents and the available literature. This was the starting point in the circle of interpretation whereby, with the analysis of each interview, I would go back and modify or extend my initial interpretations in light of the participants' experiences and stories.

In qualitative research, thick description of the methodology, analysis, and results is an important condition to the reliability of our interpretations. What's important here is to establish believability; by allowing the reader to follow how we came to those interpretations (52) along with an apparent consistency with the strategies of the research paradigm that we chose as the foundation of this inquiry.

In my analysis, I used several methods in order to assure credibility and rigor: deep immersion in the text, debriefing, and triangulation. The immersion in the text through repeated reading and cycling between the parts and the whole helped refine my emerging interpretations and make sense of the phenomenon. In addition, from the initial steps of the research I was constantly debriefing my research supervisors on the emerging interpretations and discussing the analysis steps in order to reach an overall agreement. I

also tried to add rigor to my findings by performing analyst triangulation: (39) having another qualitative researcher analyze some interview texts and compare our findings. Such an exercise helps to open the interpretations from the narrowness of one's vision and prejudices.

In qualitative research, we refer to transferability, rather than generalizability of findings. Transferability means that interpretations can fit into other contexts outside this study when an audience finds the results meaningful and applicable in terms of their own experiences. Here again, we try to provide for transferability by providing detailed description of the our Methodology and Results.

For the purpose of analysis we grouped the responses of our interviewees into three cases corresponding to their professions: researchers, dentists, and policy makers. Then we performed an inter-case analysis on the data, where we compared the perspectives and opinions of the respondents among the three groups rather than within each group where responses appeared more homogenous.

The results show many differences in perspectives between dentists and researchers. Of course one might anticipate some differences due to the different professional backgrounds, but the goal of this evaluation is to better understand what those differences are, why they exist, and to find a common ground where we can meet the expectations of all those involved in the network.

When asked about their motivation to join the pilot research network, the researchers wanted two things: to have a tool that would help them collect data from clinics and to involve dentists in research in order to promote evidence-based practice. Literature shows that the internet can serve as a powerful tool for collection and dissemination of data in a faster and cheaper manner, (16) and as research and information resources are increasing; the push towards evidence-based practice is becoming more evident with dedicated organizations and journals around the world. (53)

On the other hand, what motivated the dentists to join was the opportunity to establish a link with other dentists and the fact that the project was initiated by the university. At the beginning of the project each dentist was given a free computer and internet connection, which was a big incentive towards their participation, especially for those who didn't have a computer in their clinics. But I believe that the link with the university served as a big incentive for them to participate because some of them were graduates of the same university, some still had working ties with the university clinics, and for some it was simply "*the aura of the university*" as one policy maker puts it.

So the initial motivations to participate were different between the two groups, which may not be so surprising, but when I asked the participants about their perspectives regarding the outcomes of the pilot, it became clear that dentists and researchers where on different grounds. In general, they were all satisfied with the experience but as we went further in our discussion, the dentists expressed disappointment in terms of their expectation from the project regarding issues such as the usefulness of the conducted research to their daily practice. The researchers, on the other hand, thought the outcomes

were satisfactory and although they had a sense that the dentists might have lost their enthusiasm towards the end of the project, they weren't sure why that happened.

Before beginning my interviews and while examining the pilot documents, I noticed that the dentists and researchers had met only twice during the pilot; once at the beginning and once at the end, the rest of the time they communicated mainly through the project coordinator. So I had a preconceived notion that because the dentists and researchers did not meet enough throughout the pilot; this may have led to some disappointments and unmet expectations. I believe that some of the disappointments the dentists expressed when talking about the outcomes of the project could have been avoided or addressed; had the two groups met more frequently.

A main aspect of the pilot project was the research questionnaires. Over the period of one year, 19 questionnaires were completed by the dentists, analyzed by the researchers and returned to the dentists with the corresponding results. When we addressed the questionnaires in our interviews some important issues surfaced:

- The researchers believed the topics were interesting and useful for dental practice

- The dentists found the topics less "exciting" and not very useful

- The researchers wanted more feedback from the dentists regarding the selection of topics but failed to get much and had to put a lot of time and effort to come up with interesting topics

- The dentists remained passive and carried on with data collection but considered the questionnaires more interesting for researchers

