A JOURNEY INTO THE HIDDEN LIVES OF ELECTRONIC MEDICAL RECORDS (EMRS): ACTION RESEARCH IN THE MAKING

by

Nina Boulus
B.Sc., Norwegian University of Technology and Science, 2001
M.Sc, University of Oslo, 2004

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Name: **Nina Boulus**

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Examining Committee:

Chair: **Barry Truax**

Dr. Ellen Balka
Senior Supervisor
Professor, School of Communication

Dr. Gary McCarron
Supervisor
Associate Professor, School of Communication

Dr. Richard Smith
Supervisor
Professor, School of Communication

Dr. Sandra Jarvis-Selinger
External Examiner
Assistant Professor, Faculty of Medicine
University of British Columbia

Dr. Olga Volkoff
Internal Examiner
Assistant Professor, Business, SFU

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ABSTRACT

Drawing upon a three and a half year long research project, this dissertation examines the adaptation process of an electronic medical record (EMR) in a primary healthcare setting, with emphasis on methodological reflections on doing action research with a community partner. This dissertation thus comprises two components: the first focuses on the implementations of EMRs, and the second focuses on action research as a method used for studying the EMRs, thus giving a glimpse of the research process.

Drawing upon concepts from the fields of Computer-Supported Cooperative Work (CSCW) and Information Systems (IS), I analyze how health care practitioners adapt technology to their situated work practices. Investigating the factors promoting the adaptation process showed that reflective activities were essential for constructing emergent work practices. I therefore provide a conceptualization of the essential aspects of these reflective activities. I analyze how the technology transforms the medical practice, and identify two types of sociotechnical changes and their implications. Introducing insights from Actor-Network Theory (ANT), I argue that the EMR is more than just a tool that simply enables/constrains the medical practice. Rather, it is an active actor that has come to play an increasingly central role in the delivery and organization of care, and it is gradually transforming the medical profession.

Following a self-reflective and critical epistemological stance, I shed light on methodological complexities faced when conducting action research. I investigate the norms that are enacted within IS action research, and I argue that these are built upon a rigid and standardized platform, similar to the one that traditional action research was originally opposed to. I also argue that these norms fail to critically address ways of discussing and managing empirical uncertainties and dilemmas. Drawing upon reflexive research methodologies, first-person action research and confessionals, I illustrate how empirical uncertainties can be transformed into fruitful practical interventions and utilized as knowledge providers. Finally, I propose conceptualizing action research as an actor-network with different sociomaterial connections which configure and produce particular roles in diverse settings. A network model enables us to see how future roles and interventions can be interpreted through past connections.

Keywords: Electronic medical record; hospital information systems; medical informatics; computer-supported cooperative work; science and technology studies; technology-in-use practices; reflection-on-practice; technology adaptation; sociotechnical; actor-network theory; reflexive research methodologies; action research; confessionals

In memory of my father,
who always wanted his children to achieve
the education he did not get for himself

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Vancouver, March 2010

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GLOSSARY OF ACRONYMS

ANT	Actor-Network Theory
B.C.	British Columbia
BCMA	British Columbia Medical Association
CDM	Chronic Disease Management
CHC	Community Health Centre
CSCW	Computer-Supported Cooperative Work
EHR	Electronic Health Record
EMR	Electronic Medical Record
FTE	Full-time equivalent
GP	General Practitioner
HCIS	Health Care Information Systems
HPM	High Performance Medicine
ICT	Information Communication Technology
IS	Information Systems
IT	Information Technology
MOA	Medical Office Assistant
MSP	Medical Services Plan
PMS	Patient Management Systems
PI	Principal Investigators

PHC	Primary Health Care
PHCTF	Primary Health Care Transition Funds
PITO	Physician Information Technology Office
RA	Research Assistant
SES	Socio-Economic Status
SOAP	Subjective Objective Assessment and Plan
STS	Science and Technology Studies
VCH	Vancouver Coastal Health

CHAPTER 1: INTRODUCTION

In September 2004, I moved to Canada to pursue my doctoral education. I was given the opportunity to conduct research about the implementation of an electronic medical record (EMR[1]) in a community health centre (CHC) in British Columbia (B.C.). I was equipped with previous experience and knowledge about information technologies (ITs) in healthcare from my previous work in Norway where I carried out research examining the transition to electronic records in the national hospital (Boulus, 2009a). My familiarity with the research domain increased my motivation to conduct this study as it provided me with an opportunity to systematize and theorize my observations of EMR implementations, and to build further on my previous knowledge and experience. Shortly after some initial meetings with the clinic, I began conducting extensive fieldwork in the clinic. I gradually began noticing theoretical, empirical and methodological issues and phenomena which seemed somewhat different from my previous research and my previous experiences, and at times, challenged my knowledge. The work presented in this dissertation originates from my dissatisfaction with the literature I was familiar with and drew upon in trying to make sense of what I observed and experienced. Finding these shortcomings in the literature further intensified my interest in exploring these problematic issues which became the focal point of this thesis. I will now outline the empirical issues I was met with in relation to the research domain of healthcare IT, and will then discuss the methodological issues that emerged in relation to action research.

Informed by the literature (see Chapter 2), my previous knowledge and experience, it was obvious to me that the EMR is not simply a system that can be taken off the shelf to automatically replace paper-charts; rather I expected that the EMR implementation would bring about changes in management and division of labor, as well as in the workflow of trajectories and performance of activities. However, I began noticing that the adaptation process of the EMR was proceeding impressively fast and I

[1] Electronic medical record refers to a computerized patient record that contains all or most of the patient's clinical information from a single health care provider. As I will explain later, since the content of the medical record is not defined universally, there are various terms (e.g., electronic patient record [EPR]) with different interpretations (Dick & Gabler, 1995; Häyrinen, Saranto, & Nykänen, 2008; Jensen & Aanestad, 2007b; Kay & Purves, 1996).

wanted to investigate the factors contributing to this rapid adaptation.[2] During my fieldwork, I also began noticing that the EMR system has come to play an increasingly central role in the delivery and organization of care. This research project provided me with a unique opportunity to conduct fieldwork over an extensive period of three and a half years (in contrast to my previous work which lasted just one and a half years), and to draw upon action research which provided me with greater access to the field site. These two factors—combined with the fact that my theoretical platform was broadened and consequently exposed me to a greater variety of approaches in the literature which guided me throughout my fieldwork—enabled me to observe greater and deeper levels of impact of the EMR on the work practices (and vice versa) than my previous work. I began noticing that the EMR system had become more than just a tool that simply improves or redistributes practices (as I argued in my previous work); rather, I now see it as acting on and gradually transforming medical practices. This, together with other empirical phenomena I observed in the field and found in my analysis, led to the formulation of my first research question (outlined in section 1.3) which focuses on the impact of technology on health care practitioners (and vice versa).

Although the empirical topic of EMR technologies was somewhat similar to my previous research, the way in which these technologies were studied was different. Contrary to my current research project which was conducted in partnership with the clinic, in my previous research project I followed a more traditional ethnographic approach[3] according to which there was no particular commitment between myself (the researcher) and the health care practitioners (the participants). In the fieldwork described here, I gradually began encountering various empirical complexities in the field. For example, I was responding to various requests from the clinic, the community partner, and noticed that my research focus was gradually drifting away from the initial agenda. I often found myself juggling multiple conflicting roles, and my different positions impacted the kind of information that informants shared with me. I struggled to maintain distance to reflect upon my roles in the field and was not quite sure how to deal with these empirical uncertainties I was encountering. In an attempt to make sense of these uncertainties, I began documenting them more systematically, especially as they intensified during the course of the research collaboration. This sparked an immense

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[2] The claim that the EMR implementation process was progressing fast is based on a comparative analysis I conducted between the current research project presented in this dissertation and the EMR-adaptation I studied in my previous research (Boulus & Bjorn, 2007; Boulus & Bjørn, 2008).

[3] I chose to label this type of research as traditional ethnography to differentiate between the degree of participation, influence and commitment of the researcher and the participants. Contrary to my current action research, in my previous research, I was solely responsible for determining the research focus and design. The differences between action research and other approaches will be illuminated further in section 2.4.

interest in me and led to the development of critical reflections about my three and a half years of research experience.

Table 1.1: Two Components- Dual Focus in the Dissertation

	Component 1: IT in Healthcare (EMRs)	**Component 2: Action Research**
Focus of Study	The actual *technologies*	The *methods* used for studying and participating in the implementation of these technologies
Methodological Approach	First-order inquiry focusing on reflections related to the object of study (EMRs)	Second-order inquiry focusing on reflections related to the methods used for studying the object (action research)
Research Focus	The *end-product*, findings, of the research	Documenting the evolving action research *process*
Practice Focus	The medical practice of health care practitioners	My own research practice
Research Design	Methodological framework Action research	Reflexivity and first-person action research Confessionals
Relevant chapters:[4]	Chapter 1: Section 1.1.2, 1.4.1 Chapter 2: Section 2.3 Chapter 3: Section 3.4 Chapter 4	Chapter 1: Section 1.1.3, 1.4.2 Chapter 2: Section 2.4 Chapter 3: Section 3.5 Chapters 5-6

Observing and facing these empirical phenomena both in relation to the object of my study (the EMR system) and the method I used (action research), stimulated the kind of analysis and the critical questions that are examined throughout this dissertation. I will illustrate later how these questions relate and contribute to greater theoretical and methodological debates within several fields. But first, a note about the dual focus in the dissertation. As can be seen from Table 1.1 (above), the dissertation has two distinct foci: first, on the implementations of IT in healthcare (EMRs), and second, on the action research method used for studying the implementation of the EMR. In the first component I draw upon first-order inquiry (Pedretti, 1996) focusing on reflections related to the object of study (EMRs), and in the second component I draw upon second-order

[4] All the other sections that are not mentioned in the table are relevant to both components. This refers to sections 1.2-1.3, 2.1-2.2, 3.1-3.3 and as well as chapter 7.

inquiry (Pedretti, 1996) focusing on reflections related to the methods used for studying the object (action research). Focusing on the method used rather than on the *findings* or *end-product* of the research about EMRs leads us behind the stage and gives us a glimpse of the research *process*, meaning the work that went into constructing the empirical research project and made it function as a coherent whole. While in the first component I analyze the experiences of health practitioners, in the second component I reflect upon and analyze my own experiences from this research collaboration. For the EMR component I used action research as a method, and for the action research component I drew upon reflexive research methodologies, first-person action research and confessionals. This dissertation thus constitutes two components, with two distinct empirical foci, research questions, theoretical platforms, and contributions. I chose to keep the two components wrapped within one structure as these are, to some degree, inseparable and dependent upon each other.

In the next section (1.1), I will introduce the field site and the context surrounding my research project. Thereafter, I will explain the motivation for studying EMRs and methodological issues encountered when conducting action research (section 1.2). The research questions will be outlined (section 1.3) followed by the theoretical orientation and relevance of the study (section 1.4). Finally, I will outline the structure of the thesis (section 1.5), which tells two stories: one about the introduction of EMRs, and the other about action research. Table 1.1 in the previous page, serves as a navigation aid to the reader.

1.1 Setting the Stage

I will now set the stage for my study, by providing a short introduction of the field site (section 1.1.1), followed by a brief overview of the media and policy discourse surrounding EMR implementations (section 1.1.2). The media and policy discourse section is also intended to highlight the practical relevance of the EMR study for policy and decisions makers. Finally, I will set the stage for the action research component by describing the broader context of a contemporary research trend concerned with action-research (section 1.1.3).

1.1.1 Field Site

As mentioned earlier, my research focuses on the implementations of EMRs in the primary health care (PHC) sector, and was part of ACTION for Health,[5] a federally funded project which supported the research presented in this dissertation. Most of the empirical data that will be used throughout the thesis is drawn from extensive fieldwork that primarily took place in a non-profit community health centre located in Vancouver. The clinic is also a community partner of the project in which I was involved. The clinic embraces a unique model following a multidisciplinary, team-based approach, which includes collaborating with many different health care practitioners (e.g. a dietician, chronic disease coordinator and a clinical pharmacist), hospitals, clinics, and laboratories. Having a multidisciplinary team allows the health care practitioners to deal with complex patients who have high needs and risks, and suffer from multiple chronic diseases. There are approximately 5000 patients who use the clinic, many of whom are of a low socio-economic status (SES). I will provide further details on the clinic in section 3.4.1. However, what is important to bear in mind at this stage is the challenges faced by the clinic as the number and size of the paper charts increasingly expanded over time.

The idea of implementing an EMR in the clinic emerged from the frustration related to existing paper-based practices, which involved a large number of staff in time consuming activities related to searching for and filing papers in the correct places and charts respectively. The ultimate goal of the EMR project was, however, to improve patient care (e.g., chronic disease management) by increasing efficiency. These internal views are often shaped and supported by external pressure and financial support from the government to implement EMRs in the primary health care sector. Therefore, in the next section, I will look at the media and policy discourse surrounding the implementation of EMR systems.

1.1.2 EMRs: Media and Policy Discourse

This section will situate the empirical study of EMRs within the broader context of information communication technology (ICT) implementations in healthcare (section 1.1.2.1). I will then move to delineating EMRs in general, unpacking the various definitions of EMR and looking at how these are portrayed in policy and media discourses (section 1.1.2.2). Thereafter, I focus on the Canadian context and describe

[5] ACTION for Health: Applied Communication Technology Information, Organization, Networks for Health. This project was part of the Initiative on the New Economy (INE) funded by the Social Sciences Humanities Research Council of Canada (SSHRC). The $3 million grant (grant # 512-2003-1017) brought together various Canadian and international researchers, all of whom partnered with organizations to study implementations of different technologies (e.g., wireless call system, electronic medical records, and health information web sites) and their role in production, consumption and use of health information (http://www.sfu.ca/act4hlth).

briefly current policies implemented to support the adaptation of ICTs in the health care sector (section 1.1.2.3). The technologically deterministic and instrumental views dominant in the media and policy discourses—which will be illustrated in the following section—influenced the EMR implementation described in this empirical case.

1.1.2.1 ICT in Healthcare

Over the last couple of decades, we have been witnessing the spread of ICTs in various industries and sectors. The health care sector, however, has been criticized for lagging behind other industries when it comes to embracing information technologies (Berg, 2004a).

In President Bush's technology agenda, it was said that health care practitioners have to manage complex 21st century medical information with a 19th century paperwork system (The White House, 2007). A similarly simplistic tone envelopes the views about ICTs both in debates in the media and in various policy discourses. An illustration of this can be found in a commentary in the *Globe and Mail*, which expressed a very clear request in its title *For health's sake, trash those paper records* (Picard, 2007), followed by strong normative statements about the existing paper-based practices:

> Health care institutions and health practitioners who are still using paper medical records rather than electronic ones are much like those people with their behinds hanging out: vulnerable and *undignified*, and the very thought of them should leave us *embarrassed* and *ashamed* [emphasis added] [….] Banks, video stores, pizza parlours, taxi companies, couriers, bus systems and newspapers are all light years ahead of health institutions when it comes to electronic recordkeeping and information management. (Picard, 2007, para 4)

As can be noticed from the quote above, an incorrect equation is created when the health care sector is compared to other industries, undermining essential and fundamental differences between the service sector and the health care sector. It creates an obscure, or rather false impression, as if there is no difference between requesting a bank account summary and a medical diagnosis.[6] The former is, however, an automated task that can simply be produced (and reproduced) by printing a list of the standardized information constituting the various transactions, while the latter is a much more complicated task that cannot simply be automated and is dependent on multiple heterogeneous, contingent and unpredictable factors that vary from patient to patient (e.g., patient's illness

[6] This is not to say that banks do not have complex systems and work practices, but rather that these are fundamentally different from medical work practices. For more information about the characteristics of medical practices consult, for example, Mol (2002) and Strauss et al. (1985).

trajectory[7]) (Strauss, Fagerhaugh, Suczek, & Wiener, 1985). Furthermore, in contrast to information found in bank accounts, medical information has different characteristics in that it has a contextual nature, while at the same time it is collective and distributed and needs to be interpreted by various professionals (Berg & Goorman, 1999; Moser, 2005).

There has been a greater pressure toward incorporating more ICTs in the health sector. This debate currently holds the attention of multiple actors from various sites, such as technical experts, policy makers, researchers, health professional and patient organizations, etc. One of the main reasons for the intensified interest in ICTs is that they have been viewed as magic bullets that will solve many of the problems that are faced by healthcare organizations.

These debates in the media and various policy discourses have been accompanied by the inevitable promise that such technologies will provide overall enhancement and sustainability of health services. Accordingly, ICTs in general and EMRs in particular, are often viewed as both a facilitator and a measurement tool for success reinforcing the slogan *more IT for better health care*. Furthermore, the governments of many countries across Europe (e.g., England, Norway, Sweden, Denmark, the Netherlands) as well as Australia and North America, are investing an enormous amount of money and resources to support implementations of various ICTs in the health care sector, ranging from small technological devices such as smart cards, drug dispensing machines, wireless call systems, triage and tracking systems, to robotic technology for surgery (Balka, Kahnamoui, & Nutland, 2007; Balka, Wagner, & Jensen, 2005; Bjørn & Balka, 2007).

The implementation of these technologies takes place in a highly contested political context where originally the focus was on improving the quality of services, but increased attention in healthcare administration has been shifted to cost saving, standardization, and best practices and evidence-based medicine (Timmermans & Berg, 2004). There has also been an increased focus on patient self-care as it is expected to help manage chronic disease, which is becoming a problem in the escalating aging population in western societies (Canada's Health Newsweekly, 2007; Ludwick & Doucette, 2009). Furthermore, it has been predicted that this shift in demographics will not only lead to rising health costs, but also to "a fundamental shift in medical practice from 'cure' to 'care'" (Kay & Purves, 1996, p. 75).

[7] Strauss et al. (1985) use the term illness trajectory to emphasize the evolving character of the medical work, and to refer to the comprehensive organization of workaround the patient, which involves different schedules, actions, skills, sources, and contingencies.

1.1.2.2 EMRs in General

Various eHealth initiatives[8] are being undertaken in the name of quality improvement, efficiency and cost reduction, and prominent among these initiatives, is the implementation of EMRs. An EMR is a computerized medium that contains clinical information as recorded in a patient's record. Clinical information refers to patient data which includes, for example, diagnoses, allergies, prescriptions, etc. Some EMRs include an additional module, or component, for registering patients' demographic information.

Medical data are used by clinicians to get an overview of patients' medical histories to determine their medical status, and serve as a basis for future treatments and interventions. Health care practitioners spend considerable time on activities such as documenting, archiving, retrieving, distributing, and reporting medical data. Patient data have a long history of being written on paper, collected in physical folders and stored in archives (Berg & Winthereik, 2004; Kay & Purves, 1996). Although the idea of computerized patient records emerged in the 1960s and 1970s (Collen, 1995), the implementations of EMRs has turned out to be an unexpectedly long and challenging process where many goals have not yet been met. For the last couple of decades, the implementation of EMRs has been viewed as immensely important, and many attempts have been made to develop and use them with various degrees of success and failure.[9] In fact, some researchers argue that the failure rate for healthcare information systems ranges from 30-50% (Sauer, 1999).

In 2005, President George W. Bush set a national goal for implementing universal EMRs by 2015, and explained that EMRs could increase efficiency and reduce medical costs by 20% (Fletcher, 2005). Similarly, President Barak Obama proposed a national adoption of EMRs, and explained in an editorial published in *The Wall Street Journal* that EMRs would save $80 billion a year (Groopman & Hartzband, 2009). Obama repeatedly promises that EMRs will improve efficiency, save money, and save lives (The White House, 2009). The last sentence which portrays the EMR as a vehicle for saving lives is just one of many that illustrate nicely the tremendously high level of expectations surrounding this technology. In one of the classic articles about EMRs, Kay and Purves (1996) argue that: "The electronic medical record has been pursued as an ideal by so many, for so long, that some suggest that it has become the Holy Grail of Medical Informatics" (p. 73). In a more recent article, Berg and Winthereik (2004) referred to the process of waiting for electronic records as being similar to waiting for Godot.

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[8] The term eHealth refers to implementations of ICTs that enable electronic-based health care and health information services (Retrieved from http://www.hc-sc.gc.ca/hcs-sss/ehealth-esante/res/thesaurus/index_e.html#TEHEALTH, November 29, 2007)

[9] The concepts of 'success' or 'failure' in the context of technology implementation have been acknowledged as contested and have been problematized by several scholars, for example (Berg, 2001).

But what exactly does an electronic record mean? For the purpose of this dissertation I chose to use the term electronic medical record (EMR), although, this is just one out of many others (e.g., computerized patient record (CPR); electronic patient record (EPR); patient care information system (PCIS)). Furthermore, as will be illustrated later, EMRs were often referred to as patient management systems (PMS) or health care information systems (HCIS) in the 60's and 70's. Since the content of the medical record is not defined universally, many of these terms are used interchangeably (e.g., Berg, 2004a) and inconsistently (ISO TC 215, 2005, p. 12). Furthermore, it has been said that "the medical record remains an enigma and its consensual definition remains elusive. […] To prefix any of the…terms [e.g., patient record, chart] by the adjectives "electronic," "computerised" or "computer-based," does nothing to clarify the substance of the document" (Kay & Purves, 1996, p. 72). Although some of these terms have been defined by standards (ISO TC 215, 2005), there are various interpretations for the different terms (e.g., Dick & Gabler, 1995; Jensen & Aanestad, 2007b; Kay & Purves, 1996), and their usage varies across different countries and health sectors (ISO TC 215, 2005). According to England's National Health Service (NHS) "the EPR typically relates to the health care provided by acute care hospitals or specialist units" (ISO TC 215, 2005, p. 12). Thus, the EPR "contains all or most of patient's clinical information from a particular hospital" (Häyrinen et al., 2008, p. 5). While the term EPR emphasizes the central role played by the *patient*, the term EMR emphasizes the *medical care* (Häyrinen et al., 2008) provided by a single general practitioner and is viewed by some researchers as limited to physician's notes and physician-oriented information (Berg, 2004b, p. 6).

Even though there is no standardized agreement about which term should be used to refer to electronic records, various media and policy discourses give the impression that there is a universal agreement about the *need* for electronic records which are portrayed as vehicles to saving lives. In a commentary in the *Globe and Mail* published under the title "Will Canada click its way to better health? Switch to e-records lags behind other countries," Richard Alvarez, president and chief executive officer of Canada Health Infoway,[10] argued the following:

> Today we have documented evidence that because physicians at times just don't have the right information, we have between 9,000 to 24,000 deaths—a lot of that caused through adverse drug interaction [….] Sadly enough, a lot of that is preventable. (Avery, 2007, para. 13)

[10] Canada Health Infoway constitutes fourteen federal, provincial and territorial Deputy Ministers of Health. Their main aim is to accelerate the use of ICTs in general, and electronic medical records (EMRs) in particular, across Canada.

Among the prevailing visions for the role of EMRs are goals to use them as management tools that will support care logistics, to redesign work processes, and to improve quality of care (Nilsson, Grisot, & Aanestad, 2002). Furthermore, EMRs are 'brought to life' to encourage a particular organizational transformation, where the health authorities focus, among other things, on benefits that are measurable in financial terms. EMRs are expected to lead to annual system-wide cost reductions, by enabling better access to patient information and reducing medical errors, which in turn, will increase efficiency and improve quality of health care services (British Columbia Medical Association, 2004).[11] In a study that performed a 5-year-cost-benefit analysis of the financial effects of EMRs in the primary health care (PHC) sector in the US, the authors found that:

> the net benefit of implementing a full electronic medical record system was $86,400 per provider. Of this amount, savings in drug expenditures made up the largest proportion of the benefits (33% of the total). Of the remaining categories, almost half of the total savings came from decreased radiology utilization (17%), decreased billing errors (15%), and improvements in charge capture (15%). (Wang et al., 2003, p. 400)

It is important to note, however, that in a recent study published in the *American Journal of Medicine*, researchers evaluated data on 4,000 hospitals in the U.S. over a four-year period and found that there is no evidence to support claims of cost-savings or significant quality improvement from EMRs (Himmelstein, Wright, & Woolhandler, 2010). Similarly, in another recent article published in the *International Journal of Medical Informatics*, the authors who conducted a comprehensive systematic literature review and found that "health information systems do not improve or erode efficiency [and/or] quality of care" (Ludwick & Doucette, 2009, p. 29).

The empirical case conducted for this dissertation moves beyond simply summarizing the impact of the EMR in terms of measuring efficiency or cost, and rather opens a space for reflecting upon the contested and ambiguous nature of such technology. Hence, in this shifting landscape, the implementation of the EMR is viewed as a dynamic and reflexive process where both the technology and the medical practice affect each other and transform one another. To summarize, the discourse surrounding EMR implementations might lead to the inherent assumption that EMRs can be viewed as grand formulas that can be applied to solve the various financial problems faced in the health sector. The amount of money that is spent on such technologies is fairly high, and so are the expectations. The deterministic and instrumental views of ICTs in health care

[11] Potential benefits of EMR systems presented in a report prepared by Price Waterhouse Coopers for the Canadian medical association (CMA).

dominant in the media and political discourse can also be found—as I will show in the next section—in the Canadian context.

1.1.2.3 EMRs in Canada

In spite of the fact that Canada spent more per capita on health care IT in 2005 than the US, Australia, Germany, and Norway (Canadian Institute for Health Information, 2006), it was ranked as lagging behind some other countries when it comes to switching to electronic records (Avery, 2007) and in the implementation of IT in primary health care (Besner, 2006). In fact, less than 20% of GPs have automated their patient records, leaving nearly 80% of physicians who are still using paper documents and telephone conversations to communicate with other practitioners (Canada Health Infoway, 2009, p. 4).

EMRs are one of several other eHealth projects being implemented across Canada. The implementation of electronic health records (EHRs)[12] is another project, according to which EHRs are portrayed as "one of the keys to modernizing Canada's health system and improving access and outcomes for Canadians" (Romanow, 2002, p. 77). Furthermore, the creation of EHRs is often linked with the success of health reforms, which have recently been focusing, among other things, on providing around the clock access to care and decreasing waiting times (Canada's Health Newsweekly, 2007). Accelerating the use of ICTs in general and EHRs in particular has been supported by Canada Health Infoway, which was established in 2001 and constitutes 14 federal, provincial and territorial Deputy Ministers of Health. Thus far, Canada Health Infoway has approved 283 projects across Canada, and at the end of the 2008-2009, they allocated $1.58 billion (96% of their funds) for electronic health information systems projects (Canada Health Infoway, 2009, p. 4).

In Canada, EMR implementations are part of the renewal initiatives supported by the various regional health authorities.[13] As part of the federal government's health reform, various health authorities were given transition funds to support renewal initiatives in the primary health care sector and other areas. In the first health accord from September 2000, First Ministers created a primary health care transition fund (PHCTF), which was a federally-financed six-year funding program of $800 million. The PHCTF

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[12] Electronic health records (EHRs) are "a private lifetime record of a patient's health history, which can be accessed in real-time by authorized health professionals situated at different geographic locations" (Canadian Institute for Health Information, 2006, p. 1). Hence, an EHR is a complete record that constitutes information from several EMRs. For other definitions, see for example, Häyrinen et al. (2008) and ISO TC 215 (2005).

[13] For a brief overview of the socio-political events in the federal and provincial context, see Balka (2003).

supported 68 projects in primary care[14] innovation and expired at the end of March 2007 (Canada's Health Newsweekly, 2007). The PHCTF has accelerated various renewal initiatives across Canada, including chronic disease management (CDM) toolkit.[15]

Canada Health Infoway has recently funded a new project wherein the government of British Columbia (B.C.) will contract with Sun Microsystems (B.C.) Inc. and other partners to establish a province-wide system of electronic patient files. According to the *Globe and Mail* it is one of the largest health care projects in Canada (Mickleburgh, 2007). Another recent initiative undertaken in B.C. between the provincial government and the BC Medical Association (BCMA) was the Physician Information Technology Office (PITO). According to the agreement, the government committed approximately $108 million to support the diffusion of EMRs[16] across physicians' offices (The Ministry of Health, 2007). Pilot projects were expected to begin in 2007 followed by a complete roll-out to most physicians' offices in 2008. A recent report by the Auditor General of Canada expressed concern about the rather low percentage of GPs who had adopted an EMR system, and claims that

> a survey[17] conducted in 2007 found that approximately 10 percent of Canadian doctors maintain their patients' health records electronically. Another 26 percent of doctors use a mix of electronic and paper-based records. Unless the percentage of primary care doctors using electronic medical records (EMRs) increases significantly, the potential benefits offered by electronic health records (EHRs) will not be fully realized. (The Auditor General of Canada, 2009, p. 30)

In sum, EMRs have been, and still are portrayed in media and policy discourses as the "holy grail" (Kay & Purves, 1996, p. 73) of the health-care sector; as the "jewel in our crown" (Romanow, 2002, p. 78). EMRs are viewed as revolutionary technologies which are part of the latest driving force in a modern health sector. Those who refuse to follow the movement and implement an EMR are depicted as belonging to the "stone age" (Mickleburgh, 2007, para. 5). This stages an almost enigmatic discourse which might

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[14] Primary care typically refers to family practice and it is the first point of contact a patient has with the healthcare system.

[15] This is a system developed by the Ministry of Health to help physicians manage the care of patients with chronic conditions (e.g., heart failure, diabetes and asthma). The CDM toolkit provides physicians with access to clinical practice guidelines and patient flow sheets, and it generates different clinical and administrative reports (e.g., evaluating patient health outcomes over a period of time).

[16] Implementations of EMRs are one of seven eHealth initiatives in BC. Other initiatives include EHRs to allow sharing information across the province, the provincial laboratory information solution project to allow sharing lab results, etc. (The Ministry of Health, 2007).

[17] The report by the Auditor General of Canada does not specify which survey they refer to.

lead to false assumptions, such as the belief that EMRs will inherently save lives,[18] or the belief that paper charts can be completely/entirely removed from any health care organization.

Thus far, I have described the broad political context surrounding EMR adaptations, and reflected upon the technologically deterministic and instrumental views dominant in the media and policy discourses, both within Canada and in the United States. In the remainder of the chapter, I will explain how these views intensified my motivation for conducting the empirical study of the EMR implementation which will be discussed in Chapter 4, where I analyze the sociotechnical changes that emerged during the transition process to an EMR. In the next section, I will move from describing the broader context surrounding EMR implementations, to positioning my empirical research within the broader context of a contemporary research trend concerned with collaboration and action-research.

1.1.3 The Turn to Action: A Contemporary Research Trend

In the past three decades, we have witnessed a development in social studies that has been described by Science and Technology Studies (STS)[19] scholars as the 'participatory turn.' This refers to a move away from the so-called 'old fashioned' ivory tower scholarship (traditional social research) toward the creation of application-embedded scholarship, where researchers are engaged in various types of participatory and action-oriented research.[20] To reflect on the turn toward action-oriented research, Lincoln and Guba (2003) added a new paradigm to the second edition of the *Handbook of Qualitative Research* which was labeled 'the participatory/cooperative paradigm.' They assert that "the shift toward connecting research, policy analysis, evaluation, and/or social deconstruction… with action has come to characterize much new-paradigm inquiry work, both at the theoretical and at the practice and *praxis*-oriented levels" (Lincoln & Guba,

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[18] It is not my intention to argue here that EMRs cannot lead to error reductions, etc., but I argue that errors can also occur when using an EMR. Although these errors will most likely be different than the ones faced with paper charts, it is still important to acknowledge that the EMR will bring along new challenges and errors.

[19] STS draws upon several perspectives, including sociotechnical, political and cultural ones, to study the impact of science and technology upon society (and vice versa). STS has a broad interdisciplinary outlook, and it encompasses various rich and diverse theories, methods and approaches from a wide range of disciplines and fields (e.g., anthropology, communication studies, cultural studies, feminist studies, history, information studies, organizational theory, philosophy, social psychology and sociology). For more information about the history of the field, consult, for instance, Asdal, Brenna, & Moser (2001), Hess (1998) and Jensen and Bowker (2005).

[20] This is not to say that the move away from so-called 'armchair research' where scholars remain distant from the life of those they write is new, but rather that continuous appeals are urging researchers to demonstrate relevance and usefulness in collaborative and practical research environments.

2003, p. 268). Reason and Bradbury (2006a) believe that this participatory paradigm "is emerging at this historical moment" (p. 4). For some social scientists, this turn to participation and action came in response to a prevalent lack of utilization of findings (Lincoln & Guba, 2003); while for others, this change emerged as a response to a contemporary and increasingly growing concern with making STS 'useful' and politically relevant (Lynch, 2004; Zuiderent-Jerak & Jensen, 2007).[21]

Therefore, over the last few years, this trend of participatory and action-oriented research has been an ongoing concern within a number of fields, including STS (Zuiderent-Jerak & Jensen, 2007). An increasing number of international conferences, workshops, and journal special issues[22] are dedicated to critical discussions about the methodological consequences of the expansion of academic research to areas beyond the traditional scholarly domain, and the impact this has had on research practice.[23] Yet, "very little has been written about the actual nature of such relationships, how they are formed and sustained, and the issues that arise in them" (Mykhalovskiy & McCoy, 2002, pp. 17-18). Therefore, this part of the dissertation will focus precisely on the actual nature and dynamics of the relationships that are formed between the researcher and the practitioners.

Action-oriented research has been increasingly and explicitly supported by funding organizations that wish to establish platforms of intervention that cut across the

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[21] This is not to say that these concerns are new. For example, constructivist approaches have been criticized for lacking political and normative contributions, see for example, Winner (1993; 1986) and Cowan (1987); as well as Vikkelsø (2005) who addresses some of these critiques. However, these debates have been increasingly discussed within the STS field and this can be reflected by, for example, the increasing number of panels dedicated to interventionist research in the Society for Social Studies of Science (4S) conferences over the last few years.

[22] For example, the international workshops organized under the title "Does STS mean Business?- Some issues and questions" (Said Business School, University of Oxford, 2004; 2005, the workshops on Practice of Assessment and Intervention in Action-Oriented STS, Amsterdam, The Netherlands, 25-26 April, 2005; Workshop on unpacking intervention: action-oriented science and technology studies, part II, Aarhus, Denmark, 23-24 May, 2006; the recent Canadian Communication Association conference that adopted the theme "Bridging Communities: Making Public Knowledge, Making Knowledge Public" (Saskatchewan, 2007), and the conference organized by the Society for Social Studies of Science which addressed the impact of interventionist approaches on STS research (Rotterdam, 2008). An example of a special issue dedicated to unpacking 'intervention' in STS is (Zuiderent-Jerak & Jensen, 2007) or a special issue on action research in IS (Baskerville & Myers, 2004a).

[23] Methodological issues related to field access and conflicting agendas are surely a theme in a number of approaches other than action research (e.g., ethnography), however, dealing with these complexities is different because of the specific characteristics of action research, which refer to the collaborative and action-oriented aspects. The collaborative relationship upon which the research is based creates a higher degree of attachment and interdependence between the researcher and the practitioners. Furthermore, in contrast to other types of researchers, the action researcher is explicitly committed to the pursuit of change therefore in the face of limited field access or collaboration, the researcher is unable to fulfill her commitment and ultimate goal.

boundaries between university researchers and community-based organizations. For example, the Social Sciences and Humanities Research Council of Canada and the Initiative on the New Economy (INE), which funded the research presented in this dissertation, has the aim of exploring various dimensions of the global, knowledge-driven new economy, in order to "facilitate the development of methods and strategies, *beyond traditional academic vehicles* [emphasis added], for the mobilization of research, knowledge, and expertise in order to inform decisions, policies and practices" (INE website).[24] The current political climate in which research funding is increasingly given to action research projects is attracting and encouraging a growing number of scholars to engage in various forms of collaborative and action-oriented research.

This sharp expansion of academic research to move beyond understanding and interpretation toward social action, has become a major controversy occupying key debates about the role of the intellectual and how social science should be practiced. While critical theorists, feminists and constructivists advocate for various forms of social action, positivist/postpositivists view the call for action as undermining the aim of objectivity and contaminating research results (Lincoln & Guba, 2003). Moreover, many in the latter group do not consider 'action' the domain of researchers, but rather "of policy personnel, legislators, and civic and political officials" (Lincoln & Guba, 2003, p. 268).

Within the field of STS, the turn to action and participation has been met with varying degrees of enthusiasm. While some researchers celebrate and advocate the need to practically contribute to development and implementation (Berg, 1998; Timmermans & Berg, 2004), others express different degrees of rejection of this engagement (Guggenheim, 2004). This rejection is a result of various concerns, for example, that the interest of community partners will get co-opted by academic researchers (Mykhalovskiy & McCoy, 2002, p. 33), or a concern that the interest of academics will be overshadowed by communities (Fish, 2004). To give a taste of these strong concerns, I refer to the following provocative segment from an editorial by Stanley Fish (2004)—a literary theorist who has written extensively about university politics—entitled *Why We Built the Ivory Tower* published in the *New York Times*.

> Do your job; don't try to do someone else's job, as you are unlikely to be qualified; and don't let anyone else do your job. In other words, don't confuse your academic obligation to save the world; that's not your job as an academic; and don't surrender your academic obligations to the agenda of any non-academic constituency…In short, don't cross the boundary between academic work and partisan advocacy whether the advocacy is yours or someone else's. (Fish, 2004, para 1)

[24] INE website: http://198.96.3.162/ev_en.php (accessed 4 April 2005).

I position myself between these two poles, of those who celebrate this research trend and those who reject it, together with STS scholars who are more circumspect and follow a critical epistemological path by raising questions and concerns regarding the need to develop sensibility and find language to articulate the methodological complexities that follow from an action research approach (Vikkelsø, 2007). This includes the actual nature of such relationships between researchers and practitioners, as well as the terms and conditions that forge such engagements (Lynch, 2004; Mykhalovskiy & McCoy, 2002). Others have expressed the need to situate the interventions in their context (Jensen, 2007a; Zuiderent, 2002), as well as the need to consider the implications of different types of engagements (Mesman, 2007).

1.2 Motivation for the Study

Beside the personal motivation (mentioned at the outset of this chapter) for exploring the phenomena I encountered in the field, this research was driven by practical and theoretical motivations. In the above section (0), I described briefly the media and political discourses surrounding EMR adaptations, and showed how these reflect technologically deterministic and instrumental views. I argue that such simplistic views are problematic and call, therefore, for the need to move away from reducing the technology to a mere instrument, and toward developing a renewed understanding of the complex sociotechnical context within which a technological adaptation takes place. Moving beyond instrumentalist views of technologies in health care, I have argued elsewhere for the importance of organizational learning (Aanestad & Boulus, 2004). Accordingly, I will argue that the EMR is not simply a tool that improves or redistributes practices, but it can also fundamentally transform medical professions. I will demonstrate how in spite of tremendously high expectations, ample resources and money spent on EMRs, many of the benefits have, so far, not materialized. This reflects the practical relevance of studying the adaptation of EMRs, especially in light of the various initiatives that are taking place in British Columbia, Canada (described above in section 1.1.2.3). The complexity arising from the transition to EMRs encourages broader investigation of the extent to which technologies that are implemented in the health care sector are meeting their goals and envisioned potential.

The idea of computerized patient records emerged in the 1960s and 1970s (Collen, 1995; Morries & Collen, 1987) and in spite of the of tremendous amounts of resources and money, the transition to a so-called digital realm has been an unexpectedly long process in healthcare, where many benefits claimed by governments and vendors have, so far, not materialized. In the United States it has, therefore, been said that developing health care information systems appears to be more complex than putting a man on the moon (Collen, 1995). The complexity of technology implementations within the health sector has been continuously underestimated (Bates, 2002; Berg, 2004a; Heath,

Luff, & Svensson, 2003). Thus, there is an increasing need for more research on the adaptation of these technologies within real-life case studies, because these studies can enable alternative approaches for managing the complexities of IT in the heath care sector.

When looking at the relevant research and literature about IT in healthcare and EMR adaptations (outlined in section 2.3.2), we find a number of studies arguing that the transition to EMRs has been an unexpectedly long and challenging process, revealing multiple contingencies and ambiguities (Ellingsen & Monteiro, 2003a; Hartswood et al., 2003b; Lærum, Ellingsen, & Faxvaag, 2001; Lundberg, 2000; Nilsson et al., 2002). Furthermore, there are many examples of technology implementations within the health care sector that have fallen victim to various myths. An example of such myths is that the adaptation[25] process is merely a technical realization of a planned system, which can be left to the IT department (Berg, 2001). The complexity of technology implementation within the health sector has been continuously underestimated (Bates, 2002; Berg, 1999c; Heath et al., 2003). There is, therefore, an increasing need for more research on the adaptation of technologies in the health care sector. More specifically, there is a need for investigating the great variation of implementations and changes of work practices within real-life case studies, because these studies can enable rethinking of alternative approaches for managing the complexities of information systems in the health care sector. In sum, the combination of the political context (section 1.1.2) and the existing literature (section 2.3) helped shape my research questions which I discuss in the next section.

We have been witnessing the spread of information and communication technologies (ICTs) in various industries and sectors, and in our everyday life. In fact, technology has become so deeply embedded in our society that it is indeed immensely difficult to identify aspects of contemporary life that are not affected by it in some way, shape, or form. Technology is altering the way we work and live, and transforming the way we think and interact with the world. Living in such a highly technological realm raises several critical debates regarding technology's impact on our society, the way technology shapes our lives and vice versa. This study will focus on the health sector, which has been criticized for being one of those lagging behind other industries when it comes to adopting information technologies. This dissertation draws upon an empirical study of the implementation of EMRs in a general practitioner setting, a three and a half years journey that follows the technological system and the work practices as they undergo continuous developments, modifications and configurations. In other words, the empirical study investigates how the EMR-technology transforms the medical practice of

[25] The concept 'adaptation' will be clarified in section 4.3.

health care practitioners and how the health care practitioners configure and adapt the technology to their situated work practices.

The literature about IT implementations (and EMRs) in health care has been expanding rapidly in the past few years, consisting of studies that draw upon various methodological approaches. However, the literature is relatively small when it comes to studies of IT implementations that draw upon action research (e.g., Bal & Femke, 2007; Balka & Kahnamoui, 2004; Braa, Monteiro, & Sahay, 2004; Jensen, 2007a). Similar to these studies, the research presented here is conducted within an action research framework where I *investigated* the transition to an EMR by *participating* in the transition process. An action research approach provides the possibility to actively participate in the transition process and to generate both practical and theoretical insights into the process. However, such an active and close engagement is highly complex, posing various challenges to the research project, the researcher and the participants. I address these issues in chapters 5-6, where the focus of my analysis changes from discussing the actual implementation of the EMR system to discussing my own research practice, meaning the methods I used to study and participate in the implementation of this technology. I, therefore, draw upon my research project which was conducted through a close collaboration with a community partner, a non-profit community healthcare centre located in BC. The empirical case presented in this dissertation was conducted within an action research framework, with its explicit attention to responding to practical concerns of practitioners. In section 2.4, I will elaborate on what distinguishes action research from other approaches (i.e. traditional social research); hence I will here highlight two key-characteristics which I view as crucially important. The first one refers to the *collaborative relationship* between the researcher and the subjects, and the second refers to the *purpose* of the research where the researcher is *explicitly*, *deliberately* and *actively* involved in the change process. My motivation behind exploring methodological complexities faced when conducting action research is based upon my wish to address some of the questions and concerns that arise from such research; questions which I feel deserve more attention. In the next section, I outline the two research questions I pursued, which form the backbone of this work.

1.3 Research Questions

The main purpose of the first component of this study is to investigate the transition process to EMRs, and to identify and understand the various sociotechnical *changes* that are brought about by EMRs. I will use an empirical study (which will be discussed in Chapter 4), to explore the interplay between the technology and the health care practitioners, as well as the impact of the technology on the work practices and vice versa. My main research questions in the first component of this thesis are:

How does the technology transform the medical practice, and how do the health care practitioners configure and adapt the technology to the existing situated work practices?

To answer this question, I follow the EMR as it is being adopted and used by different health care practitioners, designed and continuously modified by the vendor, viewed by the patients, and advocated for by the health authority.[26] This will reflect upon my research journey into the implementation of EMRs. Some of the key questions that guided my research were: what are the goals that a transition to an EMR was to meet, and what was actually achieved in practice? I will explore how the various relevant actors (i.e. policy makers, the vendor, patients) perceived the transition to EMRs, with a particular focus on the health care practitioners' point of view. Thereafter I will investigate the challenges and complexities that emerged during the transition, and explore the various ways in which the health care practitioners managed the transition to an EMR. This will provide me with a deeper understanding of the sociotechnical change processes that occurred during the transition to an EMR.

I investigated the introduction of the EMR system by participating in the transition process. In other words, I will use the empirical case about the EMR to shed light on critical issues that arise when conducting action research. Adopting an action research framework provided an opportunity to actively participate/ intervene in the transition process and to generate both practical and theoretical insights into the process. However, such active and close engagement is highly complex, posing various challenges for the research, and to the researcher and the participants. Therefore, my main research questions for this component is:

What are the methodological complexities that are encountered when conducting action research and what are their implications? How can we deal with these complexities in practice? And how can we conceptualize the complex nature of action research collaborations and the researcher's roles?

To answer this question, I will critically analyze my three and a half years of experience of conducting action research and working with a community partner. Some of the key questions that served as guidelines for my research were: what are our possibilities for intervening and making a meaningful difference and what are the consequences and implications of such research engagement on our research practice?

[26] This refers to Vancouver Coastal Health (VCH).

How is action research portrayed across different fields and which criteria and norms are enacted within the different literature? What are the implications of such norms on action research, and how are critical issues of participation, usefulness and relevance addressed within these norms?

The research questions outlined above are part of greater and established debates within a number of fields. Thus, in the next section, I will explain the theoretical and methodological relevance of the study to the literature, as well as the practical relevance in terms of policy implications.

1.4 Relevance of the Study and Expected Contributions

I begin by explaining the relevance and contribution of the EMR research to the literature on IT in healthcare, and continue by explaining the relevance and contribution of the methodological discussions to the action research literature. An extensive elaboration of these theoretical fields and the literature will be provided in Chapter 2. This section is merely intended to briefly introduce the fields in order to explain my theoretical orientation and situate my study in the broader literature.

1.4.1 Healthcare IT and EMRs

This research can be positioned within the group of studies in the field of communication that adopts social constructivist approaches to examine communication technologies. This implies that these studies follow a contextual perspective that focuses on local situated practices, meanings attributed to technologies.[27] In this dissertation, I will investigate the transition process to an EMR in a general practitioner setting, and will draw upon insights and concepts from the field of Computer-Supported Cooperative Work (CSCW) and its related discipline Information Systems (IS), as well as insights from the STS field. Since studying a theme such as the link between society and technology crosses boundaries of many disciplines, I chose CSCW and STS as theoretical anchors because these are known as interdisciplinary fields that bridge between various disciplines, and more specifically, they cross the classical 'great divide' between social scientists and computer scientists (Berg, 1998). Drawing upon technology studies from these fields helped me explore the relationship between social and technical phenomena, and guided my analysis of the way in which social and technical phenomena are linked to each other and affect one another.

[27] I refer to Boczkowski and Lievrouw (2008) who describe a shift in the 80s where "many communication scholars have turned to concepts drawn from STS, such as interpretive flexibility, social shaping, and social construction of technology, in their theorizing and analyses of new media and information technologies" (2008, p. 954).

Both CSCW and STS wish to move away from technologically deterministic views, arguing that technology alone cannot determine change and that we cannot refer to one feature of the technology without referring to features of the social (Sismondo, 2004, p. 74). In addition, both fields acknowledge the contested and ambiguous nature of the technology which brings along new effects (Berg, 2001; Berg, 1999c). In both CSCW and STS, we can find research that focuses on empirical studies of technologies in their situated context, and both acknowledge that system design is not purely a technical endeavor but rather includes political institutions, organizational development, conflicts of interest, etc. (Dunlop & Kling, 1991). In addition, both fields recognize the importance of grasping the context within which the technology is developed, implemented and used (e.g., Kyng & Mathiassen, 1997; Neale, Carroll, & Rosson, 2004; Pinch & Bijker, 1987).

The CSCW field[28] gathers computer scientists and social scientists, and it emphasizes the importance of understanding technology in the context of use and focuses on a user-centered design (Neale et al., 2004). Often deploying ethnographic studies,[29] CSCW scholars are devoted to investigating how computer systems can be designed to support collaborative activities and their coordination (Bannon & Schmidt, 1992).

> Computer-based support for cooperative work can be provided by offering better communication facilities, providing improved monitoring and awareness possibilities to the actors, and by aiming at reducing the complexity of the coordination activities to be conducted by the involved actors. (Carstensen & Schmidt, 1999, p. 620)

Although there are several similarities between technology studies from STS and CSCW, there are also important differences between the two fields.[30] One of the differences relates to the fact that CSCW and IS have an explicit focus on technology, while STS focuses on the impact of science and technology on society. In other words, technology in STS is viewed as means to an end, while in CSCW and IS technology is an end in and of itself. However, the core distinction between constructivist[31] STS and CSCW are certain ontological and epistemological contrasts related to the different

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[28] The CSCW field does not yet have a generally accepted definition and I, therefore, wish to acknowledge that there are many different definitions that change depending upon the researchers. I chose to follow the definition of Carstensen and Schmidt (1999), prominent scholars within the CSCW field.

[29] The use of ethnography is more common amongst the European CSCW community than in the North American CSCW community.

[30] It is important to note that the distinctions between CSCW and STS are not always clear cut, and both fields share concepts and approaches as some scholars move across the two fields. Greater elaboration of each field will be provided in section 2.3.2.

[31] This refers to technology studies that draw upon constructivist approaches (e.g., Actor-Network Theory). It is important to note, however, that the approaches used in STS and CSCW can vary in the hands of different researchers and when used for different purposes.

assumptions each approach makes about the nature of reality, knowledge and change.[32] It is these contrasting assumptions that in turn contribute to several theoretical and practical differences between CSCW, IS and STS. For instance, as will be discussed later, some scholars within the CSCW tradition tend to employ a distinction between technology and organization, and argue that the technology must be adapted to fit the organization (Vikkelsø, 2005, p. 6). In contrast, within the STS constructivist tradition, technology and organization are rather viewed as *interconnected* and *irreducible* entities that transform one another in unpredictable ways (Vikkelsø, 2005). Thus, there is no simple causal linear relationship between technology adaptations and change in organizations (Berg, 1998). Consequently, technology studies within the STS tradition move us away from thinking in terms of 'fitting' the technology into work practices, and argue that it can be problematic to separate these and to point out single factors to justify success or failure (Berg, 2001; Vikkelsø, 2005). I thereby adopt what Sismondo (2004) has named 'ecological thinking,'[33] which in my case implies viewing EMRs as embedded in material circumstances, social relations, established work practices, and bodies of knowledge. Drawing upon technology studies within the STS field can help move away from traditional linear views which see various designs simply as stages in a logical development of technology. Instead, when analyzing the developmental process of technology, one acknowledges that different interests, interpretations and technical requirements can lead to the design of different technologies. Hence, rather than starting with pre-defined assumptions and clear categories, these studies unpack the 'black-box' of technology,[34] and look at the way in which the development process progressed.

This study aims to contribute to research within CSCW, IS and STS that focuses on empirical studies of technologies in their situated context. Specifically, I situate/articulate my contribution in healthcare technology studies within the above mentioned fields. I draw upon theoretical concepts from CSCW and IS (technology-in-use practices and reflection-on-practice) to analyze how the health care practitioners configure and adapt the technology to their situated work practices (section 4.5). I then draw upon theoretical insights from STS (in particular ANT) to analyze how the technology transforms the medical practice (section 4.6). This analysis can be positioned among the studies within the research field of IT in healthcare that draw upon different insights from ANT (Bruni, 2005; Danholt, 2008; Grisot, 2008; Jensen & Winthereik, 2002; Vikkelsø, 2005). Finally, by bringing analytical and theoretical insights from the

[32] This will be elaborated further in section 2.2-2.3.

[33] Ecological analyses are used for instance in Actor-Network Theory, and imply that human and non-human elements are deeply intermeshed and it is impossible to understand the one without reference to the other (for more information about ecological analysis, consult Sismondo (2004, p. 69-70, 74)).

[34] This term refers to an object that encompasses several different elements that are organized in such a way that they act as a complete whole (Latour 1987, p.131).

field of STS into the field of CSCW and IS (section 4.6), the study will contribute to the understanding and conceptualization of IT implementation in healthcare. This study will, therefore, provide an providing a detailed and in-depth understanding sociotechnical changes occasioned by the introduction of new computer systems in health care settings and its impact on the medical profession.

The study will also make an empirical contribution to the larger body of research about IT implementations in the health sector. I will draw upon existing literature about EMRs and will add findings from my longitudinal ethnographic research where I was given the unique opportunity to collect extensive amounts of rich and detailed empirical data for a period of three and a half years. The close and long-term collaboration with the study participants provided me with access to the informal practices and/or invisible issues embedded within the clinical setting, as well as hidden assumptions, values and biases inherent within such practices.

Finally, the empirical research contributed, and will continue to contribute, to practical knowledge in the form of summaries for policy and decision makers, as well as technical reports, guidelines and recommendations about sociotechnical issues that should be taken into account prior to and during the adaptation process of an EMR (see appendixes D and F for the technical reports which contains patient's views of the EMR and users' experience of EMR implementations in clinics in B.C.[35]). In light of the recent IT initiatives that are underway in B.C. (described in section 1.1.2.3), this is a timely topic and the practical contribution of the study is therefore of particular relevance.

1.4.2 Methodological Reflections on Action Research

The second set of research questions addressed here are significant in relation to methodological debates in science studies and STS. I will reflect upon a fairly recent trend toward more collaborative and action-oriented research,[36] which focuses on bridging the gap between university researchers and community-based organizations.[37] It is not my intention to claim that this movement is totally new, but rather that it has been spreading more rapidly in recent years across various fields, increasingly leading to

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[35] Policy reports summarizing the research findings have also been written to inform health care practitioners, IT vendors, as well as policy and decision makers (members from the health authority). These findings have been presented by the PI, Professor Ellen Balka, in a conference organized for decision and policy makers in Ottawa, and in several departmentally based meetings in Ottawa. A copy of the reports that are relevant for my project can be found in Appendix J.

[36] For more information about the different types of action research, consult Berg (2007, pp. 230-233), Davison, Martinsons, and Kock (2004), Holter and Schwartz-Barcott (1993, p. 301), Kemmis and McTaggert (2003) and Masters (2000).

[37] This will be explained further in section 1.1.3.

critical discussions on the methodological consequences of the expansion of academic research to areas beyond its traditional scholarly domain, and the impact this has on research practice. This movement where research collaborations cut across conventional university boundaries and where researchers increasingly are drifting away from the 'ivory tower' or the 'academic empire,'[38] and which often involves community partnerships, has been met with varying degrees of enthusiasm. Nevertheless, the interest in action-oriented research has been increasingly and explicitly supported by funding organizations who wish to establish platforms of intervention that cut across the boundaries between university researchers and community partners.

However, despite the high interest in the research trend toward collaboration and action, little has been written about the actual nature of such collaboration and its unintended consequences. "There is still a lack of guidelines [for conducting action research]…in terms of design, process, presentation, and criteria for evaluation" (Avison, Lau, Myers, & Nielsen, 1999, p. 96). Furthermore, "very little has been written about the actual nature of such relationships, how they are formed and sustained, and the issues that arise in them" (Mykhalovskiy & McCoy, 2002, p. 17-18). This study will, therefore, contribute to critical discussions about the transformation of the research and the researchers' role, and the implications of that transformation, by drawing upon fairly recent literature within STS which addresses action research in a critical light (see section 2.4.2).

The current research climate, where funds are increasingly provided to participatory and action research, raises a number of fundamental questions about how we, as social scientists, have been and might be involved in participatory and action-oriented scholarship. Chapters 5-6 of the dissertation will contribute to existing debates about methodological challenges that are faced when conducting action research. I will provide a more nuanced articulation of these challenges by analyzing them in relation to the impact of participating and conducting action research. I draw upon insights from action research and argue that the nature of collaboration cannot be understood simply as a dichotomous relationship. I bring critical insights about action research from the STS field into the field of IS and action research in general, and show how these could contribute to redefining and expanding the existing views on action research. This includes the need to rethink notions of interventions and participations, representation, usefulness and relevance. In addition, I call for the need to move away from the dichotomous normative and standardized criteria and norms found within IT action research and action research in general, and will redefine the conceptualization of the research collaboration and the researcher's role. I will illustrate how I drifted away from

[38] This refers to traditional social science research where the researcher sits in her office and documents changes without participating actively in the implementation of the changes.

thinking about how action research *should normatively* be conducted, into thinking about how it is *actually performed* in practice.