This clear dichotomy in perspectives brings us to a very important element of any collaborative project; Knowledge Translation. The CIHR defines KT as "the exchange, synthesis and ethically sound application of knowledge-within a complex system of interactions among researchers and users..." When the researchers in this project expressed their motivation behind starting such a network, they talked about involving dentists in research in order to promote evidence-based practice. This push towards an active exchange among research producers and users is the basis of the concept of KT. (25) KT attempts to reduce the gap between evidence and practice by going beyond mere dissemination and involving the potential users of research findings in formulating and conducting the research. (32)

If one of the aims of the project was to translate knowledge between dental researchers and dental clinicians, then the above summary of the perspectives of the participants show that the pilot failed in that aspect. The researchers thought they selected good topics for the surveys and believed the results were useful, but the dentists didn't find the selected topics pertinent to their daily practice and therefore didn't use it, so what went wrong?

In order to answer this question I went back to the literature on KT. The main elements of knowledge translation are integration and simplification. (25) Integration can be accomplished by involving the research users in the formulation and conduct of research and simplification means presenting the information in a form that is easily understood by the user.

I believe that in the case of the pilot project those two elements were not fully implemented. Although the dentists were the ones collecting the research data, it seems that they were mainly doing what they were asked to do but not necessarily what interested them. The researchers said they tried to get feedback and involve the dentists in the selection of topics but when I asked the dentists why they weren't involved they seemed to believe that the research aimed at benefiting the researchers only. The gap between researchers and clinicians in the dental field manifests itself clearly in this situation and although establishing the research network is intended at reducing that gap; there is more to be done to assure an interactive process of KT. As I mentioned earlier, I believe that the two groups should have met more often throughout the project. In addition, some form of research education could have been implemented in order to prepare the dentists for their new role. For example, the PEARL network, a dental research network launched in the United States in 2004, requires its participating clinicians to complete a research training course in order to become active members in the network. (37) Another obstacle to fulfilling the elements of KT was the fact that this was a pilot project and like any pilot study, it had its own limitations that affected its outcomes.

When asked to describe the limitations of the pilot, both the researchers and dentists referred to the small sample size as the main limitation. The small sample was related to a limited budget and according to the researchers, a lot more could have been done if the funds were bigger. The limited budget seemed to have affected many aspects of the network:

- the web-portal was basic in design and function

- the data collection and processing methods were basic
- the sample size was small which discouraged the dentists to use the discussion forum they had asked for and made them reluctant to use or generalize the research findings

The researchers also talked about the amount of work they had to put into the project. They said they realized that they had to put a lot of time and effort into designing the questionnaires and how this process would require full dedication unless the work is divided among a large team of researchers. There were a few suggestions from researchers regarding this issue; some suggested having a number of teams from different disciplines where each team would handle research material related to their discipline for a certain period of time. Others felt that the network would require full-time dedication of a few researchers.

It became clear to me that when they launched the pilot network, the researchers didn't anticipate the heavy work load they ended up with. The fact that the pilot succeeded in principle and that the dentists were willing to collect data and had remained committed throughout the project; it made the researchers feel the amount of responsibility attached to such an initiative. I think this was one of the reasons why the project was put on hold afterwards; the researchers felt that establishing and maintaining a large-scale network would require a lot of dedication. They wanted to be part of the network but they didn't want it to dominate their careers.

An internet research network bears a lot of benefits for the researchers. In our interviews the researchers referred to the network as a rich data-resource that would potentially save a lot of time and money in conducting many types of research. Literature shows that the internet provides the opportunity to collect more "real-world" data directly from the dentists and their patients in a more efficient and accurate manner. (54)

Such "real-world" research can help accelerate the uptake of new information and encourage the dentists to switch to more evidence-based practice. Clinicians often find it difficult to keep in touch with the rapidly increasing research information, evaluate relevant articles, and transform knowledge into practice (7, 8). But changing behavior is a long term process and in order to get to it, we first need to make sure that the dentists would commit to this form of collaboration. The question here is what would make the dentists join an internet research network?

We asked our interviewees about the potential utility of an online research network in order to better understand their needs. The researchers were mainly concerned about how to "please" the dentists; I believe that to them the single most important use of the network is the conduct of research in its various forms from simple cross sectional studies to clinical-trials according to the capacity of the network. The dentists wanted research that would help them make decisions related to their daily practice; the materials they choose, the techniques they implement, and so on. The policy makers were divided in their opinions: some thought the network should focus on public health research and epidemiological studies while others felt that it should also provide the dentists with the research information they seek.

Looking at other examples of networks in our literature review, I found that both clinical and epidemiological studies have been implemented in other networks with some focusing on one type of research such as the Sentinelle Sentiweb network, (34) and others incorporating various research areas into their network such as the PEARL project . (37)

Besides research, the interviewees talked about incorporating Chat lines or discussion forums in the network. The dentists expressed a lot of interest in using the network for online communication with other dentists and consultations with specialists. Because they work individually, dentists are always looking for opportunities to meet with other dentists, discuss cases, and exchange opinions on new materials, techniques, and even administrative issues.

What's interesting is that during interviews, the dentists talked about the project as if the objective was to create a link among dentists themselves and not necessarily dentists and researchers. Although all the dentists I interviewed already had some form of communication with other dentists such as personal friendships, academic positions, continuing education courses, etc.; there was repeated emphasis along the interviews on the desire for increased online interaction among the dentists. Literature shows that dentists perceive the internet as an important tool to reduce their professional isolation (1)

On the other hand, the researchers seemed interested in such form of utility mainly because they believed it was what the dentists wanted. They talked about online communication and its usefulness to the dentists' side. This can probably be explained by

the fact that researchers mostly work in teams and constantly interact with each other. Nevertheless, I believe that incorporating a discussion forum or chat line, when the network is operating on a larger scale, would draw interested participants from both sides. Another potential element of the network that was discussed during the interviews is Online Continuing Education (OCE). The researchers felt that it could be an important element of the network, here again they focused on what the dentists may get out of it. The dentists showed a lot of interest in OCE because of advantages such as saving travel time and controlling the timing of a session. Studies show that more dentists are using OCE each year. (23) Justified by the wide spread of computers and low cost of internet connection, dentists are able to benefit from the flexibility and convenience of OCE. (24)

The policy makers I interviewed were also interested in the idea of offering OCE through the network. They suggested that online courses should carry credits like the conventional continuing education courses and participants may even be offered university certificates for completion of OCE courses.

However, one policy maker raised the issue of internet use in the dental office; although more dentists have computers in their clinics, most of them are being used for administrative purposes. The policy maker described this as an obstacle to implementing the various elements of the network in the near future. A Canadian survey published in 2006 showed a high percentage of computer use among a sample of Canadian dentists. (13) Computers were mainly used for administrative tasks and internet access in the dental office was higher than previous studies. The survey showed that reasons for not

having internet access in the dental office were security or privacy concerns and no interest or need for the service.

The dentists in our sample either had no in-office computers prior to the pilot project or had computers that were mainly used for administrative tasks. Those who had in-office internet access were using it to read online journals, browse new products, or visit dental websites.

It is indisputable that it's only a matter of time before the integration of computer technologies into the dental field becomes indispensable. (55) All the dentists I spoke to showed willingness to make more use of internet technologies through initiatives such as the research network, although they maybe just starting to take advantage of internet technology in their clinical practice. A survey among Canadian dentists showed that the main obstacles to the general use of digital technologies were related to cost ands lack of comfort with technology. (56)

The researchers were also enthusiastic about incorporating latest technologies in data collection and online communication into the network, such as videoconferencing and the use of handheld devices (PDAs), but expressed concerns about cost and availability. The literature promises dramatic improvement in the cost and quality of such technologies in the near future. (18, 55)

The attitudes of the dentists, researchers, and policy makers in our sample regarding the potential usefulness of the network were unanimously positive. However, since we are

still in a transitional phase in terms of integration of computer and internet technology into the dental practice, it is very important that we properly define the framework of the future network.

The perspectives of the interviewees regarding the future of the research network reflected their personal experiences in the pilot project and their expectation from the network. The researchers talked about involving a large team of researchers in the next phase of the project in order to broaden the scope of research and divide the work load, and stressed on the need for a big budget to cover the expenses of setting the network.

The dentists expressed desire for more clinically relevant research with focus on dental materials and clinical procedures, and mentioned an interest in a large-scale network that would run across the province or the country.

Finally, the policy makers emphasized on the need to attract the dentists to join the network in the first place and suggested defining the research areas that will be covered by the network in order to guarantee funding from interested sources.