Taking into consideration the early historical roots of action research (section 2.4.1.2) where it has been viewed as a tool for change, while addressing my critique of the norms enacted within IS action research (sections 2.4.2-2.4.3, 6.2.1) and the dichotomous views found within action research literature (section 6.2.1), and given the empirical complexities[39] described in chapters 5-6, I ask: how can we conceptualize the complex nature of action research collaborations? I draw upon insight from ANT and propose conceptualizing action research as a network of the different connections that are established and reconfigured during the course of the research (Section 6.3.3). Applying a network model enables us to see how interventions become part of a larger network where future interventions and roles are interpreted through past connections. A network model is, therefore, fruitful for understanding the researcher's space for interventions and for taking into account the continual transition in types of engagements as it may have tremendous consequences on the research project and the challenges that are faced.[40]

Given that the nature of collaboration established within action research is complex, constantly emerging and changing, and that the researcher's space for interventions is shaped by multiple and conflicting roles and interventions—how then can we deal with these complexities while intervening in practice? One strategy I proposed is to adopt a self-critical reflexive stance and take moments of uncertainty from the field seriously, as these can be fruitful in sparking insights into new things, and new ways of seeing things. For this section, I draw upon notions of reflections and reflexivity existing within STS and action research in general (through e.g., first-person reflections) and suggest these notions be adopted to action research within the IS field. Finally, I suggest that the 'turn to action' (explained in section 1.1.3)—whereby a growing number of researchers are engaged in various types of participatory and action-oriented research—should be modified to a 'turn to reflexive[41] action.' Thus, I call for the need for greater critical discussions about reflexive action research; a need which is becoming increasingly pressing in the current research climate where more funds are going to such

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[39] The term 'complexity' may have a negative connotation. However, it is not my intention to portray complexities as a negative things; on the contrary, I argue that these should be embraced (instead of ignored) as these can provide different methodological and theoretical insights into the social world. The interest toward understanding complexities has intensified with the STS field, especially with the work of John Law and Anne-Marie Mol (e.g., Law & Mol, 2002; Law 2004a) whose work focus finding ways to understanding complexities of the social world while avoiding implications and reductionism. Instead they focus on aspects of multiplicity, heterogeneity, etc.

[40] In section 3.3, I will explain further the reasons behind choosing ANT as a framework for this analysis.

[41] I use the terms 'reflexive' and 'reflective' interchangeably often following their usage by different authors. Generally speaking, "the term 'reflective' tends to be used in the organizational and professional literatures, while the term 'reflexive' is associated with critical theory" (Hart & Bond, 1995b, p. ix).

types of research. Combining the two components (EMR and action research) is expected to contribute to action research studies of IT in health care.

1.5 An Overview of the Dissertation Structure

This dissertation consists of seven chapters, including this introduction. Chapter 2 provides a comprehensive overview of the existing literature and research about healthcare IT and medical practice, and action research, separately. Each of these literatures will be further divided into two parts, to distinguish the different approaches existing in the different fields. Throughout the dissertation, I will illustrate how these different fields can contribute to each other by introducing particular insights and/or extending discussions about issues that are either often left unquestioned or rarely given critical scrutiny.

Chapter 3 is dedicated to explicating the ontological, epistemological and methodological foundation,[42] the skeleton, upon which the dissertation is based and which I subsequently use when describing, analyzing and discussing the EMR and action research. I begin by delineating the constructivist paradigm and the theoretical platform used throughout the dissertation. I then describe the field setting where the empirical research occurred and the methods I used for collecting and analyzing the empirical data about the EMR. Finally, I describe the methodologies[43] I draw upon to study action research.

Chapter 4 contains the analysis and discussion (for the EMR component) of the deeper sociotechnical changes that emerged during the EMR implementation process. I begin by describing the empirical case and the actual EMR implementation. This is followed by three sub-sections: the first one focuses on ways in which the health care practitioners configure and adapt the technology to their situated work practices; the second focuses on how the technology transforms the medical practice; and the last section will connect the arguments from all the previous sections and bring them into a meta discussion that will also summarize this chapter.

Chapter 5 shifts the focus away from the study of the *technology* (EMR) toward the *method* (action research) used for studying and participating in the implementation of

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[42] Ontology refers to a set of beliefs we have regarding the nature of reality; epistemology concerns the relationship between the knower and what can be known and deals with questions regarding the nature of knowledge claims and how knowledge can be obtained; finally, methodology refers to the specific ways in which we examine the world and produce knowledge (Denzin & Lincoln, 1994a; Guba & Lincoln, 1994).

[43] The term 'methodologies' is often used interchangeably with 'methods' (e.g., Atkinson & Hammersley, 1994). I use the term methodologies to refer to research strategies which can encompass several methods, and the term methods to refer to "techniques which take on a specific meaning according to the methodology in which they are used" (Silverman, 1998, p. 83).

the EMR system. It begins by positioning my empirical research within the broader context of a contemporary research trend toward collaboration and action-research, and then moves to presenting the case and analysis of the methodological issues that arise when conducting action research. Throughout the chapter, I adopt a self-reflective and critical epistemological stance, and I focus on the nature of collaboration forged with the community partner and the impact it had on my research in general and my role as a researcher in particular.

Chapter 6 discusses in greater detail the various issues raised in the analysis (Chapter 5) and problematic issues found in the literature (section 2.4). It provides a deeper investigation of the action research collaboration and provides a nuanced articulation of the challenges encountered when conducting such research. I draw upon critical insights from action research found within the STS field and explain how these could contribute to action research found within the IS field. I unpack the various complexities and argue that the norm enacted within IS action research falls short in terms of providing fruitful insights into ways to deal with these complexities. I propose adopting a reflexive stance whereby I welcome uncertainties from the field and use these as knowledge providers.

Finally, Chapter 7 summarizes the main arguments in the dissertation and offers a few concluding remarks. The aim of this dissertation is twofold: first, to show how the EMR is gradually transforming the medical profession; second: to demonstrate the importance of methodological reflections on action research.

CHAPTER 2: LITERATURE AND RELATED RESEARCH

2.1 Introduction

This chapter provides an overview of the existing literature about healthcare IT and medical practice, and action research, separately. Each of these literatures will be further divided into two parts, to distinguish the different approaches existing in the different fields. Throughout the dissertation, I will illustrate how these different fields can contribute to each other by introducing particular insights and/or extending discussions about issues that are either often left unquestioned or rarely given critical scrutiny. As mentioned in the introductory chapter, this dissertation draws upon insights from Computer-Supported Cooperative Work (CSCW), Information Systems (IS) and Science and Technology Studies (STS).[44]

2.2 Theoretical Orientation

The CSCW field, as mentioned in the introduction, is dedicated to investigating how computer systems can be designed to support collaborative activities and their coordination (Bannon & Schmidt, 1992). For this purpose, understanding situated work practices (Suchman, 1987) and focusing on real work settings in order to explore the collaborative character of work and communication interactions (Taylor, Groleau, Heaton, & Van, 2001) is fundamental. CSCW literature offers a wide range of concepts useful for studying work practices, such as the concept of articulation work which refers to the informal work that is necessary to ensure smooth coordination and to manage the distributed and contingent nature of work (Strauss et al., 1985). Articulation work often tends to be invisible, yet it is essential as it often serves as the glue that holds complex practices together. It is used for differentiating between routine and exceptional work (Bannon & Schmidt, 1992; Suchman, 1996) and for exploring the dynamic interplay between formal task description and informal tasks that are 'behind the scenes' (Berg, 1997; Star, 1991a; Star, 1991b; Strauss et al., 1985).

[44] This chapter will focus on EMR studies found within the STS field. A more general elaboration of the STS field will be provided in Chapter 3.

Many studies undertaken within CSCW emphasize the central roles artefacts play in managing and coordinating information flow and work activities (Brown & Duguid, 1994; Hanseth & Lundberg, 2001; Heath & Luff, 1996; Luff & Heath, 1998; Luff, Heath, & Greatbatch, 1992; Svenningsen, 2002). Another recurring theme in the literature is complex coordination mechanisms (Lundberg & Tellioglu, 1999) and the distinction between articulation work and cooperative work (Schmidt & Simone, 1996). To better understand how artefacts are embedded in work practices, the field offers the concept of boundary objects (Star & Griesemer, 1989, p. 393) which explains how artefacts can have different local meanings in several social worlds, while at the same time, maintain a common identity across various communities. In sum, CSCW literature offers a collection of concepts useful for studying existing situated work practices and for finding ways to configure and adapt the technology to fit these complex practices (Balka et al., 2005; Hartswood, Procter, Rouncefield, & Slack, 2003a; Lundberg & Tellioglu, 1999).

I suggested in Chapter 1 how, in spite of the fact that there are several similarities between technology studies from STS and CSCW, there are also essential differences between the two fields (e.g., the distinction that the CSCW tradition employs between technology and society). Drawing upon technology studies within the STS field, we acknowledge that different interests, interpretations and technical requirements can lead to the design of different technologies (Pinch & Bijker, 1987). Therefore, STS studies unpack the 'black box' of technology and look at how the development and implementation processes progress in practice. There are various approaches that can be identified within the STS field, however, I choose to use Actor-Network Theory (ANT), which I find to be a flexible analytical tool that is best suited to the nature and focus of my study. Using the notions of 'actants' and 'networks' allows me to map out networks, which comprise heterogeneous social and technical elements, human and non-human actants (e.g., material and natural objects, technological artefacts, texts, organizations), both of which can actively influence the networks. ANT can provide a fruitful conceptual framework for studying phenomena that are both social and technical.[45]

2.3 Healthcare IT and Medical Practice

I will begin by situating the study of EMR implementations in their historical context and grounding it in the broader EMR-literature by providing an overview of key studies from three important fields. I will distinguish between EMR studies found within the CSCW and the IS fields and those conducted within STS, and will illustrate in 2.3.2 what the different fields can contribute to each other. Finally, I will introduce key

[45] Further illumination of my decision to use ANT and the insights which guided the work in this dissertation can be found in 3.3.

concepts which will be used in the analysis of the EMR case. In the next sub-section, I will briefly reconstruct parts of the history of EMRs in order to illustrate how the development process of the EMR technology did not simply progress in a deterministic or linear manner. After all, technologies are influenced not only by cultural and social forces, but also by historical ones (Feenberg, 1992), making the development process of technologies far more flexible, contingent and dynamic (Feenberg, 1999).

2.3.1 Brief History of EMRs

The idea of developing a computerized medium that contains clinical information as recorded in the medical record dates back to the mid-1960s,[46] where various initiatives had been taken to develop computerized patient management systems (PMS), also referred to as health care information systems (HCIS). However, most of these systems resulted in resounding failures. This was primarily due to underestimation of the complexity of such systems. Hardware and software tools were inadequate and immensely expensive, and "users, as contrasted to developers, were not involved at an adequate level, and, in fact, were not ready for computers" (Hammond, 1987, p. 156). Hammond (1987) describes how hospitals were enthusiastic and spent huge amounts of money and considerable effort on computerization, but they came to feel that they had been sold an unusable product. Optimism was therefore quickly replaced by skepticism. This unsuccessful outcome was viewed as the combination of inadequate technology and the fact that users were not ready for the change required by this technological innovation.

After increasing investments in the development of various systems, some progress could be noted in the 1970s. The work of Morris Collen (who was a practicing physician) and his colleagues at the Kaiser Permanente Medical group contributed to a high level of interest in the field (Hammond, 1987). The first breakthrough of computerized patient management systems was due to ordinary physicians who believed that computers could be used to serve their personal needs. However, as Hammond (1987) noted, the early systems were designed partly by scientists from the business world who were unfamiliar with medical practice. It was only when developers moved away from the limited focus on poor functionalism and learned to acknowledge the existing needs, that progress could be made. In addition, one could gradually observe the occurrence of a few initiatives to expand the development and design process into a democratic debate that included not only developers, but also the physicians that were the primary users of the system (Hammond, 1987).

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[46] For an extended overview of the history of the developments in medical computing consult, Kaplan (1995).

In the 1970s and 1980s the goal of such technologies was "to always have access to the patient's relevant prior medical information" (Collen, 1987, p. 123). Recently, as the focus on EMRs has been moving toward decreasing costs and standardization, its definition expanded from being a documentation tool that (merely) provides access to information,[47] into becoming a management-oriented tool for administrative use and for supporting organizational cooperation. Moreover, as EMR technologies are now routinely found in the primary and secondary healthcare sector, there has been a slight movement away from EMRs toward an increasing focus on electronic health records (EHRs). However, even though EMRs appear to be important in increasing the integration of healthcare services, "recent studies of EMR projects…remind us of the pitfalls of relying on purely technical solutions to what are, at base, socio-technical problems" (Hartswood et al., 2003a, p. 241). In the next section, I will elaborate further on what is meant by sociotechnical problems and will present different approaches to dealing with these.

EMR technologies were not developed from scratch, but rather were heavily influenced and shaped by previous paper-based practices. Through a dynamic and ambivalent process, EMRs have been evolving into multiple use areas that have opened new opportunities for transforming these technologies. Physicians, for instance, use the EMR for diagnostic and therapeutic decisions; administrative staff use it for scheduling tasks and managing the workflow. Public authorities from national and regional levels, or the hospital's management, use the EMR to extract data for statistics and planning, and researchers use it for research purposes. Writing about the evolution of computers, Feenberg (2002) points out that things are "still in flux, its evolution subject to a wide range of social influence and demands" (p. 120). The same could be said about the EMR technologies as these evolve following different paths, depending on social actors and the contextual circumstances.

2.3.2 EMR Literature

The implementation of EMRs has been studied by various researchers from a wide range of fields and disciplines, including biomedicine, medical informatics, IS, CSCW and the STS field. According to Potts and his colleagues (2008) who conducted a systematic review of how EMRs are depicted in various fields, in biomedicine, EMRs are black-boxed and viewed in a technologically deterministic and utopian light. Researchers in the field of biomedical informatics often neglect to take into account social aspects related to system development and implementation (Pratt, Reddy, McDonald, Tarczy-

[47] By access to information I refer to comprehensive patient data which includes notes from physicians and nurses, medical imaging, charts, and other information.

Hornoch, & Gennari, 2004). Medical informaticians, on the other hand, include in their analysis social and organizational aspects. In contrast to CSCW, IS and STS, the majority of publications in medical informatics are written by medical practitioners (Lundberg, 2000, p. 16) (in contrast to academic scholars) who evaluate the use of technologies in health care in order to examine organizational needs. Thus, studies within this field are practically oriented, as opposed to theoretically grounded studies found within the other fields mentioned above. Although there has recently been an increase in qualitative research in medical informatics, most studies are predominately quantitative. Furthermore, the literature in medical informatics emphasizes technical descriptions of new technologies; however, it fails to address "lessons learned from implementation problems, as well as technology seen in the context of its use in medical work practices" (Lundberg, 2000, p. 16). Medical informaticians view EMRs as a singular technology which must be configured according to specific requirements that enable control of particular business processes and "hospitals are seen as organisations that [also] must be configured in special ways to utilize the potentials of the technology. Organisational impact is thus conceptualised as a matter of fit between technology and organisation" (Vikkelsø, 2005, p. 5). Both medical informaticians and CSCW researchers share an interest in designing so-called successful healthcare information technologies, each focusing on particular aspects. In contrast to medical informatics, CSCW does not view organizations as homogeneous entities, but rather focuses on the inherent collaborative nature of medical work which makes it important to have appropriate technologies configured to support such practices. But as will be elaborated in the section below, CSCW researchers share with medical informatics the notion that successful technology implementation depends on fitting the social and technical aspects (Vikkelsø, 2005). I will now elaborate on the way in which EMRs are depicted in the IS and CSCW fields as well as the STS field since these are the most relevant for this dissertation.[48]

2.3.2.1 CSCW and IS literature about EMRs

Much of the CSCW literature focuses on how technology can be configured to support collaborative practices. The EMR is not depicted as a container of facts but as a tool supporting information sharing and collaborative work (Potts et al., 2008; Vikkelsø, 2005). The ultimate aim of such research is to develop a deeper understanding of users' needs and local medical practices in order to design and configure EMRs that will support such needs.

[48] It is important to acknowledge that the distinction between the above mentioned fields is not always clear cut as there are various scholars who cross these disciplinary boundaries (e.g., Suchman, Star, Bowker, Berg, etc.).

IS literature focuses on how technology is used in an organization (Hanseth, Aanestad, & Berg, 2004) and the importance of taking users and their situated work practices into account (Jensen, 2007b). Accordingly, IS studies provide insights into institutional characteristics of healthcare (Chiasson & Davidson, 2004) and focus on how an EMR is used in an organization. According to Potts et al., (2008), traditional IS research tends to be positivist[49] focusing on models and resistance; while practice-based IS research tends to be interpretive,[50] some of which draws upon Giddens' (1984) structuration theory, which has gained popularity within IS studies. Accordingly, such studies interpret technology as a structure with a dialectical relationship between enabling and constraining human actions (Orlikowski, 1992b; Walsham, 1993). However, it has been argued that IS studies neglect the role of technology (Hanseth et al., 2004) as it is often taken for granted and is either black-boxed or completely absent from social practices and contexts (Orlikowski & Iacono, 2001). Therefore, the need for a renewed understanding of the social context within which an information system is implemented and used and the need to theorize the technology artefact in IT studies has been acknowledged within the IS field (Grisot, 2008; Orlikowski & Iacono, 2001). Orlikowski, for instance, developed a dual concept of technology to distinguish between the actual technological artefact and the *use* of the technology (which has come to be known as technology-in-use practice[51]) (Hanseth et al., 2004). Other IS scholars advocate using ANT as it can provide fruitful insights about technology. The concept technology-in-use practice (used in the analysis of section 4.3.2) comprise people's understandings of the technology-use on a daily basis (Orlikowski & Gash, 1994). Adaptation of technology is highly influenced by peoples' perceptions (Jensen & Aanestad, 2007b; Orlikowski, 1992a) as they have to reconsider their context-dependent and invisible work practices. This is a dynamic and reflexive process where the technology is locally shaped and re-invented through situated use; it is an ongoing learning process where people try to configure ways of utilizing the technology (Rolland, 2005).

Some of the EMR literature in IS focuses on developing best practice models and indentifying factors for successful technology implementations, whereby success refers to measurable benefits, such as in efficiency and cost (Myers, 1994b). These studies have been criticized for their limited focus and their mechanistic view of the relationship

[49] Positivist studies generally assume that reality can be described by objective and measurable properties which exist independently of the observer. Positivist research generally tests hypotheses and generates quantifiable measures of variables (Myers & Avison, 2005).

[50] I am aware of the fact that the portrayal of the IS field provided here by Potts and his colleagues (2008) may be viewed as rather simplistic. However, it is not my intention to provide an extensive mapping of the field as it is not the main focus of this dissertation. For more information about healthcare information systems in the IS field, consult, Chiasson and Davidson (2004).

[51] The concept technology-in-use practice will be explained in Chapter 4 as it will be used in the analysis of the EMR case.

between organizational changes and the technology (Myers, 1994b), and researchers have been encouraged to pay attention to the way in which social and political interactions are intertwined. A similar critique has also been directed toward CSCW researchers (e.g., Atkinson & Peel, 1998; Ellingsen & Monteiro, 2003a; Ellingsen & Monteiro, 2003b; Hartswood et al., 2003a; Lærum et al., 2001; Lundberg & Tellioglu, 1999) who distinguish between technology and organization and refer to the 'fit' between the two as the recipe of a successful implementation of technology.

A large group within the CSCW community has studied the complex nature of medical practice with its mixtures of standard routine and exceptional events leading to gaps between formal plans and situated actions (Suchman, 1983; 1987). Furthermore, other scholars focus on changes in articulation work (Goorman & Berg, 2000; Strauss et al., 1985) and emphasize the importance of making work visible as well as supporting articulation work (Suchman, 1995; Suchman, 1996). Therefore, various studies undertaken within the CSCW community focus on developing health care technologies that are capable of representing articulation work (Jensen, 2006). This also led to an increased focus on understanding complex coordination processes (Lundberg & Tellioglu, 1999) as well as the important roles that artefacts play in articulation work in health care settings (Lundberg & Sandahl, 2000; Schmidt, Wagner, & Tolar, 2007; Svenningsen, 2002).

It has been acknowledged that paper documents have special properties that make them suitable in both synchronous and asynchronous collaboration. Documents are better adaptable than EMRs to supporting cooperation and coordination activities (Bringay, Barry, & Charlet, 2006) They have a high 'tailorability' in terms of affording strategies for fast retrieval and oversight (Nygren & Henriksson, 1992), and they have 'ecological flexibility' (Luff & Heath, 1998) that allows adoption to a range of situations and contingencies. Moreover, one has the possibility of tailoring paper documents by, for instance, underlying or marking text with colored pens (Luff et al., 1992). All these factors imply that paper documents embody certain properties in such a way that they alter activities and support coordination (Berg, 1999b; Hanseth & Lundberg, 2001).

Some researchers claim that EMRs and other health care technologies fail to adequately support collaborative work (Heath & Luff, 1996). Other researchers, however, claim that EMRs can support collaborative work by enhancing sharing of distributed information, enriching the overview of information, as well as facilitating coordination (Schneider & Wagner, 1993). Others investigate how the EMR impacts nurses in leadership positions (Moen, 2001), shapes the professional identity and autonomy of GPs (Kohli & Kettinger, 2004), and brings about new charting practices that have to become embedded in the daily clinical practice (Berg, 2001). Gregory (2000), for instance,

describes how the changes in recording practices implied a transition from 'free text' handwritten notes to 'structured entry'[52] (2000, pp. 5-6). While this transition encourages physicians to be more structured and precise in their writing (Berg, 2001), it also imposes new challenges since information that is entered into the EMR becomes decontextualized (Berg & Goorman, 1999). The change in charting practices is just one of the many changes that collectively can affect existing organizational realities.

Applying an incremental implementation strategy to EMRs has been viewed as significant, as well as following a user-focused orientation (Atkinson & Peel, 1998; Ludwick & Doucette, 2009) and understanding user's perspectives (Jensen & Aanestad, 2007a). The importance of determining the level of standardization and integration of the EMR with other systems was identified (Ellingsen & Monteiro, 2003a), and it has been argued that the EMR can deliver benefits only if there is an effective integration of the technology with localized work practices, while allowing space for ongoing adaptations and re-design (Hartswood et al., 2003a). The need to accommodate local configuration in generic standard information systems has also been discussed by Balka, Bjorn and Wagner (2008), who develop a typology for identifying possible sources of local variations in medical work practice across three arenas (i.e., the political, the institutional/organizational and the context of systems and workplace design).

The importance of taking into account resources beyond the patient record itself was identified, and researchers have emphasized the importance of various factors, such as organizational learning (Aanestad & Boulus, 2004; Reardon & Davidson, 2007), establishing space for reflection-on-practice (Boulus & Bjorn, 2007), and allowing communication flow and coordination of work activities that cross organizational boundaries (Nilsson et al., 2002). Finally, it has been pointed out that the actual use of the EMR is fragmented and inefficient compared to the potential (Lærum et al., 2001), and that despite the strong funding initiatives, there have been only modest organizational changes compared to initial expectations (Ellingsen & Monteiro, 2003b). Furthermore, it has been claimed that "there is mounting evidence…that the implementation of many [healthcare] information systems has resulted in unforeseen costs, unfulfilled promises and disillusionment" (Anderson & Aydin, 2005, p. vii).

2.3.2.2 STS literature about EMRs

One of the important differences between the above traditions (CSCW and IS) and STS literature about EMRs is that "the STS-literature calls for more research into the deeper qualitative ontological changes occasioned by the introduction of E[M]R, rather

[52] For more information about the transition from natural language processing (NLP) and the subjective objective assessment and plan (SOAP) notes, consult Gregory (2000, pp. 5-6, 11, 32).

than trying to measure the impact of E[M]R and the best practices regarding design and implementation based on seemingly universal standards" (Vikkelsø, 2005, p. 7). Much of the STS literature about EMRs deploys a constructionist ontology and focuses on the intertwined and inseparable relationship between technology (the material) and organizations (the social), the ways in which they co-construct and co-shape each other. For example, Berg and Bowker (1997) illustrate in their classic article how the medical record plays a central role in producing the patient's body. In the STS tradition, EMRs are not viewed as mere tools that simply support or constrain medical practice. Rather, EMRs are depicted as a part of sociotechnical networks which cannot be separated from organizations as they affect and transform one another in complex and unpredictable ways (Aanestad, 2003; Berg, 1999c; Berg, Aarts, & van der Lei, 2003; Jones, 2003; Svenningsen, 2002). For example, the work of Marc Berg (1998; 2003)—a prominent scholar within the field of Healthcare IT—discusses not only technical aspects, but also organizational and political consequences related to the adaption of a new IT system into an organization. In his studies, Berg shows how during the adaptation processes of a new technical system, both the system and the work practices are transformed in such a way that they mutually affect each other. Jensen (2006) studied the introduction of a wireless nursing call system in a hospital, and showed how many of the issues that arose were neither quite technical nor organizational, but instead belong to both domains. In sum, the intertwinement of technology and organization has been repeatedly emphasized by STS scholars.

Some STS researchers use ANT as a theoretical platform to study complex medical practices (Moreira, 2001; Moser, 2005) and/or study technology implementations. The analysis of the EMR case which is presented in Chapter 4 can be positioned among the studies within the research field of IT in healthcare that draw upon insights from ANT (Bruni, 2005; Danholt, 2008; Grisot, 2008; Jensen & Winthereik, 2002; Vikkelsø, 2005). ANT emphasizes the intermeshed relationship between the technical and the social elements (Hanseth et al., 2004); elements which are viewed as part of heterogeneous or sociotechnical networks constituted by human as well as non-human (technical and material) actors (Callon, 1986; Latour, 1986; Latour, 1988; Law, 1991). ANT is often used in order to offer an alternative understanding of the changes brought about when adopting a new technology (Winthereik, 2004, p. 24). For example, ANT has been used to emphasize how the adoption of a new technology is a continuous translation process between interconnected elements, including people, artefacts and practices (Aanestad, 2003). In this process, different actors' interests are translated into particular behaviors which are inscribed into diverse technologies and standards (Hanseth & Monteiro, 1996).

As mentioned in the previous sub-section, ANT can be a powerful tool for the IS field as it can provide renewed theoretical conceptualization of the IT artefact, which has been neglected (Grisot, 2008; Hanseth et al., 2004). Technology is not taken-for-granted

or viewed as a mere tool, rather it is viewed as an actor in a network that participates actively in redefining and transforming the medical practice. Several STS researchers argue for the need to unpack the EMR system in order to better understand its effects on practices. Jensen (2004b), for example, illustrates how the definitions of EMR (including the expectations and visions) vary inevitably depending on the different groups, and he further explains how these can sometimes oppose each other, resonate or overlap with one another, but they are rarely identical. Similarly, Winthereik (2004) looks into the multiple parts that constitutes the EMR and highlights the fact that it is not only a documentation tool, but also a tool for information sharing, categorizing, communication and accountability. Furthermore, it is not only the EMR that has been unpacked in STS studies, but the very notion of information, which Moser and Law (2006) define as something that not only flows but is also fluid, and changes its form and character in unpredictable ways.

The importance of material artefacts for articulation work has been emphasized by CSCW scholars. This has also been a key concern in ANT which already in its initial formulation strove to move away from the exclusive focus on the social and look at the way in which the social and the material/technical are simultaneously co-constructing and co-shaping each other. However, ANT offers a very different view on the technological artefacts as these become activated as non-human actors that have the ability to produce effects on the world, transform our actions, and redefine our understanding (Latour, 2005). For instance, in their study of the implementation of a medication module, Markussen and Olesen (2007) distinguish between the medication list as an instruction and as an instrument, and argue that the lists "do not *re*present the doctor's thoughts and plans but have an active role in transforming them" (p. 273). Thus, material artefacts are not simply mere tools that enable, support or constrain coordination; rather, they participate actively in transforming and redefining doctors' thoughts and actions. In other words, the artefacts do not passively *mirror* or re-present doctors' thoughts; rather, through the process of re-presenting doctors' thoughts, they change and *transform* them. As Markussen and Olesen (2007) explain,

> the written materials act, among other things, as memory aids and instruments *in situ* for the nurses. The various sheets of paper operate as material semiotic actors[53]…and their locations on the wall in the medicine room or in the bottom of the medicine tray are not accidental. The arrangement of space as well as material semiotic arrangements participated in forming a network that made medication possible. (p. 274)

[53] This concept has been developed by Haraway (1991) who views both humans and non-humans as material-semiotic actors. Accordingly, we are hybrids of materiality and semiotic (language, meaning) construction. Thereby, we—humans—are not the only actors in the production, and the construction of social reality and knowledge are effects achieved between humans and non-humans.

As can be seen from the quote above, drawing upon ANT does not only activate material artefacts, but it also distributes the source of action. Thus, the act of giving medication for example, is enabled through the interactions—the connection—between the health care practitioners, and the material semiotic actors and arrangements. A similar illustration of how artefacts participate in transforming the way we act in the world can be found in the work of Mol (2002), where she shows how a diagnosis is produced and enacted in multiple locations (e.g., the clinic, the pathology laboratory, radiology department, the duplex, operating theatre, etc.), using different practices and methods of assemblage (different sets of devices, skills and people: i.e. x-rays, ultrasound).[54]

A recurrent theme in the STS literature is the move away from viewing the EMR as a tool that will replace paper charts or improve medical practice, toward viewing it as an actor that has the potential to radically transform the medical profession (Aderibigbe, Brooks, & McGrath, 2007; Berg, 2001; Hanseth & Monteiro, 1998; May et al., 2001; Stanberry, 2000; Winthereik, 2004). Several scholars argue that the EMR will impact the medical profession by, for instance, bringing new roles and responsibilities and consequently changing practitioner roles and interpersonal relationships among health care practitioners (Jensen & Winthereik, 2002). Tjora (2000), for example, illustrates how the implementation of the new technology gave the nurses an opportunity to exercise increased autonomy in decision-making processes.

Some studies advise viewing the EMR as part of complex and interconnected networks that are characterized by stability; institutionalisation and irreversibility (Ellingsen & Monteiro, 2003b). Other studies view the implementation of EMRs as a production of distributed and broad visions (Vikkelsø, 2005), or even as a battle among systems, vendors, and public institutions (Berg, 2001; Vikkelsø, 2005). Particular attention has been paid to the different ways in which EMRs are enacted and performed differently by different actors (e.g., the media and politicians, administrators, IT firms, etc., each performing different versions of the EMR) (Markussen & Olesen, 2007). Jensen and Aanestad (2007b) move beyond enactment and performance, and draw upon sensemaking theory in order to look at how health care practitioners make sense of the introduction of an EMR.

As mentioned above, CSCW and IS researchers tend to emphasize the importance of tailoring the EMR to fit the users' needs and the existing medical work. STS scholars[55] reject this view as it employs a distinction between technology and organization and refers to the 'fit' between the two as the formula of a successful implementation of

[54] I will come back to Mol's (2002) work and clarify her argument in section 3.3.1.6.1.

[55] It should be acknowledged that not all CSCW scholars fully adopt this distinction, since as mentioned earlier, the field includes scholars from various disciplines who draw upon different approaches. Examples of such exceptions are the work of Lucy Suchman, Susan Leigh Star, Geoff Bowker and Marc Berg.

technology (Vikkelsø, 2005). Instead, they adopt the view according to which technology and organization are interconnected entities that transform one another in unpredictable ways, and they argue that it can therefore be problematic, or perhaps misleading to separate these and argue that either technical or organizational factors lead to success or failure (Berg, 2001; Berg, 1999c). It is important to note that Orlikwski's recent work about 'sociomateriality' of what she calls the 'entanglement in practice' perspective focuses precisely on challenging the separation of technology and organization (Orlikowski, 2007; 2008; 2010).

While some of the literature in the IS field focuses on developing best practice models and identifying factors for successful technology implementations, STS scholars argue that it can be problematic to follow a normative evaluation and that organizational impact cannot be simply measured by standardized factors (i.e. efficiency, cost) or by describing improvements of work tasks (Berg et al., 2003). This is due to the fact that such simplistic views fail to reflect the contested and ambiguous nature of such technology, which implies that it brings along the emergence of new effects (Berg, 2001; Berg, 1999c), which makes it harder to depict the overall effects of the technology or single out factors for success or failure.

In my analysis of the empirical case presented in Chapter 4, I will draw upon a sociotechnical approach[56] (Law & Hassard, 1999) whereby technology and health care practitioners affect each other and transform one another. Accordingly, the EMR becomes more than just a tool; it is acting on—and gradually transforming—medical practices. I will illustrate how the EMR was not simply taken off the shelf automatically replacing paper-charts, but rather participated in changing management and division of labour, and altered the workflow of trajectories and performance of activities. More importantly, I hope to illustrate how the EMR is creating new practices and is gradually transforming the medical profession. The above distinctions among the fields (CSCW/IS and STS) and in the way in which they study IT in healthcare also have methodological implications which will be discussed in the next section, that considers the research approaches which follow from each of these theoretical perspectives.

2.4 Action Research

This section introduces the literature I have assembled about action research and it is divided into three components. The first part (section 2.4.1) outlines what I have labeled here as traditional action research. This refers to action research as portrayed and perceived in its classic sense. Action research is now widely practiced in many different

[56] Greater discussion about the sociotechnical approach will be provided in section 4.5.1.

fields and disciplines (e.g., education, healthcare and medicine, organization and business, psychology) (Reason & Bradbury, 2006a) and there are different types of action research within IT related disciplines (e.g., IS, participatory design or STS). However, the history and origins of action research are common to other disciplines (Baskerville & Wood-Harper, 1998). Thereby, the section about traditional action research can be seen, to some degree, as a general umbrella constituting the historical ideological foundations under which one can find different types of action research practiced in various fields. An example of one of those types will be given in section 2.4.2 which will provide a review of how action research is portrayed and practiced within the IS field.

Finally, the last section of this chapter 2.4.3 will characterize how action-oriented research[57] is perceived and practiced within the STS field. I have chosen to delineate action research within IS and STS because they are both IT related disciplines and my empirical research (about EMRs) is situated within IT research. Furthermore, I chose to include action research literature from the IS field because my own empirical research started initially as an IS action research project. In other words, since the IS field is my background, this is the type of action research I was first introduced to in the literature. The methodological concerns and issues I will discuss in the parts of the dissertation that focus on action research were shaped and inspired by STS literature which takes a more critical epistemological stance toward action research. While providing an overview of some critical issues that are commonly discussed in the literature, I will focus primarily on the methodological challenges that are faced when conducting action research.

2.4.1 Traditional Action Research

I begin this section by unpacking and problematizing the definition of action research and showing how action research is a contested term as it has come to mean different things to different scholars. In an attempt to clarify the definition, I trace the roots of action research (in section 2.4.1.2) to better understand its contribution and identify the fundamental characteristics that distinguish action research approaches from

[57] I use the term action-oriented research to refer to research conducted within the STS field as scholars within STS are reluctant to using the term action research. It is my impression that this is an intentional choice based upon several reasons. One of the reasons is to avoid associations with traditional action research which, in contrast to STS, is based on a different ideology/purpose (e.g., community development, social justice and human rights activism) and more importantly, it is deliberately aimed at improving practices. In the next sub-sections I will explain in greater detail what characterizes and differentiates action research in the two disciplines, however, another potential reason for avoiding the use of the term action research is that STS scholars are skeptical about the pre-defined rigid criteria that are often associated with action research (in particularly those found within the IS field). Therefore, within the STS literature we find various terms, for instance the above mentioned action-oriented research, interventionist research, action-STS-research, etc.

other forms of research (section 2.4.1.3). Finally, I will delineate briefly some of the critiques that have been directed toward action research, especially in relation to issues of quality and validity.

2.4.1.1 Unpacking the Definition of Action Research

There are many different approaches to action research, but the fundamental characteristic is that the researcher is directly involved in the field and actively engaged in a process of change through collaboration with practitioners[58] (Walsham, 2006). Accordingly, action research has a dual agenda of combining both theoretical contributions to researchers and practical contributions for practitioners (Baskerville & Myers, 2004a; Davison, Martinsons, & Kock, 2004; Rapoport, 1970; Walsham, 2006). This dual agenda is echoed in Rapoport's (1970) classic definition of action research, according to which this "research aims to contribute *both* to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework" (p. 499). A mutually acceptable ethical framework refers to finding an area where the interests of the researcher and the practitioners overlap (Rapoport, 1970, p. 504).

Another recent and more comprehensive definition is provided by Waterman, Tilen, Dickson and de Koning (2001) who conducted a systematic literature review of action research and state that "action research is a period of inquiry, which describes, interprets and explains social situations while executing a change intervention aimed at improvement and involvement. It is problem focused, context-specific and future-oriented" (p. 11). Reason and Bradbury (2006a), the editors of the *Handbook of Action Research*, offer a somewhat more general definition emphasizing the commitment to community development and participatory aspects of action research, and explain that "it seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities" (p. 1).

In spite of the many definitions available, action research is a contested term as it has been applied to diverse research approaches used in a variety of fields and settings. While some scholars state that *all* participative research is action research (Reason & Bradbury, 2006a, p. 2), others are slightly more specific and claim that "*action research*

[58] The terms practitioners, collaborative partners and participants are used interchangeably across the literature from a wide range of disciplines. While I acknowledge that not all participants are necessary practitioners, for the purpose of this dissertation I use the terms participants and practitioners interchangeably to refer the group of people that the researcher collaborates with.

[is] perhaps best encompassing most of the approaches, with *participatory research* overlapping to include the rest" (Kemmis & McTaggert, 2003, p. 336).

There are, however, many terms available to describe collaborative and action-oriented approaches, and these are used interchangeably both across different disciplinary fields and within the community of action researchers.[59] For instance, Kemmis and McTaggart (2003) use the term 'collaborative action research' to underscore the interdependent relationship between researchers and practitioners, and 'participatory action research' to emphasize the practical-theoretical junction between the researcher's work and the activities of practitioners engaged in 'participatory research.' While acknowledging and accepting Kemmis and McTaggart's (2003) distinction, for the purpose of this dissertation, I have chosen to black-box these various terms and use 'action research' in a broad sense to refer to a large family of varied approaches of inquiry which are collaborative, grounded in experience and action-oriented (Reason & Bradbury, 2001, p. xxiv).

By using the term 'action research' in a broad sense, I follow Reason and Bradbury (2006b) who do not regard action research as a methodology but rather as a framework for inquiry, meaning an "*orientation of* inquiry that seeks to create a quality of engagement, of curiosity, of question-posing through gathering evidence and testing practices" (p. xxi). Accordingly, action research can be viewed as a particular way of existing and participating in the world; it is "as a way of being and doing in the world" (Reason & Bradbury, 2006b, p. xxviii). This view acknowledges that different action research 'schools' ascribe "specific sets of practices which emerge in the interplay between action, researchers, context and ideas" (Reason & Bradbury, 2006b, p. xxviii). The quotes above seem to place a great emphasis on the researcher(s) and show no concern toward collaboration or participation, which are critical issues that I will address in greater detail in Chapter 6.

The various practices of action research are informed by a wide range of paradigms and there is a significant overlap especially between action research and critical theory, where they share a mandate for social justice and for "seek[ing] to empower research subjects to influence decision making for their own aspirations" (Reason & Bradbury, 2006b, p. xxiv). Action research is now widely practiced within a broad range of disciplines (e.g., community development, education, healthcare and medicine, social work, organization and business, etc.). The diversity in action research is

[59] This includes, for example, the term 'co-operative research' (Heron & Reason, 2001), 'collaborative action research' and 'participatory action research' (Kemmis & McTaggert, 2003), 'interventionist research' (Mesman, 2007; Zuiderent, 2002; Zuiderent-Jerak, 2007), 'action-oriented research' or 'action-oriented STS research' (Jensen, 2007a; Punch, 1994; Strand, 2006; Zuiderent-Jerak & Jensen, 2007), 'applied and action research' (Denzin & Lincoln, 1994b), etc.

reflected not only in the wide range of disciplines and paradigms that inform the research practices, but also in the various methods that can be used (e.g., interviews, observations, focus groups). Furthermore, there are very different orientations within action research where researchers may adopt different theoretical perspectives. This theoretical and methodological diversity is not only welcomed but also celebrated (by e.g., Reason & Bradbury, 2006b) as it opens up to a variety of choices for the conduct of inquiry. This certainly means that "there can never be one 'right way' of doing action research" (Reason & Bradbury, 2006b, p. xxiii). Therefore, different sets of practices may emerge in the interplay between the researcher and the field site.

Recapping the above, the contested term 'action research' is not easily defined as it has been used by so many researchers in so many different ways that it has lost some of its original meaning (Reason & Bradbury, 2001). For some, action research is rooted in practices of organizational improvement, for others it aims to restore power imbalances and social justice for ordinary people, while for others it aims to create change and influence policy decisions (Reason & Bradbury, 2006b). I will elaborate further on the different meanings of action research as I briefly trace its historical roots.

2.4.1.2 Tracing the Roots of Action Research

This section is not intended to provide a complete account of the history of action research, but rather only attempts to trace briefly some of its origins.[60] Providing one coherent history of action research is, in fact, impossible, as it has tremendously diverse origins. Although there is not a single thinker who can easily be identified as the source of action research, credit for the initial idea of using science to address practical social problems is often given to John Dewey, one of the most influential American philosophers (Greenwood & Levin, 1998; Hart & Bond, 1995a) and author of the work on reflective thinking, *How We Think* (1933). Dewey called for the need to democratize education and make it a more collaborative process in which students could formulate hypotheses and test them in practice. He thereby, "urged educators to teach students how to think, rather than teaching facts" (Pasmore, 2006, p. 38).

Dewey did not use the term 'action research.' Rather, it was Kurt Lewin who coined the term with his social experiments in the 1940s where he used different methods to influence the behavior of individuals (Baskerville & Wood-Harper, 1998). Lewin strongly believed that action research could be used as a tool for learning and change (Wadsworth, 2006), meaning "a tool that could advance science while dealing with

[60] For detailed account of the history of action research, see Baskerville and Wood-Harper (1998), Greenwood and Levin (1998, pp. 15-31), Hart and Bond (1995a), Kemmis and McTaggert (2003), Pasmore (2006), and Reason and Bradbury (2006a).

practical societal concerns" (Pasmore, 2006, p.39). He conducted various experiments and showed how the behavior of an individual is influenced not only by personality, but also by its surrounding environment (Lewin, 1947). Lewin's experiments challenged Freudian psychology—the dominant paradigm at that time—which claimed that behaviors could be explained by deep-rooted aspects of the personality. He demonstrated, for instance, how changing aspects of the workplace produces behavioral changes and how different participative and democratic methods can be used for reducing resistance for change, enhancing productivity, etc.

In addition to Lewin's contribution, action research has also been influenced by the work of members of the Tavistock institute in London on behavioral sciences (Baskerville & Wood-Harper, 1998). Eric Trist from the Tavistock institute met Lewin during his exodus from Germany to the USA in 1933, and he was so fascinated by Lewin's ideas about action research that he adopted it as a core methodology in his work (Pasmore, 2006). Trist joined the army and together with members of the Tavistock Institute began treating mental casualties by integrating Lewin's collaborative approach to behavioral change in group therapies. Subsequently, researchers, therapists, and consultants began collaborating and using action research to develop techniques for assisting war-damaged soldiers from World War II to return to civil life (Mumford, 2006).

To sum up, both Lewin's action research school and the Tavistock's sociotechnical systems thinking were committed to developing methods and theories that could address practical societal problems. Both draw on the principle that change begins with the participation of those directly affected by it, and both viewed involvement in decision-making as a means to promote/enable democracy and organizational change.

The origins of action research can also be traced to critiques of the dominant view and orthodoxy of traditional social research which is concerned with offering so-called valid and reliable interpretations and findings. Such accounts are implicit in the positivist paradigm (Reason & Bradbury, 2006a), which as will be mentioned in section 3.2, locates researchers as detached, taking a stance which is believed to be objective with the aim of generating 'credible' knowledge (Guba & Lincoln, 1994) that is supposedly 'out there' in the 'real world.' The subject that is studied, 'the Other,' is "alien, foreign, and strange" (Denzin & Lincoln, 1994a, p. 7). This paradigm has been viewed by some thinkers as reaching the end of its usefulness[61] (Reason & Bradbury, 2006a). Hence, action research emerged as a response to traditional social research and it deliberately

[61] This will be explained throughout this chapter (especially in section 2.4.1.4) as I reflect upon some of the critiques that have been directed toward the ideals of positivism (e.g., questioning notions of objectivity, validity, etc.)

involves the subject being studied as collaborative participants in the research (Susman & Evered, 1978). The main goal is to explore the constructions of the participants' knowledge, interpretations, and experiences (Mason, 2002a), and to find out how these can be changed by social interventions.[62] It has been said that in spite of the claim of social science to value neutrality, its orthodoxy usually serves the political interests of those already in power (Kemmis & McTaggert, 2003).

Other action research roots can be found in neo-Marxist approaches to community development and human rights activism, with the underlying belief that it is *important not only to understand the world, but also to change it* (Reason & Bradbury, 2006a). Thus, action research offers an alternative philosophy to social research, gathering "academics committed to integrating university responsibilities with community work" (Kemmis & McTaggert, 2003, p. 338) and to undertaking participatory research as part of their engagement in politics of resistance using research as a tool for change (Borda, 2006). A local example of the philosophy of 'mobilizing academic resources for social justice and community action' is the Action Research eXchange (ARX) network. With its slogan 'get your research off the hill' (meaning off the Simon Fraser University campus on Burnaby mountain), the ARX network facilitates research exchange between students and non-profit community organizations.[63] The history of participatory and action research can help us not only appreciate the contribution of this approach, but also better understand the features that distinguish it from other methodologies. I will now discribe the key characteristics of action research.

2.4.1.3 Key Characteristics of Action Research

As can be seen from the brief history provided above, action research has fundamental criteria distinguishing it from other traditional research approaches. Accordingly, it can be viewed

> as a practice for the systematic development of knowing and knowledge, but based in a rather different form from traditional academic research—it has different *purposes*, is based in different *relationships*, and has different *ways of conceiving knowledge* and its *relation to practice* [emphasis added]. These are fundamental differences in our understanding of the nature of inquiry, not simply methodological niceties. (Reason & Bradbury, 2006a, p. 1)

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[62] It should be noted that this approach has been criticized, among others things, for being non-objective, and the validity and reliability of the research outcomes have been questioned. I will elaborate further on the critiques in section 2.4.1.4.

[63] ARX is a program organized through Simon Fraser Public Interest Research Group (SFPIRG) that aims to bridge the gap between academic research and community. For more information, consult: http://sfpirg.ca/arx/main/info.php.

I will now elaborate on each of the criteria emphasized (italicized) above: 1) purpose, 2) collaborative/participative relationship, 3) extended epistemology and 4) cyclic relation between theory and practice. These criteria support the definition of action research which I adopt in this dissertation.

2.4.1.3.1 Purpose

A primary purpose of action research is to respond to local and practical concerns and to produce practical knowledge useful to people in organizations and communities (Reason & Bradbury, 2006b; Reason & Bradbury, 2006a). As mentioned in the previous section (2.4.1.2), with its roots in community development and human rights activism, action research emerged as forms of resistance to traditional research practices (Brydon-Miller, Greenwood, & Maguire, 2003; Kemmis & McTaggert, 2003, p. 345) which are often perceived as disconnected from local and actual concerns and interests of the people who are being studied and which constitutes mere abstract theoretical descriptions, lacking practical interventions for change (Heron & Reason, 2001).

The action researcher can, therefore, be seen as an active agent, someone who is actively involved in the field and explicitly engaged in a change process aimed at improvement (Walsham, 2006; Waterman, Tilen, Dickson, & de Koning, 2001). Thus, in contrast to traditional research, the action researcher is seen as someone who has a greater degree of participation and influence, and direct impact on the field. Action research is distinguished from traditional academic research not only by its purpose, but also by the relationship upon which the research is based.

2.4.1.3.2 Collaborative and Participative Relationship

Action research is founded on collaborative and participatory research (Greenwood & Levin, 1998, pp. 7-8; Walsham, 2006) in which the degree of involvement of practitioners (or the research subject) varies (Waterman et al., 2001, p. 12), ranging from consultation with practitioners to collaborating closely on all stages of the project (Olesen, 1994; Peters & Robinson, 1984). Accordingly, the research focus is typically defined through a dialogue between the researcher and the practitioners, leading to suggestions of possible interventions (Holter & Schwartz-Barcott, 1993). Hence, in contrast to traditional research where the researcher is solely responsible for determining research design, action research invites practitioners into the research process (Marshall & Rossman, 2006, p. 166). Consequently, the distinction between the researcher and the practitioners may become fairly blurred in the course of a lengthy and collaborative

relationship, where in many cases practitioners may become (partial) co-researchers (Peters & Robinson, 1984; Reason & Bradbury, 2006b).[64]

As can be seen from the above, action research is grounded in a participatory framework and researchers share resistance to some conventional views about, for example, the notion of who can be a researcher (Kemmis & McTaggert, 2003; Reason & Bradbury, 2006a). It has, therefore, been argued that good action research should be conducted *with* people rather than *on* people (Heron & Reason, 2001, p. 179; Reason & Bradbury, 2006b, p. xxv).

2.4.1.3.3 Extended Epistemology

While different schools of thought within action research differ widely in terms of the phenomena they study and the methods they employ, they share a common epistemological starting point (Kemmis & McTaggert, 2003) where they privilege investigating the nature of reality and practices through *doing/acting* over *thinking* (Reason & Bradbury, 2006a; Reason & Bradbury, 2006b). Thereby, action research challenges the view of science which privileges "knowing through *thinking* over knowing through *doing*" and "emphasize[s] the social nature of all experience and action over insight per se" (Reason & Bradbury, 2006b, p. xxv).

Thus, action research bypasses the traditional differentiation between the knower and what is known, with the purpose "to expand the hold over knowledge held traditionally by university and other institutes of 'higher learning'" (Reason & Bradbury, 2006b, p. xxiii). This has been referred to as 'extended epistemology,' meaning "a theory of how we know, which is extended because it reaches beyond the primarily theoretical, propositional knowledge of academia" (Heron & Reason, 2001, p. 183). Propositional knowledge refers to "knowing 'about' something…through ideas and theories, expressed in informative statements" (Heron & Reason, 2001, p. 183). There are multiple and diverse epistemologies, ways of knowing, identified by different action researchers;[65] nevertheless, "they all go beyond orthodox empirical and rational Western views of knowing and assert…a multiplicity of ways of knowing that start from a relationship between self and other, through participation and intuition" (Reason & Bradbury, 2006a, pp. 9-10).

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[64] It should be noted that there are different forms of participatory inquiry in action research, and the initiating researchers may, for instance, be insiders or outsiders to the particular culture or practice that the research focuses on. For more information see Heron and Reason (2001).

[65] For more information about other ways of knowing (beside propositional knowledge) present in participatory inquiry, consult Heron & Reason (2001, p. 183), Reason & Bradbury (2001, p. xxii; 2006a, pp. 9-10).

This approach has been described as allowing "society to speak back to science" (Coopmans, Neyland, & Woolgar, 2004) and has been expected to contribute to community development and empowerment through collaboration with participants and generation of knowledge that speaks to the needs of communities (Greenwood & Levin, 2000; Reason & Bradbury, 2006a). It has, therefore, been said that knowledge in action research is a verb not a noun, meaning that "such knowing is not a thing to be discovered or created and stored up in journals" (Reason & Bradbury, 2006a, p. 9), instead it occurs in the process of living and coming to know rooted in the everyday experience of ordinary people. With its extended epistemology, action research has a different relation to practice, in that it concerns actual, concrete and particular practices of specific people in specific places (Kemmis & McTaggert, 2003).

2.4.1.3.4 Cyclic Relation between Theory and Practice

With its concrete focus on practices, action research helps practitioners understand and reflect on their own practices in order to explore possibilities to improve or change them. Thereby, "action research is a learning process, the fruits of which are the real and material changes" (Kemmis & McTaggert, 2003, p. 383). Kemmis et al. (2003) argue that action research not only investigates reality in order to transform it, but it also transforms reality in order to investigate it. They further explain that the aim of action research is not to develop theory that can stand above or beyond practice, but rather to develop theory that is grounded in the particularities of the specific situations that confront practitioners. This is done by helping practitioners find ways to change their practices through cycles of action and reflection that are intended to help them learn more about their practices and the social structures that shape their practice (Kemmis & McTaggert, 2003, p. 386).

Action research has a cyclic relation between theory and practice, reflection and action. Various scholars have different versions of what stages the cycles should include (e.g., Heron & Reason, 2001) and whether these should take the form of a cycle or a spiral with each iteration and intervention moving closer to the core problem (Kemmis & McTaggert, 2003). Nevertheless, the underlying idea is to identify a problematic situation, plan the researcher's activities, and conduct and evaluate the activities (Kemmis & McTaggert, 1990, p. 8; Waterman et al., 2001, p. 11). While most action researchers emphasize the importance of following almost strictly and rigidly these cycles, Kemmis and McTaggert (2003) are among the few who admit that the different stages overlap and "in reality, the process is likely to be more fluid, open, and responsive" (p. 381).

As can be seen from the above, the characteristics of action research imply a 'call to action' in research practice which, according to Reason and Bradbury (2006a, p. 2) accepts and moves beyond the 'linguistic turn'[66] that focused on the way knowledge is socially constructed, and asks us to think about how we can *act* in intellectual and informed ways in a socially constructed world. In section 1.1.3, I will describe further the 'action turn' (also called the 'participatory turn'[67]), but for the moment it should be noted that some action researchers criticize poststructuralist perspectives for their overemphasis on text, discourse and narrative, and for undermining the relationship that language has to knowledge in action (Reason & Bradbury, 2006a, pp. 6-7).

I have thus far delineated the characteristics of traditional action research. These characteristics apply also to action research conducted within the IS field, with some differences. Before I explain these differences, I will now outline some of the critiques that have been directed toward traditional action research, with a particular focus on issues of quality and validity.

2.4.1.4 Quality and Validity of Action Research

Action research has faced various critiques, one of which comes from positivists and postpositivists who argue that action researchers violate validity criteria by refusing to follow the 'objective' ways of doing research (Reason & Bradbury, 2006b). This critique has often been echoed by claims about its insufficient scientific rigor, and "confusing social activism and community development with research" (Kemmis & McTaggert, 2003, p. 338). As mentioned previously, action research has a dual goal of improving practice and contributing to theory; however, this is a hard goal to achieve (Davison et al., 2004, p. 67); and not surprisingly, one of the critiques that has been directed toward action research is precisely the lack of ability to combine theory with practice (Avison, 1993; Gustavsen, 2003). Action researchers have responded to these critiques in different ways, explaining for instance, that objective knowledge is impossible in action research since the researcher is always already part of the world she is studying (Reason & Bradbury, 2006a). Thus, the process of producing knowledge is never neutral, but is rather a political process serving specific purposes. The subsequent section will elaborate further on some of the responses to action research critiques.

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[66] The linguistic turn is part of the postmodernist and poststructuralist paradigm which collapses the Kantian distinction between the world itself and our interpreted experience of the world, and states that there is no world 'out there,' only 'in here' (Reason & Bradbury, 2006a, p. 5).

[67] This term has been used in a recent workshop announcement "STS Engaged-Expertise, Audience & the Participatory Turn" (March 9-10, 2007, held at the University of Virginia, USA).

With the 'turn to action' which offers new ways to understand the relationship between theory and practice, action research contributes to the movement away from a modern positivist worldview toward postmodern sensibilities. Thus, it raises methodological and epistemological questions about what constitutes good knowledge, research and practice within social sciences. With the loss of legitimacy brought about by the postmodern era the whole idea of having standardized validity criteria has been questioned (Susman & Evered, 1978). In fact, the *validity* of the very *question* of validity has been problematized and several scholars have proposed that we say farewell to validity altogether (Bradbury & Reason, 2006, p. 343). In other words, the idea of fitting the merits of action research into a conventional discourse about validity which is bound to positivist ideals has been questioned.

Several action researchers have called for the need for new criteria for assessing and judging participatory and action oriented research. Different scholars outline different ways to replace traditional validity criteria and their normative discourse which is concerned with searching for 'The Truth' with validity criteria that would be better adapted to the participatory paradigm (Bradbury & Reason, 2006; Heron & Reason, 2001; Lincoln & Guba, 2003; Reason & Bradbury, 2006b). One of these evaluation criteria refers to the quality of the relationship between the researcher and the practitioners, and within the group of practitioners themselves. This has been referred to as *authentic participation/engagement* which is thought to ensure monitoring that each practitioner is fully and truly engaged in each stage and seeks to avoid having some people dominate the group (Heron & Reason, 2001, p. 185). I will come back to this point in section 6.4 where I will question the idea of the researcher ensuring so-called 'authentic participation' of each practitioner in the research project.

Another quality criterion is ensuring a *concrete and practical outcome* of the action researcher's work. That is, asking pragmatic questions about emergence and enduring consequences and outcomes of the research is viewed as important (Reason & Bradbury, 2006a). Such questions could, for instance, be about the significance of the research and the value of the outcomes. Moreover, explicit attention has been paid to ensuring that knowledge is grounded in experience; thus researchers have been advised to repeat the *action-reflection cycles* (mentioned in section 2.4.1.3) (Heron & Reason, 2001).

Mentioned above are some of the evaluation criteria and questions action researchers raise with regard to the need for 'broadening the bandwidth' of validity concerns (Bradbury & Reason, 2006). They explain that their intention is not to provide a new set of firm criteria for validity, but rather to raise issues of importance for action researchers engaged in collaborative projects. I have described some of the critiques that have been directed toward traditional action research (most of which applies also to action research practices within the IS field) and I will raise my own concerns in section

6.4. I will now present IS action research which—although it originates from the traditional action research presented above—has changed and gained its own disciplinary identity.

2.4.2 IS Action Research

During the 1970s, the IS field began to discover and apply action research (Baskerville & Wood-Harper, 1998). There are many streams and forms of IS action research,[68] but they all share certain characteristics. Similar to traditional action research, IS action research focuses on real-life practical problem situations (Checkland & Holwell, 1998; McKay & Marshall, 2001), and it is based on "deliberate interventions aiming to facilitate a desirable change" (Strand, 2006, p. 424).[69] While change in traditional action research is often based on ideological values (e.g., pursuing social justice and human rights activism), change in IS action research often comes in the form of sociotechnical improvement of organizations. This refers to developing generalized best practice guidelines and models, and identifying factors for successful technology implementations (Strand, 2006).