Recommendations for the second phase of the network project:

In the next phase, the network can be structured in many ways depending on its objectives. Whether it's research (clinical/public health/epidemiological), online

interaction, continuing education, or a combination of those elements; a solid infrastructure for the network is a must.

If we focus on the research element, I believe that the research network should be launched on a large scale. It should involve a team of researchers from various dental schools, work in conjunction with dental organizations, and have reliable technical support. With the technological revolution we are witnessing, it is vital that we build the network with a long term vision that allows future growth.

The participating dentists should receive research education, have regular meetings with the researchers, and be involved in the preparation of research material. In order to assure a complete cycle of knowledge translation, it is also pertinent to evaluate the impact of the research outcomes on the various members of the dental community (dentists, policy makers, or patients)

In addition, more evaluation research is needed in order to inform decisions about future projects. The available literature lacks studies that explore the needs and expectations of users of internet technology in the field of dentistry.

Chapter VI: Conclusion

By bridging together my own interpretations of the network phenomenon, my review of the available literature, and the emergent interpretations from the analysis of the interviews; I was able to reach a more comprehensive understanding of the research network from an in-depth "insider" perspective.

Although the pilot project suffered some limitations and unmet expectations, it proved that in principle the collaboration between dentists and researchers is feasible and welcomed by both groups. Throughout the project, the pilot questionnaires' data collection, processing, and dissemination were smooth and systematic but the problem was in the application of the results. In other words we succeeded in building a knowledge transfer model but not a knowledge translation model. This outcome indicates the need for more integration of the dentists (the recipients of knowledge) into the process of synthesis of research by giving them more research education, involving them in designing the research, and following up on their uptake of new information.

During the interviews with researchers and policy makers there was a lot of focus on how to "attract" dentists to join the research network. Essentially, the researchers need the dentists in order to collect clinical data and although the dentists would eventually get valuable evidence-based knowledge, this long term objective of encouraging evidence-based practice doesn't seem to be adequately tempting for the dentists. They did however show interest in clinical research that deals directly with their daily treatment decisions. They also would like to be able to communicate with other dentists and consult with specialists through the network. In addition, the idea of incorporating OCE into the

network was proposed by most of the interviewees. So that gives us a wide range of options in terms of structuring the network and defining its elements.

The main points that I concluded from the interviews regarding the research element of the network are: the desire for university involvement in the project, the need for a large team of researchers in order to divide the work load, and the importance of predefining (In general) the areas of research that the network would cover in order to prepare grant proposals and recruit interested researchers.

In terms of online communication: although the pilot project did not succeed in that element it was mostly due to the small sample size. The potential for online interaction among participants in a large-scale network is apparent both in the dentists' responses and the available literature. Online consultation with specialists seems to be a bit more complicated as it would require specialists' recruitment, advanced teledentistry, and a dedicated budget. Nevertheless, with the rapid developments in the field of digital communication it won't be long before such practice becomes a normal daily procedure.

As per continuing education: providing OCE through network would be an attractive element to its participants. The dentists expressed a lot of interest in such initiative as it fits well with their busy schedules. Nevertheless, they explained how conventional CE remains a popular practice as it is also considered a social activity allowing dentists to interact with each other. I believe that offering credited OCE through the network will be a great compliment to the existing form of CE and would give the dentists more choice, flexibility, and added value to their participation in the network.

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Appendix #1:

Pilot Questionnaires topics

Pilot Questionnaires topics

1. patients' classification

e.g. age, new, recall or emergency patients, etc.

2. Diagnostic information

e.g. number of patients with new, recurrent or secondary carious lesions

- 3. Problem and cause of problem e.g. main cause of acute pain, main reason for recommending a crown, etc.
- 4. Problem and treatment e.g. new carious lesions, periodontal pockets
- 5. Immediate outcomes information for treatments e.g. local anaesthetic, crown cementation
- 6. Short term outcomes information e.g. bleaching and tooth extraction with 2-week follow-up
- 7. Stress in the dental office
- 8. Management of late and no-show patients
- 9. Appointment modification-management
- 10. Composites

e.g. diagnosis of fractured composites, placement of composites in class V restorations

- 11. Dentist satisfaction with the composite they use
- **12. SARS**
- 13. Information on endodontic treatments

e.g. elective, non-elective, tooth treated, etc.

14. Information about patients

e.g. gender, age, type (new, recall etc.), treatment provided, payment source and method.

- 15. Impact of participating in the project.
- 16. Schedule management.
- 17. Dental care for patients on welfare benefits.
- 18. Dentist/patient interaction for different groups
- e.g. infants, the elderly, handicapped etc.

19. Pain

A three month follow-up study.

Appendix #2:

Results- Pilot Questionnaires



Results of questionnaire 1 (Week of November 4th to 11th, 2002)

	Dentist 2	
Categories	Individual results	Group results
65 years +	27.3%	7.3%
40 to 64 years	33.3%	42.3%
20 to 39 years	21.2%	31.7%
13 to 19 years	0.0%	5.5%
6 to 12 years	9.1%	11.3%
0 to 5 years	9.1%	3.8%
New patients	21.9%	13.8%
Recall patients	37.5%	29.6%
Emergency patients	15.6%	10.0%
Patients with welfare benefits	0.0%	4.1%
Private insurance	65.6%	48.4%
Referred to a specialist	0.0%	2.9%



<u>Results of questionnaire 1</u> (Week of November 11th to 15th, 2002)

	Dentist 2	
Categories	Individual results	Group results
65 years +	21.7%	10.2%
40 to 64 years	32.6%	46.0%
20 to 39 years	19.6%	30.5%
13 to 19 years	6.5%	6.6%
6 to 12 years	13.0%	10.0%
0 to 5 years	6.5%	1.3%
New patients	17.4%	14.2%
Recall patients	28.3%	29.2%
Emergency patients	23.9%	14.4%
Patients with		
welfare benefits	0.0%	6.9%
Private insurance	56.5%	52.9%
Referred to a specialist	0.0%	2.2%

Results of questionnaire 4

(weeks of December 16th to 20th, 2002 and January 6th to 10th, 2003)

Treatments used or planned for new carious lesions



Results of questionnaire 4

(weeks of December 16th to 20th, 2002 and January 6th to 10th, 2003)

Treatments used or planned for periodontal pockets of 4mm and more



<u>Results of questionnaire 6</u> (from January 27th to February 21st, 2003)

Evaluation of bleaching treatment by patients (two weeks after treatment)

Do you think these results (% of patients who were not satisfied with bleaching after two weeks, % of patients who felt pain) can be of any use in your dental practice (for example, if a patient asks you to explain the effects of a bleaching



21 patients received a bleaching treatment. 21 patients (100%) have been contacted by phone two weeks after treatment for a follow-up.

Pain after tooth extraction



48 patients in whom one or more extractions were performed. 43 patients (90%) have been contacted by phone two weeks after treatment for a follow-up.

Do you think it would be useful to pursue this study further? For example, refine the questions on pain felt after bleaching (nature, intensity, length), on the satisfaction after treatment (aesthetic satisfaction, on the clinical process, on sensitivity ...), etc.

Appendix #3:

Interview Guide

Interview Guide

I: Introduction & general discussion

Courtesy introduction Consent form General discussion & demographic questions

II: Pilot research network evaluation

Motivation to join the pilot project Satisfaction, drawbacks Pilot questionnaires: - Choice of topics

- Data collection
 - outcomes

III: Potential utility of the research network

IV: Conclusion

Future expectations Final comments

Appendix #4:

Consent Form

THE DEVELOPMENT OF AN ORAL HEALTH RESEARCH NETWORK LINKING GENERAL DENTAL PRACTITIONERS BY INTERNET: A PILOT PROJECT

Dr. P.J.Allison & Dr. C.Bedos

Background:

In the first stage of the project, a pilot study was done to test the feasibility of establishing and operating a network of General Dental Practitioners (GDPs) in Quebec. The network was established among 11 GDPs in Montreal and data were collected over a period of one year.

The objectives of the pilot project were:

1.To set-up each of those dentists with a computer, Internet link and website for data entry

2. To test the utility of various data entry formats

3.To test the feasibility of data collection for a number of research questions on a weekly basis over a period of one year

4.to test the feasibility of equivalent data collection in the French and English languages

After one year, the collaboration proved successful in terms of:

- Participation: none of the dentists had left the project
- Data collection: 96.7% response rate
- Validity: data were valid and largely reliable
- Technicality: no reported difficulties

Although the pilot study was successful, we still felt that it lacked detailed feedback. The project was found feasible, but we need to know more about the participants' perspectives, and how those individuals related to the project perceived the network. Such information can not be obtained using quantitative research.