2.4.2.1 Researcher's Roles and Interventions

There are multiple types of IS action research and this reflects a variety of perspectives on research approaches including diverse conceptualizations, roles, interventions, and practices. For example, in dialogical action research, the researcher is a reflective partner supporting the practitioners in their actions through dialogues (Mårtensson & Lee, 2004), while in collaborative practical research, the researcher intervenes directly in practice, diagnosing problems and suggesting design solutions (Mathiassen, 2002). The researcher's interventions can be understood as a continuum between performing concrete activities within practice (Checkland & Holwell, 1998) or performing indirect and subtle activities (Avison, Baskerville, & Myers, 2001; Mårtensson & Lee, 2004). In sum, researcher interventions may take various forms, and may even include co-authoring academic papers with practitioners (e.g., Balka & Whitehouse, 2007; Markussen & Olesen, 2007). In general, however, "research on IS is often located in management and business schools or computing departments and aims to provide a set of generalized recommendations for improving IT management practice"

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[68] It is not my intention to provide comprehensive review of all forms of IS action research. For more information, consult Baskerville & Wood-Harper (1998), Baskerville & Wood-Harper (1996), Lau (1997) and Mumford (2001).

[69] The idea of using research in order to change or improve practices is also found within other IT-related discipline, for example, Scandinavian traditions of participatory design (PD) (Strand, 2006).

(Strand, 2006, p. 424). Therefore, while the researcher in traditional action research advocates for giving voice and/or empowering the participants (the subjects), the IS action researcher adopts a stance similar to that of a 'change catalyst' (Chiasson & Dexter, 2001), a 'consultant' (Mumford, 2001), or even an 'IT expert' who conducts normative evaluations and provides recommendations or solutions for an organization.

Action research allows greater involvement and access to the field (Walsham, 2006) and insider knowledge (Forsythe, 1999) about competencies and practices. In other words, "the researcher in action research may become a trusted insider and be provided with access seldom possible in more traditional observer roles" (Marshall & Rossman, 2006, p. 165). However, being 'an insider' may also complicate the relationship with practitioners, and questioning their assumptions or critiquing their practices might be viewed as offending or creating political difficulties (Forsythe, 1999, p. 142). Thus, fostering a close collaboration with a community partner comes at the cost of greater dependency (Guggenheim, 2004), which raises various questions related to who will determine the research design (e.g., who will decide which questions will be asked, how data will be collected) and how the findings will be presented (e.g., how much information to disclose in the final report to the research partners) (Janesick, 2000, p. 385; Lincoln & Guba, 2003, p. 269). It has, therefore, been said that it is important to have clear expectations about the researcher's role, to avoid situations that might lead to clashing objectives.

2.4.2.2 Joint Venture Based on a Shared Mutual Framework

As mentioned previously (in section 2.4.1), action research is a joint venture in that it is based on a mutually acceptable ethical framework of interest shared by the researchers and the practitioners (Rapoport, 1970). Similar to traditional action research, IS action research emphasizes the importance of having a dual agenda that combines practical problem solving and expanding scientific knowledge (Baskerville & Myers, 2004a; Davison et al., 2004; McKay & Marshall, 2001). However, IS researchers admit that defining a shared framework is not a simple task, especially in cases where the areas of interest change during the research project (Avison et al., 2001; Davison et al., 2004). Rapoport (1970) asserts that initial agreements and decisions might evolve along with the project and shift from the initial formulation of the problem definition, and this may require reinterpretations and persuasion of the practitioners. He further explains that

> if the researcher allowed the definition of the problem and associated initiatives to rest too exclusively with the client, he might be slighting both the practical and scientific goals of the exercise. On the other hand, if he were too brusque or unskilled in pressing his own perception, he might jeopardize the exercise because of resistance that may be expected in the face of new definitions of many human predicaments. (Rapoport, 1970, p. 509)

Rapoport (1970) refers to his own experience of conducting action research in a psychiatric hospital in the 1950s and warns that a lack of attention to defensive reaction can lead to a 'rejection phenomenon' of either the researcher or the participants. A rejection phenomenon may reflect, for example, a critique of methodology or other forms of inference, and may result in change of participants. Therefore, Rapoport (1970) explains that it is important to explicitly be aware of these defensive reactions as they can be very powerful and significant. I take Rapoport's warning seriously and will illustrate later how I not only documented fieldwork troubles (e.g., defensive reactions), but also tried to turn them into something more constructive, using them as sources for knowledge production—as features that can add to the understanding of the research object (Finken, 2005). In contrast to Rapoport, however, I would not relate so easily problems in the field (or rejection phenomena) to the view of the researcher as 'unskilled.' I do not find this link plausible because even a skilled fieldworker might face such problems in the field.

As noted above, the areas of interest often shift during the course of the research project and, for example, organizational constraints may hinder the research progress (Davison et al., 2004) or even prevent completion of a project. It has, therefore, been acknowledged that it is "generally impossible to draw up definitive plans for intervention. Instead, the intervention technique must be acceptable to the infinite variety of circumstances" (Davison et al., 2004, p. 68). Subsequently, an important aspect of IS action research is to identify areas of overlap and to consciously and continually revise the shared framework (Avison et al., 2001; Davison et al., 2004; Rapoport, 1970). In addition, the importance of following a cyclic process for planning and evaluation of the researcher's interventions has been repeatedly emphasized by IS researchers (Baskerville & Wood-Harper, 1996; Davison et al., 2004; Mumford, 2001; Waterman et al., 2001). Various scholars have different versions of what stages the iterative cycles should include (Davison et al., 2004); nevertheless, these are viewed as important for setting clear objectives and identifying solutions (Mumford, 2001), as well as grounding theory in practical empirical observations (Baskerville & Wood-Harper, 1996).

2.4.2.3 Established Criteria and Norms within IS Action Research

Much of the literature about action research within the IS field constitutes various types of standardized, 'fixed' and fairly static criteria researchers are encouraged to submit to. For instance, in an attempt to provide methodological guidance for conducting action research, Davison et al., (2004) generate a set of five practical and measurable principles followed by 31 criteria to assure the rigor (strict precision and exactness) and relevance of IS action research. These principles include the importance of having a mutual agreement about the project's objectives; the importance of applying a cyclic model of planning (problem), interventions (action) and reflection (with an emphasis on justifying any deviation from the initial plan); and the importance of having a theory, and

the principle of learning through reflection where the researcher and the practitioners are expected to reflect upon the outcomes of the research project. Similarly, Baskerville and Wood-Harper (1996) outline a list of recommendations about the different criteria or norms the IS action researcher *should* or *must* follow. These recommendations include "establishment of a formal research agreement" (p. 242), defining a "provision of a theoretical problem statement," "maintaining collaboration and subject learning," "promoting iteration" (p. 243), "restraining from generalization" (p. 244), etc.

While many of these criteria may be essential, I believe that in an attempt to respond to the critiques of action research (outlined in section 2.4.1.4), IS scholars (Baskerville & Wood-Harper, 1996; Davison et al., 2004) go too far in explicating principles and criteria, resembling religion rather than articulating the complexities in such endeavors. Furthermore, with such static criteria and norms, little is known about what to do in practice in situations where there is a deviation from the norm or when the criteria cannot be fulfilled. For example, what should the researcher do when she is unable to go through the last phase of the cyclic model where she is expected to reflect together with the community partner upon the outcomes of the research? Justifying deviation from the initial plan (Davison et al., 2004) is indeed important, however, it neither provides methodological tools to understand such deviations, nor does it provide actual guidance for dealing with these deviations in practice. These are some of the potentially problematic aspects of IS action research and will be a central topic in my discussion (Chapter 6).

Other recommendations can also be found in Mumford (2001) who describes how "the action researcher will also want to protect her *academic neutrality* [emphasis added]" (p. 15), and Davison et al., (2004) who adopt a similar tone and advise IS action researchers to "get 'close to the action' in order to gather rich data, but avoid 'going native,' whereby *objectivity* is sacrificed through *over-identification* [emphasis added] with the organization and its members" (p. 71). Getting 'close to action' is indeed inevitable in action research as it is based on the premise that the researcher is explicitly and deliberately involved in action (in the change process). However, with such a premise, how can the action researcher maintain an objective stance? In other words, how can the researcher be objective when action research is by definition participatory and collaborative? Such accounts and methodological guidance as discussed above are implicit in the postpositivist paradigm, with a shared emphasis on protecting *objectivity*, maintaining *academic neutrality* and avoiding *over-identification*. In other words, such accounts bring IS action research back to the postpositivists' form which action research wanted initially to break from; the view of the researcher as detached spectator of a reality that exists independently of humans; a researcher that seeks to generate 'credible' and 'neutral' knowledge and searching for absolute 'objective' truth that is supposedly 'out there' in the 'real world.' As mentioned in section 2.4.1.2, action research originated as a critique of positivist and postpositivist research which is concerned with offering so-

called valid and reliable interpretations and findings. Furthermore, as mentioned previously (in sections 2.4.1.2 and 2.4.1.4), the idea of fitting the merits of action research into a conventional discourse about standardized criteria has been questioned (Bradbury & Reason, 2006) and various action researchers proposed different evaluation criteria[70] that would be better adapted to the participatory paradigm (Heron & Reason, 2001; Lincoln & Guba, 2003; Reason & Bradbury, 2006b).

Likewise, Avison and his colleagues (2001) outline a list of recommendations for controlling action research, and claim that the "inability to negotiate these control structures has been directly linked to failure of IS AR [action research] projects" (p. 28). Another list of stages to assist systematic thinking can be found in Mumford (2001) who emphasizes the importance of having clear agreement of the objectives and outputs of the research project, and asserts that "there should be *no ambiguity or uncertainty* [emphasis added]" (p. 20) regarding the planned interventions. Important as this may be, I will argue that action research often involves different types and degrees of ambiguities or uncertainties, and it is, therefore, essential to follow a rather critical view and embrace emerging uncertainties, rather than viewing them as random mishaps. As Strand (2006) argues, "while work in IS…provide[s] an array of productive resources of linking research to practice, little work scrutinizes the more subtle and unintended outcomes of IT-related research projects" (p. 438). As I will illustrate in the analysis and discussion (of the action research component: chapters 5-6), these uncertainties can become a source of curiosity rather than anxiety, and they can allow us to develop our own sense of self-awareness and expand our skills as researchers. In other words, I will argue that action research is a continuously changing phenomenon, which must be investigated carefully in all its complexities instead of being 'hidden' or masked behind sets of pre-defined normative principles, criteria, and rules that one must subscribe to if one wishes to conduct action research.

Existing discussions within IS regarding issues of relevance or usefulness of research, participation of subjects, researcher's roles and intervention, etc. tend to get obscured in debates around normative views constituting long lists with recommendations of what the researcher *should* or *should not* do, leaving little space for empirical complexities and/or uncertainties. Furthermore, there has been a great focus within IS action research literature on *practical* reflections on interventions (the *outcomes* of the project), and little work that scrutinizes critically *methodological* reflections on research practice (the *process* of conducting research), including, for instance, reflections on roles adopted or acquired and their implications on the research in general and the

[70] Examples of such evaluation criteria can be found in section 2.4.1.4.

findings in particular.[71] This importance of deeper and more reflective analyses of, not only *practice,* (interventions) but also *research itself* has been acknowledged by only a few IS action researchers; for example, McKay & Marshall (2001), who propose to modify the cyclic model into iterative spirals—or two interlinked double-loops—which include *problem solving* interest cycle and a *research interest* cycle. However, as McKay & Marshall (2001) admit, "there has been scant attention paid to the reporting of the AR [action research] process itself (as opposed to context and content of the AR study)" (p. 46). The lack of work that critically addresses deeper reflections on research methods may be due to the fact that IS researchers have been given little guidance on *how* to conduct action research (Lau, 1997).

For the reasons mentioned above, I will now turn to STS literature which takes a more critical view of action research, questioning taken-for-granted notions (e.g., 'participation,' 'usefulness' and 'relevance'), and providing greater nurturing space for methodological reflections of empirical uncertainties. Although the debates about these notions are commonly found in STS they are not limited to this field. Rather, they are indicative of a growing focus on the utility of research findings and I will argue that these should also become part of the debates in traditional action research literature and action research in the IS field.[72]

2.4.3 STS Action-Oriented Research

Action-oriented research has been an increasing concern in the past two decades within the STS field which focuses on critical discussions of methodological issues related to action research. However, there are a few distinctions between the above presented IS action research and the kind of action research found within STS. While the rewards of traditional action research and IS action research are real and material changes, this is not necessarily the case for all STS action-oriented research endeavors as these are primarily dedicated to developing theories and not explicitly aimed at improving practices (Strand, 2006). Rather than necessarily *making* change, STS research follows a change process to see how it unfolds in practice and how it could have been differently, for example, by showing how design and use of technology could have followed a different path (Strand, 2006). In contrast to STS action research, the common agenda within IS action research is directed toward business and organizational issues (e.g., creating generalized best practice models, improving efficiencies or identifying

[71] It is important to acknowledge that reflections on research practice has been a major focus within some forms of IS action research, for example, Action Science (Schön, 1983) which has been widely adopted outside of IS (Baskerville & Wood-Harper, 1998) and promotes reflections into the reasoning which underlie human actions.

[72] Greater elaboration of this argument can be found in section 6.4.

factors for successful technology implementations). Such agendas are often more easily in line with the goals and interests of administrators and managers. Having conflicting agendas is one of the issues that is often discussed in the STS action research literature and will be addressed in the following sub-section.

2.4.3.1 Conflicting Agendas and Clashing Roles and Interventions

STS literature acknowledges that action research orientations open up the role of the researcher in relation to participants as it allows greater involvement and real time in situ feedback (Woolgar, 2003b cited in (Lynch, 2004)) and provides the possibility to contribute with practical outcomes that may have immediate effects on the field. Rather than presenting an outsider's evaluation report, the STS action researcher collaborates closely with practitioners and has the opportunity to act from *within* an organization to make a difference and change practices (Mesman, 2007, p. 381). Acting from within an organization may be done in various ways, for instance, the researcher may choose to function as an intermediary among different social groups (Balka & Kahnamoui, 2004), translate different interests and transform knowledge (Mesman, 2007), or alternatively, she may choose to align herself and support marginalized groups (Guggenheim, 2004) or those whose voice is not heard (Lincoln & Guba, 2003, p. 270). Much of the STS literature focuses on the researcher's roles that are forged within such complex collaborations.

Unlike IS action research, the role of the STS researcher is portrayed as something that is not easily and clearly defined, as she is operating in contexts that are defined by others (Gustavsen, 2003, p. 158). Thus, within the STS action research literature roles are often viewed as hard to define and even harder to enact. Zuiderent (2002), for instance, explains that his role as a change-agent meant that it "was not narrowly defined in advance; rather, what…[he] would be doing—or would be expected to do—was kept fuzzy and left open for situated construction, within the limits – and sometimes beyond—[…] [his] interest and competence" (p. 64). The high expectations for commitment to the field might be one challenge, another is the evolving character of these expectations. Several researchers admit that their degree of participation was greater than they had anticipated (e.g., Guggenheim, 2004; Jensen, 2007a; Vikkelsø, 2007). Furthermore, a number of researchers describe how they were invited to occupy multiple roles, some of which were outside of their academic domain. These roles range from doing various types of consultancy work (Guggenheim, 2004; Jensen, 2007a; Zuiderent, 2002) to becoming a receptionist in a hospital (Winthereik, de Bont, & Berg, 2002) or solving organizational conflicts (Mesman, 2007). To convey the continual transformation in the researcher's role, Zuiderent and Jensen (2007) said that "the identity of the researcher often appears shifting and multiple or even fragmented and schizophrenic" (p. 229).

As mentioned previously, in action research the researcher typically juggles multiple roles, some of which may clash. Combining the role of researcher with other roles may create conflict, as the respective roles and their associated responsibilities may require different focus and activities. Becoming a receptionist, for instance, might provide access to information about the structure and content of a particular technology; however, the demands of this role might conflict with the demands of the role of the fieldworker (Winthereik et al., 2002). Dealing with these clashing roles is a complicated matter. Mesman (2007), for instance, describes how she became a member in the patient safety committee at the hospital in order to maximize her interaction with the staff and to find intervention opportunities, but deliberately chose not to fulfill the commitment of reporting patient safety incidents as it conflicted with her role as an observer working with the nurses at the hospital ward. Tension may arise not only due to juggling conflicting roles, but also due to conflicting agendas of the researcher and the practitioners.

Action research normally involves interaction with many heterogeneous actors, who have different and sometimes conflicting interests and agendas. It has, therefore, been said that interventions cannot be fully planned or controlled (Zuiderent, 2002), rather they can be viewed as part of an event where the researcher has limited control and good intentions (Jensen, 2007a). An attempt to intervene may be successful, but it may also lead to unfortunate results (Jensen, 2007a). Balka, (2005; 2007), for instance, describes how some of the research projects she led with the aim to influence work practice and public policy through partnership with health sector organizations, did not always result in desired change or empowerment. Thus an attempt of the researcher to intervene and improve practices may be successful, but it may also not lead to desired change, or it may in fact lead to unfortunate results. For example, Jensen (2007a) talks about how with the aim of making STS research 'useful' to (healthcare) practices and policy, researchers may risk functioning in a manner that supports a pre-defined health political agenda. Therefore, sensibility is particularly acute as the action researcher must continually position herself against conflicting roles, expectations and agendas.

2.4.3.2 Joint Venture in a Shifting Landscape

The way such collaborations are formed and sustained in practice is highly context dependent. Mesman (2007) suggests that in such engagements, researchers move in and out of different settings, "transform from certain kinds of outsider into certain kinds of insider […] circulate between places and are able to establish connections and disconnections" (p. 290). Similarly, Jensen (2007a) describes the nature of collaboration as a process of creating and sorting partial attachments with different people, actions, roles and responsibilities.

STS scholars describe how action research requires continual self-positioning of the researcher and transforms the boundaries between the researcher and the subjects. The transformation of the boundaries brings along new complexities related to the roles of the researcher and the subjects. Several researchers express the fear of stepping into practices and going native (Davison et al., 2004, p. 71), or, conversely the fear of staying on the outside and not being useful or relevant. The tension between the different modes of engagement (e.g., participation, action, and immersion) raises questions about whether it is possible to preserve a critical stance while being so closely involved in the project (Lynch, 2004; Mesman, 2007). After all, as Guggenheim (2004) reminds us, one of the principles of ethnography is that the researcher should enter, but also leave, the field. Several researchers emphasize the importance of having the ability to engage and disengage from the field in order to foster self-reflection and distance. They stress the need for reflection, interpretation and criticism (Forsythe, 1999; Lynch, 2004). Other authors emphasize the importance of continuous awareness of the situatedness of the researcher's position, her room to maneuver, and the implications of the partnership with the practitioners (Jensen, 2007a; Mesman, 2007).

However, defining the degree of intervention, or the room to maneuver is not an easy or straightforward task that can simply and solely be planned by the researcher independently of the situated context and the practitioners involved. The issue of whether intervention is a *choice* of the researcher is viewed in different ways. Some researchers describe how they intentionally and deliberately chose one role over another to gain access to the field (e.g., Mesman, 2007; Vikkelsø, 2007); while others problematize the degree of choice that the researcher has. Zuiderent (2002) for instance, points out the problem where sometimes the researcher is forced to choose 'sides' and decide which social group she wants to work with. He also admits that sometimes researchers end up doing intervention even though it was not their initial intention (Zuiderent, 2002). Mesman (2007) views ethnography and interventions as intermeshed, and the act of intervening is thus not a choice, but an unavoidable condition. A similar argument is echoed by Guggenheim (2004) who points out that to act as a classical outsider (someone who 'merely' describes) will eventually lead to becoming a consultant (someone who actively intervenes), as the researcher aims to provide something in exchange to the participants. In addition, he asserts that a particular role that is acquired or adopted by the researcher will impact the opportunities for other research strategies.

In such a complex landscape, the researcher has to choose consciously between certain roles, focuses, loyalties, and responsibilities. Furthermore, the researcher may deliberately choose to align herself to particular groups (Zuiderent, 2002) or may be forced to take sides and find herself entangled in internal political conflicts and feelings of loyalty and betrayal. These multiple and simultaneous challenges construct ambiguous identities, leading to uncertain expectations and confusion. Consequently, the roles and positions of the STS action researcher are not static or stable, but are rather fluid and

ambiguous. Finken (2005) for example, describes how a process of coincidental inclusion and exclusion unfolded during her fieldwork and how she felt she was being included in some issues while simultaneously excluded from other issues (p. 110). Thus, positions such as 'insider' and 'outsider' are no longer fixed; instead these positions are multiple, transforming the researcher from certain types of insider (e.g., degrees of insiders) to certain types of outsider (e.g., cooperative, uncooperative, loyal and disloyal) (Mesman, 2007). Therefore, Pedretti (1996) suggests to transform the dichotomy between insider and outsider into a dialectic relationship where the multiple perspectives compliment and inform each other. The nature of such collaborations is thus described as a continuous transformation process of fine tuning and alignment of the researcher's roles and responsibilities with the research participants. In this process the researcher moves in and out of different settings and contexts, creates and sorts different connections (attachments) and disconnections (Mesman, 2007) with various people, actions, roles, and responsibilities (Jensen, 2007a).

2.4.3.3 Continual Reconfigurations of Intervention Space

Much of the STS action research literature focuses on this highly complex and shifting landscape, where the researcher is involved in multiple roles and modes of engagement, interacting with various heterogeneous groups and translating multiple agendas and objectives. The researcher can, therefore, no longer be simply characterized either as an (active) interventionist change agent or as a (passive) descriptive analyst. Several scholars discuss possible new conceptualizations of the researcher's role and intervention (Vikkelsø, 2007; Zuiderent, 2002; Zuiderent-Jerak, Strating, Nieboer, & Bal, 2009). Accordingly, the researcher no longer holds a privileged position that allows her to provide prescribed courses of action (Strand, 2006) and thus cannot be guaranteed to provide solutions or recommendations, or to ensure better technology (Hartswood et al., 2002). Instead, alternative conceptualizations of the action researcher are needed. Examples of these are the researcher as a trickster or as a designer. The trickster makes situated choices, shifting positions and standpoints depending on the particularities of a situation (Zuiderent, 2002), while the designer is involved in the configuration of roles and creates different modes of engagements with various practices (Boland & Lyytinen, 2004). Common to these alternative conceptualizations of the researcher is the shift from solving problems and making decisions toward prompting negotiations and improving practices, in a more modest and ongoing way. The researcher's roles are situated, political, and continuously shifting, as the interventions are subtle, emergent, and contingent upon the circumstances present at a particular point in time, in a particular context.

To sum up, several STS scholars argue that there is a need to move beyond the clear-cut dichotomies between action research and traditional descriptive research

(Jensen, 2007a; Mesman, 2007; Strand, 2006; Vikkelsø, 2007; Zuiderent, 2002), and suggest instead that we view descriptions as interventions (Vikkelsø, 2007; Zuiderent, 2002). Subsequently, all activities are viewed as performative (Jensen, 2007a) and every type of research practice unavoidably intervenes to some degree in the field of study (Mesman, 2007). Finally, Vikkelsø (2007) argues that these distinctions are preventing us from seeing how the different research methodologies produce different interventions, and are obscuring the development of sensibility and language to articulate such complex research and engagement. Hence, in contrast to IS action research, much of the STS action research literature focuses on critical *methodological* reflections on research *practice* (as opposed to practical *outcomes* of research). Furthermore, drawing upon a constructivist approach, the STS researcher is situated and reflexive and there is an acknowledgement that the field site is co-constructed with the object of study (Winthereik et al., 2002). Finally, in contrast to IS action research, STS action research suspends normative and evaluative judgments about what is right or wrong, and instead, studies openly 'how things come to matter' (Strand, 2006).

As can be seen from the literature, action research is complex, dynamic, and partially uncontrollable. It transforms boundaries between the roles of researcher and practitioner, and between the different modes of engagements. Such a shifting and fluid landscape imposes different challenges to the researcher's roles, authority and conceptual distance, as well as the practitioners' commitment and access provided to the field. In chapters 5-6, I will provide a more nuanced articulation of these challenges by discussing them in relation to the continual transformation in the dynamic relationship that is forged between the action researcher and the practitioners.

2.5 Summary

Chapter 2 reviewed the existing literature about healthcare IT and medical practice, and action research, separately. Each of these literatures was divided into two parts, to distinguish the different approaches existing in different fields. Throughout the dissertation, I will illustrate how these different fields can contribute to each other by introducing particular insights and/or extending discussions about issues that are either often left unquestioned or rarely given critical scrutiny. I will now summarize these insights from the literature within each field, and highlight the kinds of questions that the literature fails to address. This summary will serve as a basis for explaining the potential contribution of a constructivist framework, which will be discussed in greater detail in the next chapter.

In the first part of this chapter (section 2.3), I reviewed the literature about EMRs found within different fields and disciplines. I then focused on three main fields, which are the most relevant to my work, namely IS, CSCW and STS. I explained how the IS literature provides insights into the use of an EMR in an organization and insights into

institutional characteristics of healthcare. Some of the IS literature focuses on developing best practice models and identifying factors for successful technology implementations. However, IS studies fail to take into account the role of technology—the actual technological artefact—which is often black-boxed and taken for granted. Much of the EMR literature found within CSCW focuses primarily on understanding situated and collaborative work practices in order to design and configure technology that can support such practices. It offers various concepts useful for understanding work practices and the roles of artefacts, as well as insights into standardization and integration strategies of technologies with local work practices. However, CSCW and IS researchers tend to separate technical from organizational factors, and adopt the view that successful technology implementation depend on fitting the EMR system to the users' needs and the existing medical work. As I explained above, constructivist STS scholars argue that separating between technology and organization and singling out either technical or organizational factors for success or failure is too simplistic and rather problematic, as such a view fails to take into account the fact that technology and organization are interconnected and transforms one another in unpredictable ways. Therefore, in the following two chapters (chapters 3-4) I will illustrate how a constructivist STS approach (e.g., ANT) can provide fruitful insights about technology by moving away from an exclusive focus on the social toward looking at how the social and the technical are simultaneously co-constructing each other. Furthermore, instead of taking technology for granted, constructivist scholars question and unpack the object of study and the assumptions underlying its existence. Consequently, constructivists focus on how the technology came to exist, how it is interpreted and used, and how it acts/performs in practice.

In the second part of this chapter (section 2.4), I reviewed the general literature about traditional action research, as well as the more specific literature on action research as it is perceived and practiced within two IT related disciplines, namely the IS field and the STS field. The IS literature about action research offers a wide range of guidelines for participating and facilitating sociotechnical changes aimed at improving organizations. There has been a great emphasis within IS action research literature on *practical* reflections on the researcher's *actions*, yet scant attention has been paid to work that scrutinizes critically *methodological* reflections on the *process* of conducting research. Furthermore, the guidelines provided in IS action research literature contain long lists of fairly strict and static criteria and norms the action researcher is expected to subscribe to, leaving little space for understanding and discussing ways of dealing with deviations from the norm. I argued that these guidelines are built upon a rigid, objective, standardized platform which is similar to the one that traditional action research was originally opposed to. I also argued that these guidelines and norms fail to critically address ways to manage uncertainties and dilemmas encountered in the field. These problematic aspects of IS action research (which will be a central topic in Chapter 6) led

me to propose adopting a constructivist STS approach as this provides more critical insights into action research, questioning taken-for-granted notions and providing greater nurturing space for methodological reflections on empirical uncertainties.

In sum, the problematic issues that I found in the literature are the reason for why I chose to draw upon a constructivist framework; an approach which will be delineated in detailed in the next chapter.

CHAPTER 3: ONTOLOGICAL, EPISTEMOLOGICAL AND METHODOLOGICAL ASSUMPTIONS

3.1 Theoretical Platform

The present chapter is dedicated to outlining the ontological, epistemological and methodological foundations, upon which the dissertation is based and which I subsequently use when describing, analyzing and discussing the electronic medical record (EMR) and action research. It is important to provide transparency and clarity about the assumptions that shaped the interpretations and knowledge generated in this dissertation and explain how these are part of specific schools of thought. Furthermore, this chapter is also meant to explain how these views shaped the way in which I approached the topic and how the study has been carried out in practice. Therefore, in this chapter I will demonstrate how a constructivist theoretical stance has influenced both my understanding of technology (EMR) and my understanding of methodology (action research).

I will begin by outlining the basis of a constructivist paradigm (section 3.2) and its theoretical and methodological implications (section 3.2.1-3.2.2). I then delineate Actor-Network Theory (ANT), which is the constructivist approach used in this dissertation (section 3.3). The next two sections will demonstrate how the constructivist stance that I adopted influenced my choice of the methods I used for the study of the EMR (section 3.4) and action research (section 3.5). In addition to discussing the methods I used for collecting and analyzing the empirical data about the EMR, section 3.4 will also describe the field setting where the empirical research occurred. I will end by summarizing the chapter and discussing its relevance in relation to subsequent chapters (section 3.6).

3.2 Constructivist Paradigm

> Once upon a time, the Lone Ethnographer rode off into the sunset in search of his "native." After undergoing a series of trials, he encountered the object of his quest in a distant land. There he underwent his rite of passage by enduring the ultimate ordeal of "fieldwork." After collecting "the data," the Lone Ethnographer returned home and wrote a "true" account of "the culture." (Renato, 1993, p. 30)

Before I explain the worldview underlying the foundation of this dissertation, I first want to say a few words about my background to explain the transformation and conceptual shift my worldview has gone through. I come from the field of computer science, where the intellectual worldview tends to be positivist, following a realist ontology (Forsythe, 1999, pp. 136-137). Accordingly, I assumed that there was an 'objective' reality 'out there' which I thought could be 'discovered' by following ethnographic methods in a way that I presumed to be 'correct.' I was a fully fledged unreflexive and mostly enthusiastic computer scientist when I began my Master's degree. As a dedicated and newly trained ethnographer and fieldworker, I did my best to be 'a fly on the wall' (a passive observer), and preserved a 'secure' distance between the Other (the research subjects) and myself. Finally, I struggled to keep the research and its findings 'value-free' and 'unbiased,' while trying to immerse myself in the subjects' worldview. However, I quickly discovered that it was impossible not to engage with the people (informants) whom I observed, and that my role as researcher had a high impact on the informants in particular, and on the research in general. I have learned that I, the researcher, was neither invisible nor neutral, and I was never simply standing 'outside' the field site (Abu-Lughod, 1993). I realized that I am not faceless (Fontana & Frey, 2003), and that the informant's account is already mediated and shaped by the questions and the context of the interview (Lewin, 1991 cited in Olesen, 1994).

My experience from the initial fieldwork challenged my worldviews and left me with ambiguity and doubts as I was met with 'messy,' uncertain, multivoiced stories and narratives from the informants. I was fortunate to have mentors who pushed me to articulate these concerns and supported me as I searched for solutions for the challenges I encountered. This was the beginning of a long, perplexing and, at times, downright troubling journey where I began questioning my earlier ontological and epistemological views as I came to understand that reality was not simply given, but rather socially constructed. I gradually developed an interest in postmodernist debates regarding issues of evaluation criteria, the production of knowledge, writing, subjectivity, voice and representation (Best & Kellner, 1991).[73]

Coming from the field of computer science, I was trained to write in a passive voice and to shelter myself in the text. Over the last years, not only did I learn to develop sensitivity to the multiple voices of Others, but also to situate my reflexive self in the text and the context, and became interested in confessional writing (which will be explained in section 3.5.4). I have also developed greater interest in Law's (2004a) proposal of broadening the conventional way we think about method and welcoming 'greater methodological variety.' He explains that "the problem is not so much lack of variety in

[73] These issues will be explained in the next section as I delineate the constructivist paradigm.

the *practice* of method, as the hegemonic and dominatory pretensions of certain versions or *accounts* of method" (Law, 2004a, p. 4). Law argues that it is possible to craft and represent the vague and the multiple without getting trapped in reproducing a singular and definite reality. He explains that it is a matter of textuality and forms, and suggests drawing inspiration from other sources that manifest multiple realities, for example, poetry, novels and allegory (e.g., metaphor). Allegory, Law explains, refers to "the art of decoding meaning, reading between the literal lines to understand something else or more. The craft of making several things at once, what is described and what can also be read into that description" (Law, 2004a, p. 157). He provides an example from his study with Vicky Singleton (2003) about alcohol liver diseases to shows how through the description of the building where the fieldwork took place, they bring about organizational multiplicity and inadequate resources (e.g., the fact that the alcohol advise centre is located high up the stairs, that there is no meeting room, etc.). In my attempt to pursue greater methodological variety that is more creative and compelling, I adopt an approach of what I call 'action research in the making' and I combine it with confessional writing for parts of this dissertation (chapters 5-6). I will describe the clinic and neighborhood where I conducted my fieldwork to bring about the organizational reality (section 3.4.1).

While I do insist on carrying with me my background and the many fruitful things I learned in computer science, and more precisely information system development, my worldview has gone through a major transformation, where ethnography was one of the sources that offered me a corridor to a different worldview and a conceptual shift. My views have been crystallized and strengthened as I gradually and carefully found my space within the field of STS, and in particular, within constructivist approaches. Throughout the dissertation, I will explain what I learned from the STS field and what I see as potential insights for contribution to the IS and CSCW fields. In the next sections I will provide an overview of the constructivist paradigm, the worldview that shaped my research. However, before I do so, I will define the notion of paradigm.

This notion has become commonplace since Thomas Kuhn (1970) used it in his influential book *The Structure of Scientific Revolutions* (originally published in 1962) to illustrate that scientific research takes place within a taken-for-granted framework, a worldview which shapes all perception and thinking. Denzin and Lincoln (1994c) define a paradigm as "a basic set of beliefs that guide action…[that] define the worldview of the researcher-as-*bricoleur*" (p. 99). They explain that paradigms have a common set of methodological commitments that impact the choice of the method. Furthermore,

> a paradigm encompasses three elements: epistemology, ontology, and methodology. *Epistemology* asks, how do we know the world? What is the relationship between the inquirer and the known? *Ontology* raises basic questions about the nature of reality. *Methodology* focuses on how we gain knowledge about the world. (Denzin & Lincoln, 1994c, p. 99)

It is important to note, however, that over the last half dozen years, there has been substantial change in the landscape of social science research, and "the various paradigms are beginning to 'interbreed'" (Lincoln & Guba, 2003, p. 254). I will now move onto clarifying the constructivist[74] paradigm, including its ontological and epistemological assumptions (3.2.1), as well as its methodologies (3.2.2) and the theoretical platform upon which this dissertation is based (3.3).

3.2.1 Constructivist Ontology and Epistemology

This research was undertaken within a constructivist framework according to which reality is not pre-given but rather constructed, and can be interpreted in various ways (Petterman, 1998). The constructivist paradigm encompasses a relativist ontology,[75] which rejects the assumption that reality is definite or singular, and views reality as multiple, intangible, constructed, local and specific (Lincoln & Guba, 2003). Consequently, relativists reject the belief that we have access to an objective reality of an external world that is 'out there,' existing independent of, and prior to, our perception of it (Law, 2004a, p. 24). Subsequently, the question addresses the *way* in which data is collected, while emphasizing *how* facts are constructed through language. Thus, the researcher is not an independent individual existing in a vacuum. Rather, she "is always already in the empirical world of experience" (Denzin & Lincoln, 1994b, p. 199).

Following constructivist relativism, I adopt the view that reality is not independent, prior, definite or singular; rather it is complex, multiple, messy, heterogeneous, and unpredictable (Law, 2004a). Therefore, when studying the implementation of an EMR, it is not my intention to generate universal models for so-called 'successful' or 'efficient' EMR implementations. Such measurements are, to a large extent, relative and context-dependent. This is not to say that it is impossible to create 'best practice' models for EMR implementations, but rather that such models can be co-constructed together with the subjects.[76] The study presented here will neither attempt to generate crystal clear solutions to discrete problems, nor will it outline a

[74] I intentionally use the term 'constructivism' instead of 'social constructivism' and will clarify the differences in section 3.3.1.4.

[75] Actor-Network Theory (ANT), however, rejects the realist and the relativist approach as both presume there is an ontological gap that separate words (language) from the outside world, or between the subject (culture) and the object (nature, technology). Latour (2002b) explains that this presumed ontological gap creates a division that enforces false choices between social knowledge and scientific true facts. Thus, facts should not be placed on one side of an independent autonomous reality separated from the social and collective work of construction. Instead, ANT views realities as something that are being made *in conjunction with* their representation (Law, 2004a, Chapter 2). To bypass the realist/relativist debate Latour (2002b) suggests what he labels as 'realistic realism.'

[76] For such study, it is advisable to have a representative sampling and select adequately suitable size and heterogeneous healthcare community centers.

simplified set of standardized 'best practices.' In this particular study, I will *explore* together with the community partner the implementation process. The word 'explore' is intentionally used here, to emphasize that various reports and suggestions for changes that were proposed to the clinic, however, these were not put forward as concrete final *solutions*, but rather presented as prospective *possibilities* for enhancements. Through a mutual and reflexive process of interactions between myself and the community partner, our knowledge and understandings were constructed and co-created. I was interested in exploring the different ways in which the various health care practitioners integrate (or reject) the EMR in their situated work practices. A constructivist ontology is in line with accepting postmodern sensibilities which, among others, imply questioning the idea that any method or theory can have a universal claim as the 'right' or the privileged form of authoritative knowledge (Clarke, 2005, p. xxvi).

Hence, the constructivist paradigm accepts postmodern sensibility and rejects traditional positivist and postpositivist evaluation criteria of reliability and objectivity.[77] In addition, criteria for internal and external validity[78] are replaced by trustworthiness and authenticity, which refer to the "commitment to study the world from the point of view of the interacting individual" (Denzin & Lincoln, 1994c, p. 100). Thereby, "truth—and any agreement regarding what is valid knowledge—arises from the relationship between members of some stake-holding community. Agreements about truth may be the subject of community negotiations regarding what will be accepted as truth" (Lincoln & Guba, 2003, p. 273). Accordingly, validity is never fixed, but rather "created by means of a community narrative, itself subject to the temporal and historical conditions" (Lincoln & Guba, 2003, p. 273). Similar to feminist qualitative research, the constructivist paradigm adopts a subjective epistemology (Denzin & Lincoln, 1994a, p. 13). Accordingly, reality cannot be understood independently of the social actors that construct it (Orlikowski & Baroudi, 1991; Walsham, 2006). In other words, knowledge and understandings are not created objectively. Instead, the knower (the researcher) and the known (the phenomena being studied) interact and shape one another (Denzin & Lincoln, 1994a). Taking subjectivities into account is therefore important, in addition to providing adequate descriptions with explicit articulation of analytical and theoretical assumptions (Winthereik, 2004, p. 12). Findings are therefore constructed and co-created through an interpretive process between the researcher and the subject. In other words, the researcher and her description of reality are not passively 'mirroring' the social reality they observe

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[77] Reliability refers to "the extent to which findings can be replicated, or reproduced, by another inquirer" (Denzin & Lincoln, 1994c, p. 100), and objectivity refers to "the extent to which findings are value-free and unbiased" (Denzin & Lincoln, 1994c, p. 100).

[78] Internal validity refers to "the degree to which findings correctly map the phenomenon in question," while external validity refers to "the degree to which findings can be generalized to other settings similar to the one in which the study occurred" (Denzin & Lincoln, 1994c, p. 100).

(Best & Kellner, 1991, p. 4); rather, in the process of describing and writing about the reality they are also constructing it. As Moreira (2001) elegantly puts it:

> The co-construction of the 'field', the 'author' and the 'reader' is acted out in making the ethnographic writer and his or her writing devices, interests and limitations available to the reader. In including…herself in the production of the activities s/he is describing by their very description, the ethnographer loses the 'mirroring abilities' that would enable a passive reporting of reality. However, in this way, the descriptions of the ethnographers' process of arriving at a description can also be considered as part of the activities themselves. (p. 12)

3.2.2 Constructivist Methodologies

My paradigm impacts my choice of methodologies and methods, and it primarily shapes the way I situated myself, my intellectual voice/authority; and the way I view and engage with the subject that is studied. In a constructivist paradigm, the subject—the Other[79]—is no longer alien and foreign, and the researcher no longer has protected privilege or authority over the subject. This has an impact on the distance between the researcher and the subject, which is no longer formal, 'secure' and pre-defined. The question of reflexive voice is deeply grounded in the very foundations of feminist research, and it concerns the issue of how voice should be heard and with what authority. Such issues can perhaps best be summed up in the following quote, by hooks, a feminist and social activist:

> no need to hear your voice when I can talk about you better than you can speak about yourself. No need to hear your voice. Only tell me about your pain. I want to know your story. And then I will tell it back to you in a new way. Tell it back to you in such a way that it has become mine, my own. Re-writing you, I write myself anew. I am still author, authority. I am still the colonizer, the speak subject, and you are now at the center of my talk. (hooks, 1994, p. 343)

A constructivist epistemology is distinguished by the commitment to questions of knowledge and being, rather than by a commitment to particular methodologies (Denzin & Lincoln, 1994c, p. 100). The constructivists' primary field of interest is the "subjective and intersubjective social knowledge and the active construction and cocreation of such knowledge by human agents" (Lincoln & Guba, 2003, p. 271). Accordingly, constructivists follow a hermeneutic and dialectic methodology, and explore the

[79] For more information about situating the Self and 'the Other,' consult, for instance, Atkinson and Hammersley (1994) and Denzin (1994, p. 503).

constructions of meanings that are refined through interaction between and among the researcher and the subject (Lincoln & Guba, 2003). Subsequently, constructivists draw upon various interpretive methodologies (i.e. ethnography, phenomenology and ethnomethodology) that explore peoples' actions and constructions of meanings, and focus on how social order is produced and shared. Methodologies connect the research to specific methods. Conversational analysis,[80] for instance, is a central method for ethnomethodologists.

Clarke and Star (2008) explain the epistemological implications of following a theory-driven and socially based nature of perception in the following way:

> Particularly in STS, we no longer struggle with the image of some sort of *tabula rasa* as the beginning moment of research, to be gradually filled in as we encounter the "real world." Rather, we understand that we begin with some combination of previous scholarship, funding opportunities, materials, mentorship, theoretical traditions and their assumptions, as well as a kind of deep inertia at the level of research infrastructure […]. Such traditions and assumptions serve as root metaphors applicable to the situation of inquiry—from social worlds to actor-network theory…to ethnomethodology. (p. 116)

ANT, which is a constructivist approach and is used in this dissertation, offers a distinctive methodological departure point, with its idea that there is no possibility of making a priori definitions of actors' characteristics prior to starting data gathering and analysis. This is due to the view that the characteristics of any actor are not pre-defined, but rather are constructed through the connections with other actors in the network. Since it is the composition of the actor's connections that define the actor's position in the network (Law, 1999), researchers need to study the connections between actors through empirical observations. Hence, the researcher's perception and understanding is shaped by, and through, interacting with the social/empirical world. In the next section, I will provide a more detailed elaboration of ANT, explicating the theoretical skeleton which I subsequently use when analyzing the EMR implementation and the methodological issues encountered within action research.

In summary, studying technology through a constructivist lens implies, among other things, that technology is viewed as socially constructed. This approach emerged as a critique of technological deterministic views which overemphasize the impact that technology has on society. Technology is neither simply neutral, nor does it have an

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[80] Conversation analysis focuses on how participants structure their conversation, and goes beyond grammatical analysis of statements and investigate the sequential and structural organization of participants' talk.

autonomous force over society. Rather, to understand the consequences of technological change, one must take into account the social, political and cultural factors through which the design, development and use of technology takes place. Adopting a constructivist stance influenced not only the way I approached the study of the technology, but also the way I approached my methodological reflections on action research. As explained above, it primarily shaped the way I situated myself and my reflexive voice, and the way I perceived and interacted with the subject under study. Therefore, my findings are viewed as constructed through an interpretive process between the researcher and the subject. Furthermore, constructivist researchers acknowledge that they are not passively 'mirroring' the social reality they observe; rather, in the process of describing the reality they are also co-constructing it. I will return to the implications that a constructivist lens has on studying methodologies when I present an overview of the methods I used to study action research (section 3.5). But first, I will elaborate on ANT, the constructivist approach upon which this dissertation is built.

3.3 Science and Technology Studies

ANT originates from STS, an interdisciplinary field which encompasses diverse theories, methods and approaches from a wide range of disciplines. To understand the context in which STS emerged, the road map takes us back to the mid 60s, where discussions began concerning the practical need for research *on* science. In other words, research that would underpin the extension and development of science, and its relationship to technology and economic growth (Edge, 1995). In the same period, STS scholars approached the analysis of 'science as a social system' from a different angle. However, much of the work within the traditional social science research followed an essentially positivistic view of science which was concerned with offering so-called valid and reliable interpretations and findings. In the 1970s, the idea that science could be unpacked emerged and this was reflected in Kuhn's (1970) book, *The Structure of Scientific Revolutions*, where he argued, that scientific knowledge was socially shaped. This was later followed by the emergence of a new relativistic 'Sociology of Scientific Knowledge' (SSK).[81]

SSK distinguishes between the world and our knowledge about the world. It is perspectivalist as it follows a principle according to which different interests produce different perspectives of nature and therefore different versions of theories follow from

[81] The strong program in SSK introduced several controversial principles. According to the first principle, scientific knowledge should be studied without regard to whether statements are taken to be true or false, and rational or irrational. Accordingly, the same explanatory device should be applied symmetrically to the different accounts. Finally, the last principle of reflexivity implies that the same explanatory device that is used for science should also be applied to the social studies of science.

this. SSK emphasizes the importance of taking into account elements that are external to science itself, as these may have an impact on the growth of particular forms of knowledge. As opposed to classical sociology of knowledge, SSK argued that the content of scientific knowledge was open to sociological analysis (Bloor, 1976). Therefore, this approach focused on developing an understanding of the social nature of scientific knowledge production. Unique to this approach, is the challenges it imposes on the philosophy of science and the classical epistemology which distinguishes between external and internal factors that impact the foundation of knowledge. Subsequently, the view of science as 'rational' and 'objective' was questioned. Science was now viewed as a social formation that has to be understood and articulated through the situations to which it responds and transforms (Rouse, 1993). In this respect, SSK is methodologically relativist as it dissolves the distinction between outside- and inside- the context, and adopts the view that "we are always in context" (Law, 2004b, p. 1). Scientific knowledge was subsequently perceived as a form of culture (Bloor, 1976; Collins, 1985) that is a shared interpretative resource for making sense of our complex world.

The debates about epistemology and ontology increased the focus on the 'turn to practice.' This referred to empirical inquiries which focused on the way in which science was practically carried out, and provided micro elaborations of the existing philosophical claims. In sum, these were the initial achievements of SSK that led to forming a rich body of research (focusing on observations and ethnographic studies in laboratories), with the underlying intention of grasping the scientific knowledge 'in the making.'[82] I will adopt this approach to study 'action research in the making' (explained in section 3.3.1).

It was in the 1980s that STS started to crystallize,[83] and brought along new radical approaches that focused on sociotechnical systems. There was a turn toward empirical and micro oriented case studies. This was strongly related to the post-modernist discussions, where the notion of objective and universal knowledge was problematized. Accordingly, it was acknowledged that science was socially constructed and relative to context, and various feminist projects contributed strongly to this agenda with their discussions regarding the way in which knowledge was formed by gender, class and race. ANT emerged from this terrain and added several additional contributions to the STS field, and these will be delineated in the next sub-section where I will provide an overview of ANT's core analytical concepts and insights (sub-sections 3.3.1.1-3.3.1.6). ANT has changed considerably since its original formulation; therefore in the last sub-

[82] Major contributors to these studies include, Michael Lynch and Sharon Traweek (which were based in the US), Karin Knorr-Cetina (Austria and US), Bruno Latour (France), and Steve Woolgar (UK).

[83] For a good overview of the STS field, please consult Edge (1995), Hess (1998) and Asdal, Brenna, & Moser (2001).

section 3.3.1.6, I will reflect upon some of these changes and the new insights that were brought about to ANT.

3.3.1 Actor-Network Theory: Core Analytical Concepts and Insights

ANT's theoretical and methodological contributions have been a fruitful point of reference for thinking, engaging with, and writing this dissertation. I chose to use ANT as a theoretical framework for several reasons. First, with its principle of generalized symmetry of the social and the technical (to be explained later), ANT provides a strong tool for studying the sociotechnical impact of adopting an EMR system. As was explained in section 2.3.2.2, ANT can be a powerful tool for theorizing the IT artefact where neither the technical nor the social are overemphasized. With notions such as actor-networks (which will be explained below), ANT avoids the typical a priori distinctions between society and nature, human and non-human, etc., and captures instead the collective heterogeneous entities. Subsequently, the social and technical are viewed as intertwined and interconnected, part of a heterogeneous network.

I use ANT not only for the analysis of the EMR case, but also for the analysis of the action research component of this dissertation. I view action research as network building, a collective production of actors and agencies. In particular, I follow a performative approach and use ANT to see how the different roles I occupied or acquired in the field were produced and enacted by the network. I also investigate which different socio-material arrangements and resources I need to perform in a particular role. ANT is fruitful for such analysis as it allows me to focus on the different socio-material connections and explore the relations between these connections.

3.3.1.1 ANT at Glance

ANT has the ability to provide a fruitful conceptual framework for studying different sociotechnical phenomena, and has been previously used for various case studies such as: bacteria (Latour, 1983), drug users (Gomart, 2002), inhalers (Willems, 1998), scallops (Callon, 1986), and hotel keys (Latour, 1991) among others.

The term '*actor-network*' was initially translated from the French term: '*acteur reseau*,' and it has been said that several meanings got lost in the translation (Law, 1999). This notion refers to the connection and relations between an act that is carried out and the wide range of its surrounding and influencing factors, which again are linked together and produce a network. To illustrate this, consider for instance the act of driving a car; this act is influenced by various factors such as: previous driving experience, traffic regulations and the manoeuvrability of the car. An actor network consists of both technical and non-technical elements. Therefore, in our example, the act of driving is influenced by both the capacity of the car's engine and the driver's training. Hence, ANT

allows an equal explanatory status to all actors in what is often referred to as a heterogeneous network (Latour, 1983). This is perhaps the most radical idea in ANT, and is also referred to as the *principle of generalized symmetry*,[84] where the same conceptual framework is applied to both the technical and the social aspects of the problem studies (Callon, 1986, p. 200). Breaking down the a priori distinction between social and technical elements is undertaken in order to overcome inherent bias and to minimize theoretical controversies from unduly impinging on the empirical study. The point is not that everything is the same, but on the contrary that the stance of generalized symmetry keeps research sensitive to the actual establishment of asymmetries.

Furthermore, the principle of generalized symmetry breaks down the classical dichotomies between social and technical, local and global, and macro/micro distinctions.[85] According to Latour, we should "turn away from an exclusive concern with social relations and weave them into a fabric that includes non-human actants, actants that offer the possibility of holding society together as a durable whole" (Latour, 1991, p. 103). ANT uses the term '*actant'* in order to expand the traditional definition of agency in such a way that it also includes non-human things (i.e. material and natural objects, technological artefacts, texts) that can actively influence the network. The notion of actor network helps us to map out sociotechnical networks, which comprise multiple and diverse elements that influence, determine or shape actions. When unpacking networks, each element is in turn part of another actor network and so forth. In other words, the actor network comprises concrete and specific elements, which mutually shape the action of each other. The important point is that "these various networks participate in the social. They shape it" (Law, 1992, p. 382).[86]

The notion of *alignment* in ANT is portrayed differently than traditional management thinking. According to ANT, work practices, training, information systems, organizational roles, are all open-ended chains of 'things' that need to be aligned. The process of alignment suggests that no simple top down control or decision making power

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[84] This principle has been criticized by many scholars who claim it reduces human beings to mere objects, or perhaps, symbolic actors with roles but no souls (Monteiro & Sahay, 2000). Such critiques are often followed by the argument that there is an ontological difference between human and non-human, where the first can be explained by referring to 'consciousness,' 'intentions,' 'rationality,' 'emotions,' etc. However, as Law (1992) explains, the purpose of breaking the dichotomy between artefacts and humans "is an analytical stance, not an ethical position" (p. 383). For more information, consult the epistemological chicken debates (Callon & Latour, 1992; Collins & Yearley, 1992).

[85] This will be clarified further below.

[86] Recently, John Law and Annemarie Mol suggested moving away from the notion of networks to that of complexities—where sociotechnical elements do not have fixed identifies or connections with one another—in order to better conceptualize the relationship between social and technical. As Grisot (2008) explains, "they find that socio-technical relations are better seen as tightly woven together in often inseparable ways like when fluids are mixed together" (p. 54)

exists over such 'collections'. Rather, they can be seen as the outcome of a bottom up process. One challenge is thus to unpack the dynamic sociotechnical process in which a particular technology develops; another, is to "understand how it is that durability is achieved" (Law, 1999, p. 4).

As previously mentioned, the design and development process of technology consists of sociotechnical negotiations. It is a reflexive and dynamic process where various interests are translated and inscribed into different materials. The concept *inscription* refers to the way technological artefacts embody patterns of use (Akrich, 1992; Akrich & Latour, 1992), and can help to describe how specific anticipations, interpretations and restrictions of prospective patterns of use become part of the development of a technology. The notion of inscription helps us to abandon the traditional assumption (which is well known in the system design discipline) that the "best" solution is the one that will win. Instead, stability and success are seen as the results of mobilized support and the accumulation of strong inscriptions. Stabilization and thus social order are obtained though continuous negotiation of social process and aligning interests. This happens in "the process that is called *translation* which generated ordering effects such as devices, agents, institutions, or organizations" (Law, 1992, p. 366). Since the various actors in the network have different interests and anticipations, translations (Callon, 1994; Callon, 1991; Latour, 1987) are crucial for obtaining stability. This implies re-interpretation, re-presentation or appropriation of others' interest into one's own interest. In other words, it implies the creation of alliances and negotiations during which various interests, goals and intentions are tested (Callon, 1986). Through a design process, the various users' interests are translated into particular needs, which are further translated into general and unified needs. This is a process of legitimation and institutionalization that provides broader support, and allows the translation processes to stabilize as a 'solution.' When the solution is finally implemented, the various users will yet again adopt and adapt the system by translating it into their specific work tasks (Monteiro, 2000, p. 6).[87]

[87] Interesting illustrations of translation of interests and inscriptions of desired behavior, can be found in the following case studies: in Latour (1991) where the case refers to hotels that wanted to ensure that guests return their keys when leaving. Hoping to achieve the desired behaviour, the hotel management first placed a sign behind the counter, and then tried having a manual doorkeeper. As the inscriptions failed in both cases, they attached a heavy metal knob to the key, which made the inscription strong enough to impose the desired behaviour (Latour, 1991); and Latour's (1992) case about a door that remained open even though there was a sign asking visitors to shut it. The sign was later replaced with a human gate-keeper, which was replaced again with a non-human door-closer.

3.3.1.2 Human non-Human Attachments/Connections

In the book *Actor Network Theory and After* (1999), John Law reminds us that ANT draws upon semiotics[88] which treats meanings as an effect of relations between signs. Thus, ANT "tells that entities take their form and acquire their attributes as a result of their relations with other entities. In this scheme of things, entities have no inherent qualities" (Law, 1999, p. 3). Actors are performed in, by, and through these relations, and this way achieve their form. Hence, ANT argues against essentialism of any kind, as it assumes that nothing is given in the order of things. Law (1999) refers to this as 'rational materiality,' according to which elements are shaped and formed through interaction with other elements. Consequently, ANT reconfigures all dichotomies between elements, including micro and macro, agency and structure, human and non-human, knowledge and power, context and content, etc. By this, ANT proposes a generalized symmetry which does not imply that there are no distinctions at all, but rather that these should be seen as *effects* or *outcomes* of interactions (Law, 1999), that can be explained by the study of translation (Callon & Latour, 1981, pp. 280-281).

In other words, ANT goes beyond language and may be viewed as a *semiotics of materiality*. This means that "it takes the semiotic insight, that of the relationality of entities, the notion that they are produced in relations, and applies this ruthlessly to all materials—and not simply to those that are linguistic" (Law, 1999, p. 4). In summary, ANT extends semiotics by applying it to material production. As Moser (2006) explains

> this is a *material semiotics* in which facts, artefacts, nature and objects, are treated not as given categories lying outside culture or society, but as effects of interactions, relations and order building. One investigates what something is by asking what it is made to be and how it emerges. (p. 373)

In other words, drawing upon semiotics helps pay attention to the materiality of intermediaries and "makes it possible to describe the emergence of an effect by referring not to agents but to 'that which lets/makes it happen'" (Gomart & Hennion, 1999, p. 226).

With its extended generalized symmetry which avoids pre-defined and a priori distinctions between the micro and macro levels, ANT offers a flat typology and fluid network. This alternative topological system is possible with the introduction of the notion of 'network,' where "elements retain their spatial integrity *by virtue of their position in a set of links or relations"* (Law, 1999, p. 6), and object integrity refers to keeping various patterns of links stable. Accordingly, the topological system in the social

[88] Semiotics refers to the study of signs and sign systems, and how meaning is made and understood.

domain is flat and folded, and "context […] flows locally through network" (Latour, 1999a, p. 18). Subsequently,

> 'actor' is not here to play the role of agency and 'network' to play the role of society. Actor and network […] designate two faces of the same phenomenon, like waves and particles, the slow realization that the social is a certain type of circulation that can travel endlessly without ever encountering either the micro-level […] or the macro level. (Latour, 1999a, p. 18-19)

Hence, ANT provides a different strategy that bypasses the macro-micro distinctions, and focuses rather on the conditions that make these distinctions possible. This way, social processes do not necessarily have to be viewed as made of structure and agency, but rather of a *circulating* entity (Latour, 1999a) in a flat network. Hence, ANT focuses on the *movement* in the shifts of attention, and on "the *summing up* of interactions through various kinds of devices, inscriptions, forms and formulae, into a very local, very practical, very tiny locus" (Latour, 1999a, p. 17). This transformation of the social form into a circulation is a significant point in ANT, since it implied that when exploring social structures, one is not led away from local concrete sites (Latour, 1999a).

3.3.1.3 Distributed Agency: Actor-Networks

A much misunderstood point is that ANT does not view the *actor* as the source of action. Contrary to actors in traditional sociology, the actor in ANT is defined by the effects of its actions that are distributed in the network. Hence, there is no single master or creator that dominates materials (Latour, 2002b). This is intended to encourage us to think about the social in terms of a production process, and move the focus toward the effects that are produced by links between humans and non-humans. An additional aspect is the activation of objects as non-human actors that have the ability to produce effects on the world, transform our actions, and redefine our understanding. As mentioned previously, the important point here is that being an actant does not refer to what actors do, but rather to what *provides* actants with their actions. In other words, the focus is distributed from the actor's activities to the assemblages of resources and the production of differences.

The term *network* was originally introduced as a critical notion for capturing a series of *transformations* (translations) which could not be captured by traditional terms (e.g., institution, society) of social theory (Latour, 1999a). However, as Latour (2002b) admits, using the network metaphor was dangerous as it caused a transformation of the meaning of the notion to the exact opposite. With the rise of the Internet, the notion became popular and implied immediate access and circulation of information, without transformation. One of the characteristics of the notion of network as used in ANT which distinguishes it from Castells' (1996) use of the term network, is that in ANT the

elements in a network are defined through their connections to other elements. Therefore, a network is made of the traces left behind by moving elements (Latour, 2005, p. 132). The idea behind this notion is to bring into the foreground the very making of the network (Latour, 2005). However, the network, is marked not only by the connections, but also by the action, production and transformation of these connections and their effects. In other words, what is important is not merely to point out facts and their connections (Latour, 2002a), but rather to follow the production of differences and effects distributed across all actors. To illustrate this, Latour (2002b) refers to architects' stories which:

> are full of little words to explain how they are 'led to' a solution, 'constrained' by other buildings, 'limited' by other interests, 'guided by the inner logic of the material,' 'forced to obey' the necessity of the place, 'influenced' by the choices of their colleagues, 'held up' by the state of the art, and so on. (p. 4)

The relations between the human and non-human are usually taken for granted and black-boxed. It is only when something breaks down that it becomes visible; for example, when a computer breaks down during a lecture (Latour, 1999b). Therefore, Latour wishes to develop sensitivity to constraints that lead to a rather autonomous scheme that gradually gains a life of its own. This in turn, leads to a transformation of the agency, a shift from being the powerful master or creator to being distributed to a sea of 'agents,' and 'actants' (Latour, 2002b, p. 4). Thus, an actor is an effect of particular relations among heterogeneous elements.

3.3.1.4 From Social Constructivism to Constructivism

The word 'construction' is often used interchangeably with the words '*social* construction' (Latour, 2002b), in spite of the fact that there is an essential difference between the two. The paramount reason for dropping 'social' in favor of just 'constructivism' is to move away from the view that the construction is solely made of social stuff. The word *social*, refers to the collective and collaborative process of construction, while the word *construction* is used in order to metaphorically illustrate the many heterogeneous elements that participate in the long and complex coordination process that is necessary to achieve a result. By using this term, Latour wanted to associate reality and construction into one single dynamic using one single term. Unfortunately, the term 'constructivism' came to mean the opposite of 'realism,' implying that one has to choose between the former and the later (Latour, 2002b).

Latour (2002b) points out that there is a problem with using the metaphor of constructivism, as it fails to resemble the durable whole, including the role given to the builder and the material being used, the solidity and durability of the outcomes, as well as

the contingencies and necessity. He criticizes critical sociologists who use the notion of construction to illustrate that things are not naturally there, but are rather products of social skills. This implies that something was created by an agency, a powerful creator who is in full control of the production. Latour views this account as unrealistic, and emphasizes that this metaphor implies that the agency is distributed to a sea of actors, where it has no control or mastery to dominate materials. To indicate the dynamics that come from the network where actions derive from a heterogeneous collective of humans and non-humans, the term 'hybrid collectives' (Callon & Law, 1995) was introduced as an alternative notion to that of networks.

Latour (2002b) explains that the problem with privileging the 'social' is that this can quickly lead to the claim that social relations are the foundations of everything. Latour criticizes such claims that can be found in social sciences and cultural studies, which build upon what he called 'superficial facades' (Latour, 2002b); the assumption that everything is made of the indisputable and powerful society. He clarifies that the word 'social' does not refer to the stuff out of which things are made, nor does it refer to the harder structure that explains the stability of everything. Rather, social refers to the heterogeneous associations of many diverse sources (Latour, 2002b).

Another problem with providing special preference to the social is that technical elements are neglected. Technology is viewed as passive, a resource or constraint that is activated and controlled by humans. I showed (in section 2.3.2.1) how this view of technology as a structure that enables or constrains humans can be found in IS studies (Orlikowski, 1992b; Walsham, 1993) and how these studies have been criticized for neglecting the role of technology either by black-boxing it or by excluding it from social practices and contexts (Hanseth et al., 2004; Orlikowski & Iacono, 2001). Such approaches that are committed to merely social (conscious) choices, risk neglecting unintended and unanticipated consequences of technical choice as they always attach consequences to the social. ANT, on the contrary, identifies the role played by non-humans in the social order, and views it as being as significant as the role that humans play. Both artefacts and individuals can perform actions in different ways, and can consequently produce unintended and unanticipated effects.[89] In summary, when drawing upon a social constructivist approach, the context of society shapes the content of science and technology. However, when drawing upon a constructivist approach (ANT), there is a focus on the co-construction of technoscience[90] and society (Hess, 1998).

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[89] Greater elaboration of this is provided in section 2.3.2.2, followed by illustrations from the field of IT in healthcare.

[90] The term 'technoscience' was introduced by Latour to move away from a priori distinctions between science and technology, nature and society, subject and object, etc. (Moser, 2003, p. 21).

3.3.1.5 The Collapse of Epistemology into Ontology

In his book, *Pandora's Hope*, Latour (1999b) revisits the relationship between on the one hand humans, and on the other hand natural and technological objects, and presents strong arguments for the reason that humans have never been, and will obviously never be, separated from their creations. In other words, an object and its representation are intertwined and go hand in hand. He investigates the relation between the ontological world and our epistemological knowledge about the world, and wants to replace the (post)modernist worldview, where these are portrayed as two separate things and one should choose loyalty to realism or relativism. Consequently, "*essence is existence and existence is action*" (Latour, 1999b, p. 179). Jensen (2004a) explains that the claim '*essence is existence'* rejects the ideal and refers to the existing material world. The second claim, '*existence is action,'* proposes that we can try to find out what exists through activities as empirical observations. Jensen (2004a) clarifies however that this does not imply that reality is *simply* out there, waiting to be discovered, but rather that it can be articulated through an organized and coordinated effort, using different methods that will allow the researcher to explore characteristics of various heterogeneous entities. This view challenges traditional epistemology according to which activities such as observing or representing are different from intervening or constructing. When emphasizing the intertwinement of human and non-human actors, representing epistemologies is rather turned into particular ways of constructing and doing practical ontology. Accordingly, epistemology collapses into ontology, and Latour (1999b) moves the focus to the specificity of situations.

3.3.1.6 After Networks

The original formulation of ANT has changed considerably. Furthermore, there has been a shift in focus away from focusing on network building and notions of construction, alignment, closure and stability to exploring complexities and multiplicities (Grisot, 2008). This shift has been marked, among others, by the publication of the book *ANT and After* (Law, 1999) and the development of analytical insights and concepts, where the work of John Law, Ingunn Moser, Vicki Singleton and Annemarie Mol is central. I will now introduce the concepts and insights that are relevant to the work presented in this dissertation.

3.3.1.6.1 A Performative Approach: from Actors to Actions

As mentioned above, one of the recent refinements in the focus of ANT studies is the move away from notions of construction and closure, toward explorations of multiplicity and the performativity of enactment. Performativity refers to "the claim that words have effects on reality. More generally, the claim that enactments produce

realities" (Law, 2004a, p. 162). Enactment refers to "the claim that relations, and so realities and representations of realities…are being endlessly or chronically brought into being in a continuing process of production and reproduction, and have no status, standing, or reality outside those processes" (Law, 2004a, p. 159). In other words, the notions of performativity and enactment implies "arguing that *realities* (including objects and subjects) and *representations* of those realities are being enacted or performed simultaneously" (Law, 2008, p. 635). Thus, we are never simply observing an external reality that exists prior or independent of its representation; rather, through engagement in representation, reality is performed—it is en-acted (Law, 2004a).

The notion of enactment is used to emphasize that the world is performed through socio-material practices (Strand, 2006). An illustration of this can be found in the work of Annemarie Mol (e.g., Law & Mol, 2002; Mol & Berg, 1998; Mol & Law, 1994)—a prominent actor-network theorist and philosopher of science, technology and medicine—where she develops further the idea of ontological multiplicity which assumes that there are multiple co-existing realities. For example, in her book *The Body Multiple* (Mol, 2002), she shows how in order for a diagnosis (in this case, a lower-limb atherosclerosis) to be enacted, it must be crafted out of a story by the patient and embedded with the knowledge of the doctor. She illustrates how this diagnosis is produced and enacted in multiple locations (e.g., the clinic, the pathology laboratory, radiology department, the duplex, operating theatre), using different methods and practices (different sets of devices, skills and people: i.e. x-rays, ultrasound). Accordingly, she shows how each method of assemblage produces its own version of the diagnosis in different locations in the patient's body.

A similar approach is followed by Law and Singleton (2003) where they investigate how a local hospital handles patients who suffer from alcoholic liver disease, and study the multiple ways in which patient trajectories are imagined and enacted in one organizational setting. They explain how from studying alcoholic liver disease, they were led to other related phenomena (i.e. general liver disease, alcoholic abuse, alcoholism, quality of life, etc.). In theory, Law (2004a) explains, it is possible to distinguish between the different entities and then link them together; but in reality, they found out they were working with slippery and fuzzy phenomena; a fluid and ambiguous object.

The move toward performativity and enactment implies focusing on actions, on what actors *do* in *practice*. Thus, "one investigates what something is by asking what it is made to be and how it emerges" (Moser, 2006, p. 373). Consequently, instead of 'following the actors' (Callon, 1986), we follow the actions and look at what enables actors to perform/act. In other words, we "describe the emergence of an effect by referring not to agents but to 'that which lets/makes it happen'" (Gomart & Hennion, 1999, p. 226). Just as the actor is distributed in the network, so are the actions. Thus, action is not simply attached to an individual person, but is the performance of specific

collectives (Gomart & Hennion, 1999); of human and non-human actors. Different socio-material arrangements enable the enactment and configuration of particular subjects. In other words, particular sociotechnical material networks fabricate a person who has particular abilities/intentionalities, competencies, etc. (Gomart & Hennion, 1999).

3.3.1.6.2 The Ordering (Configuration) of the Subject

In the field of STS, there has recently been a turn to focusing on users (and non-users), consumers, and so on (Akrich, 1992; Oudshorn & Pinch, 2004). ANT scholars focus on *configurations* of subjects. In other words, instead of focusing on subjects, they focus on the *conditions* through which actors in networks emerge (Gomart & Hennion, 1999). This implies a shift from focusing on the *source of action* to exploring *how* particular actions are *performed*. An interesting illustration of such analysis can be found in Gomart and Hennion (1999) where they study drug users and music lovers, and focus, among other things, on the mechanisms through which 'passion' is performed.

The topic of configuration of the subject, has been a key concern in the work of Ingunn Moser—a prominent ANT scholar who has done extensive work, among other things, within disability studies (Moser, 2003; Moser, 2006). She investigates what are the modes that are enacted for ordering disability and how these capacities work together to make or enact a particular kind of subject. Moser (2006) argues

> that the mode of ordering disability at work here is geared towards normalization. It works by way of compensation to build and fix in place an order of the normal, and to turn disabled people into competent normal subjects. (p. 380)

She shows how this order is enacted in and through subjects, bodies, technologies, healthcare practices, policy documents and social services, etc. In her analysis, Moser uses Law's notion of modes of ordering (Law, 1994) which refers to recurring patterns generated as part of the ordering of heterogeneous human and non-human relations. This notion encourages us to study the way in which ordering is *done in practice* and how it enacts itself in different socio-material forms in particular conditions. Moser (2006) looks at modes of ordering of the *subject* and uses this notion in a more local way by investigating what it takes to become a subject and what type of configuration this seeks to achieve. For Moser (2006), subjects "are seen as expressions or manifestations of materially and discursively heterogeneous relations, the interactions and practices that carry and produce these relations, and their ordering" (p. 373). Here is an explanation of how she uses the notion of subjectivity:

> I adopt the notion of 'subjectivity' in its semiotic and poststructuralist usage, as referring to a location of consciousness, knowing, thinking or feeling. This is a very open definition that makes very few assumptions

> about where or what kind of location this is, and so provides me with an undetermined framework for tracing the making, shaping, embodying and delineating of subjectivities empirically. I use the term 'subjectivities' in the plural to emphasize that a subject position is not something one has, occupies or is structured into, once and for all, but rather a set of differently structured positions one moves between and is moved through, more or less fluidly. Whenever I refer to 'the subject' in the singular, this refers to a position that draws together, unified and hides a more complex set of subjective capacities. (Moser, 2006, p. 374)

Moser argues that the mode of ordering the disabled subject

> comes from the materials and is based on…crucial component parts that go into making subjects in the specific context and interactions…In this normalizing mode of ordering disability, becoming a subject also involved agency. It is distinguished and separated out from subjectivity as the external and embodied expression of an inner subjectivity. (Moser, 2006, p. 374)

While subjectivity is a structured position, agency, for Moser (2006) this refers to the capacity "to act in the world, to initiate and cause things to happen" (p. 375). In her work about disabled people, enacting agency is manifested in the capacity for activity and independence. She demonstrates how these capacities for enacting active and independent agency are made possible by and emerge in specific ordering of socio-material relations and arrangements. The body of the disabled person is attached to a set of computers, cables, and other devices that enable him to exercise centered control which is manifested in having subjective capacity and competence to control a situation and being in a position to act upon it. Thus "subjectivities, such as centered control, are made possible by and emerge in such embodied relations and arrangements" (Moser, 2006, p. 379). This leads her to argue that "agency is not a capability or property that belongs inherently in particular and bounded human bodies. Agency is always mediated. People are not actors, they are enabled to act in and by the practices and relations in which they are located, and they become actors because agency is distributed and attributed" (Moser, 2006, p. 381).

Drawing on the work presented in this sub-section (3.3.1.6), I will investigate the ordering and configuration of the subject, the action researcher (myself) in a diversity of contexts and settings. I follow a performative approach, explore how the different roles and actions (interventions) emerged in practice and how they were enabled and supported by the network. As mentioned earlier, different socio-material arrangements enable the enactment and configuration of particular subjects. I will, therefore, investigate the particular socio-material arrangements that enable me to perform/act in different contexts and situations where I was not able to act as I expected. Finally, I will delineate the

normativities that are enacted in traditional action research and IS action research literature, and identify problematic issues and limitations these may pose (see section 2.4.2.3 and Chapter 6). Thus far, I have delineated the constructivist paradigm and the theoretical platform for the dissertation.

I summarized in section 3.2.2 some of the main implications of adopting a constructivist stance to the study of technology (EMR). Applying ANT as a theoretical lens brings about additional implications. As mentioned above, with its principle of generalized symmetry ANT can be a powerful tool for studying the sociotechnical impact of technology as it neither overemphasizes the social nor the technical. This is due to the view that neither the social nor the technical alone can produce effects of social significance. Furthermore, I outlined a range of analytical concepts and insights provided by ANT that enable an investigation of the ways in which the social and the technical co-construct each other.

Using ANT had implications not only on the study of technology, but also on the study of the action research methodology. I will explain later (section 3.5) how my approach of unpacking action research, studying it 'in the making' and looking at how research findings were constructed was inspired by early constructivist ANT work (Latour, 1987) on unpacking science and looking at how facts were constructed. Drawing upon insights from recent work found within ANT (presented in section 3.3.1.6), I follow a performative approach and explore how the different roles and actions emerge in practice, and how they are enabled and supported by the network. In other words, this helps move the focus away from particular actors toward the sociomaterial connections and arrangements that enable the enactment and configuration of particular actors/subjects. I will return to the implications that a constructivist ANT approach has on the researcher's relationship to the field and to the data when I present an overview of the methods I used to study action research (section 3.5). But first, I will move onto describing the epistemological implications of applying a constructivist ANT approach and will explain the reflexive methodology I draw upon to investigate the action research approach, the dynamic and dialectic relationship between myself, my research practice, and the field site.

3.4 Empirical Case and Methods for Studying the EMR

Here I describe the empirical case (section 3.4.1), the methodologies used in the research (section 3.4.2), data collection techniques (section 3.4.3), and strategies for coding and data analysis (section 3.4.4).

3.4.1 Research Project and Field Setting

As mentioned in the introduction (Chapter 1), my research focuses on the implementation of an EMR. This research was a small part of a much larger project entitled ACTION for health, which aimed to investigate whether the introduction of new technologies into the health sector met stated policy objectives.[91] The project proposal emphasized that researchers in this project would work closely with health practitioners, community groups and other stakeholders to bridge the gap between academic findings and real-world issues. This is in line with the underlying ideology of action research (mentioned above in section 2.4.1.3) which focuses on real and actual concerns of practitioners. Furthermore, the project had the aim to communicate results to key decision and policy makers in order to inform the design of policies and systems. Again, this aim also fits well with the action research philosophy (explained in sections 2.4.1.2-2.4.1.3) which is based upon Lewin's idea of *using research* as a *tool for change* (Borda, 2006; Reason & Bradbury, 2006a; Wadsworth, 2006), for example, by influencing policy decisions (Reason & Bradbury, 2006b).

Figure 3.1: Pictures of the Clinic[92]

My research about the EMR took place in a non-profit community health centre (CHC) located in Vancouver (see picture of the clinic in Figure 3.1). The clinic is also a community partner of ACTION for Health, the project in which I was involved. A research partnership and access to the field had been negotiated prior to my involvement with the project, and hence did not prove problematic. Chapters 5-6 discuss at length the involvement of the clinic and the researcher (myself) in the study, as well as the complexities I faced in conducting the research.

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[91] ACTION for Health Project proposal. Available at http://www.sfu.ca/act4hlth/about_project/ACTION4Hlth _project%20proposal.pdf (accessed October 24, 2008).

[92] All photos, images and figures are courtesy of the author.

At the time fieldwork was undertaken, the clinic consisted of the following service providers: six to eight general practitioners (GPs) equaling four full-time equivalent (FTE) doctors, a chronic disease coordinator, a clinical pharmacist, two primary care nurses (nurse practitioners) equaling one FTE. The clinic included also a medical office administrator, an assistant to the physicians,[93] three to four medical office assistants (MOAs), one receptionist, and a few students (file-clerks and data staff). The administration consisted of the executive director, a capacity builder and the technical support staff.[94]

This non-profit clinic was established in 1988 with the underlying vision of providing multidisciplinary health services under one roof. The clinic provides both medical and dental care, which is one of its unique aspects. In addition, it offers a diverse range of services for different groups of patients (e.g. a 'youth clinic,' a 'well baby group' for new parents), and various groups for patients with chronic disease. The clinic embraces a unique model following a multidisciplinary, team-based approach, which includes collaborating with many different health care practitioners (e.g. a dietician, chronic disease coordinator and a clinical pharmacist), hospitals, clinics, and laboratories. The collaborative team-based approach is reflected in the physical layout of the physicians' charting room. Physicians[95] in this clinic do not have offices, but rather sit together in the charting room in an open space with computer stations. Charting[96] seems to be a fairly collaborative task in the clinic. In addition to having one charting room, the clinic has nine consultation rooms, and physicians rotate among the different rooms (see Figure 3.2 that shows the physical layout of the clinic).

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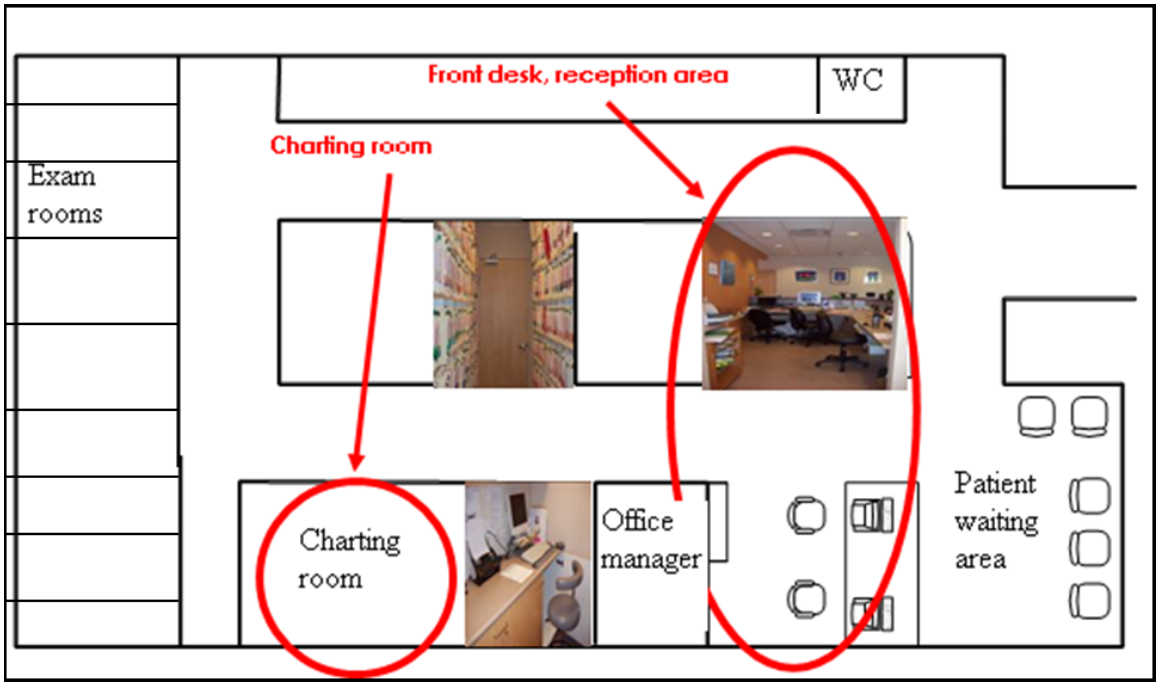
[93] I am using this role name to avoid confusion with 'physician's assistant', a para-professional role which is not licensed in Canada. The assistant to the physicians is responsible for various tasks, including, managing the patient flow between the patient's waiting areas and the consultation rooms, preparing for examinations (e.g., filing in vaccination documentation, preparing for PAP tests), assist the physicians with various tasks (e.g., taking blood pressure, measuring babies, etc.), and stocking medication and other supply in the rooms.

[94] There has been major staff turnover in the clinic during the last couple of years since my fieldwork and some positions no longer exist (e.g., the chronic disease coordinator, the technical support staff and the medical office administrator). In total, nine staff members left their positions after the change of management, leaving the rest to operate on what the staff call a 'skeleton crew.'

[95] I use the term 'physician' to refer to a general practitioner (GP), and I use the term 'health care practitioners' in the broad sense to refer to the different kinds of professionals (e.g., including both GPs, the clinic nurse practitioner, pharmacist, and MOAs).

[96] Charting refers to various documentation activities including, for example, writing referral letters and summary notes from consultations, ordering laboratory examinations, and reviewing and signing various documents.

Figure 3.2: Physical Layout of the Clinic



In Canada, most physician-based offices operate on a fee-for-service model, which implies that they bill for every service they provide. This clinic, however, operates on an alternate payment plan model, which implies that the doctors are paid a salary for their services based on a grant from the health authority. With an alternate payment plan model, the doctors track the service they provide to their patients by using a method called shadow billing, which essentially allows them to provide evidence of services rendered to the Medical Services Plan (MSP[97]) without actually receiving payment from the MSP. So in contrast to most clinics, the GPs work on salary, rather than on a fee-for-service model.

The clinic provides house calls (visiting housebound patients) and round the clock access to care (by having physicians on-call). Having a multidisciplinary team allows the health care practitioners to deal with complex patients who have high needs and risks, and suffer from multiple chronic diseases. There are approximately 5000 patients who use the clinic, many of whom are of a low socio-economic status (SES). Many patients have a multicultural background and over 25 languages are spoken in the community in which the clinic is located. A more detailed description of the clinic and the neighborhood within which the clinic is located provides a taste of the organizational reality of the clinic and the field site.

[97] This refers to the medical services plan of B.C. which insures various medical services provided by physicians, services provided by laboratories and diagnostic procedures.

The neighborhood had been undergoing dramatic changes already when I began my fieldwork in 2004. It was formerly a blue-collar neighborhood, but it has recently turned into a more upscale and hip place, with many antique shops and cafes. Several languages other than English are often heard on the busses that serve the neighborhood. The clinic is located on the corner of a busy street and another more residential neighborhood. The picture on the right side in Figure 3.1 (p. 85) shows the side that faces the busy street. The windows are decorated with opaque graffiti. The picture on the left shows the main entrance of the clinic with a big colorful mural showing small kids holding hands with what appears to be their parents, with an elder in a wheel-chair, etc.—portraying a happy and harmonious community.

Based upon my collaboration with the health care practitioners for the past three and a half years, I have learned that the clinic has a unique culture and work environment which, in part, is a result of the strong bond that exists between the various physicians and administrative staff. Most of the staff have been working in the clinic for many years, and have known each other and their patients for a long period of time. To an outsider, the staff in the clinic feels like a big family, and a sense of kinship and unity can be felt. Pictures of the staff's kids and family members are posted on the boards in the clinic. In addition, the clinic used to participate in various social activities in the community. Physicians in the clinic do not wear white coats, but rather dress casually. The clinic is patient centered and is based on the philosophy of letting patients' input shape the clinic's visions, which is reflected in various ways including patient representation on the clinic's board of directors.

3.4.2 Research Methodology and Design

Decisions regarding which methods will best guide a research project depend not only on the commitment to a paradigm, but also on multiple factors related to the conceptual framework that informs the research design (Guba & Lincoln, 1994; Maxwell, 1998). Factors related to research design include the aims of the study, the focus of the research, the context (settings) and the object of study (Mason, 2002b). The aim of the research presented here is to develop a deeper understanding of the sociotechnical aspects of the complexities and challenges that emerge along the transition process to an EMR.

The nature of the research and the topic addressed shaped my choice of qualitative research methods, as these have a specific strength in generating interpretive knowledge when studying social phenomena (meanings and processes) and actors in their natural settings (Denzin & Lincoln, 1994c, p. 4; Myers & Avison, 2002). Investigating an EMR adaptation in its natural context supports development of insight about the context surrounding the adaptation and enables the construction of alternative strategies. I did not choose quantitative methods because of the limitations that these methods have in providing in-depth explanations of the sociotechnical phenomenon which were the

subject of my interest. Through qualitative methods, I was able to acquire rich insight and in-depth understanding of the experiences of the individuals (health care practitioners) and the meanings they ascribe to the EMR-adaptation process. In other words, qualitative methods allowed me to explore the actual experiences of people's everyday world through the point of view of participants.

A significant amount of time was spent in the field establishing trustworthy relationships with the study participants. This, I believe, provided me with access to informal practices, hidden assumptions, and/or otherwise invisible issues essential to understanding the context and the interpretation of the phenomena being studied. The overall aim of this ethnographic study was to gain a deeper understanding of the existing situated work practices as well as insights into how the new EMR system was actually used by the participants. In summary, an ethnographic eye can help reveal hidden assumptions, values, and biases that are inherent in various practices and tools.

The research with which I was involved draws upon an action research approach (Punch, 1994), and was conducted through a close collaboration with the community partner. In this complex setting, the decisions regarding the research design were made recurrently as the research progressed, and they encompassed continuous negotiations between the principal investigators (PI), me as the research assistant (RA), and the clinic as the community partner. This is a continuously evolving process of translations of various heterogeneous interests. Janesick (2000) uses the metaphor of a dance to describe qualitative research design:

> Qualitative research design has an elastic quality, much like the elasticity of the dancer's spine. Just as dance mirrors and adapts to life, qualitative design is adapted, changed, and redesigned as the study proceeds, due to the social realities of doing research among and with the living…the qualitative researcher is like the choreographer who creates a dance to make a statement. For the researchers, the story told is like the dance, in all its complexity, context, originality, and passion. In addition, the researcher is, like the dance, always a part of the research project and, like the choreographer, an intellectual critic throughout the study. (p. 395)

Besides the focus of the research and the object of study, there are other factors that influenced the research design and these included the selection of the fieldwork site, as well as issues of access, participants and timeframe (Janesick, 2000, p. 383). Site selection and access to the field were negotiated by the PI prior to my participation in the ACTION for Health research project. In this project, I had an RA position which provided me with great flexibility as it financially supported my extensive fieldwork and allowed longitudinal research. Chapter 5 elaborates in greater length my position(s) in the field, but for now I will briefly note that in addition to the factors mentioned in the literature above, the design of my research was also shaped by broader contextual

circumstances. These circumstances included the interests of the ACTION for Health project, the interests of the community partners, the interest the PI had in me as an RA, and my own interest as a PhD Candidate. Furthermore, the design of my research was also shaped by other contextual circumstances, for example, the challenges that would have been involved in getting ethical approval (from the research ethics review broad,[98] the clinic and the patients) to observe patient consultations; this in addition to the circumstances in the clinic present at different points in time (e.g., the most optimal time for me to do fieldwork was during the summer, but this is often the most chaotic period within the clinic, with many locums replacing the various physicians). The choice of research methodologies and design impacted the kind of data collection methods chosen for the fieldwork.

3.4.3 Data Collection Techniques and Fieldwork

The fieldwork and data collection began in October 2004 and was completed in August 2007. The implementation of the EMR was followed from the initial phase of EMR installation, and continued throughout a period of three and a half years. Before starting the fieldwork, I participated in several initial formal meetings with the executive director of the clinic and the technical support staff.[99] I also attended medical team meetings, in order to be introduced to all the health care practitioners in the clinic. Table 3.1 (p. 91), provides an overview of data collection activities, and Figure 3.3 situates these data collection activities on a timeline.

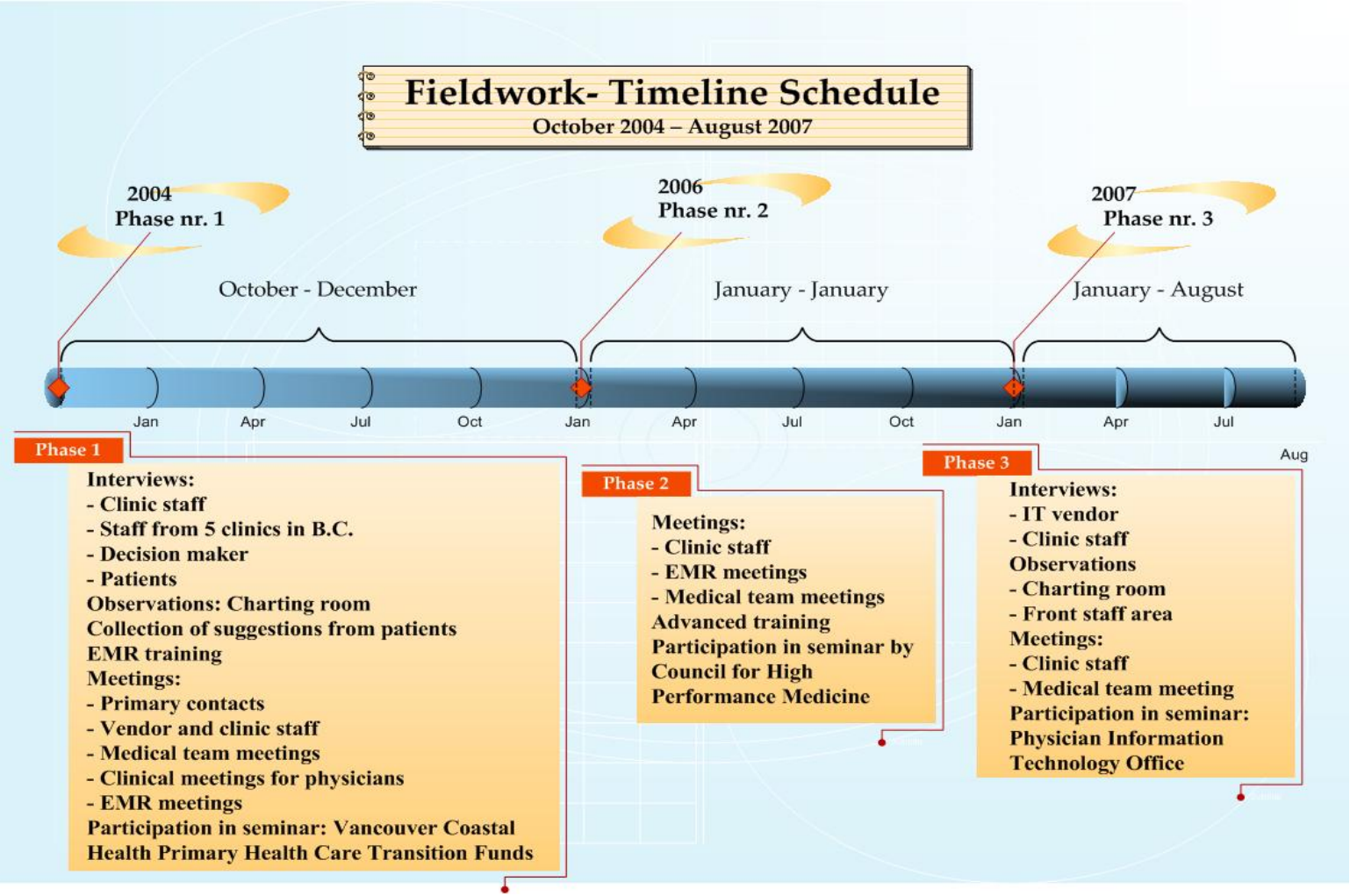
[98] It is interesting to note that in a recent editorial from the New York Times, research ethics review boards were characterized as institutions that are built upon postpositivist evaluation criteria which are more appropriate to hard sciences (i.e. medical models), rather than social science and humanities (Cohen, 2007). Mattingly (2005) challenges the assumptions that guide the practice of research ethics review committees—assumptions that it is possible to judge ethical matters from an objective or universal position—and suggests that ethical issues are contextual and actions are particular and these can in some situations be in conflict.

[99] An internal staff member, who was previously a Medical Office Assistant (MOA), was designated the role of providing technical support.

Table 3.1: Fieldwork Log

Source
Open-ended, semi-structured interviews: Health care practitioners from five different clinics in B.C.: 5 (range 1 to 2.5 h) ▪ Office Manager (Vancouver). ▪ Physician (Powell River) ▪ MOA (North Shore). ▪ Office Manager (Powell River). ▪ Public Health Nurse (Bella Coola) Health care practitioners from one clinic in B.C.: 11 (range 1 to 2.5 h) ▪ MOA: 3 ▪ Physician: 3 ▪ Executive director: 2 ▪ Physician assistant: 1 ▪ Technical support staff: 1 ▪ Registered nurse: 1 IT vendor (the president): 1 (1.5 h) Decision maker (Practice Development, VCH PHC Network, IT strategy): 1 (1 h) Patients from one clinic (10 November—15 December, 2004): 22 (range 15 to 45 min)
Collection of suggestions from patients: 13 suggestions
Participant observations in various locations (e.g., the charting room and the reception area): 10 sessions (29 h)
Participation in formal and informal meetings: ▪ Clinical meetings for physicians: 3 (1 h) ▪ Medical team meetings for all staff: 3 (1.5 h) ▪ Meetings with the vendor: 2 (range 1.5 to 2.5 h) ▪ Meetings between the vendor and the health care practitioners
Participation at EMR meetings: 29 meetings (range 1-2 h)
Informal conversations: ▪ Various health care practitioners (physicians, MOAs and executive director) ▪ IT vendor (technical support staff and the president)
Participation in seminar organized by the provincial health authority (VCH PHCTF): ▪ Practice enhancement collaboratives: 3 (27 h) ▪ Physician Information Technology Organization (PITO): 1 (9 h)
Participation in seminar organized by the Council for High Performance Medicine to various health care practitioners: 1 (2 h)
Participation in basic and advanced EMR training sessions provided by the vendor to physicians and administrative staff separately: 3 sessions (4.25 h)
Document analysis

Figure 3.3: Fieldwork Timeline



Gradually, I was given the opportunity to participate in weekly EMR meetings that were organized by a special EMR committee established shortly after the technical implementation, and I subsequently received the responsibility of chairing the meetings and writing minutes.[100] The EMR committee consisted of representatives from each professional group who gathered on a weekly basis to discuss the various challenges and complexities faced, to evaluate the adaptation process and to define new goals. In total I participated in 29 EMR meetings. In addition, I participated in several other kinds of formal meetings, such as three clinical meetings for clinicians and two meetings with the IT vendor, as well as many informal meetings with the health care practitioners (for a complete list of the fieldwork see Table 3.1 and for the data collection timeline see Figure 3.3, previous page).

Although the primary source of empirical data comes from the clinic—the community partner—I will also make use of interviews conducted during the initial fieldwork phase with health care practitioners from five different clinics in British Columbia (B.C.). These semi-structured interviews were undertaken in response to the community partner, who requested that I investigate experiences of health care practitioners in other clinics using the same EMR. Face-to-face interviews were conducted where possible in the respective clinics, and telephone interviews were conducted in situations where the clinics were located in remote and rural areas in B.C. These interviews lasted between 1 to 2.5 hours. All interviews were audio-recorded, some were fully transcribed and some were interpreted through repeated listening and selective transcriptions.[101] A report summarizing insights from the interviews was written and delivered to the clinic, and was later used to inform the implementation of the EMR (see Appendix F). Finally, I attended several practice enhancement collaboratives that were organized by the provincial health authority supported by the Primary Health Care Transition Funds (PHCTF), which funded the clinic's EMR purchase and implementation.

Interviews were also conducted with patients from the community partner, to explore their views of the EMR. A draft of the interview questions were submitted to the clinic, who provided me with feedback and asked me to revise the language to make sure it fit their patient population (the language negotiations from this meeting will be discussed in greater detailed in section 5.2). In total 22 interviews were conducted, all of which were audio-recorded, and most of which were transcribed (lasting between 15 to 45 minutes). In addition, a suggestion box was placed in the clinic, to collect patients' opinions about the EMR. All 13 paper-based suggestions were scanned and included in a

[100] This will be elaborated in greater detail in Chapter 5.

[101] Not all interviews were transcribed due to time constraints and the pressure to begin the second sub-project which focuses on the EMR implementation in the community partner's clinic.

summary report which was submitted to the clinic. This report (see Appendix D) included a reflection on the various benefits patients expected would be achieved by the implementation of the EMR, the challenges they expected their health care providers would face, as well as the concerns they had about the implementation. In addition, education material to address the concerns of patients was prepared and given to the clinic (see Appendix E). The interviews with the patients were primarily used for the summary report given to the clinic. They were also used as background material for Chapter 4 (in particular section 4.2.1). I chose to use the patient interviews mainly as background material because they did not provide sufficient in-depth information that would help me answer my research question. Because the interviews were conducted prior to the actual implementation of the EMR, the patients could not so easily relate to questions about the impact of the EMR on their consultations with their doctors. Since the transition to an EMR was not yet tangible for the patients, the interviews drifted away from the topic of EMRs to the impact of computers on our society in general. The initial plan was to conduct interviews with the patients both before and after the EMR implementation. This, however, turned out not to be feasible due to time constains and the pressure to move onto other sub-projects (i.e., the study of EMR implementations in other clinics and the in-depth study of the EMR implementation in the community partner's clinic).

A first set of interviews was conducted during the first stages of the EMR implementation (October-November, 2004) with the various clinic staff to acquire preliminary knowledge about the context surrounding the adaptation of the EMR as well as to acquire a deeper understanding of the situated work practices. Another set of interviews was conducted between June- August (2007), with the intention of understanding the actual use of the EMR two and half years after its implementation. These were all open-ended, semi-structured interviews conducted face-to-face. This resulted in 11 interviews (each lasting between 1-2.5 hours) with various health care practitioners, including three MOAs, three GPs, two extecutive directors, a technical support staff, a nurse and an assistant to the physicians. In addition,,one interview was conducted with the IT vendor and one interview with a decision maker (each lasting between 1-1.5 hours). These interviews were audio-recorded, and fully transcribed. The interview questions were based on the previous set of questions, but were revised throughout the fieldwork based of my observations.

In most cases, I either sent the questions to the interviewee beforehand or sent a list of the topics I wanted to discuss during the interview. Since my intention has been to grasp the individuals' perspectives, most of my questions were open-ended (Deacon, Pickering, Golding, & Graham, 1999, p. 64; Petterman, 1998, p. 480) and reflexive (Hammersley & Atkinson, 1995 p. 151). From the main list of questions, the interview questions were tailored to specific people and their positions, and how long they had been working in the clinic. Because of a lack of physical space in the community partner's

clinic, most interviews with the staff were conducted outside the clinic in coffee shops. The advantage of this was that the interviewee felt comfortable in such a neutral and informal location. This practice of conducting interviews in public places was nevertheless at the cost of poor recording quality of the interviews. I allowed the interview to progress in a way that was comfortable for the interviewees, and tried to fit the questions into topics of particular relevance to them. In the second round of interviews, rather than reading formal questions, I prepared a list of possible topics I wanted to discuss with the interviewees but left space for exploration and allowed the interviewees to discuss topics that were of interest to them. In addition, I used the second round of interviews to clarify issues that were unclear to me and to cross-check and verify whether my observations and insights were consistent with the views of the health care practitioners.

I used different strategies for finding informants: in the patient study, I simply interviewed anyone who sat in the waiting room and agreed to be interviewed. In the study of other clinics and the study of the community partner's clinic, I followed, by and large, the "snowball" technique, moving from one practitioner to another that was recommended to me.

Figure 3.4: Reception Area

Even though language is the most significant source for empirical data, it is nonetheless not the only one (Hammersley & Atkinson, 1995 p. 126). I also paid attention to non-linguistic accounts, the tone of voice, expressions, body language, etc., as these can help explain and extend the words the informants use (Tierney, 2003). Interviews have the strength of proving insights into how the staff perceived the EMR system; insights which cannot be accessed through observations alone (Walsham, 2002). Nevertheless, there are also interactions that occur and other issues that are inaccessible

during interviews. To capture these interactions, interviews were supplemented with participant observations (in total 28 h 45 min) in one clinic (the community partner), where physicians and administrative staff were observed using the EMR. This occurred during ten sessions of participant observations (in total 22 hours) behind the reception desk (shown in Figure 3.4, p. 95) and in the charting room. Participant observations and interviews are both designed for use in natural settings (Forsythe, 1999, p. 128), and they have specific strength in capturing the individual's point of view (Denzin & Lincoln, 1994a). Since my research was conducted in natural settings and I was interested in the individual's point of view, observations and interviews were the most adequate methods for my setting. According to Hammersley and Atkinson (1995), the advantage of combining these methods is that data from one technique can be used to sustain or refute the other. Following a constructivist paradigm (presented in section 3.2), I am rather interested in the *reasons* for the differences between what people say and what they do.

Figure 3.5: Unintrusive Researcher[102]

One of the challenges I faced when conducting observations in this particular setting was with the physical layout of the clinic, especially behind the reception desk where there is barely space for the MOAs. I was continuously struggling not to be in the way. I was not exactly sitting on a tall chair (illustrated in Figure 3.5)—like the actor from the Norwegian film Kitchen Stories[103] (Hamer, 2003)—observing 'objectively' the 'subject' that is studied. I was nonetheless intrusive despite attempts not to be. My intrusiveness was intensified when the atmosphere in the clinic was hectic and chaotic, for example, during the winter around the flu shot period, or during summer when there are many locums.

[102] All sketches and figures are courtesy of the author.

[103] Kitchen Stories (Salmer fra Kjøkkenet) is a Norwegian film which takes place in the 50s where Swedish researchers are sent to Norway to study single men's kitchen habits. It provides an amusing illustration of observations in the positivist paradigm. According to the strict and rigorous rules of the scientific research institute, the observer has to sit on an umpire's chair and is banned from communicating with the 'object of research.' Gradually, the subject stops using his kitchen and instead starts observing the observer through a hole in the ceiling. The relationship gradually becomes complicated as the researcher develops a friendship with his subject, the aging farmer.

Table 3.2: Empirical Data used in Different Chapters

Chapter	Type of Data	Informant/Location
Chapter 4 4.2.2 4.2.1	Interview transcriptions	Health care practitioners from the community partner's clinic. Health care practitioners from five clinics in B.C. IT vendor. Decision maker. Patients.
Chapter 4	Observation notes	The charting room and the reception area.
	Notes from formal and informal meetings and conversations	Meetings with various health care practitioners, EMR meetings, clinical meetings for physicians and medical team meetings for all staff. Meetings with the IT vendor and meetings between the IT vendor and the health care practitioners.
	Notes from participation in seminars	Organized by the health authority and the vendor.
	Notes from EMR training sessions	Basic and advanced training.
Chapters 5-6	Memos from interviews	Health care practitioners from the community partner's clinic. Health care practitioners from five clinics in B.C. IT vendor. Decision maker. Patients.
	Memos from observation notes	The charting room and the reception area.
	Memos from formal and informal meetings and conversations	Meetings with various health care practitioners, EMR meetings, clinical meetings for physicians and medical team meetings for all staff. Meetings with the IT vendor and meetings between the IT vendor and the health care practitioners.
	Memos from EMR training sessions	Basic and advanced training.
	Memos from participation in seminars	Organized by the health authority and the vendor.
	Email communication	With the community partner's clinic, the vendor and people from the health authority.

To become familiar with the EMR system, I attended three basic and advanced training sessions provided by the vendor and organized separately for each professional group. In addition, various documents were collected, such as meeting minutes, emails, memos, reports, project plans and newsletters provided by the IT vendor, the regional health authority and the Ministry of Health. Finally, to create visual representation of the context photos were taken, and work activities of the health care practitioners were mapped in various flow diagrams.

I have thus far described the various methods I used to collect data about EMR implementations. Table 3.2 (p. 97) provides an overview of the data I have used in the two components of my dissertation. Data used in Chapter 4 constitutes field notes about the EMR and the health care practitioner's work practices. As shown in the table, the interviews with patients and with health care practitioners from different clinics in B.C. were primeraly used as background material for sections 4.2.1-4.2.2. The table also shows the data I used in chapters 5 and 6 which constitutes analytical ideas and reflections related to my methodology. As will be explained in the next section (3.5), I kept a research journal writing memos that documented my fieldwork experience. As I gradually became increasingly interested in my roles in the field, I followed a more systematic approach and kept track of and summarized important interactions and events (e.g. informal conversations, email communication).

3.4.4 Coding and Data Analysis

As in most qualitative research, data collection and analysis are conducted in parallel to help develop a coherent understanding and interpretation (Marshall & Rossman, 2006). Therefore, in my research, I began analyzing the data as I was collecting it, modifying my observation techniques and focus as the research proceeded, based on the experiences and the data collected (Marshall & Rossman, 2006, pp. 155-156; Schatzman & Strauss, 1973, pp. 108-110). Incomplete or unclear data or interpretations lead to collecting and analyzing new data that strengthen the interpretation (Marshall & Rossman, 2006). Finally, "interpretation takes shape as major modifications become rare and concepts fall into established categories and themes" (Marshall & Rossman, 2006, p. 156) and saturation is reached.

The analysis I conducted involved writing and identification of themes. The writing refers to ensuring thick descriptions and summaries of the empirical data and analytical ideas. With the aim of studying the transition process to the EMR, my initial focus was on understanding the existing work practices. I chose various tasks (e.g. writing a referral letter, prescription refill) and tried to map out all the activities and actors involved in each task. Thereafter, I began focusing on understanding the EMR system, and the way it was used (and at times rejected) by the health care practitioners. As I began participating in the EMR meetings, and gradually received responsibility for

chairing these meetings and writing minutes, I started tracking issues that were discussed in the meetings in order to document which challenges were faced and how these complexities were solved (or not). I kept a separate folder of the formal meeting minutes that I sent to the EMR committee, and another folder of my observation notes from these meetings.

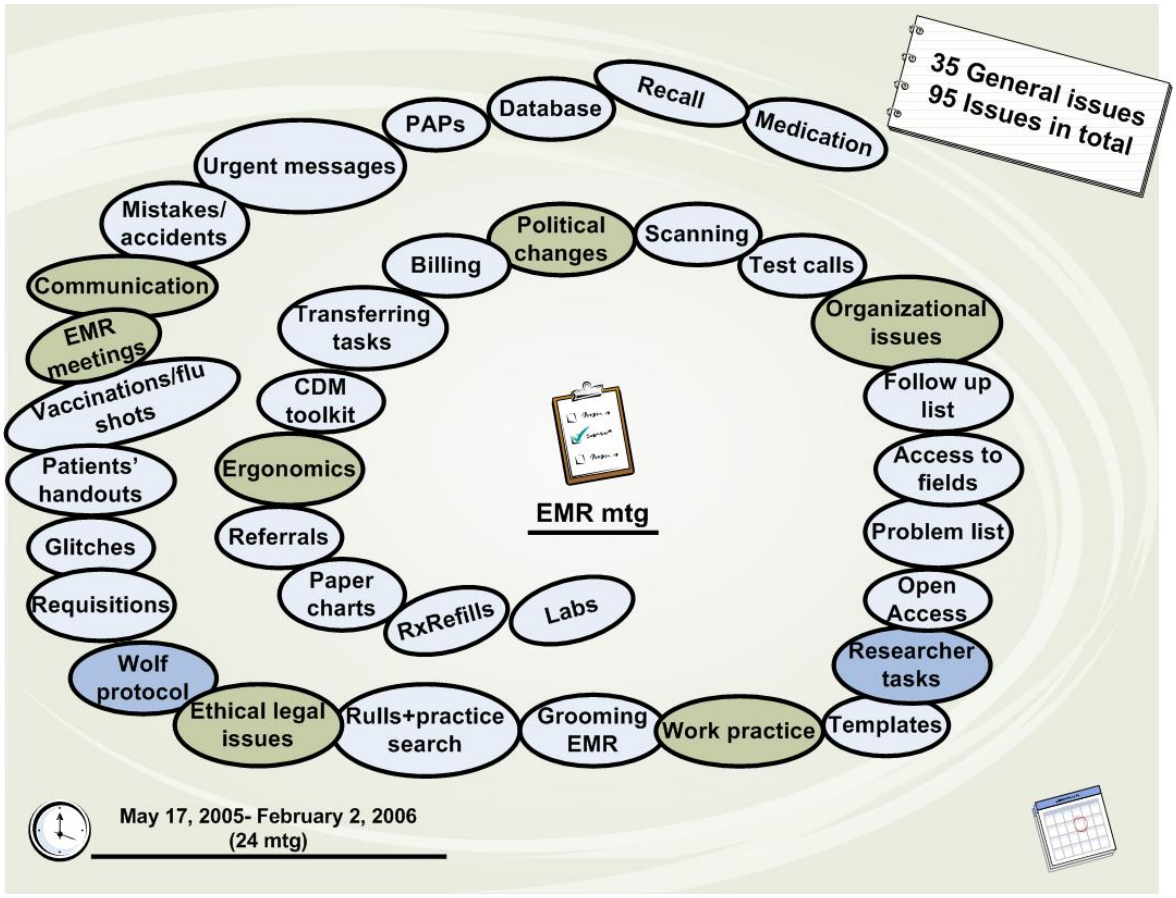
Depending on the purpose of the analysis, I followed different types of approaches. This included following an inductive approach according to which I looked for categories, themes, and repeating patterns emerging from the data (Janesick, 2000). I grouped and clustered the data in multiple ways (using for instance maps and diagrams), to provide space for different conceptualizations and interpretations. In other instances, I followed a theory-driven approach, and interpreted the empirical data according to my theoretical framework (Walsham, 2002). Following a hermeneutic and dialectic approach, I traveled back and forth between the empirical data, the theory and literature.

I used different types of codes some of which emerged from the research question, others from the empirical data, and some which came from the literature. For instance, when analyzing the interviews with health care practitioners from different clinics in B.C., I used a priori codes (e.g. challenges, benefits, lessons learned) which I generated in the beginning of the research project and which I used as a starting point for the preliminary research focus. For tracking issues discussed in the EMR meetings, I used "'*in vivo*' categories" (Richards, 2005) which refer to grounded codes (that emerged from the data) using the participants' own words. In other words, I used each issue as a code (see Figure 3.6 for a list of these codes).

Other codes I used included, for example, technology-in-use practices (Orlikowski & Gash, 1994) and reflection-on-action activities[104] (Schön, 1983), which reflected categories of issues documented in the literature that were likely to be of interest in the context of this study. These codes helped me retrieve all the data that is relevant in order to compare and contrast them, look for repeating patterns, and try to characterize them.

[104] Technology-in-use practices comprise people's understandings of the technology-use on a daily basis and the consequences of such use, and reflection-on-action refers to the activity in which health care practitioners explicitly reflect on experienced problems and articulate new strategies for actions. These codes were used in the analysis presented in section 4.3.

Figure 3.6: Codes from EMR Meeting Minutes



For section 4.3 which discusses technology-in-use practices, I examined the empirical data and extracted essential aspects related to the adaptation of the EMR. I coded the empirical data using one set of categories. During this process it became evident that the meetings held by the EMR committee were one of the most essential driving forces of the EMR adaptation. I therefore decided to focus the analysis on this particular aspect and to identify characteristics in the management, execution, and impact of the reflective spaces. To identify the way in which the practices evolved over time, I carefully reinvestigated the data by applying the theoretical concept of technology-in-use. Identifying both the initial and the emergent technology-in-use practices made it clear that the meetings had a high degree of impact on the adaptation process. The re-examination of the data concerning the meetings lead first to the conceptualization of continuous reflection-on-action activities, and then later to the identification of the characteristics of the important space for reflection-on-action activities within technology adaptation.

For section 4.5 which identifies and distinguishes between initial and emergent changes, the empirical data was grouped in different ways to allow investigation of different phenomena and careful exploration of various repeating and/or contrasting

patterns. I began by summarizing the various changes that were brought about by the technology. During this process, I began noticing differences between the changes the informants described in the second set of interviews (conducted nearly three years after the installation of the EMR) and the changes that they described in the first set of interviews (conducted in the beginning of the implementation process). Trying to explain the differences between the changes led me to focus on the differences between the *implications* of these changes.[105]

Finally, for the purpose of coding and analyzing the empirical data, I have used the qualitative research software NVivo 7. There are various advantages in using software for qualitative analysis. For instance, storing all types of data (e.g., interview transcripts, observation notes, meeting minutes, reports, etc.) in one place is advantageous, and the software supports ease of retrieval of text, building a hierarchical tree-structure for the codes, linking to various external files, attaching memos to particular documents, etc. In addition, using such software makes it possible to cross reference codes and to connect comments with their resources (Deacon et al., 1999, p. 362). One of the major strengths of NVivo is the ability to run advanced and sophisticated searches across all documents by using the various query functions. These searches can be saved both as queries and as nodes (codes). This is especially useful for exploring the data and looking for prospective patterns. All the above mentioned functions

> help speed up your research work considerably, particularly when you are dealing with a large number of lengthy documents. Moreover, it ensures that you get a *comprehensive* record of all that was written or said on that particular theme or issues, rather than just the most memorable comments or points (Deacon et al., 1999, p. 36).

However, one of the main challenges I faced using NVivo was the lack of flexibility with shuffling and scanning activities,[106] which resulted in narrowing down the level of analysis at a rather early stage. I have also used other software (i.e. Mind Manager, Microsoft Office Visio and Inspiration) to allow visual representation of locations in the clinic and to map various phenomena observed.

In the above section, I described the methods I used for studying the EMR. I will now move onto describing the epistemological implications of applying a constructivist

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[105] This analysis will be provided in section 4.5.

[106] By this I refer to the activity of scanning and skimming through text, as opposed to reading text carefully. An hour transcript may be over 15 pages, and while it is important to pay attention, code and analyze text and paragraphs in the transcripts, it is also paramount to be able to zoom out and see the paragraphs in relation to the rest of the transcript. This zooming out activity is difficult when using NVivo, because one can see only one page (or a few paragraphs) at a time.

ANT approach and will explain the reflexive methodology I draw upon to investigate the action research approach, the dynamic and dialectic relationship between myself, my research practice, and the field site.

3.5 Studying Action Research- The Reflexive Turn

3.5.1 Second-Order Inquiry and Action Research 'in the Making'

As mentioned in the introduction (Chapter 1), chapters 5-6 in the dissertation focus on the research practice and the methodology I used to study action research. This was possible by adopting second-order inquiry which—in contrast to first-order inquiry that focuses on reflections related to the object of study—focuses on the research process and method used for studying the object (Pedretti, 1996). In other words, while first-order inquiry, in my case, focuses on reflections related to technology in health care, the latter focuses on the method used for studying the technology. Focusing on the method used rather than on the *findings* or *end-product* of the research leads us behind the stage and gives us a glimpse of the research *process*, meaning the work that went into constructing the research project and made it function as a coherent whole. By adopting second-order inquiry I wish to question the tacit knowledge (Polanyi, 1997) behind the practice of doing action research and in this way try to articulate the otherwise invisible research practice. The identity of an action researcher can be constructed and reconstructed, among other things, through the roles she chooses to adopt when intervening in practice. It is only through reflections that we can access the invisible and taken-for-granted reasoning underlying these choices. As proposed by Boland and Lyytinen (2004), I embrace the responsibility of reflecting upon my own research practices and studying the process of action research 'in the making.'