Thus, in this stage of the project, we want to continue our study using qualitative research methods. Our aim is to understand how the network is considered useful, from the perspective of individuals who would benefit from it. The results of this study will be very advantageous in the planning of the proposed network.

What will participation in the study involve?

You will meet with an interviewer and discuss issues related to the network project. The discussion should last about one hour. If necessary, we might contact you again for more information.

Where will the interview take place?

The interviewer will meet with you in a convenient setting of your choosing.

What will happen at the meeting?

The interviewer will briefly introduce herself and explain the purpose of the discussion. She will ask you questions during the course of the interview to encourage discussion about the topic. She will also take notes and tape record the discussion, to make sure that no important information is missed. The recording will be typed for purposes of analysis. In order to guarantee absolute confidentiality, your name will be replaced with a code; thus, your identity will remain confidential.

Benefits of the study

While you may not benefit directly from your participation, we hope that as a result of this research we will gain a deeper understanding of your perspective, expectations, and concerns. This will allow us to improve the structure of the proposed network

Risks of this study

There are no risks.

Confidentiality

All data collected in this study will be used, analyzed, and reported in an anonymous format. In order to guarantee absolute confidentiality, your name will be replaced with a code. Only the project directors will have access to the data.

Your rights

Your participation in this study is entirely voluntary and you have the right to withdraw your participation at any time in the course of the study

If I need further information, whom can I speak to?

If you have any questions regarding this project you may contact the principal researcher Dr. Paul Allison at (514) 3987203 ext. 00045
THE DEVELOPMENT OF AN ORAL HEALTH RESEARCH NETWORK LINKING GENERAL DENTAL PRACTITIONERS BY INTERNET: A PILOT PROJECT

Dr. P.J.Allison & Dr. C.Bedos

CONSENT

By signing this consent form I acknowledge that:

1. The study and this consent form have been explained to me by who has responded satisfactorily to my questions.

2. My participation is voluntary and I may withdraw at anytime.

3. A copy of the consent form will be given to me and another copy will be placed in my file.

Participant's signature:

Witness's signature:

Date:

Appendix #5:

Contact Summary Sheet

Contact summary sheet

Interview no.1 With: Dr. X Site: Contact date: Today's date:

What were the main issues or themes that struck you in this contact?

Summarize the information you got (or failed to get) on each of the target questions

Anything else struck you as important, interesting ,or illuminating?

What new target questions you are considering for the next interview with a (researcher/dentist/policy maker)?

93

Appendix #6:

Pilot Questionnaire- Bleaching

Questionnaire 6

Test the possibility to collect short term (not same day) outcomes information

Questionnaire used from January 27th to February 21st, 2003

Bleaching treatment

Phase I :

Items												Question # on Internet
Α	Tick off a number for each patient in whom you recommend bleaching (not necessarily performed or	1	2 12	3 13	4 14	5 15	6 16	7 17	8 18	9 19	10 20	1
	sold bleaching kit)	21	22	23	24	25	26	27	28	29	30	l
В	Tick off a number for each patient for whom you <u>do a</u>	1	2	3	4	5	6	7	8	9	10	2

<u>Phase II :</u>

Patients' follow-up

For those patients in whom you did bleaching, ask the following two questions 2 weeks after treatment :

1. Since your bleaching treatment 2 weeks ago, have you had any pain in the tooth treated?

2. Are you satisfied with the bleaching treatment?

Patient's name	Phone number	Treatment date	Follow-up date*	Impossible to reach	Pain (Y/N)	Satisfied (Y/N)
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· · · · · · ·			-			
				· · · · · · · · · · · · · · · · · · ·		
				· · · · · · · · · · · · · · · · · · ·		
				· · · · · · · · · · · · · · · · · · ·		
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* The follow-up date should be 14 days (+/- 1 day) after the treatment date

Total number of patients impossible to reach (for two week follow-up):	3
Total number of patients who <u>felt pain</u> (pain yes) :	4
Total number of patients who <u>did not feel pain</u> (pain no) :	5
Total number of patients who were <u>satisfied with result</u> (satisfied yes) :	6
Total number of patients who were not satisfied with result (satisfied no):	7

N.B. The data on this sheet will be transferred on the Internet questionnaire after the patients' follow-up, i.e. on February 21st, 2003