My approach to studying action research 'in the making' is inspired by Latour's influential book *Science in Action* (1987), where he studies how scientific theories and facts are constructed. Latour traces the web of associations between controversies, statements, and artefacts by following scientists inside and outside of their laboratories as they collect allies. This approach is based on the premise that the black box of science should be opened and that scientific theories should be subjected to critical scrutiny. As mentioned earlier, scientific knowledge was now deemed as contestable as other forms of knowledge (Kuhn, 1970). The examination is conducted by a dissenter whose main role is to question decisions made by the majority and to question how claims become taken for granted, 'true' facts. I use the action research 'in the making' approach to delineate the nature of action research collaboration, and unpack some of the complexities embedded within such collaboration and their impact on the roles of the researcher and the practitioners. I want to explore what constitutes the dynamics and uncertainties within action research. Rather than simply focusing on how action research should normatively

be carried out following a set of pre-defined principles (e.g., Davison et al., 2004; Mumford, 2001), I focus on how my research project unfolded *in practice*. I gradually noticed I was so immersed in the field that I feared being unable to step out of the context and reflect on my roles and interventions. I, therefore, decided to critically challenge myself and engaged in reflective monitoring of my own research practice.

To better understand the transition in the types of engagement that the researcher adopts, in Chapter 5 I investigate the complex dynamics of negotiating and balancing roles and interventions within action research by turning my roles into the object of inquiry. I thereby embrace responsibility for reflexive monitoring of my own research practice by capturing my reflections which were mainly triggered by uncertainties I experienced in the field. During this three and a half year project, I, as action researcher, encountered different uncertainties related to the dynamics of roles—uncertainties which I systematically used as starting points for reflecting on my own research practices.

3.5.2 Reflexivity and First-Person Action Research

Traditional action research is likely to adopt methods that have a reflexive-dialectical perspective on practice. These methods "are reflexive in the sense that they engage participants in a collaborative process of social transformation in which they learn from, and change the way they engage in, the process of transformation" (Kemmis & McTaggert, 2003, p. 355). In other words, such research adopts an emancipatory view as it aims to help people explore ways to intervene and change the wider social structures that shape their practices (Kemmis & McTaggert, 2003).

In addition, traditional action research methods are reflexive in the sense that the researcher is expected to be both situated and self-critical, reflecting explicitly upon the perspective and assumptions used to create knowledge (Reason & Bradbury, 2006a). Reflexivity can be achieved, for instance, by adopting one of the three modes of self-reflective practices offered in traditional action research. These modes are: first-, second- and third-person action research.[107] First-person action research speaks to the researcher's ability to cultivate a critical approach to her own understanding and research practice, and in general, to her way of being and acting in the world (Heen, 2005, p. 265; Kemmis & McTaggert, 2003, p. 355; Reason & Bradbury, 2006b, p. xxv). While first-person research focuses on the single person, second-person action research brings people together to address issues of mutual concern and themes of shared interest. Finally, in third-person research the inquiry is extended to groups too large to engage in face-to-face

[107] For more information about the different types of research practices see (Marshall & Mead, 2005) and the special issue about self-reflective practice and first-person action research (Baskerville & Myers, 2004b).

communication. Several scholars suggest that first-person research is best supported when conducted in the company of colleagues who can both support and challenge the researcher through a collaborative inquiry process which may evolve into a second-person inquiry (Marshall & Mead, 2005; Reason & Bradbury, 2001). This was the case with the research presented in this dissertation, where the initial first-person inquiries evolved into second-person inquiry. [108]

Recently, the importance of grounding action research practice in first-person inquiry has gained a growing recognition within traditional action research (Marshall & Mead, 2005), and it has been argued that before we can engage in change processes aimed at the improvement of society, we need to be willing "to engage in transformation of consciousness and behaviour at personal and interpersonal levels" (Reason & Bradbury, 2006b, p. xxvi). Debates regarding reflexive methodology exist also outside of action research, where social scientists have, in the past decades, been concerned with the importance of interpretations and reflections during the research process. The term 'reflexive methodology' was proposed by Alvesson and Skoldberg (2000), to promote careful reflections and interpretations of the researcher's impact on the findings, and an acknowledgement that the findings are co-constructed through the interaction between the researcher, the research process, and the empirical data. As Alvesson and Skoldberg (2000) explain, this calls for the utmost "attention to the complex relationship between processes of knowledge production and the various context of such processes as well as the involvement of the knowledge producer" (p. 5). Law (1994) also discusses the importance of reflexivity and encourages us to investigate how we came to order reality and practices the way we have. He offers the following principle, which I kept in mind throughout my work: "Act unto others as you would have them act unto you. Or better, act unto yourself as you would unto others" (Law, 1994, p. 16).

3.5.3 Reflective Thinking- Reflexive Methodology

A very critical activity in action research is the stage of reflection where "the researcher and participants engage in collective interpretation of the findings and contemplate what can be learned from the experiences" (Lau, 1997, p. 52). Reflective monitoring of research practices is obviously important; still, it is unclear what 'reflective monitoring' actually entails. This may be related to the fact that we often lack formal training in the practicalities and practices of doing action research (Heen, 2005), and it may be related to the fact that descriptions of actual inquiry practice are seldom included in action research publications (Marshall & Mead, 2005). The aim of this component of the dissertation (primarily chapters 5-6) is, therefore, to provide a glimpse of the process

[108] As mentioned earlier, these second-person dialogues were conducted with another action researcher.

of self-reflective practices, based on my experience of enacting action research for three and a half years. Furthermore, I wish to articulate the researcher's transformation when embracing empirical uncertainties faced in the field; uncertainties which can be a catalyst for learning and shaping our theoretical views of action research. This articulation requires the willingness to be open, to question, and to negotiate how action research is performed in practice. If we, the action researchers, provide ourselves with space for reflection and argumentation, which nurtures learning and is free from judgmental or rather hostile views, we can turn methodological uncertainties into useful reflections, which might provide us with new alternative strategies for handling our roles and identities. It is essential that the space is not inhabited by self-justifications and defensive reactions. Action research is not a religion we must defend and submit to. Instead I perceive action research as a continuously changing phenomenon requiring careful reflections on emerging uncertainties related to roles and identities.

Reflective monitoring involves a critical endeavor and an interest in the practical situation. Critical interest refers to reflections through questioning the taken-for-granted assumptions, feelings, beliefs, and actions within a particular situation (Ross & Hannay, 1996). A reflective thought constitutes an "active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it, and the further conclusions to which it tends" (Dewey, 1910, p. 6). Reflections are, therefore, not coincidental thoughts, but rather careful considerations of an experienced state of uncertainty or doubt without clear suggestions for action (Dewey, 1910). Reflective thinking involves the following sub-processes: "(a) a state of perplexity, hesitation, doubt; and (b) an act of search or investigation directed toward bringing to light further facts which serve to corroborate or to nullify the suggested belief" (Dewey, 1910, p. 9). Reflective monitoring of my practice as a researcher thus requires that I willingly choose to endure a condition of puzzlement or disturbance triggered by experienced uncertainties within my own practice. The aim of reflective activity is to search and evaluate alternative suggestions for solving perplexity in a situation where experience and prior knowledge cannot supply a solution, but only a suggestion. Reflective activities can take different forms, one of which is the previously mentioned first-order inquiry which I adopted to critically reflect on my own research practice, driven by my experiences of doubt, disturbance, and uncertainty when enacting action research.

For this purpose, I kept ongoing memos to reflect upon methodological complexities I faced throughout the research collaboration and to describe my experiences from the field. In contrast to my field-notes that constitute descriptions related to the EMR system and the clinic staff's work practices, these memos encapsulate reflections on my own research practice, my roles and interactions in the field, and the impact the different roles had on my interventions and on the way practitioners viewed me. These memos are what Latour (2005) calls notebook for feelings from the field where one "document[s] the transformation one undergoes by doing the travel [including,

for instance,] appointments, reactions to the study by others, surprises to the strangeness of the field" (p. 134). These memos allowed me to see how my identity as an action researcher was continually constructed and reconstructed through the choices I made about my roles when intervening, and it pushed me into thinking about the invisible and taken for granted reasoning underlying these choices. In addition, these memos allowed me to capture the way in which my views about action research evolved as I gradually became more critical and circumspect toward my own roles and research practices. In sum, reflective monitoring of research practice requires that one willingly endures a condition of puzzlement triggered by experienced uncertainties. In practice, this requires adopting a first-person perspective, and keeping ongoing memos in separate notebooks to document and reflect on methodological complexities encountered in the field.

I collected all these memos, gathered copies of all email communication with the community partner, and used these data as empirical material. The analysis of this empirical material involved writing rich and detailed narratives that map out the trajectory of the collaboration during the course of the research, with particular focus on interactions and events surrounding the experiences of doubt and uncertainties I encountered in the field. I was inspired by several scholars who suggested giving critical scrutiny to fieldwork problems by turning them into research data and integrating them into the research, instead of sheltering or obscuring them (Winthereik et al., 2002; Zuiderent, 2002). Therefore, rather than shying away from these uncertainties, or passively accepting them as inherent elements in action research, these should be included in the research inquiry to determine the space for interventions and explore the artful interplay between the field site and practices of practitioners and researchers. As Finken (2005) argues, fieldwork troubles (e.g., issues of access) can be treated as a knowledge provider, as a feature that adds to the understanding of the research object(s). For this purpose, I adopt a confessional style to the narratives (in section 5.2) as this writing style uses a notoriously reflexive voice. In addition to writing narratives focusing on important interactions and events, the analysis involved tracing the different roles I have occupied within the same context as well as tracing me occupying the same roles across different contexts (see section 5.3 for more information). Finally, I used different types of codes to categorize the material, some of which were topics that were repeatedly discussed in the literature (e.g., clashing agendas, issues of authority, conceptual distance, and control/prediction), while others were categories and repeating patterns which emerged from the empirical data (e.g., my own roles as a researcher, transition in types of my engagement, the research partnership, miscommunications and misunderstandings, and internal organizational conflicts).

3.5.4 Confessionals: Reflexive Voice and Writing Style

Writing narratives[109] can be done in multiple ways using different writing genres. To highlight my fieldwork experiences, I chose to adopt confessional tales as they can support and strengthen my aim of providing a self-reflexive account of the research process. The confessional genre adopts autobiographical writing in order to focus on the fieldworker's point of view. Confessional accounts are, therefore, highly personalized and rest on the testimonies of personal fieldwork experiences where the researcher exposes herself, rendering her actions and failings open to critique (Schultze, 2000). Confessionals are notoriously sensitive with an attempt to explicitly demystify fieldwork by showing how it is practiced in the field (Van Maanen, 1988, p. 73). They normally constitute "emotional reactions, new ways of seeing things, new things to see, and various mundane but unexpected occurrences that spark insight" (Van Maanen, 1988, p. 76).

I choose a particular narrative style, consciously using the first person. This choice certainly places me in a vulnerable position as I deliberately provide a collection of confessions from my fieldwork experiences; confessions which deliberately include all that is usually cut from a final formal publication. As the label confessional tales implies, confessionals give rise to some of the most unflattering portraits of research practice. While I am fully aware of this, I reject the view of vulnerability as a weakness but rather see it as a position from which one can learn and change practices (Van Maanen, 1988). I choose to write vulnerably because of the type of empirical material (which constitutes moments of uncertainty and confusions) and because I wish to evoke a vulnerable response in the reader (Tierney, 2003). In addition to my wish to trigger emotions/feelings in the reader, I choose to keep myself (the researcher who is also the author) closely attached to the text (the narrative) for several reasons, one of which is that I want to take the reader through the transformation my identity as a researcher has gone through.

It should be noted that I focus on my point of view because I do not have full access to the practitioner's point of view about our research relationship. I can access their views only through my subjective and partial interpretation of their reactions. In spite of the confessionals' self-absorbed mandates, the underlying intention is not to become self-indulgent. I was inspired by Michel de Montaigne (1949)—the most influential writer of the French Renaissance—who is known for merging intellectual

[109] The literature about narratives is vast and it is not my intention to discuss it as it is not my main focus. I use the term narrative to imply that attention is paid to the way in which I chose to tell the events from the field and that I acknowledge that by telling, I am actively reconstructing the events. For more information about narrative consult, for example, Barthes (1974).

speculations with autobiographical anecdotes. The intention is to provide a deeper view of the challenges described in the research (Van Maanen, 1988). Confessionals encourage the researcher to constantly challenge and examine their own research practices and assumptions, and prompt the reader to do the same. Therefore, among the prominent features of confessionals are accounts of what fieldwork did to the researcher. Finally, confessionals normally appear as separate articles dedicated to fieldwork practice and they typically provide "accounts of how the author conducted a piece of research reported elsewhere" (Van Maanen, 1988, p. 75). This break between the research work itself and the results of the research is adopted in my dissertation, which I chose to divide into two components, each with a different foci: the research methodology (chapters 5-6), and the results of the research (Chapter 4).

3.6 Summary

This chapter began by introducing the constructivist paradigm upon which the dissertation is built (3.2). I explained the implications of adopting a constructivist stance to the study of technology and methodology. As summarized earlier (at the end of section 3.2.2), a constructivist stance implies that in order to understand the consequences of technological change, one must take into account the social, political and cultural factors through which the development and use of technology takes place. Furthermore, adopting a constructivist stance also has implications for studying methodologies as it shapes the way I situate my reflexive voice, and the way I engage with the field site and the subject under study.

Section 3.3 focused on one particular constructivist approach used throughout the dissertation, namely ANT. I outlined some of ANT's key insights and explained their potential contribution to the study of technology and methodology. I delineated how ANT can be a powerful tool for studying the impact of technology, while taking into account both social and technical factors. Furthermore, technology is not viewed as passive, a resource or constraint that is activated and controlled by humans. Rather, technology and other non-humans are viewed as actors who have the ability to act, to produce effects on the world, transform our actions, and redefine our understanding. It is important to remember, however, that neither the social nor the technical alone can produce effects of social significance. When studying the effects of technology, one must look at both the social and the technical.

Using ANT had implications not only for the study of technology, but also for the study of the action research methodology (see section 3.3.1.6.2). I explained earlier how my interest in studying methodologies and the research process 'in the making' was inspired by the early constructivist ANT work of studying science in the making. Drawing upon insights from recent work found within ANT (presented in section 3.3.1.6), I investigated the ordering and configuration of the subject, the action researcher

(myself) in a diversity of contexts and settings. I followed a performative approach, explored how the different roles and actions (interventions) emerged in practice and how they were enabled and supported by the network. The last two sections demonstrated how I operationalized the constructivist ANT stance that I adopted through my choice of the methods I used for the study of the EMR (section 3.4) and action research (section 3.5). I will now move to discuss the implementation of the EMRs while using the literature about healthcare IT and medical practice (section 2.3).

CHAPTER 4: ELECTRONIC MEDICAL RECORDS

4.1 Introduction

As mentioned in the introductory chapter, the idea of computerized patient records emerged in the 1960s and 1970s (Collen, 1995; Morries & Collen, 1987); yet, in spite of the of tremendous amounts of resources and money, the transition to EMRs has been very challenging and many expected benefits have, so far, not materialized. As one of Jones' (2003) informants famously said: If "computers can land people on Mars, why can't they get them to work in a hospital?" (p. 410). The immense challenges in implementing electronic medical records (EMRs) intensify the need for more empirical research on the adaptation of these technologies within real-life case studies, because these studies can enable rethinking of alternative approaches for managing the complexities of health care information technologies. Many studies of EMR implementation focus on measuring quantitative outcomes, however, such studies tend to view organizations (users) and technologies as static, independent, and objective, while neglecting aspects of cultural environment and processes of interaction and negotiation (Goorman & Berg, 1999). This study will therefore draw upon a three and a half year long qualitative research project to provide in-depth knowledge and insights into the adaptation process of an EMR system in a primary care setting.

This chapter will address the first set of research questions (outlined in section 1.3) which focus on the ways in which the EMR system transforms the medical practice and the ways in which the health care practitioners configure and adapt the EMR system to their existing work practices. I begin by setting the stage and introducing the empirical case of EMR implementations (section 4.2). I will then unpack the various visions underlying the transition to an EMR (section 4.2.1), and I will explore throughout the chapter the different ways in which the health care practitioners tried to achieve some of these visions. I studied the health care practitioners' journey from abstract visions to concrete realities, with multiple goals, and many different challenges and changes. Drawing upon interviews conducted with practitioners from five different clinics in British Columbia (B.C.), I describe the trajectory of events that took place before the EMR was brought into life (section 4.2.2). The remainder of the chapter will focus on the implementation of the EMR system in the community partner's clinic. It is divided into three main sections following the chronological order of the empirical events, starting from the initial stages of the EMR adaptation (section 4.3), following its progress during

the first year and a half (section 4.4), and investigating the adaptation nearly three years after the introduction of the EMR (section 4.5).

I draw upon theoretical concepts and insights from the fields of Computer-Supported Cooperative Work (CSCW) and Information Systems (IS) to provide an in-depth examination of the technology practices developed throughout the first year and a half of the adaptation process (section 4.3). Analysis of the empirical data led me to distinguish between two types of technology practices (initial and emergent). I then investigate the factors that supported the adaptation process in general, and the development of the emergent technology practices in particular (section 4.4). During the analysis it became evident that the meetings held by the EMR committee were one of the most essential driving forces of the EMR adaptation. As explained earlier (section 3.4.3), re-examination of the data concerning the meetings led first to the conceptualization of continuous reflective activities, and then later to the identification of the characteristics of the important space for these reflective activities. Sections 4.3-4.4 address the second part of the first research question (section 1.3) which focuses on ways in which the health care practitioners configure and adapt the technology to their situated work practices.

Section 4.5 will address the first part of the first research question which focuses on how the technology transformed the medical practice. This section will summarize the sociotechnical changes described thus far and examine the changes that were observed nearly three years after the installation of the EMR. Trying to explain the differences between the changes led me to focus on the differences between the *implications* of these changes. This section (4.5) will also bring analytical and theoretical insights from the field of Science and Technology Studies (STS) into the fields of CSCW and IS, to illustrate how implementing a new technology in healthcare is not simply a matter of fitting it to existing work practices (or vice versa), as has been claimed in some EMR studies within the CSCW field (e.g., Atkinson & Peel, 1998; Ellingsen & Monteiro, 2003a, 2003b; Hartswood et al., 2003a; Lærum, et al., 2001; Lundberg & Tellioglu, 1999). Rather, introducing a new health care technology constitutes a complex and dynamic process of continuous negotiations and translations of different interests and alignments of both the technology and the work practices. Similar to EMR studies within CSCW and IS, I will illustrate how at times, the EMR supports collaborative work and other times, it constrains the work practices. However, findings from my research project, show that the EMR is not a tool that simply improves or constraints the medical practice. In other words, using the EMR is not a matter of doing the same tasks in a better or poorer way; rather, the EMR enacts different practices with different outcomes. Using ANT as a conceptual lens invites us to think differently about the EMR as it becomes an active actor that has the ability to produce effects and transform the medical practice and profession. Finally, section 4.6 will provide a summary of the chapter and the detailed and in-depth analysis of the sociotechnical changes occasioned by the introduction of new computer systems in health care settings.

4.2 Setting the Stage

I begin this section by unpacking the visions (in my empirical case) behind implementing EMRs and unpacking the actual EMR technology (by outlining the different components/modules which constitute the specific EMR discussed in this empirical case). I will then contextualize the implementation of EMRs by drawing upon interviews I conducted with health care practitioners from five different clinics in B.C. in order to describe the trajectory of events that took place before the EMR was actually taken into use by practitioners (section 4.2.2). I then briefly present the vendor and their EMR system, and will focus on the community partner's clinic to describe their initial phases of the EMR implementation.

4.2.1 Unpacking EMRs: Visions and Technologies

As discussed in the introductory chapter (section 1.1.2), the implementation of EMRs has been on the political agenda for a long time, as these are viewed as crucial for the Canadian healthcare system. However, before following the implementation of an EMR in the primary health sector, I would like to critically question its definition and start by asking *what exactly is an EMR*? Although this question might seem trivial, I have already illustrated (in section 1.1.2.2) how the definition of this technology is by no means uniform, and I will now use this as a point of departure for a richly articulated analysis of the EMR while focusing on its multiplicity and heterogeneity. Inspired by Berg and Bowker's (1997) article, *The Multiple Bodies of Medical Records*, I will illustrate how the EMR is expected to serve various aims for divergent groups.

I will begin by unpacking the composition of visions that are the driving force behind the dream of implementing an EMR. I will then explore the way in which the multiple visions unfold and shape a concrete reality, a reality of a new EMR. Drawing upon a constructivist approach (introduced in section 3.2), the existing reality was not pre-determined, but rather is the outcome of configurations of both the social and the technical elements (Law & Hassard, 1999). This journey will follow the technological system and the work practices as they undergo continuous development, modifications and configurations. This process was not a linear one and did not follow a pre-defined script. The different visions were continuously deconstructed into many small goals, which were constantly changed and redefined to accommodate the existing and ever changing reality.

As mentioned in section 1.1.2, EMRs are brought to life to encourage a meticulous organizational transformation, where the health authorities essentially focus on achieving measurable benefits (e.g., cost and efficiency). EMRs are expected to provide annual system-wide cost reductions, by providing better access to patient

information while reducing medical errors, which in turn, will increase efficiency and improve quality of healthcare services (British Columbia Medical Association, 2004).

Tracing the visions in the empirical case presented here, we find that similar issues are echoed by the IT vendor who provided the EMR system for the clinic. In an interview with the vendor's president, he explained that his vision behind the EMR was:

> *To build something…that can do far better than what paper can do…I had the ambition to improve patient care by creating some tools that allow physicians to practice more efficiently since we figured that computers should save some time and money (Dr. Brendan Byrne).*

Looking at the way in which the vendor's president (who is also a GP) frames his last sentence, it becomes clear that the idea that computers are good and will save time and money is fairly unquestioned. I will get back to this point later, when I discuss the sociotechnical changes that emerged along the transition to an EMR.

Figure 4.1: The Community Partner's Archive

As mentioned earlier, there is a strong external pressure and financial support from the government to implement EMRs in the primary health care sector. However, based on the interviews conducted with health care practitioners from the community partner's clinic and five other clinics, the external pressure is often strongly supported by internal interest in implementing an EMR system. This desire often emerges as the number of patients in the clinics increases as the years go by, and this leads to an increase in the number and physical size of paper charts. This in turn leads to decreasing space for charts in both the clinics' archives and storage rooms (see Figure 4.1). The increase in the physical size of the paper charts occurs for various reasons, one of which relates to the change in the medical practice and the increasing focus on quality assurance. This leads to an increase in the number of regulations for what should be documented and how,

which results in an increase in the amount of information documented. Furthermore, the growth of physical size of the charts is also related to the shift in demographics in the aging population all over the world. Hence, the idea of implementing an EMR emerged from the frustration related to existing paper-based practices, which involved a large number of staff in time consuming activities related to searching for and filing papers in the correct places and charts respectively. As one of the general practitioners (GPs) puts it:

> *We spent an awful lot of time looking for charts, and losing charts, and losing bits of paper, as all paper offices will tell you. And there's an awful lot of work that goes into preparing a chart, filing it, filing the lab data in the chart. So that was one issue. The notes are difficult to read with the hand writing. So we were aware that we were wasting a lot of time just trying to keep track of information and the longer the clinic has been around the thicker the chart would get. And it just seemed that electronic records…would be a tool that would assist us with that (Dr. Maya[110]).*

Thus, in the pursuit of minimizing papers, the health care practitioners envisioned having a paper less clinic. The ultimate goal of the EMR project was, however, to improve patient care (e.g., chronic disease management [Dr. Mary]) by increasing efficiency. As one of the medical office assistants (MOAs) expressed it: "*The goal of this was the level of care. The efficiency of getting things done*" (Jocelyn), and this is what one of the GPs said: "*It [having electronic documentation] is obviously the way where the future goes...[and] there's theoretically all kinds of efficiency that will come about through that*" (Dr. Ashley).

The ambitions of achieving better organization and structure to the medical records were also repeatedly mentioned by the patients when asked about their views of the EMR. Comments such as "*It's what happens; it's obviously where the future and the world are going*" (Riccardo), or "*Go for it and join the digital age!*" (Tracy) were often expressed by patients. Common to the visions from the health authority, the vendor, health care practitioners and patients, is the technologically deterministic and instrumental frame that envelops the views about the EMR. Similar to the discourse in media and policy document (introduced in section 1.1.2), the transition to an EMR is portrayed as a natural and inevitable progress, as part of 'where the future is going.' The EMR is viewed as 'the latest driving force in a modern clinic.' I will get back to these visions at the end of this chapter (section 4.5.4) to show how these shaped the existing reality; a reality with a new medical record and a redefined medical practice.

Even though many of the expectations generally have a common starting point, little is obvious about what exactly counts as part of an EMR. I argue that the EMR is an

[110] In order to preserve the anonymity of the informants, I have chosen to give them fictional names.

ambiguous object which was abstracted to something general labeled as 'EMR.' In other words, it has been packed up with various general assumptions where it is being viewed as something universal that can automatically lead to improvement of healthcare services. Following Star's (1991b) footsteps, I will critically challenge these taken for granted assumptions and deconstruct the definition of the EMR. I will first introduce the EMR system by referring to the technological components that it constitutes and subsequently unpack the different understandings that health care practitioners have.

It may seem obvious or natural to think of an EMR as a clinical information system that consists of a set of modules/components. However, as soon as one questions the legitimacy of what should be considered as part of an EMR, debates begin. In this empirical case, the EMR (called Wolf Medical Systems) consists of several components (i.e. Physician WorkDesk, Front desk staff WorkDesk, Scheduler, Billing, Wolf Link), but some of these components are interlinked to, and at times dependent upon, other external programs. For instance, Wolf Link (used to link scanned documents) is linked to external scanning software. Other examples of external systems that are linked to Wolf are PathNET,[111] which is an electronic lab reporting system (British Columbia Medical Association, 2004); and the Chronic Disease Management (CDM) toolkit, which is a system developed by the provincial Ministry of Health for patients with heart disease and diabetes. These external systems should be considered as integral parts of the EMR, and should therefore be taken into account in the implementation process.

The various professional groups agree on the fact that the EMR is not an isolated singular entity, however, each group has different visions and discourses about the EMR. Physicians, for example, conceptualize the EMR as a tool for entering electronic notes, communicating with the MOAs (using a messaging feature), and a tool that has the potential of improving patient care (e.g., by using reminders and follow-up features). The MOAs, on the other hand, view the EMR as an administrative tool that supports tasks related to billing and scheduling appointments, as well as communicating with the various staff. This illustrates how each professional group prescribes a different meaning to the EMR. Therefore, instead of viewing EMRs as merely technical objects, these should be viewed as sociotechnical entities with properties that are variably articulated and interpreted in different practices. In order to grasp the scope and variation of the EMRs, we should study them in relation to the practices of use and look at how they are enacted by different people in different settings. Before analyzing the practices of use, the next section will describe the trajectory of events that took place before the EMR was brought into life.

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[111] PathNet has later been bought up by Excelleris, a company founded by two of the province's major diagnostic laboratories (B.C. Biomedical and MDS Metro Laboratories which has now been merged into LifeLabs Medical Laboratory Services).

4.2.2 'The Jewel in our Crown:' Pre-EMR Implementation

The introduction of the EMR was not an isolated event of placing computers in the clinic or simply installing the EMR system. Rather, a complex set of trajectories and events had to take place prior to the actual implementation. Having the aim of opening the black box of the EMRs and looking at the sociotechnical changes they bring about, I will follow these technologies from the point where they are financially supported by the Vancouver Coastal Health (VCH) Primary Health Care Transition Funds (PHCTF), through their design and implementation by the vendor, and eventual usage by the clinics.

Prior to implementing an EMR, the various primary care clinics had the opportunity of applying for three or four years of funding from the VCH PHCTF. The various clinics would enter a competition for receiving funds managed by the health authority (VCH). The clinics that were approved for funding would become one of the Primary Care Demonstration Projects (PCDPs). In total, there were ten PCDP sites that were approved for funding. These clinics received funds which could, for instance, be used for renovations of the existing facilities, supplying a public health nurse and/or chronic disease manager, and implementing an EMR system.[112] Each clinic had the responsibility of determining their actual needs and priorities, and generating specification requirements accordingly. Determining IT expenses in relation to software and hardware equipment was often viewed as a challenging task for the various clinics. This was due to the fact that several small clinics do not have their own IT consultant, and were often forced to hire external service from an IT consultancy company which was not always familiar with the existing technical infrastructure and tended to estimate slightly high costs. The VCH PHCTF offered support to this process; however, most of the clinics I interviewed were not familiar with this service.[113] In the next stage, the various primary care providers attended a vendor open house (an event arranged by VCH), in order to view the various EMR systems and choose a vendor. Prior to the actual installation of the EMR, adequate hardware had to be in place, which included a Local Area Network (LAN), a stable server and database, scanners, as well as software which had to be installed for these different technologies. This was in addition to upgrading and

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[112] According to the application form, the community partner's clinic estimated the total expenses for the EMR project would be $786,412, which would include project management, evaluation, information systems and technical devices (maintenance, support, license, etc.). Note that $220,000 of the total sum was dedicated to facility costs, leaving approximately ⅔ of the sum to issues related to the actual implementation of the EMR.

[113] It is interesting to note that there has been a great change in the strategy used by the provincial government and VCH, and the importance of providing support in these very initial stages has been acknowledged. An illustration of this is PITO, which as mentioned earlier, is a recent initiative that intends to provide support both pre- and post-EMR implementations to improve the diffusion of EMRs across physicians' offices.

purchasing new computers, as well as placing them in examination rooms (which are primarily used for the actual consultation with the patient) and/or the charting rooms.[114] The installation of the hardware and software was conducted in different ways. In some clinics, it was conducted by IT-personnel, but other clinics which did not have this service hired external IT-staff. The EMR vendor provided technical support only for their software. Thus, in order to receive technical support for the other software (e.g., related to the configurations of the server), the clinics had to find an additional support company. It is interesting to note that the IT vendor recommended the same technical support company for all five clinics.

The EMR systems were gradually gaining their technical existence, as these were being implemented in different ways in the various clinics. Some clinics implemented all the modules simultaneously, while others followed a gradual and incremental implementation strategy where the billing and scheduling modules were implemented for the MOAs, and thereafter, the clinical module was implemented for the GPs.

Before starting to use the EMR, the vendor provided one-day training sessions for each clinic and for each professional group separately (a four-hour session for the MOAs, and for the physicians). Educational material was not made available for the staff, because as the vendor explained, the existing manual was 300 pages and none of the health care practitioners had time to read such a long document. In addition, the clinics that were chosen for the Demonstration Projects (meaning those that received funds for implementing an EMR) had the possibility of participating in collaborative sessions that were organized by the VCH PHCTF and were intended to support the transition to an EMR. Approximately 15-20 clinics participated in the collaborative sessions. Before discussing the actual implementation of the EMR in the community partner's clinic, I will provide information about the IT vendor and the EMR system.

4.2.2.1 Meet the IT Vendor and EMR System

The EMR system discussed in this case is called Wolf Medical System. The system's popularity has been growing rapidly and is the most commonly used EMR in the primary care sector in B.C. (British Columbia Medical Association, 2004). The company

> is now a profitable $2 million a year business, with revenue expected to jump between 40 and 60 per cent in 2006. What was once an eight-

[114] This refers to the room used by physicians for most documentation activities (e.g., writing referral letters and summary notes from consultations, ordering laboratory tests, and reviewing and signing various documents). Physicians in this clinic do not have their own offices, so they sit together in one room, the charting room, which is an open space with computer stations.

> employee company is now close to 35, with more hires expected to increase Wolf's staff to 50 by year's end (Bisetty, 2006, para. 12).

In fact, Wolf Medical System is the fourth largest company among EMR vendors in Western Canada. The company considers their EMR system (Wolf) to be the 'next generation of Medical Information Systems,' and follows the slogan 'Software that *works* the way *you* do.'[115] This is off-the-shelf software that allows high configurability and has been designed to adapt to an increasing variety of purposes and patterns of use.

As mentioned earlier (section 4.2.1), the EMR consists of several parts, integrating billing, workflow, scheduling and clinical components. The system is designed in such a way that it is fairly easy to use as it is based on a familiar user interface (Microsoft Windows oriented) which applies the idea of a windowing system interface—"a package that helps the user monitor and control different contexts by separating them physically onto different parts of one or more display screens" (Myers, 1994a, p. 6). This graphic interface allows easy navigation between the various modules. This comment about the system being easy to use is based upon what the health care practitioners told me and my own opinion after studying and seeing several EMRs from different vendors. In addition, the EMR system supports transparency and workflow by displaying various lists that provide the physicians with an overview of, for example, the scheduled appointments, incoming lab results to be reviewed, prescriptions refills, referral letters and follow-ups. It also affords a quick overview of the workload and supports delegation of tasks with its messaging function and reminders in real time (distinguishing it from older architecture in that it also functions as a communication application). Finally, the EMR system is designed in such a way that it has a configurable architecture enabling different levels of tailorability. In other words, the EMR allows different types of users (clinicians, administrative staff, IT personnel) to adapt some parts of the system to the existing work practices and local needs. For instance, the different users are allowed to create or modify existing templates and flow sheets, as well as change some pre-defined fields and variables in the system. Finally, the EMR system contains advanced functions, such as 'the practice search' which allows physicians to run complex queries using quantitative parameters to get an overview of a particular type of patient population (e.g., diabetic patients who have sub-optimal blood pressure control). Query results can be displayed graphically and saved as a rule which will automatically flag particular patients. In the next section, I will focus on the actual EMR implementation in the community partner's clinic and this will remain the focus throughout the rest of this chapter.

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[115] Such slogans can be found in some of the company's advertisements and training material.

4.2.2.2 Meet the Community Partner's Clinic

Shortly after the implementation of the EMR, the staff from the community partner's clinic decided to establish an EMR committee consisting of representatives from each professional group (administrative staff, MOAs and GPs). The idea of establishing an EMR committee was an internal initiative from the clinic which has had a fairly long culture in establishing committees for different projects. The EMR committee, which functioned as a task force, was part of an enduring collective entity committed to conduct all the necessary changes to make the implementation of this technology successful—all in the name of improving patient care. In their weekly meetings, the group discussed various challenges faced during the adaptation process, evaluated the transition process, and defined new goals for further development. This was viewed as highly significant for dealing with concrete complexities, especially since there were no particular guidelines related to the *actual* implementation and necessary adaptations in work practices. The only guideline available was provided by the VCH PHCTF and focused primarily on standardization, evidence-based medicine, as well as patient health education and self-care (e.g., the CDM toolkit). Participating in these meetings provided me the unique opportunity to not only observe but also actively participate in the process of constructing new technology-in-use practices.[116] In section 4.3.3, I will come back to the EMR meetings and their characteristics as I view these as one of the important factors for promoting the adaptation process.

In sum, we see that the visions expressed by the health care practitioners and the patients are strongly influenced by those found in media and policy documents. I will show later how these visions shaped the way in which the EMR was implemented and taken into use. The section above shows how a complicated set of trajectories had to take place before the introduction of EMRs in the clinics (e.g., applying for funds from the health authority, choosing an EMR and a vendor, as well as determining technical infrastructure required for the EMR). We also see that the EMR is not an isolated singular entity; rather, it consists of a set of modules and it is dependent on other external systems (e.g., a server, scanning software). Similarly, we see that each professional group has different visions and they prescribe different meanings to the EMR. I will later get back to these points and discuss their implications for technology adaptations. However, I will now proceed with an in-depth analysis of the actual EMR adaptation, following it from the first day of installation and throughout nearly three years.

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[116] In section 5.2.3, I will describe the implication that my participation had on the research in general and the findings in particular.

4.3 The Birth of the EMR

There are various concepts that reflect the process in which a technology is introduced and interlinked to the work practices in a particular setting. This includes, for instance, adaptation, adoption, implementation, and acceptance. However, the various concepts have different connotations. According to Bjørn (2006), the concept 'implementation' connotes a primary focus on the technical aspects, whereas 'adoption' or 'acceptance' might suggest that adopting technology is simply a human choice and not a transformation process. 'Adaptation,' on the other hand, refers to a process that changes both the technology and practice as a transformation process (Bjørn, 2006). In the analysis of the EMR case, I follow a sociotechnical approach[117] (Berg, 1999c; Berg et al., 2003) and view the interlinking processes of technology and practice as adaptation emphasizing the transformation aspect.

In order to understand the adaptation of complex technologies, we need to investigate the realities of introducing technology in specific organizational settings (Gallivan, 2001). Technology adaptation is a transformation process in which existing work practices influence and are influenced by the technology. Such a process produces new situations, which in turn result in new transformed practices (Berg, 1997; Berg, 1998). It is now widely acknowledged amongst CSCW, IS and STS researchers who study healthcare technologies that before we can develop computer systems, we need to understand the social settings and local practices (Orlikowski & Iacono, 2001). Furthermore, the importance of empirical research on technology *in use* has also been acknowledged (Heath, Luff & Svensson, 2003; Orlikowski, 1992a; Orlikowski & Gah, 1994). Therefore, this section will focus on the social context within which the EMR is implemented and used, and then focus on the actual use of the technology.

This section will describe the adaptation process of the EMR as it proceeded in the community partner's clinic. I draw upon insights and concepts from CSCW and IS (introduced in section 2.3) to provide in-depth analysis of the adaptation process, beginning with the initial stages and following its progress during the first year and a half (January 2005-July 2006). I begin by describing the trajectory of events that took place during the initial stages of the EMR adaptation (section 4.3), and I will show how the EMR was progressively redefined to cover new domains beyond the technical infrastructure (section 4.3.1). I then focus on technology-in-use practices (section 4.3.2) which comprise people's understandings of the technology-use on a daily basis and the consequences of such use. I identify and distinguish between the initial technology-in-use practices that were developed during the first half a year of the EMR implementation and

[117] The sociotechnical approach will be explained further in section 4.5.1.

will move onto identifying the emergent technology-in-use practices that were developed after a year and a half. Finally, I investigate the activities supporting these technology practices (section 4.4).

4.3.1 Beyond Technical Infrastructure

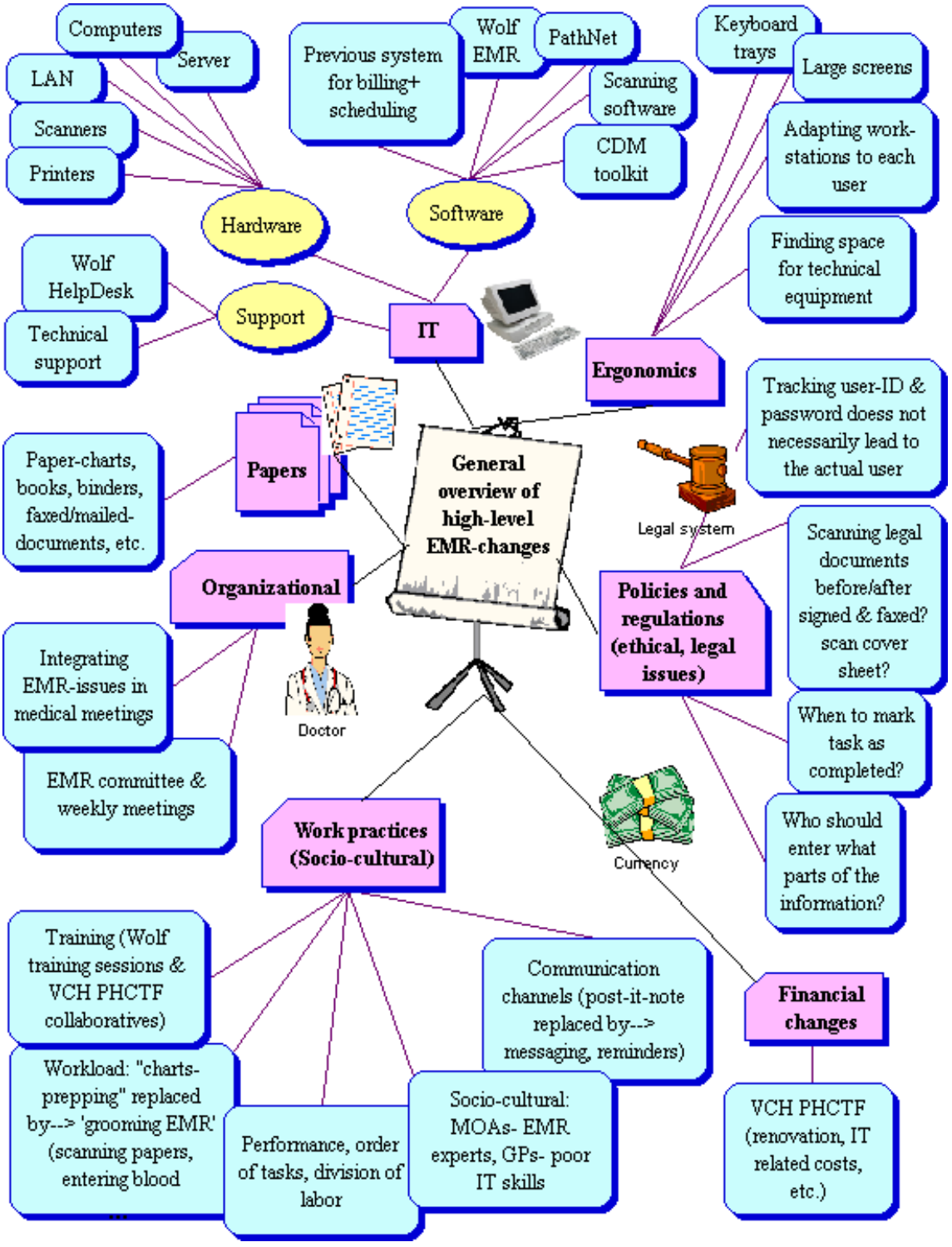
This implementation of the EMR was not simply an introduction of an isolated artefact—placing new computers in the clinic. The EMR was introduced to a pre-existing complex infrastructure which includes, among other things, shelves, papers, desks, fax machines and telephones, standards, regulations, information systems, not to mention health care practitioners and patients, all of which are connected in various ways and to various degrees.

Previous studies acknowledge that the implementation process of a healthcare technology is as important as the technological system itself (Ludwick & Doucette, 2009). When looking at the empirical case presented here, many changes were brought about by the implementation of the EMR and it was progressively redefined to cover new domains, beyond the technical infrastructure described in the sections above (e.g., hardware, software, technical support). The introduction of the EMR implied placing computers in the charting rooms and examination rooms, and this triggered discussions concerning adaptations that had to be conducted in the physical space in order to accommodate an ergonomic work environment. This included finding suitable places for the computers, printers, and scanner (Figure 4.2 contains pictures of the scanning area); adjusting the height of the screens to each user, installing keyboard and mouse trays, as well as purchasing bigger screens. Ensuring an ergonomic work environment was important as occupational health researchers suggest that computerization of healthcare work has various health effects (e.g., musculoskeletal diagnoses) on health care workers (Morrison & Lindberg, 2008).

Figure 4.2: Scanning Area in the Clinic

Beside bringing about changes in the ergonomic work environment, the implementation of the EMR influenced other domains. Figure 4.3 (p. 123) provides a high level overview of some of these domains, which includes among others things, various organizational changes and work practice adaptations, and financial changes in relation to IT costs and investments. In addition, the EMR brought about changes in regulations of policies and in some cases introduced legal or ethical issues, for example, who should enter which parts of the information? As will become evident later, in the beginning of the implementation process, the EMR increased dramatically the GPs workload. Therefore, the GPs delegated some of tasks to the MOAs, who were now asked to update patient's allergies. This was viewed as immensely crucial because the EMR system automatically generated a default message: 'No noted allergy,' which is misleading as it gave the impression that the patient has been examined and that she has no allergies. It was, therefore, important to go through every record in the EMR and update the allergy information. Assigning this task to MOAs raised discussions about the legal and ethical implications this might have, especially due to the fact that the MOAs lack sufficient medical knowledge required to enter such sensitive and crucial information as allergies. Regardless of who enters the information in the medical record, the GP is always the one who would be held responsible for the situation (e.g., in case of error). This was an example of an ethical and legal issue that was brought about by the EMR. The rest of this chapter will examine more closely what is labeled in Figure 4.3 as work practices, technical (IT) and organizational changes, in order to provide an in-depth elaboration of the sociotechnical changes that emerged along the adaptation process.

Figure 4.3: Changes Brought about by the EMR[118]



[118] Please note that the division in Figure 4.3 among the various issues (the technical, organizational, socio-cultural changes, etc.) is rather artificial as these issues are interrelated and integrated.

Thus far, I have described in general the trajectory of events that took place during the initial stages of the EMR implementation, and I touched briefly upon some of the initial discussions and issues that arose, while maintaining a high-level overview of the adaptation process. The next section will focus on the ways in which the health care practitioners adapt the technology to their existing work practices. According to the EMR literature, success of adaptation has been found to depend on the malleability of the existing organizational work practices (Majchrzak, Rice, Malhotra, King, & Ba, 2000) and on how well the technology becomes embedded within the local context (Karsten, 1999).This issues will be investigated in the next sub-section.

4.3.2 Identifying and Analysing Technology Practices

4.3.2.1 Initial Technology-in-Use Practices

During the first half a year when the EMR was implemented, it brought along many new additional tasks. This was a long and gradual transition period where the health care practitioners were partially using the EMR as well as the paper charts. These initial technology-in-use practices comprised the MOAs' use of the EMR for scheduling and billing activities.

GPs were slower than MOAs in developing technology-in-use patterns, and they initially used the EMR primarily for entering medical summaries. Some GPs completed the medical summaries with the patient in the consultation room, while other GPs wrote partial notes and completed the summaries at the end of their work day. In addition, some GPs followed an incremental adaptation process by using the EMR for one patient and then gradually increasing the number of patients they would report upon within the EMR system. Applying an incremental implementation strategy to EMRs has often been recommended by CSCW and IS scholars as it permits time to adapt to the change and exposes users to the system gradually, often using the EMR alongside the paper charts during the transition period (Atkinson & Peel, 1998; Bergen, 2004; Ludwick & Doucette, 2009). Shortly after the initial installation, some GPs began using additional functions of the EMR, such as writing prescriptions; however, the majority of the GPs' tasks (e.g., billing and referrals) were conducted using paper documents.

There was an increase in the amount of paper used especially since everything had to be printed out from the EMR and filed on the paper charts.[119] During that period,

[119] At that time, it was still unclear whether the GPs electronic signatures on the clinical notes would be sufficient from a legal point of view. Therefore, notes were printed out and the GPs continued the practice of handwritten signatures.

the MOAs' workload increased dramatically as they were updating (prepping) both the paper-charts and the EMR. The so-called 'chart prepping' practice refers to retrieving, organizing and storing the various paper documents in the correct place in the respective chart. MOAs were also responsible for scanning different documents, including those that were mailed and/or faxed to the clinic (e.g., lab results, referrals, requisitions). Backup mechanisms still existed and papers were continuously filed or stored in different locations for a particular period of time. Various notebooks and folders were still in use as backup and to keep track of different tasks. Figure 4.4 includes examples of different notebooks and folders. The first picture (from top left to right) is of a folder that contains referral letters that were already faxed and are kept as backup for three days; the second is of one out of the many drawers that contains different forms; the third and forth photos are of the pink day sheets[120] that are kept for backup; and the last picture is of all phone messages that are left on the clinic's answering machine.

Figure 4.4: Backup Notebooks and Folders

[120] The pink day sheets are forms that were created by the clinic and provide each doctor a daily overview of the patient's appointments that are booked. At the end of each day, MOAs collect the information from these forms in order to get a summary overview of the total number of patients seen by their own doctor, patients seen by other doctors, and patients who do not belong to the clinic. This was intended to improve the quality of their care services.

One of the most challenging issues at this initial stage was the integration of information from multiple sources, as the clinic receives many different paper documents that are mailed and faxed (i.e. lab results, referrals, requisitions, etc.). Decisions had to be made concerning which parts of the information from the paper charts should be entered into the EMR and by whom; should the information from the paper charts be scanned or should it be summarized and entered manually to enable greater search possibilities.

A strategy had to be established for finding a way to enter all the information that is in paper charts into the EMR. The increased use of the EMR by both MOAs and GPs raised the need to have more information from the paper charts accessible electronically—an issue which was placed on a high priority early on in the adaptation process. Acknowledging that scanning all charts is immensely time consuming and most likely not feasible, the EMR committee spent a few months discussing and testing various ways to tackle entering the huge amount of information into the EMR. Finally, the EMR committee decided that only some parts of the charts would be scanned and that the decision would be taken by each GP. A detailed strategy was established in order to limit and balance the number of documents that would be scanned, and to develop a standardized labeling mechanism using key words to group the various types of documents. GPs were therefore requested to go through each chart and select the most prominent documents they wanted to be scanned. It is important to keep in mind that the clinic has approximately 5000 active patients (patients seen within the last 18 months). Many practitioners in the clinic said that transferring the information from the paper charts into the EMR was what made the first year difficult.

GPs were already spending longer time on charting activities (e.g., documenting patients' encounter and ordering laboratory tests) using the EMR when compared to paper charts, and while some were still struggling with a lack of familiarity with the system, others struggled with poor computer literacy and/or typing speed. These were in addition to the many technical challenges that were faced—some of which related to lack of knowledge about the system while others were related to technical problems identified in the system—all of which were very difficult and distracting to the consultation with a patient. As one of the GPs described it, comments such as "*talk to me not to the computer*" (Dr. Ashley) were expressed by some patients. Another GP described the first year as a challenging period:

> *Just getting used to having a keyboard in front of you and screen at all times…and to be able to use that with enough ease so it didn't interrupt the flow of communications with patients, was a real challenge. And then there were multiple other challenges in terms of understanding how the system works, there were glitches in the system. So I remember that period as extremely stressful (Dr. Georgina).*

The executive director described this period in the following way:

> *When we went on to electronic records, within a couple of months we were exceeding the doctor budget by like ten thousand dollars a month …and all that admin time…it was really a huge amount of time spent looking at the papers, struggling with software issues, trying to figure out how to message somebody…they used urgent messages for a while, and then had hundreds of messages…So it was like trials and error…they [the health care practitioners] tried to find ways to replace the old system that has been in paper and they tried to replace them electronically (Jenny).*

At the end of this sub-section, I will come back to the initial changes and challenges that were faced by the health care practitioners and discuss their implications for EMR adaptations. But now, I will move from the initial to the emergent technology-in-use practices.

4.3.2.2 Emergent Technology-in-Use Practices

After more than half a year, paper charts were barely visible in the clinic, and the health care practitioners were motivated to 'go paperless.' Gradually as the EMR contained more information there was a significant decrease in the 'chart prepping' practice and in the GPs' requests for pulling charts, and this in turn resulted in a clear reduction in the MOAs' workload. GPs' workload, on the other hand, continued to increase as they were now responsible for additional administrative tasks and articulation work, such as retrieving and storing information in the EMR as well as following the previously existing monitoring mechanisms (e.g., checking that clinical notes were signed). In addition, GPs gradually started using additional function of the EMR, such as writing prescriptions, referrals, and billing, and using the 'practice search' with which one can run complex queries to get an overview of a particular type of patient population (e.g., to retrieve all female patients over the age of 15 that did not have a Pap Smear exam in the last two years). Since the GPs' workload was already high, a new strategy was implemented to delegate tasks and balance the workload. Accordingly, the MOAs became responsible for updating the EMR which implied going through each patient record and updating the height, weight, blood pressure, the narcotic agreement, the allergy record and smoking status.

Since the MOAs had been scanning old paper charts for a period of time, the amount of information available through the EMR had expanded. This led the EMR committee to implement a new policy whereby GPs were expected to stop asking MOAs to pull paper charts. Instead they were expected to retrieve most of the information directly from the EMR. Furthermore, the EMR committee decided to stop the practice of signing and date-stamping paper documents by GPs and the rigid double-checking routines by the MOAs. This decision was taken when it became clear that from a legal

point of view, no signature was needed on the clinical notes since these were entered into the EMR and an electronic trace replaced the handwritten signature and date-stamping practice.

At this point there was a sense of stabilization in the adaptation process and the number of challenges began to decrease. MOAs were now responsible for shredding papers that were printed out from the EMR for faxing or mailing purposes. Some GPs started to use the advanced function for writing quick referrals, which enabled re-use of previously entered information. Moreover, there was an increasing interest in using and creating additional electronic templates (for activities such as preventive care and chronic disease management). Other advanced functions used by the physicians were the creation of rules for reminders (e.g., flag all diabetic patients that did not have a visit in the past six months), or the creation of graphs that allow visual representation of numbers over time (e.g., from electronic lab results, blood pressure monitoring, height and weight, and medication lists).

To ensure a balanced redistribution of tasks, the EMR committee developed a strict protocol (strategy) for which information the MOAs would be required to scan. If a GP requested additional information not approved by the protocol, this information would have to be scanned by the GPs themselves, who were provided training sessions in scanning.

Above I have shown how the technology-in-use practices of both the GPs and MOAs developed over time. The extent to which the work practices changed rapidly was indeed impressive. If GPs would have continued to use the EMR only to validate and sign notes, it would have delayed the development of emergent technology-in-use practices. But the GPs in the clinic instantly used the EMR to enter medical notes, search for patient information, and write electronic prescriptions. Gradually, GPs took the use of the EMR to a different level and created advanced emergent technology-in-use practices. They started creating electronic templates, using electronic referrals, and even scanning old paper charts, which in itself was a crucial step for achieving the goal of becoming a paperless clinic.

When investigating the emergent technology-in-use practices of the MOAs, scanning old paper charts, and grooming and updating the EMR was fully integrated into the MOAs work practices. The integration of scanning activities in their work practices was reflected through the creation of the protocols for redistributing tasks between staff.

The health care practitioners managed not only to adapt the EMR to their work practices and develop technology-in-use practices over time, but they also managed to implement numerous changes which are reflected in the increased use of the EMR Table 4.1 summarizes the development of the initial and emergent technology-in-use practices which developed over a period of a year and a half.

Table 4.1: Initial and Emergent Technology-in-Use Practices

Initial technology-in-use practices		Emergent technology-in-use practices	
GPs	MOAs	GPs	MOAs
Entering medical notes	Scheduling	Entering medical notes	Scheduling
Prescriptions	Billing	Retrieving information	Billing
	Scanning	Prescriptions	Scanning
		Practice Search	Grooming and updating the EMR
		Referrals	
		Scanning	
		Creating templates	
		Graphs and diagrams	
		Billing	

4.3.3 Summary and Implications for EMR Adaptation

I began this section by describing the trajectory of events that took place during the initial stages of the EMR implementation. This refers to the establishment of a technical infrastructure which includes, among others, installing LAN, purchasing adequate computers, scanners and a server, as well as installing software for these technologies. I have also shown how the EMR was progressively redefined to cover new domains beyond the technical infrastructure (e.g., financial, ergonomic and organizational changes, as well as changes in policies and work practices). I then focused on work practices, in particular technology-in-use practices, and identified the initial technology-in-use practices that emerged during the first half a year of the adaptation process (section 4.3.2.1). I described the initial changes that were brought about by the EMR and the challenges that were faced by the health care practitioners (e.g., struggling with the EMR systems, spending more time on administrative tasks, etc.).

These initial changes and challenges were not mentioned by the VCH PHCTF when they summarized their evaluation of the demonstration projects (discussed in section 4.2.2) in the last collaborative session. The primary care providers were told, among other things, that the transition proved to be slow; that doctors spend more time on administrative tasks, and that there has been an overuse of lab resources. Such an evaluation reflects the focus on outcomes and performance measurements following standardized best practices. However, it can be misleading to use such uncritical indicators to define EMR failure or success, as these capture partial representations of a fairly simplified reality. In other words, the impact of the EMR cannot be summarized in terms of efficiency, without reflecting on the contested and ambiguous nature of such technology (Vikkelsø, 2005; Berg, 2001). Going behind the scenes and between the silent layers allows us to restore important issues that were undervalued or neglected by the

health authority. These include, for instance, neglecting the fact that the transition to an EMR implies mastering new technologies and skills which requires adequate IT competencies that many GPs did not have (e.g., typing skills and basic computer literacy); the poor technical support and inadequate training; the absence of sufficient and practical guidelines and policies for managing the actual implementation and transition to an EMR and for dealing with concrete problems (e.g., what should be done when the system goes down and how to deal with urgent incoming labs that are sent electronically to a GP that is not on duty, etc.). It is pertinent to take these issues into account when evaluating the initial stages of the transition to an EMR as they are crucial and necessary in the adaptation process.

There is obviously no general standardized recipe for managing EMR adaptations (Huisman, 2004). Nevertheless, there are recurring issues and challenges observed in the empirical case described above (sections 4.2-4.3) which have also been central in the EMR literature found within the fields of CSCW and IS (summarized in section 2.3). These include, for example, recommending an incremental implementation strategy as it provides users with time to adapt gradually to the change (Atkinson & Peel, 1998; Bergen, 2004; Ludwick & Doucette, 2009). While the empirical study described above confirms the importance of providing adequate training which has been emphasized in the EMR literature (Ludwick & Doucette, 2009), it also suggests that different types of training sessions may be advisable for different clinics and/or different stages in the implementation. For instance, it may be advisable to have shorter but more frequent training sessions, focusing on small components and different functions within the EMR. Other options that some clinics may consider are alternating between group training and individual training, and distinguishing between levels of knowledge (e.g., basic and advanced). As can be seen from the empirical case described thus far, transition funds provided by the provincial health authority have been necessary as most clinics had to establish a new technological infrastructure upon which the EMR would be implemented. Providing funds to support the implementation process of the EMR is important, however, providing IT support is equally important both during and after the implementation stage (Ludwick & Doucette, 2009). The case described above shows that having funds dedicated to hiring an IT person was viewed as highly important, especially during the initial stage of the implementation. An IT person would have the technical knowledge needed to determine which hardware (e.g., computers, printers, scanners, server) and software (e.g., the EMR, scanning software) is needed for the EMR system. In addition, an IT person would be able to assist with the actual installation of the hardware and software, and provide immediate on-site support to health care practitioners.

As can be seen from the description above, one of the biggest challenges during the initial phase of the implementation was integrating information from the paper charts into the EMR. It is not practically feasible to manually transfer all the data or scan all the

pre-existing paper charts. Decisions had to be made as to which parts of the information will be entered and by whom. The activity of exporting parts of the information from the paper charts into the EMR is highly time consuming and crucial for allowing a smoother and faster transition. Insufficient medical information in the EMR will lead to increased use of paper charts and delays in the transition process. The EMR committee established a careful strategy to ensure entering data into the EMR while at the same time, using this as an opportunity to update the medical records (e.g., height and weight, blood pressure, allergy, smoking status). Acknowledging that this stage of entering all the data from the paper charts into the EMR is a very time consuming task which requires resources and funds is of utmost importance. In the case described above and the data collected from other clinics, no particular resources or funds were allocated for this important yet time consuming stage of transferring data from paper charts to the EMR, and the various clinics tested different strategies along the way.

Another issue which has also been a great challenge in the case described above is the lack of adequate synchronization and exchange of information across IT systems. The clinic in our case uses various IT systems (e.g., PathNet, CDM toolkit, the EMR), and it is important that these are connected properly to allow information transfer. Furthermore, some, if not most, of the information that is sent to the clinic from other institutions is still paper-based, and this implies that additional work is required to ensure the integration of the paper-based information into the EMR. Therefore, closer attention should be paid to the lack of integration and/or compatibility of IT systems on organizational and provincial levels. As mentioned in section 4.2.1, one of the important EMR visions is that it can enable information to travel more easily and rapidly across IT systems and organizational boundaries. While this vision may have partially materialized, it is far from reflecting the current status where many health care organizations still use paper charts alongside EMRs and fully integrated EMRs are rare (Goorman & Berg, 2000). It is, therefore, important to acknowledge the additional work that is required to deal with the fragmented infrastructure which contains both paper-based and electronic information. As can be seen from the way in which EMRs are portrayed in media and policy discourse (section 1.1.2), there is a consistent tendency to promise goals which are hard to achieve. Rather than constructing grand visions, for example about fully digitalized health care organizations, it may be advisable to construct concrete nuanced goals which are achievable in the foreseeable future (e.g., having paper less organizations).

Thus far, I presented out several empirical observations which are of importance for managing EMR adaptations. I then moved from discussing adaptation strategies to focusing on the construction of technology-in-use practices. I have illustrated how the technology-in-use practices developed rapidly into more complex work patterns. In the next section, I will investigate the factors that supported the adaptation process and enabled the development of both initial and emergent technology-in-use practices.

4.4 Factors Supporting the Adaptation Process

Based on research found within CSCW and IS we know that the adaptation of EMRs and other collaborative technologies requires more effort and commitment from the users than single-user systems (Grudin, 1994). We also know that evaluation of healthcare technology often focuses on single-user interaction and ignores how well these systems support collaboration (Madhu & Bradner, 2005, p. 56). Still, we know little about which factors or activities foster such a commitment and support an adaptation process. I, therefore, investigate and identify enabling factors promoting the process of adapting the EMR, by looking at the following aspects: the organization of EMR meetings, sources of changes, management control, follow-up mechanisms, communication channels for dissemination of new practices, selection of participants, decision mechanisms, frequency of meetings and evaluation mechanisms (section 4.4.1). The investigation of these aspects leads me to argue for the importance of establishing space for reflection to allow the creation of technology-in-use practices. In other words, renegotiating technology-in-use practices requires space for reflection-on-action, which refers to the activity in which health care practitioners explicitly reflect on implicit problems experienced and articulate new strategies for actions (Schön, 1983). Enacting the space for reflection-on-action activities requires health care practitioners to step back from their situated practices and to critically evaluate and reflect upon their technology-in-use practices and, on this basis, construct new practices.

We know that large-scale information systems adaptation in health care should be managed by a project group, including not only IT-developers, but also representatives of future users and management (Berg, 2004a). Based on the literature and grounded in the empirical observations, I complement and expand the notion of project meetings as composed of continuous reflection-on-practice activities to construct technology-in-use practices. Finally, I provide a characterization of such reflection-on-practice activities (section 4.4.2), which I view as frequent encounters of negotiations of work practices and technology use, whereby internal actors are provided a space for systematic evaluation of suggested changes. The importance of involving future users in the design and implementation process has already been acknowledged in the CSCW and IS fields (Berg 1997; Bergen, 2004). While I agree with this, I further argue that representatives of the affected professions should not only participate, but also have a mandate to make and evaluate decisions of the technology-in-use practices of the particular group.

4.4.1 EMR meetings

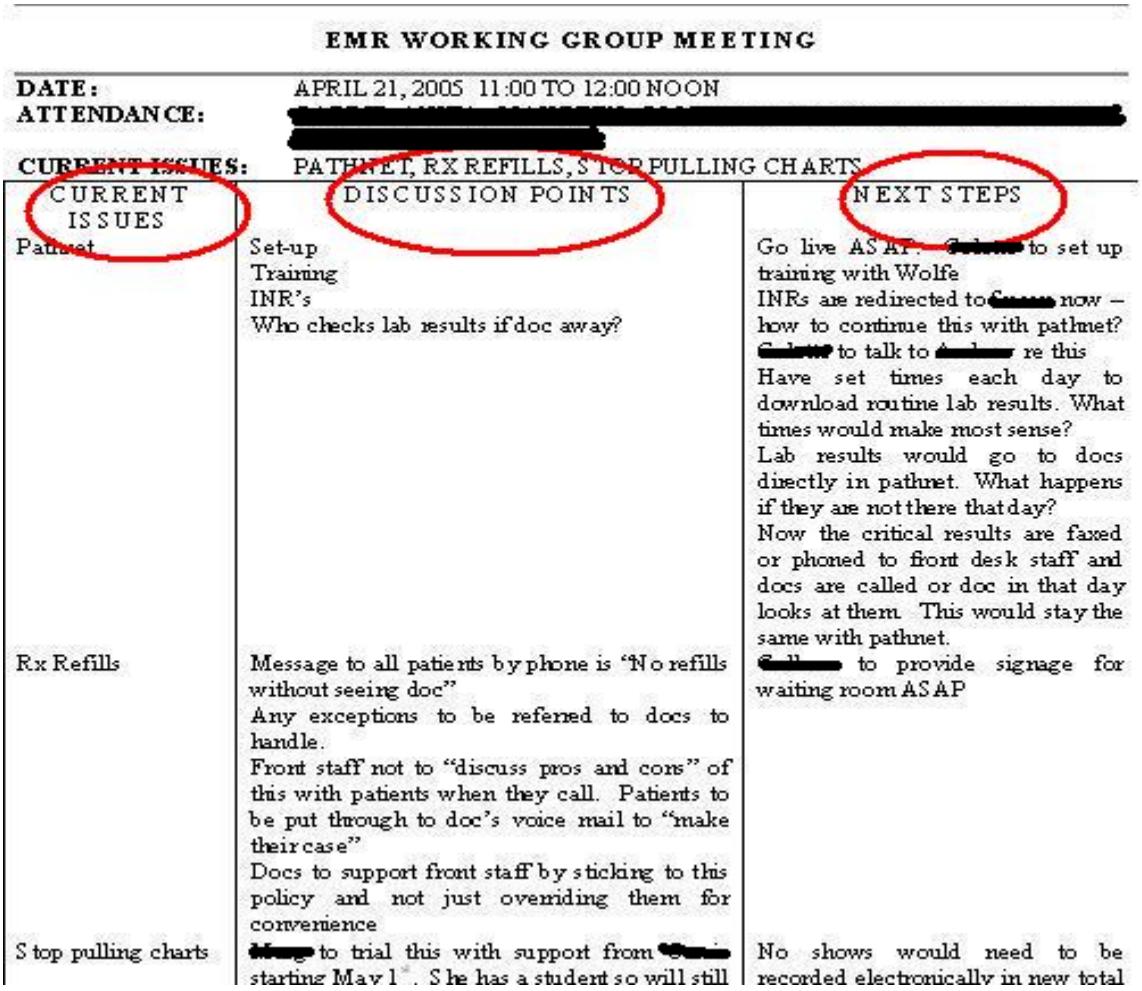
Examining my empirical observations, I found that one of the major driving forces that supported the adaptation was the establishment of the EMR committee and their meetings. It was during these meetings that the health care practitioners evaluated

the adaptation process and continuously developed new and more advanced technology-in-use practices. The EMR committee reflected an interdisciplinary (team) approach and provided strong leadership, both of which have been identified as crucial during the adaptation phase of EMRs (Bergen, 2004; Ludwick & Doucette, 2009).

These meetings were not organized by an external group (e.g., people from VCH PHCTF or the IT vendor), but rather by an internal committee consisting of health care practitioners from the clinic, who were representatives from each professional group. This included a core group of an MOA, a GP, the technical support staff, the chronic disease manager, the medical office administrator and the executive director who joined a few of the meetings. The changes were, therefore, initiated internally by the health care practitioners, following a 'bottom-up' approach. The EMR meetings were different in nature as the participants did not constitute individuals that were randomly chosen to represent their professional group. Rather, the committee consisted of self-selected individuals who freely volunteered to participate in weekly meetings and to dedicate their time to testing the EMR. It was, therefore, a group of committed and enthusiastic individuals who took responsibility for dealing with various challenges and actively defined new goals for further development.

The meetings, however, did not contain discussions of smooth unproblematic sequences of events. Instead of a static chessboard with wooden players moving back and forth, the EMR meetings showed an extremely intensive, hectic and sometimes chaotic work environment where decisions concerning the technology-in-use practices changed rapidly. An illustration of that can be found in an incident when I attempted to create a document that kept track of the (post-EMR) work practice changes, and I realized quickly that this seemingly simple task appeared to be immensely challenging since the document had to be repeatedly updated due to continuous changes in the decisions. Since there were rapid changes applied to the technology-in-use practices, the committee acknowledged the importance of disseminating knowledge to all of the health care practitioners, including those who are not members of the EMR committee. The process of building, documenting and disseminating knowledge was complex and constituted enrolling a series of statements and facts, which moved through various stages, from being a 'current issue,' to becoming a 'discussion point' that would lead to the 'next steps' (see Figure 4.5 for an illustration).

Figure 4.5: Example of the EMR Meeting Minutes



EMR WORKING GROUP MEETING

DATE: APRIL 21, 2005 11:00 TO 12:00 NOON
ATTENDANCE: [redacted]
CURRENT ISSUES: PATHNET, RX REFILLS, STOP PULLING CHARTS

CURRENT ISSUES	DISCUSSION POINTS	NEXT STEPS
Pathnet	Set-up Training INR's Who checks lab results if doc away?	Go live ASAP. [redacted] to set up training with Wolfe INRs are redirected to [redacted] now – how to continue this with pathnet? [redacted] to talk to [redacted] re this Have set times each day to download routine lab results. What times would make most sense? Lab results would go to docs directly in pathnet. What happens if they are not there that day? Now the critical results are faxed or phoned to front desk staff and docs are called or doc in that day looks at them. This would stay the same with pathnet.
Rx Refills	Message to all patients by phone is "No refills without seeing doc" Any exceptions to be referred to docs to handle. Front staff not to "discuss pros and cons" of this with patients when they call. Patients to be put through to doc's voice mail to "make their case" Docs to support front staff by sticking to this policy and not just overriding them for convenience	[redacted] to provide signage for waiting room ASAP
Stop pulling charts	[redacted] to trial this with support from [redacted] starting May 1st. She has a student so will still	No shows would need to be recorded electronically in new total

The process of reaching decisions constituted continuous discussions and negotiations that took place with all committee members. Thus, discussions were not dominated by individuals and decisions were made collectively. Typically, when a new function was put into use, the committee members would request comments from the individuals specifically impacted by the change. This was often followed by a testing period where the new work practice was piloted. The committee would then request feedback on the pilot test evaluating whether the changes were feasible and/or beneficial. This was a mechanism for creating an inner logic (for what works) in the EMR, which is based upon the functions available within the EMR system and the feasibility of a task in terms of changes in work practice and resources (time and money). This can be portrayed as a continuous process of striving toward the constantly changing 'ideal' (Berg, 2001, p. 153), but in this landscape, 'the ideal' is continuously re-imagined and redefined. For example, when the committee discussed the need to fully update the EMR, they decided that it was not feasible to ask the health care practitioners to enter all of the information found in the paper charts, as this demanded a considerable amount of time. Instead, the

committee decided to prioritize which parts of the information should be entered. Hence, decisions were reached through a mutual and dynamic process of negotiation and renegotiation of technology use (Bjørn, Scupola, & Fitzgerald, 2006). While in most cases decisions were made by the EMR committee, some issues were forwarded to the clinical or team meetings. This includes situations where the GP representative wanted to consult all the GPs before making a final decision. Technical issues which could not be solved internally in the clinic (e.g., glitches in the EMR system) were often forwarded to the vendor and support staff.

When looking at the chronological order in which the issues were discussed in the EMR meetings, one can note a progression from simple functions to advanced ones (e.g., from discussing data-entry into the EMR to discussing modifications of existing templates). Furthermore, one can note a progression from the most common and general functions to more concrete and specialized ones (e.g., from dealing generally with referral letters [which apply to many patients] to dealing specifily with flu shots and Pap Smear tests).

These meetings encouraged increased collaboration across professional groups. The committee meetings developed a process of continuous alignments, adaptations, and fine-tuning of local work practices to the technology (and vice versa). In situations where the workload evolved, new decisions were made based on new evaluations. Scanning, for instance, was initially conducted by the MOAs; however, as the number of requests increased, new strategies were established to redistribute the workload between the MOAs and the GPs. These regular meetings helped prevent situations where work practice changes are not followed by the health care practitioners, and they enforced systematic evaluation mechanisms through iterative feedback loops.

Each new EMR function was always discussed in relation to other existing functions. Hence, if a new function increased the workload for one professional group, it was always evaluated in relation to the overall context of changes. Decisions concerning changes in the distribution of practices were based upon the existing workload at a certain point in time. When the health care practitioners discussed the need for updating the EMR, for example, the GPs suggested the MOAs do this task since their workload decreased dramatically when they stopped grooming paper charts. Hence, the committee acknowledged the continuous changes in the workload and strived to balance the distribution of the tasks among the staff. The process of reflection was essential for enabling and assessing the management of the adaptation process and for cultivating technology-in-use practices. Jocelyn, one of the MOAs suggested that:

> *If we didn't have this [EMR] committee in the beginning of things, I don't think we would have made any changes or implementations. [...] Also [the process of] add[ing] rules, different responsibilities for different people. That's what the program [EMR] brought forward. [...] That's why those [EMR] meetings are great.*

You can bring aboard issues, or try to fix them. Sometimes there's just a problem, but then we fixed it, or we tried something for a while and then we fixed it ourselves. Then it's not an issue.

The meetings were not only held at the beginning of the adaptation process, but rather on a weekly basis for half a year (beginning in April, 2005). It was only when there was a sense of stabilization and the number of challenges decreased that the committee changed their schedule to biweekly meetings, which were later reduced to monthly meetings. This allowed the health care practitioners to deal with unexpected challenges as they emerged along with the adaptation process. Such challenges and unanticipated uses could not be predicted in advance (DeSanctis & Poole, 1994). For example, use of the messaging feature brought along challenges regarding how to deal with electronic urgent messages that were sent to GPs who either had their computer turned off, or were not in front of the computer. In other words, a new mechanism had to be established to assure that urgent messages reached the GP in a rapid manner.

Thus, the weekly meetings constituted continuous reflection-on-action activities (Schön, 1983), which were essential for dealing with concrete, local, and situated complexities related both to the technical implementation and the necessary adaptation activities. Because of these meetings, technology-in-use practices gradually emerged from situated actions (Suchman, 1987). Furthermore, the meetings provided space to engage in critical debates and question existing rigid and duplicated routines. For example, the MOAs at one point questioned the GPs' redundant routines of signing paper charts when this also was done through the EMR. In other words, MOAs were questioning patterns of work that were the result of old habits.

While in the beginning of the adaptation process the technology was viewed as something that took the practitioners' time and disrupted the medical practice, new technical knowledge was articulated through use and influenced peoples' perceptions and understanding of the technology and its use. Gradually, technology-in-use practices became embedded in the medical practice and were viewed as an important aspect for enhancing quality of care. Table 4.2 summarizes the characteristics of the meetings.

Table 4.2: Characteristics of the EMR Meetings

Dimensions of meetings	Actualization
Organization of EMR meetings	EMR committee (internal actors) drawn from all staff groups
Source of change	Internal
Management control	Centralized in the committee
Follow-up mechanism	Close and continuous follow-up the EMR committee
Communication channels for new practices	Information disseminated through clinical and medical team meetings
Approach	"bottom-up"
Participants	Self-selected
Decision	Collaborative through negotiations
Frequency of EMR meetings	On a weekly basis (then biweekly and monthly meetings)
Evaluation	Systematic evaluation mechanisms through iterative feedback loops

4.4.2 Characteristics of the Space for Reflection-on-Practice

I have now identified the EMR committee and their meetings as one of the key factors supporting the adaptation process. These meetings provided a space for ongoing reflection-on-practice activities related to constructing emergent technology-in-use practices. In this section, I will characterize this space for reflection-on-practice activities grounded in the empirical observations and thus discuss several essential issues related to this important space for reflection.

As previously mentioned, the nature and characteristics of these meetings were unique, forging and nurturing the essential space for reflection-on-practice activities. The EMR meetings were organized by internal actors representing clinical staff. The group organizing these meetings followed a participatory approach, working closely with health care practitioners. If the committee consisted of external actors, they would have been viewed as 'outsiders' who have their own political agenda and would most likely have faced a larger degree of interdepartmental resistance for change (Goffman, 1974) and would have been challenged when trying to reach consensus amongst the health care practitioners. In this case, however, the EMR committee consisted of a group of internal actors ('insiders'), thus changes were perceived as intended to benefit the internal and situated needs of the health care practitioners.

The participants in the EMR meetings were not randomly chosen, but rather a group of self-selected, committed individuals who actively and collectively defined new

goals to achieve. Thus, the changes came from *within* the organization, from the health care practitioners in the clinic. Changes did not emerge from pre-defined standards or formal protocols, but rather from the local and situated practice. This reflects a bottom-up approach according to which formal protocols were created based upon situated practices. These changes were neither static nor implemented 'once and for all,' but rather were continuously modified and adapted to the work practice that existed at a certain point in time.

It has been acknowledged in EMR studies found within CSCW and IS that it is essential to have a project team whose members dedicate significant time to the adaptation process (Bergen, 2004). While the case described above supports this, it provides additional insights into the some of the reasons for the importance of dedicating time for reflecting upon the EMR adaptation. Since there were many challenges and rapid changes in the technology-in-use practices, the frequency of the EMR meetings was essential because these meetings functioned as a supporting infrastructure for the overall changes by enforcing systematic evaluation mechanisms through iterative feedback loops. Also the frequency created a strong and solid platform for ongoing negotiations and crucial reflections of unexpected challenges. This is especially important because implementing an IT system always brings along unexpected challenges, which are impossible to predict before the actual use of the system (Kiesler, 1986). In addition, these meetings created a framework that contextualized changes, and changes were therefore always discussed in relation to the overall redistribution of tasks among the staff.

The EMR committee followed a more centralized management control and all health care practitioners were expected to follow decisions that were taken by the committee. It is important to note that the EMR committee did allow space for so-called personal preference by, for example, letting each GP decide how many consultation notes she wanted to do using the EMR. In other words, the degree of use was voluntary and GPs were given some degree of local autonomy to decide and choose preferences related to the degree of use of particular functions of the EMR. This was intended to provide GPs with the flexibility to gradually get used to the EMR. However, after a period of time, a formal and centralized decision was made, according to which all the GPs had to chart their notes electronically using the EMR. It has been argued by CSCW scholars that in order to allow effective integration of the EMR with localized work practices, it is important to provide space for ongoing adaptations and re-redesign (Hartswood et al., 2003a). The case described above reflects a strategy that combines centralized decision making while leaving some degree of autonomy for local variations of degrees of use. Furthermore, the fact that the EMR committee constituted internal actors ('insiders') from the clinic implied that they could closely monitor adequate involvement and commitment of the health care practitioners, ensure follow-up mechanism and take action if changes were not adopted in practice. The importance of decentralizing and spreading

the IT knowledge across the health care organization has been acknowledged (Bergen & Berg, 2004). In the empirical case described above, the EMR committee integrated communication of decisions related to the EMR into their medical team meetings in order to assure that all the health care practitioners were aware of any new changes and the new knowledge related to the use of EMR.

4.4.3 Discussion and Summary

Previous research found that large-scale information systems adaptation in health care should be managed by a project-group including not only IT-developers, but also representatives of future users and management (e.g., Berg, 1997). They also found that negotiations of system specifications, as well as organizational changes, should be discussed frequently at project-group meetings (Berg, 2001). While I also argue for the importance of these meetings, I additionally complement and expand the notion of project meetings by providing a conceptualization of the essential aspects of these meetings. This includes the importance of supporting the emergence of technology-in-use practices and allowing reflection on technology use in practice. I have conceptualized the meetings as continuous reflection-on-practice activities through which technology-in-use practices were constructed (section 4.4.1). Reflection-on-practice activities are internally initiated and involve critical reflections by the participants, who continuously evaluate and question work practices in relation to technology.

I then investigate how I can characterize the space for reflection-on-practice activities (section 4.4.2). Based on the analysis of the empirical material, I found that reflection-on-practice activities were essential for constructing and developing emergent technology-in-use practices. Moreover, I argue that reflection-on-practice activities can be characterized by ongoing, frequent encounters of negotiations of work practices and technology use, providing internal actors a space for systematic and iterative evaluations of suggested changes. I further argue that it is essential that the reflection-on-practice activities are based upon a contextualized understanding of the overall changes and redistribution of tasks. Finally, I found that making centralized decisions about technology-in-use practices at the committee meetings, as well as having mechanisms for communicating new changes and closely following the actual integration of these changes into the daily work, strongly supports the adaptation process. The conceptualization of reflection-on-action activities has been helpful in understanding technology adaptation by health care practitioners, and it is important for constructing and developing technology-in-use practices. Moreover, this characterization of the space for reflection can be used by both practitioners as well as by researchers when implementing or investigating new technology in health care practice.

As can be seen from the sections above, the adaptation process constituted a complex dance between the work practices and the EMR, both of which were

continuously changing through translations and mutual alignments where at times, it is the work practices that had to be aligned to what the EMR system afforded, and other times, it is the EMR system that had to be configured to the existing work practices. Depending on the contextual circumstances (e.g. type of task, availability of resources, affordability of the EMR system) the health care practitioners would either modify the EMR or their work practices. I illustrated above how these modifications and changes were not based on pre-defined standards or formal protocols, but were rather based on the situated work practices. I also illustrated how these changes were not static, configured once for all; but were rather continuously changing depending upon the contextual circumstances. The analysis of the adaptation process thus far shows that implementing a new technology is not a matter of fitting it to the existing work practices (or vice versa), as has been claimed in some EMR studies within the CSCW field (e.g., Atkinson & Peel, 1998; Ellingsen & Monteiro, 2003a, 2003b; Hartswood et al., 2003a; Lærum, et al., 2001; Lundberg & Tellioglu, 1999). Rather it is a complex and dynamic process of continuous negotiations and translations of different interests, and alignments of both the technology and the work practices. I will explain this point further in the next sections; however, to better capture the complex dynamics between the EMR system and the work practices, I will draw upon a constructivist STS approach which will be explained in section 4.5.1.

The fields of CSCW and IS provided me with useful insights into how the health care practitioners configured and adapted the EMR system to their collaborative work practice (Suchman, 1983; Suchman, 1987), and it helped identify factors that supported the adaptation process of the EMR. In the next section, I will discuss how the technology impacts the medical practice, thus answering the first part of the first research question (presented in section 1.3). To investigate the impact of technology on the medical practice, I will bring insights from the field of STS into CSCW and IS, and I will illustrate how these can help better understand adaptations of health care technologies and move away from the static view of fitting technologies to organizations (and vice versa).

4.5 Technology Transforming Medical Practice[121]

The idea that system design and implementation are not solely and purely driven by technology has been acknowledged in IS, CSCW and STS. This has been labeled as the 'sociotechnical' approach, which originally aimed at moving away from technological determinism (Berg et al., 2003). Although the term has been used across the fields mentioned above, it has different connotations which have often been

[121] This is based on a recent paper (Boulus, 2009b) that was published in the *American Conference on Information Systems (AMCIS), 2009 proceedings*.

overlooked or misunderstood by some researchers from CSCW, IS and especially medical informatics. I begin by clarifying the different connotations of the sociotechnical approach (section 4.5.1) and will use a constructivist lens to analyze the various sociotechnical changes that were brought about by the EMR.

I have already described above (section 4.3.2) the initial changes that occurred after using the EMR for a year and a half. In the following section, I will reflect upon the immediate implications of these initial changes (4.5.2). I will also reflect upon empirical data collected nearly three years after the introduction of the EMR (4.5.3). In the process of analyzing the data, I began noticing essential differences between the sociotechnical changes that were observed in the beginning of the implementation process, and those observed after using the EMR system for nearly three years. Trying to explain the differences led me to focus on their implications. I distinguish between the initial changes that occurred and their implications which had straightforward, direct, and immediate effects (section 4.5.2); and the emergent changes with their implications which I characterize as being broader and having a deeper level of impact in the long term (section 4.5.3). Furthermore, I will illustrate (in section 4.5.4) how some of these changes reflected realizations of some of the shared visions I mentioned earlier (section 4.2.1) behind the dream of implementing an EMR, while other changes enabled new practices and brought forward issues that were invisible.[122] Finally, drawing upon insights from ANT, I show how the EMR is becoming more than just a tool; it is participating in creating new practices and gradually transforming the medical profession.

4.5.1 The Sociotechnical Approach

The term sociotechnical approach has been used by scholars from the fields of IS, CSCW and STS. Within STS, the term emphasizes the intertwinement between technical and social aspects (e.g., Berg, 1999a; Bijker & Law, 1992; Callon & Law, 1998). Similarly, CSCW scholars coined the term 'sociotechnical' (Bannon & Schmidt, 1992) in order to understand the interrelation between technical and social aspects. The 'sociotechnical' approach has also found its way to the Information Systems (IS) field (e.g., Mumford, 2006) and medical informatics, with Marc Berg and Jos Aarts as some of the prominent figures in this field (e.g., Aarts, 2005; Berg, 1999c). Although all approaches emphasize the interrelation between technology and society, the sociotechnical approach within the STS field carries a different interpretation. I will now clarify the interpretation that the term 'sociotechnical' has within the STS field and its difference from the fields mentioned above (i.e., CSCW, IS, medical informatics) since these differences have not been addressed in the literature.

[122] This will be clarified and illustrated in sections 4.5.3-0.

Constructivist STS scholars (i.e. actor-network theorists) move a step further and argue that society and technology are not only interlinked, but they should also be *analytically indistinguishable*. Following the principle of symmetry, ANT argues that no predefined and predetermined distinctions should be drawn between humans (social) and non-human (technical) (Callon, 1986; Latour, 1999a; Law, 1999). As Latour (1993) points out: "we…need to abandon the idea that fixed human actors or fixed non-human actors can simply be taken "off the shelf" and inserted into process" (p. 388). Therefore, following an ANT perspective, we talk about "sociotechnical networks [which] allows a more fluid and "hybridized" exploration of the development, emergence, and resolution of particular problems—and without "purifying" discussion into such predetermined categories as "science" or "politics"" (Irwin, 2008, p. 592). As Law (1991) argues, we should "find a way of talking about the-social-and-the-technical, all in one breath" (p. 8). Accordingly, "ANT and STS studies put emphasis on the socio-technical processes that shape the technology and the work practices. Within this perspective, change emerges from complex interactions between individuals; it is not solely driven by technology" (Jensen, 2007b, p. 24). Thus, using the term sociotechnical networks, or hybrid collectives[123] as Callon and Law (1995) call them, ANT offers a different methodological point of departure. Accordingly,

> there is no possibility of making a priori definitions of actor's characteristics. Before starting data gathering and analysis, there is no possibility of deciding what an actor does or what 'role' it fulfills. As the characteristics of any actor depend of its position in a network (Callon and Law 1995), researchers need to study the connections between actors empirically. (Winthereik, 2004, p. 11)

Hence, in this heterogeneous network, we can neither distinguish between work practices (users) and technology, nor can we refer to the notion of 'fit' to explain a successful implementation of technology. Instead of placing technology on one side and its users on the other, we focus on the relations and interplay between the two.

The refusal to make an a priori distinction between social and technical elements implies a move away from the idea of fitting technologies to work practices (or vice versa); an idea which as I mentioned earlier exists within some of the CSCW literature (Vikkelsø, 2005). For example, Hartswood, a CSCW scholar and his colleagues (Hartswood et al., 2003a) argue that "in order to make systems 'work,' actual working practices have to be 'disciplined' to fit the requirements of the system" (2003a, p. 263).

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[123] See section 3.3 for an explanation of the term. A somewhat related concept which was also introduced earlier is Latour's term 'technoscience' which moves away from a priori distinctions between science and technology, nature and society, subject and object, etc. (Moser, 2003, p. 21).

But making systems 'work' is neither simply a matter of 'disciplining' work practices, nor is it a matter of 'disciplining' technologies. Within the STS constructivist tradition, work practices and technologies are viewed as interconnected and irreducible entities that transform one another in unpredictable ways (Aanestad, 2003; Berg, 1999c; Berg et al., 2003; Jones, 2003; Svenningsen, 2002).

Similar to other CSCW research on EMR (presented in section 2.3.2.1), I will illustrate how the EMR changes representations of work, division of labor and workload. In line with EMR studies within CSCW and IS, I will also illustrate how at times, the EMR supports collaborative work and other times, it constrains the work practice. However, findings from my research show that there are deeper qualitative ontological changes occasioned by the introduction of the EMR (e.g., it is changing the way GPs think and the relationship between GPs and patients). Accordingly, the EMR is neither a tool that simply enables/constrains the medical practice, nor does it passively re/present GPs thoughts and practice. Rather, it is an active actor that is participating in transforming the medical practice. As mentioned earlier, drawing upon ANT, (technical) artifacts become activated as non-human actors that have the ability to produce effects on the world, transform our actions, and redefine our understanding (Latour, 2005). Thus, the act of practicing medicine (or in my case, having a consultation with patients) is enabled not only by the health care practitioners (humans) but also by the material semiotic actors and arrangements (non-humans). Similar to EMR studies found within STS (presented in section 2.3.2.2), I looked at how the EMR was enacted and performed by different actors in various locations using diverse practices.

4.5.2 Initial Changes and their Immediate Implications

One of the most obvious changes that the EMR brought about was in performance of tasks, especially in relation to documentation activities which were now conducted using the computer. New communication channels were used (e.g., the messaging feature in the EMR), and post-it-notes were gradually replaced by the use of e-reminders (prompts). These changes imply that all information became traceable as the EMR kept a continuous electronic audit of all activities. More importantly, the change in documentation activities had implications for the amount and type of information entered, as well as the presentation and format of information. The EMR included a Subjective Objective Assessment and Plan (SOAP[124]) note which is a template for writing progress notes for patients' encounters. This was a radical change when considering the fact that

[124] The SOAP template is intended to instruct clinicians to record their observations under the following headings "Subjective (what the patient says); Objective (what the doctor sees and hears); Assessment (what the doctor thinks); and Plan (what is to be done)" (Taylor, 2006, p. 17).

prior to the EMR no particular form or template was used for documenting patients' encounters. A new charting practice had to become embedded in the daily clinical practice (Berg, 2001), and there had to be a transition from 'free text' handwritten notes to a more structured content approach (Gregory, 2000).

The EMR also decreased the number of tasks, especially those related to articulation work. GPs were now increasingly involved in activities previously conducted by the MOAs related to coordinating tasks and sorting information. The EMR also decreased the number of staff involved in a particular activity. For example, prior to the EMR, when a lab result would come to the clinic, the MOAs would open the various letters, sort them in different piles, and then place them on different shelves depending on which GP was responsible for ordering the lab tests. The GP would then see the lab result and place a post-it-note on the document requesting that the MOAs pull out the chart. Assuming the chart was not misplaced, it would be found and placed on the GP's shelf. The GP would then assess the situation and describe actions to be taken. As we can see from this example, the EMR also altered the workflow and the chronological order in which tasks are carried out. The EMR now routes all the electronic labs directly to the GP's inbox.

Furthermore, prior to the EMR, GPs used to prepare themselves for a consultation with a patient by glancing/skimming quickly through the patient's chart (e.g., looking at the medical history and lab results). This was often done on their way to the examination room, since paper charts embody particular inscriptions (Akrich, 1992; Akrich & Latour, 1992) which makes them tangible and enable mobility (Heath & Luff, 1996; Luff & Heath, 1998; Luff et al., 1992). The EMR altered this flow of work, and the GPs now skim through the EMR either in the examination room while sitting together with the patient, or while sitting in the charting room before seeing the patient. In other words, the EMR system removes the mobility afforded by the paper charts and changes the way in which GPs prepare themselves for a consultation.

The EMR had a major impact on the division of labor and distribution of work. During the transition period, MOAs were responsible for most of the articulation work. Gradually, as more information was available through the EMR, there was a significant decrease in the practice of updating paper charts. Since the MOAs' workload was reduced they started gradually to exercise a higher degree of responsibility for advanced tasks, such as updating narcotic agreements, allergy records, medication renewal, etc. GPs' workload, on the other hand, continued to increase as they were becoming responsible for additional articulation work.

MOAs' responsibility for more advanced tasks (e.g., updating allergy records and medication renewal) increased the knowledge and skills that was expected of them. Here is how one of the GPs explained it:

MOA are now doing much more the background work so that all we [GPs] have to do is say yes or no. So in that sense…it increases their skill level because they have to understand the medications, have some kind of basic understanding of when it is or isn't appropriate to even request it, understand [medications] dosages, and things like that. So in that sense, it really pushes them [MOAs] to upgrade their breath and knowledge of medicine and healthcare (Dr. Georgina).

Dr. Georgina is referring here to a new work practice that was piloted for medication renewals which prior to the EMR used to be done by the GPs. According to this new practice, MOAs would pull out the medications as they were last prescribed in the EMR system and send a message to the GPs who would officially renew the medication prescription by signing it off. In other words, the EMR changed the distribution of work for the MOAs which now have new responsibilities that require greater skills and knowledge about new areas (e.g., medications, allergies, etc.).

The EMR also redefined responsibilities and interdependencies between the GPs and MOAs. Prior to the EMR a buffering mechanism was established to assist in planning the workflow. For example, when lab results were sent to the clinic these were sorted by the MOAs into two piles distinguishing between normal and abnormal results. It is only when the sorting mechanism is completed that the GPs would review the labs that are most important. While lab results used to be buffered before reaching the GPs, the EMR routes all lab results directly to the GP's electronic inbox. The new process removed the MOAs' role as buffer and required the GPs to take on the task of sorting lab results into normal and abnormal. In an attempt to keep some level of buffering mechanism, a labeling strategy has been created for all incoming paper-based lab results. Accordingly, when scanning each lab result, the MOAs enter a keyword to indicate whether results are normal or abnormal. These keywords assist in planning the workflow, and in this case, abnormal results are prioritized. In other words, attaching keywords to scanned lab results replaced the piles of papers which were used in order to distinguish between normal and abnormal results.

The representation of workload was also altered, and while different folders and shelves with piles of papers used to represent the workload status, these were now replaced with different electronic lists of appointments, lab results, etc. This is how the executive director described the changes in representation of workload brought about by the EMR:

Piles of papers, bin full of documents…[used to] represent workload. One could see this workload just by looking around. Now [with the EMR] there is non of that; it just disappeared inside the computer. So it is a really new situation for us as we have to train new staff [MOAs] to know where to look for work…But I think this impacted the doctors too. They can be really high on [delayed with] billing but we don't know that. Whereas before [the EMR], there would have been a big paper pile [reflecting the workload]…Now I can actually go downstairs and I have no idea

if they are having a peaceful day or a hectic day. It is all masked electronically (Jenny).

Contrary to electronic lists, paper-based documents inscribe special properties that enable them to represent workload, support delegation of tasks, and both synchronous and asynchronous collaboration (Luff et al., 1992). Therefore, various studies undertaken within the CSCW field focus on developing health care technologies that are capable of representing articulation work (Lundberg & Sahdahl, 2000; Berg & Goorman, 1999). The various electronic lists found within the EMR system discussed above translates some of the properties inscribed in paper documents as these lists supports representation of articulation work and workload. However, the representation of workload provided by the EMR is not as physically visible as piles of paper documents (Heath & Luff, 1996). It can, therefore, be said that the workload became invisible as stacks and piles of papers previously visible became subsequently masked behind the screen. Table 4.3 summarizes the initial changes and their immediate implications.

Table 4.3: Initial Changes and their Immediate Implications

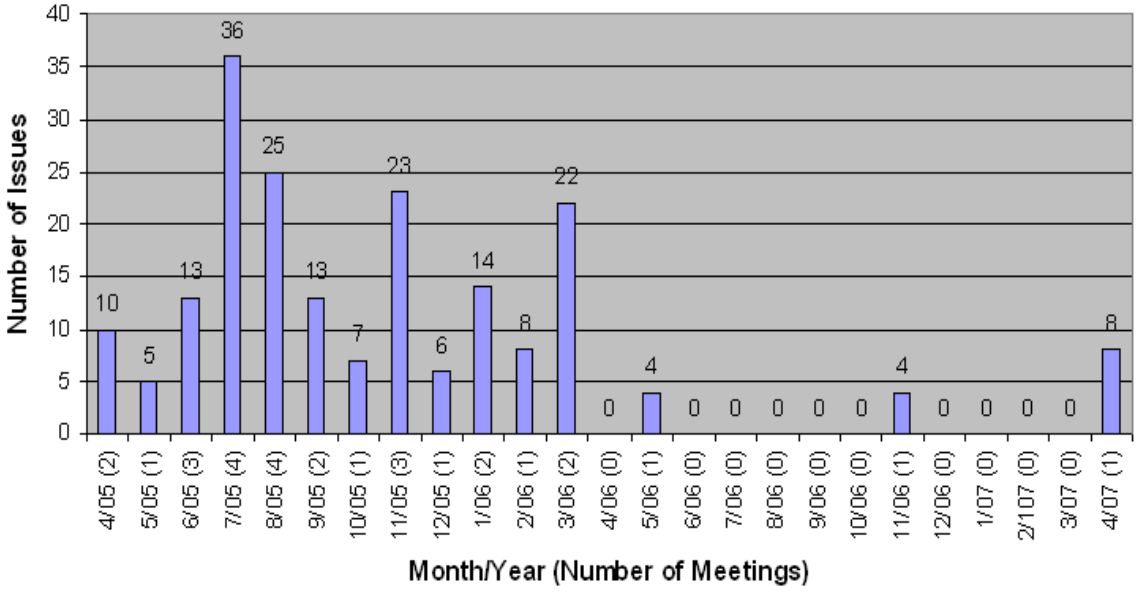
Initial changes	Immediate implications
Performance of tasks	Documentation activities: transition from using paper charts to using the EMR
Presentation and format of information entered to the EMR	SOAP template: transition from 'free text' to 'structured entry'
Number of tasks required to complete a patient trajectory	Overall decrease in articulation work (coordinating and sorting information) and decrease in number of staff involved in a particular activity (e.g., responding to incoming labs)
Division of labour/ distribution of work between the GPs and MOAs	Increase in articulation work for GPs Decrease in articulation work for MOAs who are gradually exercising higher degrees of responsibility for advanced tasks (e.g., updating narcotic agreements and allergy records)
Responsibilities and interdependencies between the GPs and MOAs	Removal of sorting and buffering mechanisms established to assist planning the workflow
Presentation of workload	From piles of papers to electronic lists masked behind a screen

4.5.3 Emergent Changes and their Broad Implications

During the first year of the implementation, the health care practitioners were occupied with trying to understand how the technology worked and they focused merely

on finding ways to use the system in order to accomplish their tasks (e.g., how to create a follow up or review lab results). As time went by, the practitioners acquired more knowledge and experience in using the EMR. As mentioned previously, there was a sense of stabilization in the adaptation process and the number of challenges decreased significantly. The chart in Figure 4.6 shows a decrease in the frequency of meetings (from weekly to biweekly) and a gradual decrease in the number of issues[125] discussed in each meeting during the following period: January 2005—April 2007. As can be noticed from Figure 4.6 (p. 147), there was a major increase in the number of issues during the month of July, August and November (2005). The increase that can be seen in the chart for the month of July is due to the large number of issues discussed. The increase in the month of August is most likely due to summer locums, and the increase in the month of November is due to a large number of meetings.[126]

Figure 4.6: Number of Issues Discussed Each Month



The new issues that were discussed in the EMR meetings were more advanced and sophisticated (e.g., how to search for a particular patient population, such as diabetic patients). Most of the informants describe this period in terms of increased comfort and

[125] Please note that an 'issue' here refers not only to a complexity or a challenge that is faced, but it can also refer to something that was recorded because it required clarification or because it was an update of new information.

[126] For more information about the issues discussed in the EMR meetings, please consult appendix I.

confidence that is related to the growth of the technical knowledge about the EMR. This is how one of the GPs described the first period:

> *It was just a learning curve. So there were lots of frustrations. Cause if you're not instructing the computer in the right way, it won't do what you need it to do. So you just ran into the blocks. But over time, it's actually a really good program if you understand how it works. It's just learning how to drive the program better […] You can't take in all the details when you're just learning where the screens are. But as you get more comfortable with the basics, then you can start to appreciate the shortcuts (Dr. Mary).*

As mentioned previously, the various health care practitioners started using advanced functions, such as 'practice search,' the creation of graphs and 'rules' for reminders. The focus of the health care practitioners in general, and the EMR committee in particular, shifted from 'how to do things' to 'this is how things can be done.' There was a change in the attitude from 'how to adopt existing work practice to the technology,' to a more proactive engagement with the technology—to actively seeking possible configurations in the system. Gradually, the technology became so truly integrated in the work practice that it was viewed as a tool for achieving something else. For example, as will be illustrated later, when using the practice search and rules, practitioners view the EMR as a tool for enabling preventive care, and a tool that is helping doctors evaluate their own practice and patients evaluate how they are doing with their medical condition. Furthermore, a few GPs began accessing the EMR system from home. This is how Dr. Georgina explained it:

> *Ah, well one of the things is that it [the EMR] allowed a much greater ease of accessing information off site…As a primary care practice we provide after hour service and one of us always carries a pager. So for instance, I was on-call last night and someone called me and said they were prescribed a certain medicine and they don't know if they should continue it. Now in the normal course of events I would be lost because I have no access to that patient's chart. That's another person's patient, not my patient, but it is a [patient of our clinic]…But because of the EMR I was able to go into his [the patient's] chart from home, see exactly what he was prescribed, exactly what the problem was and then advise him. So that's huge in terms of really being able to provide a better after hour service. It also from a work perspective, for myself, it means that if I need to write a report and don't have time to write it in the office, I can write it from home.*

The increased accessibility to patient charts from locations outside the clinic was viewed by the GPs as improving their after hours services (i.e. house calls and on-call services). Finally, some GPs began using the Internet both during and outside the consultation to look for updated information about new treatment, medication, etc. Here is how Carrie, the nurse practitioner, explained it:

Carrie: Now that we have computers in the exam rooms, we can go online and show patients websites they should consult if they have a computer. A lot of them [the patients] usually don't have [Internet] access so then we show them the various treatments available or whatever they need to know [...] I can go online, see a medical site, show the patient a picture of something and say this is what you have and this is what we are gonna do about it [...] We are finding that we have to really educate our patients on being cautious with whatever they read on the Internet and to learn to distinguish between consumer sites versus other sites. So that's changed our practice, because they are now approaching us with expectations and ideas about what they think they have and want.

Nina: It sounds like you now have patients that are challenging your knowledge?

Carrie: I think it's good. I'm excited by that challenge because then it shows that patients are actually being more active in managing their own care.

The Internet brought about a new role for some GPs—the role of guiding the patients to the most reliable sources of information online. The Internet has also redefined the patients' role as it indirectly promoted a more active engagement of patients in the process of care. Thus, the GP is no longer the sole provider of information and medical knowledge and the patient is no longer a passive recipient of information and care. Rather, with the Internet, the patient now has the opportunity to access medical knowledge, challenge the GP, and participate more actively in managing their own care.

As can be seen from the above, beside changes in performance, workload and workflow, there were other emergent changes that together with the initial changes, seem to have a deeper impact and broader implications in the long term. The implications of the emergent changes which appeared after using the system for nearly three years are discussed below.

GPs started using advanced functions that allowed them to run complex queries to get an overview of a specific patient population. Previously, for example, in order to identify all diabetic patients who did not have an examination in the past six months, the MOAs would ask each patient that came to the clinic whether they were diabetic and when they last had an examination. This was a tedious and slow process which failed to capture patients who are not 'frequent users' of the system (meaning those who did not visit the clinic in the past 18 months). The EMR, however, with its search function, ensures capturing all patients in the clinic. Furthermore, the EMR allows for the automation of former coordination mechanisms as it provides the possibility to create rules that will remind GPs to call patients for a visit. Another example is the follow-ups which were automated by the EMR. Previously, when the GP requested a follow-up examination be repeated, for example, in three years, she would note this request in the paper chart and ask the patient to remember. This practice was described as 'hit and miss' by several GPs. The EMR, however, not only provides an accurate follow-up mechanism,

but also altered the responsibilities related to remembering the examination date. While this responsibility was previously distributed between the patient and the GP, it is now delegated to the EMR which provides an overview for each doctor of the tasks that must be followed-up.

Advanced functions such as the practice search and rules provide an extended overview of a whole population rather than just individual patients. Such a comprehensive and accurate overview was previously unseen or hard to discern. The EMR allows data to accumulate in such a way that it can be used for identifying and monitoring demographics and long-term changes in disease patterns. This was viewed as useful especially since it enables preventive care and chronic disease management.

Furthermore, the EMR allows GPs to create graphs that provide visual representation of patient's progress (e.g., the patient's blood pressure) over time. Prior to the EMR, the GP would shuffle through the charts and look for the previous lab results. Assuming that the results were not misplaced or lost, the GP would then compare the numbers spread across different papers and would asses the results. Dr. Georgina explained that this process of finding all the relevant papers and assessing the lab results took considerably longer time when compared to the EMR. Furthermore, using graphs implied a change in the type of data GPs work with, and a move away from numbers to working with graphs. In this case, the EMR provides a different mode of data representation. Moreover, because the EMR translates numerical data into visual information, this format is more comprehensive and can be better understood by patients. Dr. Maya explained it in the following way:

> *I think the best thing about it [the EMR] is that it [the graph function] gives you data in a way that's easy to understand and make decisions about it [...] And patients love that. They're very proud of it [the graph] when you show it to the patients. So it really gives you a sense of how things are with the time.*

Dr. Georgina expressed a similar view about the graphs:

> *They [the patients] love to be able to look at their data in a clear way. They love the ease in which past test can be pulled up. You can do a lovely graph of, for instance, all the hemoglobin done. They love being able to easily get a printed copy of their [examination] results. When you have mothers bringing their kids, you can make a beautiful chart of the kids' height and weight and give it to the mothers.*

As can be seen from the above example, the act of translating numbers and interpreting information for patients has now been partially delegated to the EMR which provides enhanced and comprehensive information that can be more easily understood by patients.

The EMR offers many different templates which enforce standardized practices, such as charting and billing. The increase in standardization is expected to lead to ensuring performance measures, medical legacy and analysis of health outcomes. Standardized practice is a realization of some of the shared visions behind implementing an EMR. As mentioned earlier, the SOAP template is supposed to improve charting practices by enforcing a structured content approach. However, this approach has also been viewed as challenging by some of the GPs as it demands different reflection and cognitive skills. Several GPs explained that the template forces them to work in a more precise and linear manner and does not provide as much flexibility as paper charts. Heath and Luff (1996) who study the documentary practices of health care practitioners, explain the importance of the flexibility provided by the paper charts:

> The entries on the paper record…are tightly interweaved, they rely on certain ambivalence to the recording of categories, particular vagueness in the entries and flexibility in the type of components which are entered. This flexibility is required so that readers can read the record 'as a whole' and 'at a glance'. These requirements for both the entry and access of computer records are clearly distinct from those implied by other financial and bureaucratic purposes. (Heath & Luff, 1996, p. 362)

This is also true in our case, where the SOAP template which enforces standardized charting and billing practices may be well designed for financial and bureaucratic purposes; however, it is viewed as challenging for clinical purposes (e.g., patient assessment and diagnosis) as it fails to provide GPs with adequate flexibility and forces them to work in a linear manner.

Furthermore, one of the GPs viewed the SOAP template as challenging because it is limited to one problem (chief complaint) per patient, while many of the patients in this particular clinic have high needs and risks, and many suffer from multiple chronic diseases. Dr. Mary explains how the SOAP template inscribed in the EMR system changed the way she thinks when assessing patients:

> *The way the EMR is laid out constrains one's ability to analyze multiple problems…I tend to think while I write, so I have had to change that quite a bit and I still find it quite awkward to sort of fit the way I think into the format of the EMR system.*

In other words, the SOAP template constrains the GP's ability to analyze multiple problems. Hence, in spite of the fact that with the EMR, text about individual patients is entangled within the larger patient population—the text is still limited to one chief complaint per patient.

As mentioned earlier, the EMR brought about a decrease in the number of tasks related to articulation work and the number of staff involved in a particular activity. This, in turn, increased the speed with which tasks are completed. Quicker task-handling and

increased accessibility to information enabled what is called point of care (POC) charting which refers to the expected formal and legal practice whereby charting ought to be done while sitting with the patient. Prior to the EMR, papers would be sent back and forth between GPs and MOAs, traveling through various shelves, desks and folders, and leaving traces in different notebooks before a final decision would be taken. As expressed by one of the GPs, the EMR has increased the speed with which patient assessment is completed:

> *Dr. Georgina: "Now some other things, I'll just let you know, from an efficiency point of view, in the old days, again, I would tend to see the patient jot a few things down and then complete my charts at the end of the day. Jot down what I prescribed, or some of the key things, you know, some of the findings. But in terms of signing off I would do it at the end of the day. And you know, I would sometimes go back and think about various aspects of the visit, ah…so there'll be a big pile on the desk. Whatever…20 charts on the desk. Now I sign off as I go, because if I didn't I would be swamped. I'm sort of forced to sign off as I go. Is that a good thing? Probably, because it does force you to be efficient however it may prevent again that kind of looking back and saying well how about that kinda slightly more thoughtful approach to a visit.*
>
> *Nina: So do you feel that the EMR system in a way is kinda forcing you to make decisions more rapidly?*
>
> *Dr. Georgina: yes, yes. More rapidly and maybe you may skip in-depth analysis. Recently for complex patient I've tried not to sign off. I've tried to pick one or two in the day where I don't sign off but I go back and think about because if you sign them off ah...you're probably missing some aspects of the visit.*

The speed and intensity of the clinical decision making process might be viewed as increasing the efficiency, but at the same time, some GPs felt it was discouraging them from having the possibility to conduct in-depth analysis. The following quote illustrates how the EMR was viewed as a tool that tends to compel them to do more work right away.

> *The EMR has speeded up the intensity of the work and the phase of the work [...] Having an EMR, tends to compel you to do more right away. So…well I'll use the example of the low hemoglobin, the anemia. I would get a report saying you know, pt X has low hemoglobin…It would come in on a piece of paper, the first thing I'd do put a sticky [post-it-note] on it and say 'please pull out the chart.' So that would go to the front office [MOAs] and then they would look around for the chart. Usually that would take about a day to find. So then that would trickle back, and I'd make a decision and then maybe a day after, some action would be taken. Whereas now [with the EMR], it's right there, the chart is in front of you. You can't say oh the chart hasn't arrived yet, and the patient's phone number is right there. You know, you have to make a decision the day it comes in. The other thing is that…you can get lab results the same day it gets fed into your computer. So*

again, whereas in the old days [pre-EMR], a patient might go and get tests, the results would be faxed in a day or so—now it's pretty immediate. So that means that you're really doing much more in a given day [...] It's partly the impact of the EMR on conveying the information and allowing you to act on it that speeds things up (Dr. Georgina).

As can be seen from the above, the EMR system not only improved access to information but it also increased the speed with which information can be accessed. This in turn influences the speed with which tasks are completed and clinical decisions are taken, leading GPs to do more work in a given day. While this is viewed by some GPs as increasing efficiency, it has also been viewed as discouraging in-depth analysis of a patient's visit.

It has been said that "when designing the layout of an exam room, the computer monitor placement was shown to affect the interaction between provider and patient" (Ludwick & Doucette, 2009, p. 5). While this was true in the empirical case described here, the introduction of the EMR which required placing computers in the consultation rooms, brought along access to the Internet. Several GPs explained how accessibility to the Internet and graphs that translate information indirectly promoted active engagement of patients in the process of care. In other words, the introduction of computers in the consultation room reorganized patient-provider interactions. In addition, as explained earlier, the Internet redefined the patient's role: from being a passive recipient of information and care to having the possibility of becoming a more active information seeker and taking a greater role in the process of care. The Internet also affected some GPs which now received the new role of guiding the patients to reliable sources of information online. Table 4.4 summarizes the emergent changes and their broad implications.

Table 4.4: Emergent Changes and their Broad Implications

Emergent changes	Broad implications
Access to patient records	Access to records from locations outside the clinic improves the clinic's after hours services and provides greater flexibility for GP to work from home.
Access to online medical information	Internet: Indirectly promoted a more active engagement of patients in the process of care. Introduced new role for GPs: the role of guiding patients to the most reliable sources of information online.
Overview of patient population	'Practice search' and 'rule:' Provides a holistic and potentially accurate view of a whole population, as well as captures all patients (active and inactive). Queries: provides an overview of a particular type of patient population.
Coordination mechanism **Responsibilities**	'Rules' (as reminders): Automation of former coordination mechanism. 'Follow-ups:' Delegation of responsibilities to EMR.
Preventive care and chronic **disease management**	'Practice search' and 'rules:' Enables preventive care and chronic disease management. Allows monitoring demographics and long-term changes in disease patterns.
Representation of medical information **Responsibility of translating medical information**	'Graphs:' Provides visual representation of patient's progress over time and sheds a light on invisible patterns. Delegated from the GP to the EMR which translates numerical data into visual information that is comprehendible to patients.
Billing practice	Standardizes billing practice. Ensures performance measures and outcomes analysis.
Charting practice	SOAP template: Standardizes and increases efficiency of charting practice. Enables POC charting, as well as ensures performance measures, medical legacy and outcomes analysis. But forces GPs to work in a more precise and linear manner and does not provide sufficient flexibility required in the process of patient assessment and diagnosis. Limits GPs' ability to analyze multiple problems.
Patient assessment and clinical decision making	Improves efficiency and increases the speed with which patient assessment is completed. But tends to compel GPs to do more work right away and discourages in-depth analysis.

4.5.4 Discussion and Summary

As I suggested in the introductory chapter of this dissertation (section 1.1.2) and as can be seen from the empirical case presented above, the impact of the EMR cannot simply be described in terms of success or failure, or measured by standardized factors, such as efficiency and cost. The case illustrates that such simplistic views fail to reflect the contested and ambiguous nature of such technology (Vikkelsø, 2005). Adopting a sociotechnical perspective (Berg et al., 2003) where technology is viewed as intermeshed with the medical practice, one acknowledges that the EMR brings about the emergence of new effects which makes it harder to single out factors for success or failure (Berg, 2001; Jones, 2003).

Previous research illustrates how EMR implementations can be viewed as a production of distributed and broad visions (Jensen & Winthereik, 2002). This view can indeed be applied to the case presented here where several changes reflected the realizations of some of the formulated visions, for instance, moving toward a 'paper less clinic' and standardizing charting practices. Other changes, however, reflected realization of standards and formal protocols, or improvements of existing practices, for example, ensuring good follow-up mechanisms, standardizing charting and billing practices as well as enhancing clinical decision making processes. As Suchman (2002) explains, visions and lived realities can inform each other in an artfully integrative manner to produce new partially shared visions.

However, the adaptation process of the EMR brought about unexpected changes beyond those that reflected realizations of formulated visions. As has been argued by other researchers, the implementations of new technologies often affect the medical practice in unpredictable ways (May et al., 2001). This was evident in the case presented here where in some situations the EMR brought about unexpected implications, for example, with the Internet redefining the roles of GPs and patients, and with the SOAP template which constrained the charting practice, increased speed and intensity of the clinical decision making process, and discouraged GPs from conducting in-depth analysis. In other situations, the EMR brought along new practices and thereby extended the GPs' medical practice by shedding light on patterns and connections that were previously invisible or simply impossible. Graphs that enable visual representation of patient's progress over time, and 'practice searches' and rules that provide an overview of a whole patient population illustrate this feature nicely.

Previous research identifies various sociotechnical changes brought about by the EMR, for example, new charting practices (Berg, 2001; Gregory, 2000), changes in representation of workload (Lundberg & Tellioglu, 1999), division of labor and distribution of work (May et al., 2001; Stanberry, 2000; Vikkelsø, 2005). While some of these findings were evident in the case presented here, this research also moves a step further and identifies essential differences between two types of sociotechnical changes

and their implications. This includes initial changes which I characterize as having straightforward, direct, and immediate effects, and emergent changes, which I characterize as being broader and having a deeper level of impact in the long term.

As can be seen from the emergent changes, the research presented here brings forth a more granular and nuanced description of the way in which the EMR has come to play an increasingly central role in the delivery and organization of care. Thus, the EMR does more than simply support/constrain coordination or increase/decrease workload. In other words, the EMR introduces other changes beyond those that are quantitative and measurable. Findings from my research show that there are deeper qualitative ontological changes occasioned by the introduction of the EMR.

The EMR sheds light on invisible patterns with its advanced functions (i.e., queries, practice search and rules) which provide an overview of specific patient demographics, long term changes in disease patterns, as well as an overview of a whole population. Furthermore, with the function of graphs, the EMR provides a visual representation of patient's progress over time, shedding light on patterns which were previously unseen or hard to discern. While GPs used to work with numerical data (e.g., blood pressure) that would be spread across different forms, they can now get an overview summarizing the data over an extended period of time. In other words, the numerical data about, for instance, an individual lab result of a patient, is now more easily situated within the large context of all the lab results that were recorded during a particular period. Several GPs explained that prior to the EMR, they used to check the last few results that were available in the paper charts; while now with the EMR, they can track the patient's progress over time.

The fact that the EMR sheds light on invisible patterns changes the way GPs think. While GPs used to work with numerical data, these are now translated through the EMR (i.e., graphs) into visual information. Furthermore, the SOAP template in the EMR is demanding different reflection and cognitive skills, enforcing thinking in a linear manner and limiting the flexibility needed for patient assessment and diagnosis. Furthermore, the EMR modifies the clinical decision making process by accelerating its speed and intensity, and limiting it to one chief complaint per patient.

As can be seen from the above, the EMR is enacted and performed differently in various contexts for different purposes. When looking at patient-provider dynamics, the EMR (along with the Internet) redefined the roles of both patients and GPs. Furthermore, the EMR redefined not only the roles, but also the skills and knowledge of MOAs who were now exercising higher degrees of responsibility for advanced tasks.

The analysis above shows how different practices are enacted through the EMR, yet several repeating patterns can be observed across some of these practices and these include a general move toward efficiency and standardized practices. The EMR brought about an increased accessibility to information and speed with which information is

transferred within and across health care organizations (e.g., labs), and from locations outside the clinic (e.g., GPs accessing patient charts from home). This led to increased speed with which tasks (e.g., patient assessment) are completed and GPs reported that the EMR enables them to complete more tasks in a given day. Although quicker task-handling may be viewed as improving efficiency and fulfilling the formal and legal requirements of the medical practice, several GPs explained that the EMR tends to compel them to do more work right away, discouraging them from conducting in-depth analysis, and limiting their ability to analyze multiple problems per patient. The EMR seems to be enacting practices which requires larger quantities of information that can easily be transferred across organizations. Such information may be well-suited for epidemiological purposes, financial and bureaucratic purposes, research, etc.; however, it is viewed as challenging for some clinical purposes, in particular, patient assessment and documentary practice where a certain vagueness and flexibility in the information entered in the patient charts is required (Health & Luff, 1996). In sum, the EMR is not a neutral tool; rather, it embeds particular inscriptions (Akrich, 1992; Akrich & Latour, 1992) which are specific anticipations, interpretations and restrictions of prospective patterns of use. These inscriptions seem to be focusing on performance measures, increased efficiency and cost reduction; a focus which is similar to some of the visions found in policy and media discourses surrounding EMR implementations. While issues of cost and efficiency are indeed important, these should not be at the cost of providing adequate medical care. Taking into account the issues mentioned above is highly important as these have implications for the way in which we design health care technologies.

In this section, I illustrated how the EMR is redefining roles, interactions, knowledges and skills. Through the lens of ANT, the EMR is an active actor that participates in changing the construction of work practices and has an impact on the rest of the network. Thus, the EMR is becoming more than just a tool; it is acting on—and gradually transforming—medical practices. As illustrated in this chapter, the EMR was not simply taken off the shelf to automatically replace paper-charts, rather it actively participated in creating new practices and is gradually transforming the medical profession.

4.6 Meta Discussion and Summary

The main sections (4.3-4.5) of this chapter focused on the community partner's clinic, providing an in-depth analysis of their EMR adaptation, starting from the initial stages (section 4.3), following its progress during the first year and a half (section 4.4), and investigating the adaptation nearly three years after the introduction of the EMR. I began by describing the trajectory of events that took place during the initial stages of the EMR adaptation (section 4.3) and showed how the EMR was progressively redefined to cover new domains beyond the technical infrastructure (section 4.3.1). I then focused on

work practices, in particular technology-in-use practices, and identified the initial technology-in-use practices that emerged during the first half a year of the adaptation process (section 4.3.2.1). I described the initial changes that were brought about by the EMR and the challenges that were faced by the health care practitioners (e.g., struggling with the EMR systems, spending more time on administrative tasks, etc.). These initial changes and challenges were not mentioned by the provincial health authority when they summarized their evaluation of the demonstration projects (discussed in section 4.2.2). show that it is important to take these changes and challenges into account when evaluating the initial stages of the transition to an EMR as they are crucial and necessary in the adaptation process.

I reflected upon issues observed in the empirical case and explained their implications for EMR adaptations. This included, for example, the importance of following an incremental implementation strategy (Atkinson & Peel, 1998; Bergen, 2004; Ludwick & Doucette, 2009) and providing adequate training (Ludwick & Doucette, 2009). Findings from the initial stages of the adaptation process suggest that different types of training sessions may be advisable for different clinics and/or different stages in the implementation. For instance, EMR vendors may consider providing shorter but more frequent training sessions, focusing on small components and different functions within the EMR. Other options which may be of relevance for some clinics are alternating between group and individual training, and distinguishing between levels of knowledge (e.g., basic and advanced). The empirical case shows that providing funds to support the EMR implementation process is important. However, providing IT support is equally important both during and after the implementation stage. The case described above shows that having funds dedicated for hiring an IT person was viewed as immensely important, especially during the initial stage of the implementation to assist with the establishment of a technical infrastructure, the actual installation of the hardware and software, and to provide on-site immediate support to health care practitioners. Another important issue during the initial phase of the implementation was transferring data from the paper charts to the EMR. Acknowledging that this stage of entering all the data from the paper charts into the EMR is a very time consuming task which requires resources and funds is of utmost importance. Furthermore, closer attention should be paid to the lack of integration and/or compatibility of IT systems and information on organizational and provincial levels. It is important to acknowledge the additional work that is required to deal with the fragmented infrastructure which contains both paper-based and electronic information. It is, therefore, advisable to avoid the tendency observed in media and policy discourse to emphasize grand visions and goals which are hard to achieve, and rather construct concrete yet flexible goals which are achievable in the foreseeable future.

Drawing upon concepts from CSCW and IS (introduced in section 2.3) helped me focus on how the health care practitioners configured and adapted the EMR system to support their collaborative work practice (Suchman, 1983; Suchman, 1987). With their

work practice orientation, these fields offer a wide range of concepts useful for understanding the complexities of work practices, in particular the medical practice (Strauss et al., 1985). In Section 4.3, I identified and analyzed the different technology-in-use practices that were developed, and distinguished between initial and emergent technology-in-use practices. These technology-in-use practices were supported by the EMR meetings, which I identify as one of the important factors promoting the adaptation process. Within the CSCW and IS fields we can find research that argues for the importance of project meetings and the involvement of all actors affected by the change (Berg, 2001; Berg, 1997). While I agree with these scholars, I also expand the notion of project meetings by providing a conceptualization of the essential aspects of these meetings (section 4.4). I have conceptualized the meetings as continuous reflection-on-practice activities (Schön, 1983) through which technology-in-use practices were constructed. Reflection-on-practice activities are internally initiated and involve critical reflections by the participants, who continuously evaluate and question work practices in relation to technology. Moreover, I argue that reflection-on-practice activities can be characterized by ongoing, frequent encounters of negotiations of work practices and technology use, providing internal actors a space for systematic and iterative evaluations of suggested changes. I further argue that it is essential that the reflection-on-practice activities are based upon a contextualized understanding of the overall changes and redistribution of tasks. Finally, I found that making centralized decisions about technology-in-use practices at the committee meetings, as well as having mechanism for communicating new changes and closely following the actual integration of these changes into the daily work, strongly supports the adaptation process. The conceptualization of reflection-on-action activities has been helpful in understanding technology adaptation by health care practitioners, and it is important for constructing and developing technology-in-use practices. These contributions can be located within the CSCW and IS fields, as they are dedicated to understanding the collaborative work and identifying factors that support better design and implementation of health care technologies.

I illustrated how the adaptation process constituted a complex dance between the work practices and the EMR, both of which were continuously changing through translations and mutual alignments where at times, it was the work practices that had to be aligned to what the EMR system afforded, and other times, it was the EMR system that had to be configured to the existing work practices. These modifications were neither based on pre-defined standards, nor were they static or configured once and for all. Rather, these modifications were based on the situated work practices and they were continuously changing depending upon the contextual circumstances. The analysis of the adaptation process thus far shows that implementing a new technology is not a matter of fitting it to the existing work practices (or vice versa), as has been claimed in some EMR studies within the CSCW field. Rather it is a complex and dynamic process of continuous

negotiations and translations of different interests, and alignments of both the technology and the work practices. To better capture the complex dynamics between the EMR system and the work practices, I draw upon a constructivist STS approach (explained in section 4.5.1).

As mentioned above, many of the studies within STS tend to start their analysis by unpacking the object of study, questioning it and looking at how it acts/performs in practice, rather than simply accepting it and the assumptions underlying its existence. Within the STS literature about medical practice and IT in healthcare, the object of study may be technology (Jensen, 2004b; Winthereik, 2004), medication/diagnostic procedures (Markussen & Olesen, 2007; Mesman, 2007), or the very basic notion of information (Berg & Goorman, 1999; Moser, 2005) and information flow (Moser & Law, 2006). In section 2.3.2.2, I explained how unpacking the technology being studied can help avoid taking for granted the technological artefact and its use (Hanseth et al., 2004; Orlikowski & Iacono, 2001), as has been the case for some studies of EMR within the IS field(Hanseth et al., 2004; Orlikowski & Iacono, 2001). In the introductory chapter (section 1.1.2), I contextualized the empirical study of the EMR within the broader discourse, by reflecting briefly upon the ways in which ICTs in general and EMRs in particular are portrayed in policy and media. I then unpacked the definition of the EMR, and showed how even though there is no standardized agreement as to what an EMR system actually means, the implementation of these technologies is framed in various media and policy discourses in such a way that it gives the impression that there is a universal agreement about the *need* for electronic records. In this chapter (section 4.2), I unpacked the different visions behind implementing an EMR and showed how these change depending upon the different relevant actors (i.e., the health authority, the vendor, health care practitioners and patients). I also showed how similar to the discourse in media and policy documents, the transition to electronic records in the clinic has been enveloped by a technologically deterministic and instrumental frame.

I unpacked the actual EMR system and looked at the components constituting it and how it is interpreted and used in practice. Such an approach of unpacking the object of study—be it science[127] (Hess, 1998), technology (Latour, 1992; Latour, 1996; MacKenzie & Wajcman, 1999) or the visions and discourses surrounding them (Jensen & Winthereik, 2002; Moser, 2005)—and looking at how these are carried out in practice, is grounded within the constructivist ontology that underlies the work in this dissertation. As explained in section 3.2.1, constructivism grew out of these micro-oriented ethnographic studies with the understanding that facts and reality are constructed and built, rather than discovered (Lincoln & Guba, 2003; Sismondo, 1993). Therefore, the

[127] I am referring to the work of Kuhn and SSK that introduced the idea that science could be unpacked (Kuhn, 1970).

constructivist paradigm looks at the ways in which reality is constructed and interpreted, while viewing reality and our knowledge about it as relative, multiple, local and specific (Lincoln & Guba, 2003). Thus, similar to some of the EMR studies found within the STS field (presented in section 2.3.2.2), this chapter followed a sociotechnical approach, investigating the way in which technology and work practices are co-constructed and co-shaped, while focusing on heterogeneities and particularities of the EMR adaptation.

Similar to other CSCW research on EMR (presented in section 2.3.2.1), I have illustrated how the EMR changes representation of work, division of labor and workload. In line with EMR studies within CSCW and IS, I have also illustrated how at times, the EMR supports collaborative work and other times, it constrains the work. However, this research project also moves a step further and identifies essential differences between two types of sociotechnical changes and their implications. This includes initial changes which I characterize as having straightforward, direct, and immediate effects, and emergent changes, which I characterize as being broader and having a deeper level of impact in the long term. As can be seen from the emergent changes, the research presented here brings forth a more granular and nuanced description of the way in which the EMR is increasingly playing a larger role in the delivery and organization of care. Thus, the EMR does more than simply support/constrain coordination or increase/decrease workload. Findings from my research show that there are deeper qualitative changes occasioned by the introduction of the EMR (e.g., it is changing the way GPs think and the relationship between GPs and patients). The EMR sheds light on invisible patterns with its advanced functions which provide an overview of specific patient demographics, long term changes in disease patterns, as well as an overview of a whole population. It also provides a visual representation of patient's progress over time, shedding light on patterns which were previously unseen or hard to discern. The EMR changed the way GPs think, enforcing thinking in a linear manner and limiting the flexibility needed for patient assessment and diagnosis. Furthermore, the EMR modifies the clinical decision making process by accelerating its speed and intensity, and limiting it to one chief complaint per patient. Finally, I illustrated how the EMR is enacted and performed differently, redefining the roles of patients, GPs and MOAs.

The analysis of the section above (4.5) showed how the EMR enacts certain practices, in particular, those related to efficiency and standardized practices. The EMR increased accessibility to information and speed of information transfer within and across health care organizations. This led to increased speed with which tasks are completed, improving efficiency and fulfilling the formal and legal requirements of the medical practice. Yet, the EMR tends to compel GPs to do more work right away, discouraging them from conducting in-depth analysis, and limiting their ability to analyze multiple problems per patient. The EMR seem to be enacting practices which requires accurate and quantitative information that can easily be transferred across organizations. Such information may be well-suited for preventing care, epidemiological purposes, financial

and bureaucratic purposes, research, etc.; however, it is viewed as challenging for some clinical purposes, in particular, patient assessment and documentary practice where a certain vagueness and flexibility in the information entered to the patient charts is required. In sum, the EMR seemed to embed inscriptions that focus on performance measures, increased efficiency and cost reduction. While these issues are important, these should not be at the cost of providing adequate medical care.

In sum, as stated in the title of the dissertation, this chapter reflected my research journey into the hidden lives of EMRs. I followed the EMR as it is being advocated for by the health authority, modified and configured by the vendor and adopted by the health care practitioners. Throughout the chapter, I unpacked various sociotechnical complexities and changes brought about by the introduction of the EMR; changes which were *hidden* from the policy and media discourse, and from the health care practitioner. I described EMRs as having 'lives' in the ANT sense; that is, moving away from viewing the EMR as a static and neutral tool to viewing it as a nonhuman actor which is 'alive,' unpredictable, complex, etc. and can produce effects on work practices.

Finally, drawing upon a constructivist epistemology allowed me not only to see the issues mentioned above, but it also encouraged me to reflect upon the way in which the methodology shaped the findings. Using action research allowed me to conduct research over a long period of time, and have active and ongoing access to the field. Furthermore, a constructivist epistemology puts me in a different relationship with my research subjects. Acknowledging that these findings were co-constructed through an interpretive process between myself and the research subjects (Denzin & Lincoln, 1994a, p. 13) led me to the second research questions about methodological issues faced when conducting action research; issues which will be discussed in the next two chapters.

CHAPTER 5: CASE AND ANALYSES OF ACTION RESEARCH

5.1 Introduction

This chapter will address the second set of research questions (outlined in section 1.3) which focus on the methodological complexities that are encountered when conducting action research and their implications for research in general and the researcher's role in particular. For this purpose, this chapter shifts the focus away from the study of the *technology* (EMR) toward the *method* (action research) used for studying and participating in the implementation of these technologies. It also shifts the focus from the work practice of the health care practitioners to that of the researcher (myself). As explained in section 3.5.1, I adopted a second-order inquiry (Pedretti, 1996), which enabled me to focus on the research process and method used for studying the technology (EMR), instead of focusing on reflections related to the actual technology. Focusing on the method used rather than on the *findings* or *end-product* of the research leads us behind the stage and gives us a glimpse of the research *process*, meaning the work that went into constructing the research project making it function as a coherent whole. Inspired by Latour (1987), I developed an approach for studying action research 'in the making' (presented in section 3.5.1) and rather than focusing on how action research should normatively be carried out, I explored how my research project unfolded in practice.

The empirical material upon which chapters 5-6 draws constitutes copies of all email communication with the community partner and my own memos. These memos—in contrast to my field-notes that constitute descriptions related to the EMR system and the clinic staff's work practices around it—encapsulate reflections on my own research practice, my roles and interventions in the field. These memos can also be seen as notebooks for capturing feelings and reactions from the field (Latour, 2005).

I begin this chapter by presenting my own research journey, which includes the case and analysis from the action research project (section 5.2). Throughout the chapter, I will focus on the nature of collaboration forged with the community partner and the impact it had on my research in general and my role as a researcher in particular. Following a self-reflective and critical epistemological stance, I shed light on various methodological issues and challenges faced when working with a community partner and conducting this type of research. Finally, section 5.3 will provide a summary of key issues which will be discussed in greater detail in the discussion chapter (Chapter 6).

5.2 Conducting Action Research in Practice

As I carefully trace the trajectory of the collaboration with the community partner, I will identify moments of uncertainty which I faced during my fieldwork and will use these as a starting point for a deeper and more constructive discussion (in Chapter 6) about what these incidents mean and what their implications and unintended consequences are. The case description and analysis provided here involves a narrative that illustrates how uncertainties experienced were transformed to balance the dynamics of roles within the action research project. The narrative comprises short snapshots from my memos. As explained earlier (section 3.5.3), these memos—in contrast to my field-notes that constitute descriptions related to the EMR system and the clinic staff's work practices around it—encapsulate reflections on my own research practice, my roles and interventions in the field. These memos can also be seen as notebooks for capturing feelings and reactions from the field (Latour, 2005). The memo snapshots provided in the narrative follow a rather confessional style (introduced in section 3.5.4) with the aim of conveying some impression of the inquiry *in process* and recreating the sense of uncertainty I encountered. The following memo snapshots were chosen because they represent incidents of encountered uncertainties which embody crucial turning points in the trajectory of the research collaborations. As will be evident in the narrative below, the incidents that sparked important uncertainties share certain qualities; the most important one being the emerging gap between the expectations I had and the practitioner's expectations of my roles and interventions.

Before I begin the case description and analysis, I would like to point out that I have chosen to structure this chapter in such a way that it is based on the chronological order of events that occurred during the fieldwork, because I want to take the reader through the fieldwork journey that I went on. This structure was chosen to illustrate the inherent uncertainties in conducting such research; uncertainties which cannot be predicted (and can only be partially controlled) and can therefore not be completely avoided. To illustrate how these uncertainties cannot be fully predicted, I describe the trajectory of events as they arose and evolved during the fieldwork. I, therefore, chose to divide this chapter into three sub-sections. Section 5.2 describes the beginning of the research journey which consists primarily of two sub-projects I was responsible for: a study of the experiences of other clinics that implemented the same EMR system and a study of the patient's perspective of the EMR (both sub-projects were discussed in section 4.2.1). Section 5.2.2 focuses on the uncertainties I faced, followed by description and analysis of my attempts to transform these uncertainties into something presumably fruitful (section 5.2.3).

5.2.1 The Beginning of the Research Journey

In what follows, I draw upon longitudinal research I have been engaged in during the past three and a half years (October 2004—March 2008[128]). This research (about the EMR system) was a small part of a much larger project entitled ACTION for health, which aimed to investigate the introduction of new technologies into the health sector. In this project, ACTION for health, I held a research assistant (RA) position, where I mainly worked with one of the principal investigators (PI). The research I was involved with was conducted through a close collaboration with the community partner, a non-profit community health centre in British Columbia (Canada). The PI had already established a partnership with the community partner and negotiated access to the field prior to my participation in the project. I had no prior formal practical experience in conducting action research as my previous work was an ethnographic study.[129] To prepare myself for the field work, I revisited some of the IS action research literature with which I was familiar. In the remainder of this chapter, I will describe the research project in which I was involved.

In 2004, when I joined the research project, the clinic was about to implement an EMR system to replace their paper charts. Our research collaboration was based on the understanding that I would be provided with the possibility of investigating the introduction of a new EMR system, and would in turn assist the clinic with issues arising during the adaptation process. I expected to start fieldwork immediately, but had to postpone it due to a delay in processing the application for ethical clearance submitted to the office of research ethics at the university (SFU).

Meanwhile, the PI and I had several preparatory meetings with the executive director and the technical support staff who were our primary contacts[130] from the clinic in order to identify possible research tasks that I could conduct while waiting for the ethical clearance. The primary contacts expressed an interest in obtaining information about the experiences of other clinics that implemented the same EMR system. The motivation behind this sub-project was to identify lessons learned from other EMR adaptations that could be applied to our community partner. In this project, my primary contacts often reminded me about my role and asked me to emphasize that the initiative for the project came from the clinic. During our meetings, I would occasionally hear

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[128] Please note that although data collection was completed in August 2007, my research acitivities which included data analysis and writing technical reports for the project, continued until March 2008.

[129] I will get back to this point in the next chapter and will discuss the implications this had for the research.

[130] At the beginning of the project, our primary contacts also included the chronic disease manager since she held a leading role in the EMR implementation. However, a few months later, she went on maternity leave and left the executive director and the technical support staff as my primary contacts. As will be noted later, all communication with the clinic staff went through the executive director.

expression such as: "*Don't forget to say [the clinic] asked me to...*" (Marianne[131]), or "*[The clinic] believes that it is important to...*" (Anne)…"*You can say, WE are interested*" (Anne). Being asked to say *we* made me feel as though I was a relative *insider*, 'one of them;' however, as I will illustrate later, this had an impact on my point of departure and the way interviewees interacted with me. After interviewing health practitioners from different clinics in British Columbia (Canada), I generated a short report that summarized the challenges they faced during their EMR adaptations and included a short section with recommendations and lessons learned that could be applied to our community partner (see Appendix F).

Later on, the clinic staff were interested in introducing the EMR to their patients in order to inform them of the new changes that were about to take place. In addition, the clinic was interested in obtaining information from their patients about their views about the new EMR system. Several long meetings were conducted with the primary contacts in order to plan the patient study, discuss issues related to the fieldwork, and to confirm the interview questions I suggested (see Appendix B). Being very protective of their patients, they repeatedly reminded me that the patients I would be interviewing were not mere 'informants,' but rather patients—people who might be ill, in physical pain and/or experiencing emotional stress. I took note of that and reminded myself to be sensitive and cautious when requesting to interview patients.[132]

Prior to the fieldwork, I was asked by the clinic to design posters that would inform the patients about the planned transition to an EMR as well as introduce the research. Together with my research colleague,[133] we sent a proposal to the clinic in order to confirm the content and the graphics in the posters (see final version in Appendix C). In a meeting that lasted two hours, the staff kept rephrasing sentences, striving and struggling to find 'simple' words and use 'correct' terms. The following is a snapshot-transcription from the meeting I had with the primary contacts discussing the content of the posters.

One of the sentences in the posters alerts the patients to the transition from paper charts to electronic records. The staff commented that the language I used seemed too formal and complex.

Marianne: I think that 'transition' is too big of a word...

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[131] As mentioned earlier, to preserve anonymity of informants, all the names are fictional.

[132] Only one patient (out of 22) declined my request for an interview, explaining that she was in physical pain.

[133] This refers to my colleague, Nicki Kahnamoui, who worked as a RA with this clinic prior to my arrival and was at that time finishing her RA position in the ACTION for Health project.

I realized that I had to discard, or rather replace, my learned jargon and use 'simple' words (everyday language) in order to communicate with the particular patient population at the clinic which, as mentioned previously, consists mainly of patients with English as their second language.

To ensure simplicity and clarity, the word 'transition' was now replaced with 'change.' But a new problem arose regarding the need to estimate *when* the EMR system will be implemented in practice.

Anne: We could say 'over the next'...well, actually we could say…

Marianne: starting in January..

Anne: Are we? For sure?

Marianne: Well, let's say it.

Anne: If we're gonna say it, we need to do it

Marianne: Well, we won't be lying because we've got the system up and running, so maybe you are right, maybe we should say 'we are starting the process now.' Cause we do. We have the scheduling and billing [Two components of the EMR system which the clinic has already implemented].

Anne: We could say we've began the process and should be fully functional, we should be up and running maybe in January?

Marianne: Do they need to know that now?

Anne: That's true, really.

Judith: Cause it really depends on what's the purpose of these posters. You are just trying to collect information before…

Anne: No, no...I'm trying to inform the patients that changes are coming.

Judith: Right, right. So a date should be there I think.

Anne: 'In the new year'

Anne: Ye, ye, that's perfect. There you go. It's not a specific date.

Nina (researcher): That's good cause this way we carefully give them some information without promising too much.

The staff wished to inform their patients about the upcoming changes but they did not want to promise something they might not be able to fulfill. Consequently, they were striving for a balance between giving *some* information to their patients but not too much

to avoid confusion and high expectations. This led the staff to another long discussion where they try to explain why they are implementing an EMR. One of the staff explained that the ultimate goal was to achieve 'better care,' another said that it was to increase access to information for patients, and a third one rejected the whole idea of listing the expected benefits in the posters for fear of overpromising.

> *Marianne: Ok, let's pull ourselves back for the purpose of the posters and our whole goal to let patients know that in the new year, things are gonna be different around here…That's all they need to know right now.*
>
> *Marianne: And then they'll have questions to you [Nina]…*
>
> *Nina: Yeah, it is then that we can start talking about increased access to information, etc.*
>
> *Anne: So, what are we gonna say here? Do we even wanna say why we are doing it, in the poster? I don't know…*

Finally, the staff decided to include a section in the poster explaining that they are implementing an EMR to ultimately provide patients with better health care. The word 'better' was then replaced with the word 'timely' as it is a more accurate and careful promise than claiming that an EMR would provide better care.

> *Jocelyn: Yeah, you don't wanna say 'quicker' access to information, cause then they'll hear 'quicker,' and they'll go "oh, it's becoming a factory"*
>
> *Nina: Oh well, I see you know very well your patients.*
>
> *Marianne: Or, how about using the term 'more efficient,' more efficient and timely healthcare?*
>
> *Marianne: We're doing it to…ultimately be more efficient…*

The dilemma here is that the implementation of the EMR will in practice provide better organization of information and communication, and only indirectly will it provide better care. In the end, the staff decided to replace the word 'care' with 'information' thereby focusing on increased access to patient information. But then one of the staff explained that they already have access to information so the quantity of the information is irrelevant; rather, it is the efficiency with which they can access information that is relevant. Another staff member agreed that improved information access is beneficial for the physicians but how will it affect the patients? Finally, the words 'better care' were put back on the posters, just before the discussion drifted further to the importance of explaining that this change will take time and require support from the patients. Two hours later, when we were almost done with formulating and re-phrasing the wordings in the posters, Anne said:

If I'm reading a poster "how will this effect you"...and then it's WE WE WE, it doesn't really give me concrete information. I thought you'll give me information about how am I gonna be affected ...

To conclude, the snapshot above illustrates how the different terms were carefully replaced with other terms to avoid misinterpretation and/or high expectations. Suddenly, what first appeared as a simple task—designing posters with a few sentences—turned out to be a complex one. Furthermore, to ensure that patients could identify me from the crowd in the waiting room, it was suggested that I would wear a t-shirt that indicated that I was the EMR-researcher patients could approach with questions and concerns (see Figure 5.1). I was a little uncomfortable wearing the t-shirt as it made me feel as if I was advertizing for a product or a company. I felt in a way as if I was advertizing myself as a researcher or the research project whose logo I had in several locations on the t-shirts. However, what made me feel most uncomfortable was that I felt I was advertising the transition to an EMR (with the graphics/drawing) indicating which direction one *should* go (from paper-based office to an electronic one). I suggested to my primary contacts to wear a nametag (instead of that t-shirt), but I was told it will not be visible enough for patients. When I began my fieldwork at the waiting room in the clinic, patients did not seem to notice the t-shirt until I approached them and introduced myself as the EMR researcher, pointing on the posters that were posted on the walls of the clinic. Some patients would then look at my t-shirt (which had a drawing matching the one in the posters) and either nod their heads as a sign of confirmation that they have noticed the posters or look at me and ask about the project.

Figure 5.1: T-shirt Designed for the Researcher

After all these preparatory meetings, I conducted interviews with patients and collected their suggestion using a suggestion-box that was located at the reception in the clinic to allow patients to provide comments even when I was not in the clinic. Based on all the data collected, I created a brief technical report that reflected the various views of

the patients, and summarized their expectations and concerns (see Appendix D). Thereafter, the PI suggested that I create educational material for patients to address the concerns they mentioned in the interviews (see Appendix E).

A few months later, the PI and I asked for a meeting with our primary contacts in the clinic. The agenda was to discuss the report on the experiences of EMR adaptations in other clinics and the report that summarized the patient study. Also, I wanted to discuss prospective plans for my tasks during the summer, and I reminded them of my interest in interviewing the staff at their clinic. In the process of scheduling our meeting, the technical support staff asked to proceed with our plans and conduct the meeting without the executive director, who had a busy schedule at that time. During this meeting, the PI and I received an update of issues related to the EMR, and discussed the motivation behind conducting interviews and observations of the staff in the clinic. Aiming to provide something back to the community partner, the PI suggested that I would function as a 'super-user' and provide technical support to physicians in the charting room. Although I was at first flattered by the trust in my technical abilities, I was somewhat concerned that the high expectations would result in disappointment as I did not have sufficient and qualified expertise for this particular and fairly complex EMR system. At the same time, the desire to be 'useful' by helping physicians with practical and technical issues was so strong and tempting that I eventually decided to take up this challenge of providing technical support. I therefore attended a few training sessions provided by the vendor in order to become familiar with the EMR system. In one of the training sessions that were provided to the MOAs, we were four staff in total (an MOA, the office administrator and the technical support staff) crammed in the office administrator's tiny office, standing around one computer, staring at the little computer screen and listening to the trainer. In another training session, all the computers were taken by the staff so that I was left with no computer. I sat next to one of the staff and observed her using the EMR system without having the chance to use it in practice. Due to the challenges and limitations described above, the training sessions were not as useful as I initially expected. To become more familiar with the EMR system, I spent some time reading the various manuals and training materials that were given by the vendor to the clinic. I also joined a few remote training sessions provided to the technical support person. These sessions took place in the technical support person's office and were conducted over the phone. In such sessions, the support staff would address particular issues which were of interest for the clinic.

Thus far, I felt that our research collaboration was improving and strengthening over time. My primary contacts kept me informed about the various changes in the EMR, forwarded me news and updates from the health authority, and invited me to participate in various meetings with the vendor and collaborative organized by the provincial health authority (VCH PHCTF). Already in the first collaborative, the executive director proudly introduced me to their vendor and to people from the health authority. She

introduced me as *their* researcher, and took the time to carefully explain *our* research activities. Also, a quick glance at my nametag confirmed my affiliation with the clinic. I viewed the close attachment to, and collaboration with, the clinic as part of the process of strengthening the trust relationship I had with the staff. During various occasions, my primary contacts from the clinic asked me to contact the health authority in order to investigate problematic issues and voice their concerns. I would, therefore, use the opportunity whenever I attend a seminar, a meeting or an interview with people from the health authority or the vendor to raise some of the concerns and questions the community partner had. In these settings, I mediated between the clinic and the health authority, the vendor, and other clinics. In such situations I was sent to exchange and transform knowledge among the different social groups, and translate their different interests. The following excerpt from my memos, summarizes my thoughts and impressions from the trajectory of the research collaboration I had up to that point with the clinic.

> *The last six months have indeed been an interesting, yet somewhat cumbersome, journey. I have had the wonderful opportunity to engage in many different activities and collect a large amount of data. For instance, I have studied other clinics' experiences of EMR implementations, health authority decisions, and patients' perspectives on EMRs. But I must admit that I am beginning to be concerned because all these activities do not directly focus on the EMR implementation in our community partner's clinic. How can I study the EMR implementation in the clinic without having the opportunity to actually talk to the staff and observe them use the EMR in practice? How can I study something I am unable to see in practice? (Memos, April 2005)*[134]

5.2.2 The Rise of Uncertainties

Up until that point, the various sub-projects were conducted *for* and together *with* the community partner *on* other research subjects (i.e., patients and health care practitioners from other clinics). But now I wanted to conduct research *on the community partner's clinic* and study *their* adaptation of the EMR system, since it was after all, the initial plan and reason for my engagement in the project. This turned out to be the beginning of a long journey of misinterpretations and miscommunications.

Meanwhile, the technical support staff asked me to become a member of the EMR committee that was established to discuss challenges and provide support to the staff. I

[134] I chose to use a different font style in order to distinguish between the three types of quotes I have used throughout the dissertation. This includes my own quotes which are from my field-notes, the quotes from the literature, and those of the informants.

was very happy to adopt this role and I viewed the invitation to attend the EMR meetings as a way to maintain access to the field and negotiate indirect access to the kind of data I was looking for regarding the EMR implementation in the community partner's clinic.

During the summer of 2005 the clinic implemented multiple changes simultaneously. Along with the various technical changes (e.g., PathNet was being implemented), there were also organizational changes (e.g., implementation of Open Access[135]), managerial changes (a new staff was hired for the administration) and several staff replacements (e.g., of the chronic disease manager was being replaced, new MOAs were being recruited) that took place in the clinic over those three months. In addition, there were many locums replacing doctors who were on their summer vacation and many of the locums were neither familiar with the clinic's work practices nor the EMR system. The accumulation of these factors contributed to the increased complexity of maintaining the partnership, and influenced the context of research in general and my role in particular. Furthermore, the nature of collaboration changed dramatically when the executive director—who was my primary contact and with whom the PI negotiated access to the field site—retired. There was a period of overlap between the outgoing and the incoming executive directors; a short, but fairly challenging period, which I will now outline.

It became challenging to conduct research in such a fluid and complex setting, and a simple task such as communicating information to the clinic staff, became highly demanding. I was unsure whom I should contact, and was challenged by the unstable communication channels. Talking to the incoming executive director triggered misunderstandings with the outgoing director. In one incident, I informed the incoming director that I would be conducting observations in the doctor's charting room, and I heard a day after from another staff member that the outgoing director was asking what I was doing in the charting room. I learned quickly that lack of communication can have tremendous implications for fieldwork (e.g., in terms of access to the field). In another incident (which I will describe later) where I informed both executive directors about my tasks and assumed the information was communicated to all the clinic staff, I was met with mixed interpretations and expectations, and at times, defensive reactions. In this context, I found myself again trapped between organizational conflicts and other internal political issues in the clinic.

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[135] Open Access is an additional project that was being implemented around the same period aimed at decreasing the number of appointments booked in order to increase free access to patients. This was done by trying to see which appointments could be cancelled and instead dealt with by phone (e.g., patient appointments for medication renewal or for receiving test results could be illuminated by phone, if the results where normal and no further tests where required).

5.2.2.1 Negotiating Access

> *I have been trying to remind my primary contacts at the clinic that I need to observe and interview the clinic staff. One of my main contacts, the executive director, is retiring and is busy finishing tasks and training her replacement. Moreover, staff replacements and organizational and technical changes are taking place. These factors make it difficult for me to continue the research collaboration, which at the moment, feels like it is blowing in the wind. Lack of communication between the outgoing and incoming director of the clinic, and between them and the clinic staff, has triggered misunderstandings, mixed expectations, and even defensive reactions. What I say gets lost in translation, and I feel entangled in, or trapped, between organizational conflicts and internal political issues. (Memos, August 2005)*

I was uncertain about my role and was becoming increasingly concerned about the future of my fieldwork. I had now been waiting for nearly nine months to be allowed to conduct the research that the initial collaboration was originally based upon; the research which focused on studying the actual EMR implementation in the clinic. I decided to take the issue regarding the focus of the research and my roles seriously and scheduled a meeting with both the retiring and the new executive director to avoid further misunderstandings. In this meeting, I took the time to clarify carefully, explicitly, and formally my roles and tasks in the clinic. I reminded both executive directors about the original research agenda upon which the partnership was based. According to this dual agenda, I—the researcher—would not only support the practical implementation of the EMR, but would also be provided the opportunity to study the actual implementation. I had thus far fulfilled the first part of the research agenda; the part which had practical relevance for the clinic. I interviewed patients and health care practitioners from other clinics and assisted with minor trouble-shooting and technical problems (e.g., with the computers, printers and scanners). But now I had to get back to the original focus of conducting an in-depth study of the EMR implementation in the clinic. Therefore, I repeatedly explained the importance of conducting interviews and observations with the clinic staff in order to learn about their local and situated work practices.

In my struggle to give the community partner something back, I proposed being responsible for a few tasks which may have been of relevance to the clinic. This included, helping with scanning old charts by providing the community partner with contact information of clinics who told me in their interviews that they developed a scanning strategy which might be useful to the community partner, and by helping them design a template for scanning old charts. I also proposed creating a guideline for using the EMR system as I had many notes about the actual use of the system and the changes in the work practices (e.g., routines, division of labour and ways of communication). This idea

was viewed as fruitful by both executive directors, because, as I mentioned before, the only practical guideline available at that time was a 300-page general manual created by the vendor (Wolf). This was expected to be helpful especially during this time period where they had many summer locums and new staff that were not familiar with the existing local practices. I also explained that the aim of the guideline (which was referred to as protocol by one of the executive directors) was to ensure dissemination of EMR-knowledge to practitioners outside the EMR committee and to give a somewhat holistic overview of the progress and various phases that led to each decision and/or change. I explained to the executive directors that I noticed that, at times, some of the discussions were repetitive, raising issues which had been solved in the past but the committee could not recall these because there had been so many changes in such a short period. By collecting all these issues and decisions in one digital document, this knowledge, I explained, can more easily be retrievable. I also suggested entering all the hand written minutes from the EMR meetings. The new executive director said that since I was always writing notes, I could have the responsibility of writing minutes and chairing the EMR meetings. I accepted this new responsibility as I saw this as a part of negotiating my access to the field site. I was provided with an office in order to have a working space in the clinic. The executive directors suggested I notify them about my fieldwork schedule and that I would have biweekly meetings with the incoming director. I reminded the outgoing director that we followed this practice in the two other sub-projects (the patient's study and the study of other clinic's experiences) and told her that I found this close collaboration and feedback fruitful. To avoid further misinterpretations about my roles and tasks in the clinic and ensure transparency, I adopted a new practice and sent copies of the minutes from the meeting which summarized the decisions that were made to all the members of the EMR committee.

I left the meeting with the executive directors with mixed feelings. On the one hand, I felt I had reached a common understanding with the directors; on the other, I feared misinterpretations in communicating my tasks to the *rest of the staff*. In one incident, the office manager thought I was documenting policies and procedures. I began receiving mixed messages and was overwhelmed by different and often contradictory interests. While the outgoing executive director asked me to prioritize some particular tasks, the incoming director asked me to focus on other tasks which she was more interested in, for example, evaluating the efficiency of existing work practices. This interest of the incoming director in efficiency led one of the physicians to the false impression that I was recording and evaluating patient interactions. On one occasion, as I was trying to gather material for the EMR protocol that I promised to create which documents the changes in work practices, I learned that although this was viewed as useful and important by the incoming director, some of the clinic staff did not seem to have the same perception. It was only at a later stage that I learned that the staff's lack of interest was a reaction against the incoming director. This became clear to me when the

office manager approached me after one of the meetings and said the following: "*I don't know why [the incoming director] has the impression that we don't have protocols with our regulations here, but we do have!*" She showed me a thick binder labeled 'Medical Staff References,' and added assertively: "*We're organized here!*" I felt I was stepping on her toes, as if I was taking over her work. That was of course never my intention and the incoming director never informed me about the already existing protocol. I asked the office manager for permission to look at the binder and said that I could perhaps update some of the text to include recent changes in work practice that were brought about by the EMR. I felt that she had calmed down a bit when I explained carefully that my work would not replicate what already existed as I focused on EMR related changes for both MOAs and physicians (while the binder she showed me was for MOAs and not in particular focusing on EMR practices). I suggested we could perhaps work together on creating a protocol that would be more adapted to the EMR changes for MOAs.

I scheduled another meeting with the executive directors as I was becoming increasingly concerned about the changes in the relationship I had with the staff. We spent two and a half hours discussing various general issues, including a reiteration of my roles and tasks, the potential contribution to the clinic and the difference between the academic research I was conducting and the evaluation that was being conducted by the provincial health authority (VCH) at that time. We discussed the increasing focus of VCH toward evidence-based medicine and patient self-care, and they told me (as mentioned in section 4.3.2.1) that in the last collaborative organized by VCH PHCTF to summarize the ten demonstration projects, the clinic staff were told that the projects were too slow, that lab-resources were overused and that too much time and money was spent on administrative work. I explained to the executive directors that my academic research would shed light on the hidden complexities and invisible contingencies that are often impossible to capture when conducting quantitative surveys that focus only on benefits measurable in financial terms. As can be seen above, I took the opportunity to justify again the importance and relevance of my research. A few months later, the outgoing executive director left the clinic and the incoming director formally began her position.

Toward the end of the summer of 2005, in one of my short informal conversations with the executive director, I told her I did not feel comfortable being put in the position of *judging* or *evaluating* the work practices of her staff. She seemed to agree but then she said "*just tell us what is right*." I explained that I did not want to judge what was right or wrong, and that instead, I wanted to *learn from* her staff about their practices and that I could merely propose suggestions for changes. The director suggested I create small flyers that would briefly state what I had done so far in the various research projects with the clinic, and what I was currently working on. I suggested adding another section to the flyers, clarifying what I *do not* do, and specified that 'I am not judging or evaluating work practices, and I am not conducting efficiency measurements or generating best

practice solutions.' These flyers were posted in the corridors of the clinic to be visible to all clinic staff.

Having the responsibility for writing minutes and chairing the EMR meetings put me in a position where I was, at times, viewed as a relative insider. Other times, however, when the atmosphere was highly tense and there were conflicts among the staff, writing minutes became challenging because decisions about which tasks would be assigned to whom were not always clearly made. In such situations, a long discussion would typically develop between the technical support staff who would claim to have solved the problem (or at least contacted the vendor and asked that the problem be solved), another who would insist that the problem was not solved and yet a third one who would argue that the origins of the problem was elsewhere. A tense atmosphere would often arise when a technical problem, which was expected to be addressed by the technical support staff, lead to questioning the skills of the technical support staff and blaming her personally for her inability to solve the problem.[136] In such situations, I found it immensely challenging to disregard the personal accusations that were directed at the different staff members (mostly at the technical support staff) and did my best to focus on reassigning the task to one of the staff. This was not always so easily accepted, and at such times, I was immediately transformed into an outsider, into someone who was not capable of following the discussion or understanding the problems encountered. I think, however, that I did understand most of the problems that arose, and took advantage of the fact that I was writing minutes to document the activities of the technical support staff whose tasks seemed invisible to the rest of the staff.

I continued attending the EMR meetings and spent the rest of the year creating guidelines for scanning and working on the EMR protocol which needed constant updating as the decisions of the EMR committee continuously changed. Summer 2006 arrived and my contact with the executive director was increasingly diminishing. I spent most of my time conducting informal conversations with the EMR committee and doing minor tasks of trouble-shooting and immediate problem-solving.

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[136] At that time, I did not quite understand why the clinic staff questioned the skills of the technical support staff. Toward the end of my fieldwork, I was coincidently told that the technical support staff was in fact an MOA who had an interest in acquiring technical skills and was, therefore, given the position of a technical support staff person when the clinic received transition funds to support the EMR implementation. Based on the comments I continually heard, I developed the impression that this decision, which most likely had been made by the executive director, was perhaps not fully and completely supported by all the staff.

5.2.3 Transforming Uncertainty and Stepping into the Academic Character

> *I still did not receive feedback about the EMR protocol I created for the clinic and my emails are often unanswered. I do not know what to do but I think I'll just leave this issue aside for the moment. Last week, when I went to the clinic to attend the EMR meeting, I saw briefly the executive director, who told me she was very busy dealing with various challenges. I asked her to let me know when she had time for a meeting to discuss the EMR protocol and my interest in conducting interviews and observations. She assured me she will contact me and went to her office. I need to conduct interviews and continue the observations sessions which I stopped last summer because of the chaotic conditions in the field. It's now been nearly two years since I joined the project and this is my second summer where I was hoping to begin my second round of data collection, because it is only during the summer semester that I can work full-time and conduct extensive fieldwork. (Memos, August 2006)*

The summer passed by quickly and I still had not received any confirmation from the executive director to allow me to start conducting interviews and continue observations in the clinic. I told myself that she had not responded to my emails because she was most likely preoccupied with trying to learn the system, adjust to her new job and deal with the extra burden of having locums in the clinic over the summer. I decided, therefore, to postpone the fieldwork and continue attending the EMR meetings since this seemed the only way for me to investigate the technology use. In other words, since I was unable to conduct interviews and observations of the practitioners' work practice, I saw the EMR meetings as something that would enable me to *study practice* while *being away from practice*. Thus, attending the EMR meetings would give me a window into empirical data regarding changes in work practice; data which I was unable to access through interviews and observations.

Through these EMR meetings I acquired insider knowledge about local competencies and practices (Pinch, Collins, & Carbone, 1996). In addition, I gained access to the complex process of 'practice in the making,' as I saw how the paper-based practices were gradually replaced with new EMR-mediated practices. Participating in these meetings allowed me not only to follow the implementation process closely, but also to see the way in which abstract visions were deconstructed into many small concrete goals which were continuously changed and redefined to accommodate the existing reality, a reality of a new EMR. Having access to rich and detailed empirical data provided me the unique opportunity to observe and participate in the process of constructing new EMR practices and knowledges, which as explained previously (in

sections 4.2.2.2), includes exploring a set of possibilities and modifying these to accommodate the situated and contingent work practices.

As I continued to struggle with access to the field, I decided to analyze the observation notes I had from the EMR meetings since that was the empirical data I had available at that time. I decided to track the trajectory of issues discussed in the EMR meetings, and gradually became interested in the way in which technology-in-use practices were created, how decisions were made by different people on different occasions, etc. (this results in the work presented in section 4.2.2). This led me to explore the heterogeneous ways in which the various health practitioners integrate (or reject) the EMR in their situated work practices. However, the EMR meetings provided me with only limited access to data about the technology use.

> *Reading my observation data collected during my one-year participation in the EMR meetings, I notice that previously discussed issues faded away from the agenda. I wonder why these issues disappeared, and how were they resolved in practice? While tracking trajectories of issues, I also notice that some workarounds created during the EMR meetings were never mentioned later, and I wonder if these were ever implemented in practice. (Memos, March 2007)*

I felt uneasy writing about the EMR-adaptation in the clinic without having the possibility of clarifying issues that I found in my data through interviews and observations, as well as verifying whether particular decisions made during the EMR meetings were implemented in practice. I was interested in knowing whether there was a gap between the planned actions that were determined during the EMR meetings, and the work practice situated outside of these meetings. I also felt the need to hear the voices of the clinic staff who were not members of the EMR committee. The partial access to the field also limited the data gathered which included detailed descriptions of challenges debated during the EMR meetings, but nothing concerning possible benefits or positive perspectives related to the EMR.

Therefore, I contacted the executive director (who had now been in the clinic for nearly two years) and requested a meeting with her in order to discuss issues regarding my fieldwork in early summer. I reminded her that this was the last summer before the research project would end. I explicitly expressed my need to conduct observations and interviews with the clinic staff in order to enable stronger grounding of observations from the EMR meetings with the locally situated practices in the clinic. I needed to ensure that my findings were verified and not merely based on what people 'say,' but include 'seeing' the actual use of technology (Blomberg, Giacomi, Mosher, & Swenton-Hall, 1993). In this incident, I left my role as an 'EMR consultant' and stepped back into the role of the academic researcher; a role which allowed me to determine methodological

decisions related to the data and my fieldwork. As an 'EMR consultant,' the focus was continuously modified to respond to the clinic's emerging requests and needs; and as a collaborative partner, the clinic had thus far a greater degree of involvement in decisions regarding the research (e.g., the formulation of the interview questions for the patients' study). By stepping back into the role of the academic researcher I wanted to regain the space that would allow me to determine methodological issues related to the importance of verifying the data collected, ensuring balanced accounts and a sufficient variety of informants and perspectives. I also asked the executive director for permission to attend their monthly medical-team meeting in order to be re-introduced to all clinic staff and to prevent misunderstandings about my role in the clinic.

At the end of April (2007), I finally had a meeting with the executive director and we had a long discussion about our collaboration; a similar discussion to the one we had when she started in her position. But now I realized that she clearly did not understand our research collaboration and was not at all familiar with the tasks and reports I previously wrote for the clinic. She admitted she assumed that this collaboration was 'in place' since it existed before she came and asked innocently whether there was anything she should be doing. I was struck and puzzled to hear that she did not understand our research collaboration, especially since she participated in most of the meetings I had with my primary contacts around the period when she started her new position. However, she told me that during that period, she was struggling with understanding her new position and defining her role in the clinic, and spent, therefore, a considerable amount of time figuring out the system as well as her tasks and responsibilities. She also told me she has been fulfilling other positions of staff who left the clinic (i.e., the office administrator and the technical support staff). After that meeting, collaboration with the community partner improved dramatically, enabling me to conduct extensive fieldwork at the clinic and interview the health care practitioners.

A few weeks later, I attended the monthly medical-team meeting in order to be reintroduced to all clinic staff. I was relieved and happy to notice that most staff seemed to recognize me. I had hoped to formally reintroduce myself to the staff, but due to a lack of time, the executive director told me she would do so. She began by acknowledging that most of the staff probably already knew me, and added that "*Nina, has been part of our EMR committee and has been writing minutes for us. For the last three years, she's been keeping an eye on us.*" I was confused and frustrated, and did not totally understand why the director introduced me as an 'inspector' who 'kept an eye' on the staff. I quickly corrected her and emphasized that I was there to 'learn' about the work practices around the EMR, rather than 'keep an eye' on anyone. In spite of my clarification, I feared that the director's comment would demolish the trust I had worked so hard to establish and maintain throughout the years. I could clearly feel the impact of this comment on the clinic staff, especially the MOAs who suddenly began throwing sharp and somewhat sarcastic comments such as "*Will you report that [the workaround] to the executive director"?* I

felt like an underdog, or worse, a spy who was sent by the director (who sits in the second floor, physically separated from the actual clinical practice) to investigate what the staff were doing (on the first floor). I have learned since that some staff members were particularly sensitive to the seemingly good relationship I had with their boss. Regardless of how hard I tried to repair the relationship with some of the staff, I could clearly feel the impact of the director's comment in the medical-team meeting on the clinic staff, some of whom became suspicious of me. In the next section, I will summarize the various roles I acquired or occupied in different contexts, the impact these had on the ways I felt I was perceived by informants and the challenges these posed in doing action research.

5.3 Discussion and Summary

During the three and a half years of my research engagement I have occupied multiple roles and positions, [137] all of which shaped my research in general and my space for interventions in particular. I described above the various tasks which were part of my position as an RA in the ACTION for Health project. On the one hand, this position allowed me to be relatively flexible, as I was not directly bound to a particular IT vendor or to policy makers. In contrast to consultants, I was not paid to further the interests of a particular group, but perhaps as Mumford (2001) puts it, as an academic researcher I was "ideally, dedicated to the pursuit of knowledge in an ethical manner" (p. 15). However, on the other hand, I was also constrained by my position as an RA, where mid-term reviews and other deliverables had to be generated for the funder, to indicate progress in the project. My space for intervening as an RA was also shaped by the community partner (the clinic) whose needs and concerns had to be taken into account, and it was also shaped by my own academic needs as a PhD candidate who had to assemble and compile a coherent dissertation about EMRs based on the various sub-projects I was engaged in; projects which seemed to continually drift away from the actual implementation of the EMR at the clinic to experiences of other clinics, patients' views, and policy decisions of the health authority.

The RA position within ACTION for Health, provided me with the unique opportunity to not only study the implementation of an EMR, but also to actively participate in it. While participating in the EMR implementation increased my space for intervention, it also imposed new challenges. I described above how it is not only the focus that drifted along the course of the research, but also the multiple roles I was

[137] I distinguish between 'positions' and 'roles,' where the former refers to formal roles I fulfilled (e.g., RA, PhD student) and the latter refers to informal perceived roles (e.g., the clinic's researcher, EMR consultant).

invited to occupy. Balancing the different and sometimes contradicting interests, roles, and responsibilities was a battle I occasionally found myself facing.

In Table 5.1, I identify a list of the various roles I enacted in the different events. Each of these roles greatly impacted my point of departure, the way I was perceived by the informants and the type of information they shared with me. Contrary to a classic ethnographer (which is traditionally conceived as an 'outsider'), my position and autonomy in this project changed depending on the different roles I acquired and the responsibilities attached to these. For example, when interviewing decision makers from the health authority, I was perceived as an academic researcher, leading interviewees to adapt the topics discussed, and in one case, even share with me articles that individual found in an academic journal.

When interviewing staff from other clinics about their experience of the EMR, some informants viewed me as a staff member of the community partner, and thus chose to selectively share their success stories with me. In one incident, an office manager made sure to list all the advantages they enjoyed by implementing an EMR system. Later, a few minutes after I was told the clinic had faced no difficulties, a message announced in the loudspeakers warning that the whole system was shut down. In another incident, I visited staff from a clinic which had emphasized to me on the phone that they were a fully digitalized clinic, and the first thing I encountered as I entered the clinic was a wall covered with large numbers of colorful paper charts. As can be seen from these incidents, being associated with certain groups—in this case the community partner's clinic—may cause staff to withhold information about challenges experienced using the system because these might be perceived as mistakes made by the clinic staff rather than a shortcoming of the system. In a discussion with the EMR-vendor, I was viewed as someone with a computer science background familiar with technical issues found in the system and some experience with providing support. When attending the seminar organized by the health authority, I was introduced by the executive director as the clinic's researcher, and was portrayed as an '*inspector*' who was called to *investigate* the initiatives taken by the health authority, and to *evaluate* the vendor and its EMR.

As can be noted from the above, particular roles connected me with particular groups and influenced the data collection. A similar situation arose when I interviewed other clinics about their experiences of the EMR. In this sub-project I was perceived as 'the community partners' researcher' and this led informants to selectively share successful stories. Thus, the challenges illustrated in the examples above are not only related to juggling multiple conflicting roles, but also to being aware of the fact that different roles—or rather affiliation with groups—may have influenced the kind of data collected.

Table 5.1: The Different Roles across Contexts

Contexts	Roles/Positions	Implications	Challenges
ACTION for Health	Action researcher	Allowed me to study and participate in the EMR implementation	Juggling the multiple conflicting roles (e.g., participation and observation)
	Research assistant	Allowed creating technical documents and guidelines for the clinic	Learning the appropriate writing style and language for technical reports
		Allowed reporting research findings to policy makers	Translating research findings into information useful for policy
		Generating mid term reviews and other deliverables to the funder	What to report in mid term reviews when little data is collected due to limited access to the field
School of Communi-cation, Simon Fraser University	Academic researcher	Not bound to any stakeholders	Dealing with continually shifting focus and the pressure to produce findings fast
		Authority to determine methodological issues regarding fieldwork	
	PhD Candidate	Allowed insights from literature on IT in healthcare	Needed to compile a coherent dissertation based on different sub-projects
Health authority seminars	Representative of the clinic; 'Inspector'	Enabled access to seminars for health care practitioners	Representing the clinic and talking on their behalf
Policy and decision makers	Academic researcher	Led to discussing research on Healthcare IT	Proving relevance of academic research while acknowledging the different languages, agendas, goals
Support staff from the EMR vendor	The community partner's researcher; Computer scientist	Informants shared more technical challenges related to the design and architecture of the EMR system and to databases	
Practitioners	Representative of the	Staff shared selectively	Establishing trust

Contexts	Roles/Positions	Implications	Challenges
from other clinics	community partners clinic	success stories, withholding experienced challenges using the EMR system	and moving beyond success stories
The community partner's clinic	EMR-consultant; 'super-user'	Resulted in partial and imbalanced views/accounts of the EMR constituting primarily of technical challenges	Spent observation time dealing with technical challenges
	The patients' study: 'a PhD student studying health communications'; an 'EMR consultant'	Influenced patients who shared selectively positive comments and who did not mentioned concerns they may have had toward the EMR[138]	Act in double-role: interview patients vs. introduce the EMR to patients
	EMR committee member; chair and minute-taker	Access to the *process* of constructing new practices and configuring the EMR system. Enabled active participation in the adaptation process	Juggling conflicting roles: researcher (observer) vs. chair and minute taker

In summary, in each event and context I occupied or acquired multiple roles, some of which were not necessarily my own choice;[139] others conflicted with my role as a researcher. Each of these roles impacted and shaped my autonomy and intervention space. For example, I have described how being associated with certain groups had serious implications in terms of the type of information that informants shared with me, and in other situations, caused staff to withhold some information. I have also described how I developed practical strategies to work around these problematic situations where the different roles conflicted or where my association/affiliation with certain groups caused staff to withhold information. Occupying these various roles and carrying the

[138] I will clarify in section 6.4.2 how part of my role as an EMR-consultant implied that I introduce the EMR and its advantages to patients, and how this may have silenced concerns some patients may have had regarding the EMR.

[139] I accepted some of these roles in spite of the fact that it was not necessarily of my own choice because I did not want to jeopardize the access I had to the field. In other words, I feared that refusing to accept these roles could result in my deportation from the field. The issue of '*choosing*' interventions will be discussed in the next sections.

different titles *outside* the clinic did not seem as particularly problematic to me as it impacted neither my research collaboration with the community partner nor the data I collected.[140] However, as described above, when I later wanted to investigate the adaptation process of the EMR *within* the clinic, uncertainties emerged. Therefore, in the next chapter, I will investigate what happens when the action researcher shifts position from doing research *with* to doing research *on* practitioners. As can be seen from Table 5.1, sometimes I occupied *different roles* in the *same context*. Other times however, I occupied the *same role* in *different contexts*. I summarize these roles in Table 5.2. Thus far, I have described some of the challenges I faced when occupying multiple different roles in the same context, and will investigate in the next chapter the challenges that arise when enacting the same role across different contexts.

Table 5.2: The Same Roles across Different Contexts

Roles	Contexts
Academic researcher; Action researcher	ACTION for Health School of Communication, Simon Fraser University Policy and decision makers The community partner's clinic
The community partner's researcher;	Health authority seminars Seminar and meetings with the EMR vendor Study of practitioners from other clinics Patient's study EMR meetings at the community partner's clinic
EMR-consultant; 'super-user'	The community partner's clinic Study of practitioners from other clinics Patient's study
'Inspector'	Health authority seminars Seminar and meetings with the EMR vendor The community partner's clinic

[140] I will explain later why it became problematic for me to occupy these roles inside the clinic.

CHAPTER 6: DISCUSSION OF ACTION RESEARCH

6.1 Introduction

The previous chapter described my action research journey, including the empirical uncertainties I encountered and the different ways I tried to deal with them. I also reflected upon the multiple roles I have acquired, the continual battles I faced when trying to juggle two conflicting roles, and the implications these roles had for the research and the type of information that was shared with me. This chapter, will provide a deeper investigation of the action research collaboration. For this purpose, I draw upon Chapter 3, especially sections 3.3-3.5 and the action research 'in the making' approach I proposed. I begin this chapter by describing the beginning of my Information Systems (IS) action research journey (section 6.2). I then argue (section 6.2.1) that the nature of research collaborations within IS action research is portrayed in a dichotomized manner, and I explain the problematic aspects with such frameworks where research projects are expected to fit into 'either-or' categories. In section 6.3, I revisit the nature of research collaborations, by drawing upon insights from the Science and Technology Studies (STS) literature (section 2.4.3). My aim is to provide a more nuanced articulation of the challenges encountered when conducting action research by analyzing these in relation to a transition in the types of engagement. I draw upon insights from traditional action research, in particular the distinctions between two types of engagements identified by Heron and Reason (2001), and investigate what happens when the action researcher transitions from one type of engagement to another. I illustrate how in the process of analysis, I found the distinction between research *with* and research *on* rather too simplistic and limiting, offering two somewhat fixed categories to describe types of research engagements.

In section 6.3.2, I revisit the norms that are enacted within IS action research which also have repercussions for action research in general. I argue that these adopt a moralistic approach where it is believed that if we follow the principles of action research properly, it will presumably lead to a successful research project. I also argue that these norms are often based on ideal and unproblematized relations between the researcher and the community partner, and I explain how this is problematic as basic notions of 'participation and intervention,' 'usefulness' and 'relevance,' are rarely given critical scrutiny.

Section 6.3.3 proposes conceptualizing action research as a network, with the aim to provide a deeper articulation of the nature of action research collaborations and a more nuanced understanding of the factors that impact the researcher's engagement and space for interventions. I investigate how the different roles came into existence, and illustrate how the roles and interventions are produced by a network of socio-material arrangements and attachments. Applying the model of a network on action research leads me to argue that past connections from previous settings are taken into the present and shape the creation and configuration of new or different types of connections and disconnections which enable particular roles (section 6.3.3.4). I further argue that balancing the dynamics of roles and interventions is a process of transforming uncertainties, where existing roles can be understood through past connections. Finally, in the last part of this section (6.3.3.5), I illustrate what happens when the network of relations and attachments are missing and how this undermines my capability to act in a particular role.

In section 6.4 I argue for the importance of taking seriously fieldwork dilemmas and uncertainties and illustrate how these can be both transformed into presumably fruitful practical interventions and utilized as knowledge providers. That is, they can spark insights into practical ways of dealing with the uncertainties and insights into theoretical ways of understanding the social context.

In section 6.5 I revisit the norms enacted within action research in general, and finally, I describe the process by which I moved away from committing to these norms into rather focusing on the way in which I enacted action research during the three and a half years project (section 6.6).

6.2 The Beginning of an IS Action Research

This chapter emerged as a result of the knowledge and experiences I acquired during the three and a half years of conducting action research. As mentioned earlier, I had no prior formal practical experience in conducting action research, and I mostly learned about it by spending years *doing it in practice*. Not having practical experience in conducting action research may have been a strength as I was extra sensitive to methodological issues which would have otherwise been taken for granted. In many ways, my project started out within an IS action research framework, since the kinds of action research I was familiar with were the ones found within the IS field. As explained in section 2.4.2.1, an IS action researcher adopts a stance similar to that of a 'consultant' (Mumford, 2001), who conducts evaluations and provides recommendations for an organization. I described in Chapter 5 how I responded to the needs of the community partner, and how I functioned in some contexts as an EMR consultant generating various technical reports with recommendations relevant for their organization (e.g., the study of practitioners from other clinics and the patient's study). In the following section, I will

discuss my research while drawing upon insights from the IS action research literature (presented in section 2.4.2.1).

As described in the previous chapter, the clinic was about to implement an EMR system when my collaboration with them began. This was an 'immediate problematic situation' (Rapoport, 1970) in which I, the researcher, could intervene by providing theoretical insights about practical concerns that might arise in the transition process to an EMR (e.g., by sharing recommendations found in the EMR-literature for ways to manage the transition). Using action research provided me with the unique opportunity to not only *study* the transition to EMR, but also to *participate* and generate practical insights for the community partner. Studying the impact of the EMR on the health care practitioners has theoretical relevance to the field of healthcare IT, and identifying and assessing the challenges that are brought about by the technology has practical relevance for the health care practitioners in the clinic.

The dual agenda of combining the theoretical and practical contributions (Baskerville & Myers, 2004a; Davison et al., 2004; McKay & Marshall, 2001; Walsham, 2006) formed the underlying foundation upon which the partnership with the clinic was established. As mentioned in the previous chapter, the partnership was established prior to my participation in the project, and was based on a general acceptable ethical framework (Rapoport, 1970), where both the researchers and the community partner were interested in the implementation of EMR system and its impact on health care practitioners. This mutual understanding was established at the beginning of the collaboration, and was kept on a general and abstract level. Hence, rather than following a strict and rigorous research agenda (with predefined or concrete milestones), an explorative approach was followed in which decisions regarding the research focus and design were made continually as the research progressed. Following several iterative cycles (Baskerville & Wood-Harper, 1996; Mumford, 2001), the PI and I met with the community partner to set clear objectives and plan activities to be carried out by the researcher. Having such a broad framework provided me with greater flexibility and space for reformulations of the research focus. This was, however, at the cost of working with a continually drifting research focus.

The importance of following iterative cycles for planning and evaluating the researcher's interventions has been emphasized by several IS action researchers (Baskerville & Wood-Harper, 1996; Mumford, 2001; Waterman et al., 2001). I argue that it is equally important to be aware of changes in the dynamic relationship between the researcher and the practitioners. IS action researchers admit that the areas of interest may gradually evolve and cause changes in the scope of the research (Avison et al., 2001; Davison et al., 2004; Rapoport, 1970). This was evident in the research project described in the previous chapter where the focus of the community partner drifted away from the initial inquiry, from studying the EMR at the clinic to exploring other clinics' experience

with EMR adaptation, investigating decisions taken by the health authority, and introducing the EMR to patients.[141] Since the areas of interest gradually evolve, it has been said that it is especially important to consciously and continually revise the shared framework (Avison et al., 2001; Davison et al., 2004; Rapoport, 1970). Yet, little is known about what it actually means in practice that the research focus evolves and what implications this has on the researcher and the research project.

6.2.1 Dichotomous Nature of Collaboration

As I explained in section 2.4.2.3, the action research literature found within the IS field contains various criteria and norms the action researcher is expected to subscribe to. However, little is known about what to do in practice when these norms—the "methodological gold standards"—cannot be fulfilled, or when there is deviation from the norm. I described in the previous chapter how I tried to conduct several meetings with both executive directors to summarize the findings from completed projects and to plan new projects, but since the outgoing director was training her replacement and due to the several other organizational and technical changes (discussed in section 5.2.2) that were taking place at the same time period, this turned out to be a fairly challenging task. Thus, I was unable to fulfill the last phase of the cyclic model where I had hoped to reflect upon the outcomes of my research (i.e., the EMR protocol, the reports summarizing the patient's study and the study of practitioners from other clinics). Many of the criteria and norms found within IS action research (Avison et al., 2001; Baskerville & Wood-Harper, 1996; Davison et al., 2004; Mumford, 2001) did not provide me with methodological tools to understand such deviations and deal with these in practice.

Existing discussions within IS action research literature regarding methodological and empirical complexities tend to get obscured in debates around normative views constituting long lists with recommendations of what the researcher *should* or *should not* do. However, a few IS scholars acknowledge that there has been scant attention paid to work that scrutinizes critically *methodological* reflections on research practice (the *process* of conducting research) as well as to work that provides guidance on *how* to conduct action research (Lau, 1997; McKay & Marshall, 2001). As I argued in section 2.4.2.3, the methodological guidelines and recommendations provided in IS action research literature are built upon a rigid, objective, standardized and value neutral platform which is similar to the one that traditional action research was originally opposed to. In addition, these guidelines and norms leave little space for understanding

[141] Although the different focus mentioned above are relevant and related to the initial inquiry, I view this as a drift because the initial inquiry was supposed to focus primarily on the implementation of the EMR in the community partner's clinic and the work practice of health care practitioners.

and managing uncertainties and dilemmas encountered in the field. In the previous chapter, I described the various uncertainties I faced in relation to managing the many different roles I adopted or acquired, their implications on my research and on the way I was perceived by informants and the kind of information they shared with me. As acknowledged in debates within the STS action-oriented literature, managing the research collaboration while balancing the dual agenda of having theoretical and practical relevance is complex and brings about many challenges. This includes, for instance, challenges related to managing the multiple and sometimes conflicting roles the researcher acquires or adopts (Guggenheim, 2004; Mesman, 2007; Vikkelsø, 2007); dealing with high and evolving expectations of practitioners (Jensen, 2007a; Stanley, 2004; Zuiderent, 2002); and the impact this fluid and constantly changing research setting has on the researcher's activities, epistemic authority, and access to the field (Lynch, 2004; Winthereik et al., 2002; Zuiderent-Jerak & Jensen, 2007). The nature of action research collaboration is complex and there is, therefore, a need for a greater investigation of such engagements.

Within IS action research, research engagements and styles of intervention are often portrayed in a dichotomized manner, fitting into 'either-or' categories (e.g., non-interventionist vs. interventionist, research vs. practice, passive vs. active, neutral vs. engaged, descriptive vs. normative, analytical vs. action-oriented, rigorous vs. relevant) (Strand, 2006, p. 425). This is also the case in general with action research, where a distinction is invoked between research committed to social change and descriptive research, or between action (intervention) and interpretation (description) (Markussen & Olesen, 2007). However, I will illustrate throughout this chapter how in practice, there is no static or stable order that fits our 'dichotomized' fears and expectations. Accordingly, collaboration does not simply mean being co-opted or being in full control and different objectives do not need to result in conflicting agendas. As mentioned previously (section 2.4.3.3), it is exactly such dichotomized views of the research collaboration (found within IS and traditional action research) that some STS scholars wish to do away with (e.g., Jensen, 2007a; Lynch, 2004; Strand, 2006; Vikkelsø, 2007), as these distinctions prevent us from seeing how the different research methodologies produce different interventions, and obscure the development of sensibility and language to articulate such complex forms of research and engagement. I will get back to this dichotomous view of the nature of research collaboration in section 6.3.2. But first, I will investigate in the next section the nature of research collaboration by drawing upon insights from action research found within the STS literature. I will further point out problematic aspects of frameworks such as those found within IS action research, with implications for action research in general. I will focus on the challenges that emerge when conducting action research and will discuss these in relation to the transition between different types of researcher engagement.

6.3 Nature of Research Collaboration- Revisited

I described in Chapter 5 the battle I occasionally found myself encountering as I sought a balance between different and sometimes contradicting interests, roles, and responsibilities. I have also articulated the various challenges the different roles posed for my fieldwork and research. My initial aim is to move a little further and provide a more nuanced articulation of these challenges by discussing them in relation to a shift in the types of engagement the researcher occupies. This is intended to contribute to existing debates within the STS field regarding methodological challenges encountered in terms of acting with all people when conducting action research.

I draw upon insights from traditional action research, in particular Heron and Reason (2001) who identify two types of engagements to advocate that 'good' research should be conducted *with* people rather than *on* people. Rather than getting mired in a normative debate about how action research *should be* conducted, I want to take this distinction between the different types of engagement in a different direction and investigate what happens when the action researcher shifts position from doing research *with* practitioners to doing research *on* practitioners. However, I will illustrate how in the process of answering this question, I found the distinction between research *with* and *on* to be rather too simplistic and limiting, offering two somewhat fixed and static categories to describe types of research engagement. I will also illustrate how it is not always a simple and straightforward either-or decision between conducting research *with* or *on* practitioners, and the distinctions between these types of engagement are not always clear-cut. It is not my intention to add a new category (e.g., research *for* practitioners) to the two types of engagements proposed by Heron and Reason (2001). Rather, I argue that this dichotomous view of types of engagements can potentially hinder us from exploring the various artful ways in which researchers can intervene and *act with* practices in different contexts and at different points in time. By this I wish to move from adhering to the idealized views found both within traditional action research (e.g., that 'good' action research ought to be conducted *with* rather than *on* practitioners), and within IS action research (e.g., the various rigid criteria and norms outlined in section 2.4.2.3).

6.3.1 Transition in Types of Engagements

In the following sub-sections, I further explore the transition from doing research *with* to doing research *on* practitioners, and will look at its impact on several factors: the researcher's roles (section 6.3.1.1), authority and conceptual distance (section 6.3.1.2-6.3.1.3), as well as the practitioners' commitment, involvement and access provided to the field (section 6.3.1.4).

6.3.1.1 Reconfiguration of Roles

The shift in the type of engagement implies redefinition and reconfiguration of the roles of both the researcher and the practitioners. When conducting action research *with* practitioners, they become to some degree co-researchers on the project (Peters & Robinson, 1984; Reason & Bradbury, 2006b) engaged in collective inquiry processes (Wadsworth, 2006). As was illustrated in the first part of the analysis, the study of the other clinics and the patient study were planned through a close collaboration with the community partner. Several meetings were conducted with the clinic to determine my roles, positions and activities in each sub-project. However, up to that point, the various sub-projects were conducted *with* the clinic *on* other research subjects (e.g., patients and health care practitioners from other clinics). When I later wanted to conduct research *on* the community partner, their role was transformed from being research fellows into becoming research subjects.

In the transition from conducting research *for* and *with* practitioners to conducting research *on* practitioners, it is not only the practitioners' role that is redefined, but also the researcher's roles. In this transition, the researcher may have to abandon some of the multiple roles she may have acquired or occupied, to reclaim the role of the 'researcher.' In my case, I tried to abandon the multiple roles I occupied within the clinic (i.e., 'EMR consultant,' 'super-user,' a member of the EMR committee) and step back into the role of the researcher. This implied a shift in my position, moving from being the one answering questions and solving technical problems, to being the one asking questions and observing practices. Abandoning the multiple roles became even more challenging in light of the managerial changes. While the outgoing executive director still saw me as an 'EMR consultant' and asked me to create a protocol documenting changes in work practices, the incoming director asked me to evaluate the efficiency of existing practices. Furthermore, the office manager thought I was documenting policies and procedures and one of the physicians thought I was recording and evaluating patient interactions. Changes in staffing, as well as community partner circumstances came to bear on both what interventions were possible for me and how I was perceived.

6.3.1.2 Reclaiming Epistemic Authority

Abandoning the multiple roles the researcher occupied and stepping back into the role of the academic researcher is important for regaining, or rather reclaiming, one's epistemic authority. Epistemic authority grants the academic researcher certain authority which becomes influential for certain kinds of roles and activities. In other words, various kinds of roles and activities require different kinds of epistemic authorities, and different authorities have different accountabilities (Zuiderent-Jerak & Jensen, 2007). When I was, for instance, functioning as an 'EMR consultant' and later became a 'super-user,' a certain degree of authority was conferred upon me, authority that allowed me to influence

particular kinds of activities and decisions related to the adaptation process of the EMR (e.g., suggesting alternative redesign of work practices or configurations of the EMR). However, as I wanted to move away from being an 'EMR consultant' and step back into the role of the academic researcher, it was important for me to regain the epistemic authority which enabled me to determine methodological decisions related to my fieldwork. As described in the second part of the analysis, in my struggle to regain my academic authority, I had several meetings with the executive director where I repeatedly explained the underlying intention of my requests to conduct observations and interviews. I explicitly clarified the need to conduct observations in order to better ground what I learned in the EMR meetings with the locally situated practices in the clinic. I wanted not only to hear about small examples of challenges, but also to observe how the clinic staff dealt with these in practice. I explained I could not make knowledge claims based merely on what I heard during the EMR meetings, and emphasized the need to directly hear the voices of the rest of the clinic staff, in particular those who were not members of the EMR committee. In this context, I stepped back into the role of the academic researcher and explained the importance of having balanced accounts from various informants, and verifying the data I previously collected to be able to make accountable knowledge claims about the impact of the EMR on the clinic.

6.3.1.3 Creating, Rather than Preserving, Conceptual Distance

However, stepping back into the role of the academic researcher and reclaiming epistemic authority requires that the researcher distance herself from practitioners and create conceptual and critical space to reflect. Indeed several researchers emphasize the importance of creating spaces for reflection, interpretation and criticism (Forsythe, 1999; Lynch, 2004; Walsham, 2006; Zuiderent, 2002). Preserving a careful epistemological view is challenging when conducting research *with* practitioners. The challenge is related to the close relationship that is forged and the need to preserve conceptual distance from the practitioners to avoid too much immersion[142] (Forsythe, 1999). However, when moving to conducting research *on* practitioners, a different type of challenge is faced. Rather than *preserving* conceptual distance, the challenge becomes configuring or *recreating* such distance while avoiding misunderstanding or falling out of and losing ties to the field. This implies reconfiguration of existing analytic spaces and redrawing the boundaries or lines of interactions between the researcher and the practitioners.

When conducting research *with* practitioners, the researcher fosters a close relationship with some degree of dependency on the practitioners (Guggenheim, 2004). Furthermore, the researcher may become a relative 'insider' in certain settings (Mesman,

[142] I will get back to this point in section 6.4.3.

2007). However, to create a conceptual distance to reflect, the researcher may need to distance herself from the practitioners. This is particularly challenging because throughout the research collaboration, the researcher has already gained a particular position (a relative insider) and now wants to replace it with a different position (a relative outsider). In a closely coupled interdependent relationship between the researcher and the practitioners, shifting positions from a relative insider to a relative outsider, and balancing between creating conceptual distance while still maintaining a level of engagement in the field, may lead to tension in the relationship. As was illustrated in the second part of the analysis, in my struggle to abandon the multiple positions I had occupied in order to go back to the role of the academic researcher, I was confronted with a number of misunderstandings about my role(s) in the field.

6.3.1.4 Transformation in the Involvement and Access to the Field

When the practitioners are transformed from being research fellows to becoming research subjects, this has an impact on their degree of commitment and involvement. It has been said that action research is based on a research partnership in which the degree of involvement of the research subjects varies (Waterman et al., 2001). This was evident in particular during the shift in the researcher's engagement. When conducting research *with* practitioners, the degree of involvement was significantly different, and to some degree even greater, than when conducting research *on* practitioners. As was illustrated in the analysis, when conducting research *with* practitioners they provided me with various sources of information, forwarded me updates from the vendor and the provincial health authority, invited me to different events (e.g., clinical staff meetings, seminars organized by the vendor and the provincial health authority), and introduced me to various actors (e.g., practitioners from other clinics, people from the health authority). Subsequently, I was provided with a greater degree of access to information, people and resources.

Greater involvement and access to the field are some of the benefits of action research (Guggenheim, 2004; Pinch et al., 1996; Walsham, 2006; Winthereik et al., 2002). While this is true, I would add that these benefits are temporary and contingent upon certain contextual circumstances.[143] The degree of involvement and access to the field may be altered, for instance, in the face of sudden organizational changes (e.g., staff turnover or replacement), or changes in the relationship between the practitioners and the researcher. As was illustrated in the second part of the analysis, the shift in the type of engagement affected the way the practitioners viewed me, and in turn created drastic instability in my fieldwork in terms of my access to the field. From being trusted and

[143] I will get back to this argument in section 6.3.3 and clarify further how I conceptualize the contingency and temporality of the action research collaboration as well as its benefits.

provided considerably high access to the field (e.g., provided with an office), the level of access shifted into being more controlled and circumspect (e.g., being asked to inform the executive directors about my fieldwork schedule and to conduct biweekly meetings with them), and eventually reaching limited access to the field (e.g., accessing the field only through the EMR meetings).

6.3.1.5 Recapping

The aim of this section was to provide a nuanced articulation of the challenges faced when conducting action research. For this purpose, the challenges were analyzed in relation to the transition in the researcher's type of engagement. I illustrated how the transition from conducting research *with* to conducting research *on* practitioners affected the roles of the practitioners and the researchers, the researcher's authority and conceptual distance, as well as the practitioners' degree of commitment and access provided to the field. One may claim, for instance, that when doing research *with* practitioners they are more committed and involved in the project, thus guaranteeing access to the field. Following the same line of thoughts would imply that when doing research *on* practitioners, they are less likely to be committed and involved in the research and more likely to restrict access to the field. This is indeed one of the thoughts I initially had as I was struggling with (re)gaining access to the field. However, I cannot make such simplistic claims, especially as I have little empirical evidence to prove or support them. Nevertheless, I will show in the section 6.3.3 how I investigate further the transition in types of engagements by zooming out and looking at the various events that surrounded the shift and impacted the nature of collaboration. But before I do so, I wish to discuss further the distinction between research *with* and *on* practitioners.

6.3.2 Norms Enacted within IS Action Research

In the process of analyses, I found the distinctions between the types of engagement (research *with* and *on* practitioners) are not always clear-cut, and the researcher may conduct research *on* the practitioners, in collaboration *with* the practitioners, to produce findings *for* practitioners. I, therefore, argue that rather than subscribing to idealized normative views of what a 'good' action researcher should or should not do, we should open the space to explore the many different types of engagement and ways in which we can intervene and *act with* different practices and practitioners, in different contexts and at different points in time.

Such established criteria and norms as the ones found within traditional action research are also echoed in IS action research (see section 2.4.2.3), and they provide imperatives on how action research should be enacted. These norms provide specific configurations of both the research and the action researcher as they establish particular

positions and capacities that become considered as acceptable action research. For instance, as mentioned previously (section 2.4.2), Mumford (2001) emphasizes the importance of having a clear and agreed upon research agenda, and asserts that there should be no ambiguity or uncertainty of the planned interventions (p. 20). Uncertainties do not seem to be quite welcomed when conducting IS action research, and the researcher is, therefore, provided with various recommendations for avoiding or removing these uncertainties and controlling the research project (e.g., Avison et al., 2001; Baskerville & Wood-Harper, 1996; Davison et al., 2004; Mumford, 2001).

The troubling aspect with such norms is that they also adopt a moralistic approach where it is believed that if we follow the principles of action research properly, it will lead to a presumably successful research project. However, these norms are often based on assumptions and ideals of smooth and unproblematic relations between the researcher and the community partner. This points to problematic aspects which have repercussions for action research in general as basic notions of 'participation and intervention,' 'usefulness' and 'relevance,' are rarely given critical scrutiny. Participation and intervention are most often portrayed as necessarily good independently of the context; they are something the researcher should aim to achieve. For example, one of the quality criteria of action research (mentioned in the section 2.4.1.4) is ensuring full participation of all practitioners. This means ensuring that each practitioner is "as expressive, as heard and as influential in decision-making as every other group member. [Otherwise,] the inquiry will not be truly co-operative if one or two people dominate the group, or if some voice are left out altogether" (Heron & Reason, 2001, p. 185).

While the idea of ensuring maximal and authentic participation sounds promising, I am left puzzled and somehow concerned with how ambitious this criterion is. After all, when action researchers work with communities or organizations, there are already pre-existing social structures and hierarchies embedded within these organizations. These social structures imply that some voices will almost inevitably be heard more than others, and that some will participate more closely and authentically than others. For example, in my empirical case, my primary contacts certainly participated more closely than others in the design of the different sub-projects. Furthermore, during the periods where I had partial access to the fields, most of the accounts that I had access to were from the EMR committee. Similarly, when I was unable to interview and hear the voice of the health care practitioners in the community partner's clinic, my field-notes from that period contained primarily informal conversations with the incoming director since that was the only voice I had access to at that time. In other words, during that period of partial access to the field, the voice of the management was louder and more dominant than that of the physicians and MOAs. I believe the researcher should indeed ensure collecting balanced accounts and try to listen to as many varied voices as she can, however, it is somewhat unavoidable that some voices will be louder and other voices will be silenced or left out. Thus, rather than thinking about ensuring 'maximal' or 'authentic' participation, STS

action-oriented literature offers more nuanced and critical discussions about different levels and types of participation appropriate at different settings and contexts (Zuiderent-Jerak et al., 2009). Such an approach moves beyond dichotomous and rather simplistic views of 'maximal participation' and 'no participation,' and rather opens up space for richer debates about complex types of participations and interventions, and their critical implications on the research in general and the researcher in particular.

Thereby, in the next section I will draw upon insight from the STS literature, in particular from Actor-Network Theory (ANT) and the work of Moser (presented in section 3.3.1.6). To better understand the nature of collaboration and types of engagements, I proposed viewing action research as a network with different types of attachments among different elements. I will now explain how the model of a network can help move beyond dichotomous views and provide a deeper articulation of the nature of action research collaborations and more nuanced understanding of the factors that impact the researcher's engagement and space for interventions.

6.3.3 Action Research as Network: Collective Production of Actors and Actions

To better understand the dynamic and complex engagements found in action research projects, I use the notion of network(s) from ANT. As explained in Chapter 2, network refers to a collection of heterogeneous human and non-human actors that are connected together and mutually shape each other (Latour, 2005; Law, 1992). The notion of network allows me to map out the different actors and the connections between them. Accordingly, people, actions, roles, authorities, conceptual distance, commitments and access are interconnected elements that form a network which functions as an apparently coherent whole designated as the research project. However the network is marked not only by the actors and the connections, but also by the actions, productions and transformations of these connections and their effects (Latour, 2002b). In other words, what is important is not merely to point out facts and their connections (Latour, 2002a), but rather to follow the production of differences and effects distributed among all actors. In this section, I will, therefore trace the various connections and attachments constructed between the clinic and myself throughout the research project and look at the way in which these unfolded and shaped my engagement and interventions. In other words, I will investigate how the different attachments existing in the network at different points in time produce and enable the ordering and configuration of particular subjects with capacities to enact different roles and interventions in a diversity of contexts and settings. I will illustrate how in order to act/perform in different roles, particular attachments and socio-material resources are required, and will investigate what happens when these attachments are not in place and I was unable to act as I expected.

In addition, the view of action research as a network taught me that enacting roles for intervention is not a simple or straightforward matter. Instead, roles are highly influenced by the unpredictable and emerging socio-material arrangements and attachments (Moser, 2006)—modes of ordering (Law, 1994)—existing in the particular research project. Thus, applying a network model allowed me to go further and add the aspect of movement in time and settings, and illustrate how past connections from previous settings are taken into the present and shape existing or new types of connections. In other words, it allowed me to conceptualize roles and interventions as products which are assemblages of past and present connections. I further argue that balancing the dynamics of roles and interventions is a process of transforming uncertainties, where existing roles can be understood through past connections. In other words, the creation and/or redefinition of existing roles is shaped by past roles and interventions from previous settings.

6.3.3.1 Roles and Interventions as Network Effects

The collaborations that are formed and sustained in action research are highly complex and dynamic. The researcher moves among different settings, circulating between different places, alternating between certain kinds of positions (Mesman, 2007), and creating and sorting attachments with different people, actions, roles and responsibilities (Jensen, 2007a). As was illustrated in the analysis, I was constantly alternating among different positions, depending on the settings, as well as the roles and responsibilities I received. Furthermore, the connections between myself, the researcher, the practitioners, and the research topics, changed continually and impacted my position. On some occasions I was the researcher, the one who asks the questions; on other occasions I was viewed as an informant, expected to be the one who provides answers and, preferably, solutions. It has, therefore, been said that in this shifting and fluid landscape some partial connections are strengthened and other are disconnected (Jensen, 2007a). I illustrated in the previous section (6.3.1) how when the types of engagements shift from conducting research *with* to conducting research *on* practitioners, the previous strong connections and attachments between the researcher and the practitioners had to be redefined into different types of connections—somewhat weaker connections, like those that exist between an observer and subjects.

As can be seen from the analysis, I sometimes conducted research *with* the practitioners *on* their patients or on other clinics' use of the EMR; other times, I conducted research *for* the practitioners *on* decisions taken by the health authority or the vendor; and other times, I conducted research *on* practitioners. Depending on the contextual circumstances—the socio-material conditions in the network—I alternated between the different positions and types of engagements. Conceptualizing the research project as a network can be fruitful as it allows us to see the way in which the various

elements are connected at different points in time to form an apparently coherent whole (Latour, 2005; Law, 1992). Furthermore, with their notion of actor-networks, ANT helps turn or redefine actors into networks. Consequently, they move away from focusing on the individual actor to the collective, on the conditions and means through which actors in networks emerge (Gomart & Hennion, 1999).

Thus, viewing action research as a network building—as a collective production of actors—directs attention to the many other change processes surrounding and impacting the shift in the engagement of the researcher. This shift provides a partial view of the research trajectory and becomes part of a larger network of changes in connections and disconnections with different elements. The network in my empirical case comprised the abstract and rather vague partnership (research agenda) in which decisions regarding the research focus were made continually as the research progressed, as well as the different and often conflicting interests of each of the executive directors, the different practitioners, and my own interest. The network also consisted of the evolving focus and the multiple roles and interventions I occupied and the impact this had on the ways the clinic staff perceived me. Furthermore, as described in the previous section, the network became more complicated during the transition in the types of my engagement, moving from conducting research *with* to conducting research *on* practitioners. I have described how this transition impacted several elements in the network, including my roles, authority and conceptual distance, as well as the community partner's degree of commitment, involvement, and access provided to the field.

Thus, changing one element, in this case the type of the researcher's engagement, impacts the whole web of connections. The transition in the types of engagement, however, was one amongst many other changes which took place simultaneously around that time. Looking at the conditions (in the network) through which the transition in the types of engagement emerged, sheds light on the change in management (the replacement of the executive director) which was gradually followed by high turn-over and staff replacement, in particular of support staff (e.g., an MOA who was a key figure throughout my research collaboration and the technical support staff who was one of my primary contacts). These were in addition to technical and organizational changes and challenges (e.g., implementation of Open Access and PathNet), as well as internal political issues and organizational conflicts (described in the previous chapter) which also impacted the nature of collaboration I had with the clinic. All these elements were part of continually reshaping my roles and my space for interventions.

6.3.3.2 Distributed Agency: Actors and Actions

As explained earlier (section 3.3.1.3), ANT's notion of actor-networks transforms actors from being the powerful master or creator to being distributed to a sea of actors in the network (Latour, 2002b, p. 4). Hence, agency—the capacity to act/perform—is not

simply attached to an individual person, but is the performance of specific socio-material arrangements and attachments (Gomart & Hennion, 1999; Moser, 2006). Thus, the action researcher's capacity to act in a particular role is located neither within the researcher nor the research project, but in the particular socio-material relations and ordering of practices that simultaneously produce the researcher, the community partner and the research project. Any of these entities and their characters can be understood as relational effects. Thus, actors are defined by virtue of their position in the network (Law, 1999), which implies that "one investigates what something is by asking what it is made to be and how it emerges" (Moser, 2006, p. 373). In this section, I will investigate the roles I acquired by looking at how they emerged.

I began the narrative in Chapter 5 (section 5.2.1) by describing how I became an action researcher. This role and the ability to act as an action researcher came about through particular socio-material relations and attachments. This includes, the RA position I received within the ACTION for Health project which funded my research; my affiliation with the university and my PhD position in the School of Communication; the partnership with the clinic and the access to the field which enabled me to both study and participate in the implementation of the EMR system; my previous research experience and knowledge of EMR implementations which allowed me to relatively easily step into the role of the action researcher; the primary contacts from the clinic who ensured access to the field, to people and information, etc. It is the assembly of all these attachments that enabled me to perform in the role of an action researcher. In other words, these provided me with agency which enabled me to act as a competent action researcher and to initiate action. Thus, with the help of the socio-material arrangements and connections in the network, I could practice active agency and initiate action. As described in the beginning of the research journey, my relationship with my primary contacts had improved and the attachments were strengthened as the research progressed. I was provided with considerable access to the field site, continuous access to updated and internal information (e.g., from the health authority or the vendor regarding EMR implementations) and access to key actors both from within and outside the clinic. All these attachments—the networks of relations—enabled me to act as an action researcher and respond to various issues that were of concern to the community partner, conduct interviews and create technical reports for the clinic, etc.

From being an action researcher, I was gradually perceived as an EMR consultant, as someone who is an expert of the system. It has been noted by Gomart and Hennion (1999) that particular sociotechnical material networks fabricate a person who has particular abilities, intentionalities, competencies, etc. As explained earlier, I was initially introduced to the community partner as an EMR researcher; as someone who did her Master's about EMRs, who participated in the implementation of such a system in Norway, and was familiar with the literature and discourse surrounding these technologies. I was also introduced as a computer scientist, as someone who had

technical competencies and skills. Later on, I interviewed other clinics about their EMR experiences and introduced the EMR to patients at the community partner's clinic. All these socio-material arrangements and attachments configured, or rather constructed, a particular subject, someone who could potentially be easily perceived as an EMR consultant.

I described in the previous chapter how in contexts outside the community partner's clinic, I was often perceived as the clinic's researcher. When attending the second seminar organized by the health authority, my nametag changed from the clinic's researcher (a representative of the clinic) to an 'EMR consultant' (an expert of the system). I assume it was my primary contacts who chose this new title for me, since they were the ones who registered me for the seminar. Regardless of who did it, the most interesting aspect for me is looking at how this role came to exist. In addition to the factors described above concerning the ways in which I was introduced to the clinic, the role of becoming 'an EMR-expert' was produced by the network and my previous interventions, where I interacted regularly with the clinic staff during the countless EMR meetings and clinical meetings, training sessions, observations, informal conversations and lunches. It was my previous interventions that earned me the position of an EMR-expert. Previous interventions, such as functioning as a 'super user' and providing technical support, significantly impacted the way I was perceived by the clinic staff. These, in addition to other interventions, such as prompting essential negotiations related to the configuration of the EMR system and suggesting prospective adaptations of existing work practices, constructed an identity of someone who is knowledgeable and capable of articulating otherwise invisible local work practices and sociotechnical challenges that occurred. In other words, these previous interventions helped to construct the identity of an EMR-expert consolidated with the clinic. However, I will illustrate later how this identity was continuously reconfigured during the three and a half years of collaboration.

6.3.3.3 Different Attachments Produce Particular Roles

Thus far, I have illustrated how interventions and roles enacted by the researcher can be seen as network effects—they are produced, supported and enacted by the network. However, the network is not static and the attachments are not configured once and for all; they continuously change and influence the roles and interventions produced and supported by the network. In other words, the network enables and supports particular roles, and shapes the space within which the researcher is given the agency to act. Thus, the roles and interventions the researcher might take depend upon the attachments existing in the network at different points in time. For instance, when I accepted the role of chair and minute taker in the EMR meetings, my choice of accepting the role depended upon the attachments and socio-material resources I had in the clinic at

that particular period. At that time, I had limited access to the field and circumspect space for interventions. I experienced uncertainties about my role, as I was unable to act the way I wanted and interview or observe the clinic staff. The combination of the absence of the actions (that I desired) and the risk of losing access to the field, encouraged me to accept the role of a chair and minute taker. I saw this role as giving me the opportunity to gain indirect access to the clinic and to issues related to the use of the EMR while actively participating in the adaptation process of work practices and configurations of the EMR system.

Roles are produced and supported by the network, and as explained in the previous chapter, the researcher may find herself occupying multiple *different roles* in the *same context* (see Table 5.1 for an overview of the different roles I occupied). I have also illustrated how, at times, the researcher may occupy the *same role* across *different contexts* (see Table 5.2). However, as I argued above, action research roles are not static and predefined 'fixed-packages' the researcher picks and chooses from to fit a particular purpose. After all, being labeled a consultant (Guggenheim, 2004) or a change agent (Pedretti, 1996) might imply totally different interventions depending on the context. In other words, one and the same role may imply totally different interventions depending on the context and the socio-material arrangements within the network. Unlike IS action research, the role of the STS researcher is portrayed as something that is not easily and clearly defined, as she is operating in contexts that are defined by others (Gustavsen, 2003; Zuiderent, 2002). For example, in the patient study, the clinic staff had to find a proper title for me—one that would appear on the posters that we designed. The staff suggested that the word 'researcher' might alienate the patients and advised me to avoid presenting myself as such. It was initially suggested that I would introduce myself as one of 'their staff,' but this proposal was rejected due to the concern that patients would confuse me with the clinic staff. Finally, after struggling with finding a proper title for me, the staff decided that I should introduce myself as 'a PhD student studying health communications.' In other words a rather vague title. Even I was unclear about what it meant other than the fact that I was a 'student' and perhaps associated with the 'filing students' (students the clinic hires to help with filing papers and other administrative tasks).

6.3.3.4 Network of Past and Present Roles and Attachments

Previous research within STS found that roles in action research cannot be understood simply as the dichotomy of insider and outsider, suggesting instead to transform the dichotomy into multiple types of insiders and outsiders (Mesman, 2007) or into a dialectic relationship between the researcher and the field site (Pedretti, 1996). As explained earlier, the research collaboration is more fluid, dynamic and dialectic and the researcher may alternate between different types of engagements (e.g., 'for,' 'with,'

'about,' 'by' or 'against'). I would additionally argue that the dialectic relationships between the multiple roles should be viewed as part of a network of roles and interventions that are connected in different ways at different points in time. The researcher has to balance the dynamics of alternative strategies, shifting different roles and interventions for dealing with the continuously changing context. Through this complex and dynamic process of connections and disconnections with people, roles, and interventions, the researcher and the object of study come into being and continuously co-construct each other (Winthereik et al., 2002).

Applying the model of a network on action research helps me to move a step further from conceptualizing roles as fluid, into viewing them as something that is produced and enacted by the attachments in the network. Particular attachments create specific kinds of roles and expectations to which the researcher may, or may not, be able to conform. As was illustrated in the first part of the analysis, strong attachments were established over time with the practitioners. These attachments shaped the research focus and the roles I was invited to occupy, but they also made it difficult for me to maneuver in the field site and complicated the creation of different types of attachments. This was the case when I was portrayed as an 'inspector'—as someone who investigates health authority initiatives and evaluates the vendor and the technology—and created a perception of my role quite different from what I desired. My role as an 'inspector' was shaped by the attachments I had with the community partner, the vendor and decision makers from the health authority, but initially, I did not perceive this as problematic to my position and role in the research. However, when moving to conducting research *on* practitioners *within* the clinic, the role I was given in the past as an 'inspector' seemed to inescapably follow me to the point where the incoming executive director asked me to 'inspect' the efficiency of existing work practices. This request was in spite of the flyers I had created stating clearly and explicitly that I do not evaluate work practices. In this case, being viewed as an inspector in previous settings and contexts challenged my role as an academic researcher and complicated the creation of a different type of attachment by triggering tension between the clinic staff and myself.

This is, however, an example of only one of the roles I was given. But as described in the analysis, throughout my research I enacted multiple roles which created particular kinds of attachments, some of which where so strong that they complicated the creation of new or different types of attachments. At this stage, I was no longer operating in a fluid and flexible network and alternating between different roles and responsibilities, but rather found myself entangled in the web of past and present attachments. This leads me to argue that past connections from previous settings are taken into the present and shape the creation and configuration of new or different types of connections and disconnections which enable particular roles. I further argue that balancing the dynamics of roles and interventions is a process of transforming uncertainties, where existing roles can be understood through past connections. Thus, in

this network of roles and interventions, changing positions has consequences on not only present, but also future roles and interventions.

Although it may seem obvious that roles and identities are continuously shaped and reshaped by past connections, I argue that when 'out in the field site' researchers tend to accept roles offered by the practitioners all too quickly in a desperate attempt to help or give something back. I described in the previous chapter the many situations I faced where the desire to be 'useful' and give something back to the clinic was often stronger than the fear of disappointing them. For instance, when I proposed creating guidelines for using the EMR system, or when I accepted the role of 'super-user' in spite of my concern that the high expectations of my technical skills would result in disappointment. As an action researcher it is so easy to become over-focused on being 'useful' such that one risks overseeing the implications of particular interventions. Furthermore, researchers are often expected to respond quickly to intervention possibilities that, often times, emerge unexpectedly. An example of this can be seen when I was offered the possibility of writing minutes and chairing the EMR meetings. Thus, although the impact of particular roles may seem obvious retrospectively, it is not necessarily the case in the moment of choice. In addition, as has been pointed out by Fisher (2007), researchers are "often found to be unaware that they [make] decisions in the first place" (p. 158).

6.3.3.5 Missing Attachments and Implications on the Network

I have, thus far, described how roles and interventions can be viewed as network effects as they are produced and enacted through the network. I have also explained the ordering of attachments and socio-material arrangements that were established between myself and the field site, and that provided me with agency—the capacity to act in the role of an action researcher and do things that otherwise would have been difficult or simply impossible. However, what happens when the networks of relations are not in place or when they are not aligned and stable? I rely on a network of relations that enables me to act. In this section, I will illustrate how my agency and capability to act in a particular role is undermined when the network of relations and attachments are missing.

I described above how the role of a chair and minute taker came to exist. My ability to act in this role was made possible and produced by a specific ordering of socio-material arrangements. I was provided with an office in the clinic and the EMR committee accepted me as 'one of them,' as a relative insider who had the competence to understand the sociotechnical issues that were brought about by the EMR, and I was in a position to act upon these issues (e.g., through documentation and/or delegating and assigning tasks to other committee members). However, as explained earlier, agency is not a position one occupies once and for all; it is always mediated and depends upon practices and relations through which it is located (Moser, 2006). Thus, in situations

where the atmosphere was highly tense and there were conflicts among the EMR committee (e.g., personal accusations over whether technical issues were solved or not), writing minutes became immensely challenging because decisions about different tasks were not always clearly made. In such situations I was not so easily able to act/perform in the role of a chair and minute taker, and I was struggling with delegating tasks as my decisions and/or meeting minutes were disregarded or simply ignored. I explained in the previous chapter how in such situations, I was transformed into a relative outsider, into someone who was incapable of following the discussion or understanding the problems encountered. Different socio-material arrangements enable the enactment and configuration of particular subjects who have particular abilities, competencies, etc. (Gomart & Hennion, 1999). In situations where the atmosphere in the EMR meetings was tense, my agency was reconfigured into a position of someone who did not have the ability and competency to follow the complex discussions and decisions that were taking place.

As long as the network relations are in place and running smoothly—as in the case where I had the capability to act as a chair and minute taker—I could be seen as in command/control of the situation, and the network connections tend to move into the background and become invisible. However, when there are instances of partial disconnections or disruptions in the network (e.g., when there are internal conflicts among the committee members), my reliance on the network connections becomes more present and visible. I described above how in these situations, I was unable to act in the role of a chair and minute taker and lost the agency that enabled me to participate in decision making and delegate tasks to other committee members. Other examples of disruptions in the network and their impact on my roles can be found in my discussion above regarding the general roles of an action researcher. I unpacked in section 6.3.3.2 the different sociotechnical attachments that enabled me to enact the role of a researcher and to initiate different actions. However, when the network of relations was not in place, I struggled with limited access to the field site, to information and to people. I lost some of my capacity to act as a researcher and was unable to conduct interviews and observations of the health care practitioners.

Such situations of disruptions or complications in research projects are viewed within the IS action research literature as failure of the researcher or the research project. As mentioned earlier (section 2.4.2), Avison et al., (2001) provide a long list of recommendations for controlling action research, and claim that inability to negotiate and manage the research agenda has been directly linked to the failure of IS action research projects. Similarly, as mentioned in section 2.4.2.2, Rapoport (1970) links the inability to deal with problems in the field to the view of the researcher as ‘unskilled’ (p. 509), thus referring indirectly to factors as, for example, seniority or previous experiences. However, attributing the inability to negotiate the research agenda or deal with problems in the field to the so-called failure of an IS action research project or the researcher’s

skills is problematic, as it provides a rather simplistic view and undermines the complexities involved in negotiating and managing relationships in action research projects. I have described above how the ability of the action researcher to act is dependent upon complex attachments and socio-material arrangements. Thus, if the ability of the researcher to act is distributed across the network, the same can be said about the researcher's inability to act. Accordingly, 'failure' of action research is not simply located within the research project or the researcher, but is rather manifested in the other interactions and attachments within or related to the community partner which do not directly involve the researcher.

I argued in section 6.3.2 that uncertainties and fieldwork problems are not quite welcomed within the IS action research literature, and these are viewed as something that should be avoided or controlled, no doubt reflecting somewhat of a positivist orientation. However, rather than shying away from these uncertainties and problems, and viewing them as instances of failure, I will illustrate in the next section how these can be both transformed into presumably fruitful practical interventions and utilized as knowledge providers. That is, they can spark insights into practical ways of dealing with the uncertainties and insights into theoretical ways of understanding the reality (the social context).

6.4 Implications for AR: Reflection on Moments of Uncertainty

6.4.1 Reflexive Research

Reflexive methodology promotes careful reflections and interpretations of the researcher's impact on the findings, and an acknowledgement that the findings are co-constructed through the interaction between the researcher, the research process, and the empirical data (Alvesson & Skoldberg, 2000). As mentioned in section 1.4.2, recently, the importance of grounding action research practice in reflective inquiry has gained a growing recognition within traditional action research (Marshall & Mead, 2005), and it has been argued that before we can engage in change processes aimed at improvement of society, we need to be willing "to engage in transformation of consciousness and behaviour at personal and interpersonal levels" (Reason & Bradbury, 2006b, p. xxvi).

I argued previously (section 2.4.2.3) that within IS action research literature, there has been scant attention paid to work that scrutinizes critically *methodological* reflections on research practice (the *process* of conducting research), for instance, reflections on roles adopted or acquired and their implications on the research in general and the findings in particular. Although the importance of methodological reflections has been acknowledged by few IS scholars (Lau, 1997; McKay & Marshall, 2001), it is still unclear what methodological reflections actually entails. This section is, therefore, intended to extend the notion of reflection to include not only reflection on our actions,

but also reflection on our own assumptions, thoughts, and feelings as these can spark new insights and change our views of the world, enriching our intellectual journey. In other words, I argue for the importance of reflections not only for the research process in itself, but also for the self development of the researcher and her identity as an intellectual. I will illustrate how self-reflections can help improve not only practical actions in the field, but also help develop ourselves as better researchers, and extend and sharpen our views as academics and educators.

Thus far, I have illustrated some of the implications of such complex collaborations. This includes, for instance, the impact the different roles and positions may have on the informants, leading to withholding of information, and the impact the different roles and positions may have on the researcher who continually encounters trade-offs between the demands of research and that of practice. Given these challenges and the fact that the nature of collaboration established within action research is complex, constantly emerging and changing, and that the researcher's space for intervening in practice is shaped by vivid, multiple and conflicting roles and interventions which are also assemblages of past and present connections, then how can we deal with these complexities while acting with practices? One strategy I propose is to take moments of uncertainty and dilemmas from the field seriously, as these can be fruitful in sparking insights to *new things* and new *ways of seeing* things. As I will illustrate in the following section, such moments of uncertainty can be both transformed into presumably fruitful practical interventions (section 6.4.2) and utilized as knowledge providers, as a feature that adds something to the understanding of the research inquiry (Finken, 2005) (section 6.4.3). In other words, such moments of uncertainty can spark insights into practical ways of dealing with the uncertainties as well as insights into theoretical ways of understanding reality (the social context). Finally, I also propose using confessionals as a writing genre which can encourage the researcher to constantly challenge and examine their own research practices and assumptions. I will show in the next section how I continually challenged myself and I will illustrate the transformation my identity as a researcher has gone through. As mentioned previously, confessionals give rise to some of the most unflattering portraits of research practice as these constitute moments of uncertainty, confusion, and perplexity (Van Maanen, 1988). While I am fully aware of that, I hope to show how vulnerability can be a position from which one can learn and change practices.

6.4.2 Transforming Uncertainties into Presumably Fruitful Interventions

Engaging in reflective thinking helped me in searching for alternative suggestions and ways to deal with empirical uncertainties I encountered in the field. As explained in the previous chapter, when I accepted the invitation to attend the EMR meetings at the clinic, this choice was an effect of the socio-material attachments that were available for

me. At that time, I was unable to conduct interviews and observations of the practitioners' work practice and saw the EMR meetings as something that would enable me to *study practice* while *being away from practice*. Similarly, when I accepted the role of chair and minute taker for the EMR meetings, I had limited access to the field and limited space for interventions. I experienced uncertainties about my role, as I was unable to interview or observe the clinic staff. Being chair and minute taker gave me the opportunity to transform the dilemma into a presumably fruitful intervention. Accordingly, I gained indirect access to the clinic and to issues related to the use of the EMR while actively participating in the adaptation process of work practices and configurations of the EMR system. This alternative strategy for dealing with my experience of uncertainty emerged from the particular context that set the boundaries for the researcher's interventions. Becoming chair and minute taker was not simply a choice I took independently of the context. Rather, it was the result of careful reflections on the limited intervention possibilities emerging within the field. The reflections made me aware of the risk of losing access to the field and of the alternative strategy to maintain moderate access through active engagement in the EMR meetings.

Engaging in reflective thinking also helped me in searching for alternative suggestions for solving the perplexity I faced when noticing that my role as an observer conflicted with my role as a minute-taker. Although both roles imply the act of writing, the content and purpose are radically different. Writing minutes implied I was responsible for documenting final decisions and *outcomes*. However, as an observer I was rather interested in the *negotiation processes* that led to particular outcomes. Writing minutes simultaneously as observation notes became challenging as these are two different roles and responsibilities, and the type of information recorded is different. When my role and responsibilities as a researcher clashed with other roles and responsibilities, this involved continual trade-offs where I occasionally had to detach the research component in order to respond to practical issues in the field. Such trade-offs between the demands of research and that of practice has been pointed out by Jensen (2007a), who describes how when the requirements of research conflicted with the demands of practice, "the result was invariably to detach the research effort in order to respond to the immediate issues at hand" (p. 246). This was a situation I often faced, especially at the beginning of my fieldwork, where the clinic staff would approach me during my observation sessions (as I was fulfilling the role of an academic researcher) to ask if I could fix their computers, printers or scanner (to fulfill the role of a technical supporter). Alternating between fulfilling the role of an action researcher and that of a technical supporter, or rather an EMR-consultant, was a situation I had to learn to manage.

In such a complex collaboration, the researcher may have to chose one role over another (Mesman, 2007), or find a strategy to separate the multiple conflicting roles. As described previously I found myself having to act in multiple conflicting roles in the patient study. I was responsible for introducing the EMR to the patients, while at the

same time, interviewing them and answering their questions. My role as an academic researcher was now redefined to cover new domains, perhaps more related to business-consultancy (EMR-consultant). Consequently, I found myself in an ambiguous situation where I had to act in multiple roles, which at first did not seem to contradict each other. Since I was responsible for introducing the EMR to patients, I made sure in each interview to list all the various advantages that were expected to be achieved after the transition to an EMR. However, after the first couple of interviews I quickly found myself inevitably presenting the EMR in a positive light and indirectly advocating for it. Unintentionally, this may have silenced concerns some patients may have had regarding the EMR. The impact that my role had on patients became clear to me when I began reflecting critically on my role in the patient study, and tried to interpret the moments of uncertainty and suspicion I experienced when noticing that only a few patients had concerns regarding the EMR. Reflecting consciously and critically about my roles in the field was crucial as it influenced the kind of accounts informants shared with me, which in turn (eventually) influenced the reality I co-constructed and described in my research findings. In an attempt to carefully avoid influencing the patient's perspective, I deliberately decided to separate the conflicting roles and divide the interviews into two parts where I first asked the interviewees questions and listened to their concerns, and only then, answered their questions.[144]

In sum, throughout the research project, I developed various strategies for dealing with the different uncertainties and dilemmas I encountered in relation to my roles and interventions. These included, for instance, requesting meetings with executive directors and creating flyers to clarify the research purpose; requesting permission to attend team meetings in order to be reintroduced and ensure that all the staff were aware of my research activities; and sending minutes from the meetings with the executive directors to all staff to ensure transparency regarding the decisions made in these meetings. In sum, reflective thinking helped me recognize and acknowledge such problematic situations where the different roles conflicted or where my association/affiliation with certain groups caused staff to withhold information, and enabled me to find local and practical strategies to deal with these.

Continuous transformation of uncertainties requires increased awareness of the researcher's engagement in the field. Awareness of roles and interventions can help conceptualize the uncertainties experienced. This is important as researchers are not always aware of the decisions they make (Fisher, 2007). I, therefore, emphasize the need

[144] Applying this practice was not always feasible, as the interviews were conducted while patients were waiting for their appointment. This implies that the time frame available for each interview was unspecified and unpredictable and was in most cases interrupted by the physician who called the patient to the consultation room.

to render decisions and reflective processes more visible to the researchers who perform them. I found that reflective thinking and confessional writing help increase the visibility of essential issues and aspects related to the research inquiry, as these stimulate the rethinking of existing interventions and expands the range of alternative interventions. Furthermore, reflective thinking can spark new insights about mundane issues and increase awareness to aspects of the research that are otherwise invisible or simply taken for granted. I will illustrate in the next section how uncertainties can be used as knowledge providers (Finken, 2005).

6.4.3 Utilizing Uncertainties as Knowledge Providers

You may have noticed while reading the analysis in the previous chapter that I, at times, switch to passive voice, giving an impression of 'they-made-me-do-it,' when describing, for instance, how 'I was asked' to become a super-user, minute taker, etc. This should not be too surprising because as Van Maanen (1988) explains, "there is, in fact, something of a they-made-me-do-it character to many confessionals in which certain non-negotiable demands are made [on the fieldworker]…, the refusal of which would mean instant exile" (p. 78). You may have also noticed that some of the events are described in the analysis as if they 'just seemed to happen' out in the field site, for example, I was introduced as 'their researcher' or 'an inspector,' my nametag suddenly changed to 'EMR consultant,' etc. Although sometimes unexpected events do take place in the field, this is, of course, not always the case. As I explained in the previous section, my previous roles and interventions shaped my present space for interventions and led to particular roles (e.g., my previous activity of functioning as a 'super-user' and providing technical support in the clinic could have led to my new nametag: an 'EMR consultant'). Yet, looking retrospectively at my memos and reflecting critically upon my experiences and feelings from the field at that time, I can now see how along the research journey I lost some of my agency, the capacity that enabled me to act as an academic researcher, to conduct interviews and observations of the health care practitioners. For instance, I described in section 6.3.1.2 how when I wanted to move away from being an 'EMR consultant' and step back into the role of the academic researcher, I was struggling with reclaiming the epistemic authority which enabled me to determine methodological decisions related to my fieldwork. In my constant battle to prove the relevance and usefulness of my research interventions and project, I somewhat lost my voice; the voice of the academic researcher. As I encountered many of the uncertainties described above, I felt my capacity to tackle these issues was diminishing as I was increasingly unsure about what to do. I accepted the different roles and interventions I was offered, because on the one hand, I was happy to help the clinic staff with practical issues and on the other hand, I felt I did not have much choice. I feared that refusing to accept some tasks would result in my deportation from the field. As an RA in a larger project, I feared that objecting to some of the tasks I was asked to do would jeopardize the research collaboration that was

established prior to my participation in the project. There is a very fine balance between staying on the inside and on the outside, and indeed, several researchers express the fear of stepping into practices and going native (Davison et al., 2004) or, conversely the fear of staying on the outside and not being useful or relevant. Therefore, several researchers emphasize the importance of having the ability to engage and disengage from the field in order to foster self-reflection and distance (Mathiassen, 1998; Ross & Hannay, 1996; Zuiderent, 2002). They stress the need for reflection (Lynch, 2004), interpretation and criticism (Forsythe, 1999), and reflexivity (Boland & Lyytinen, 2004).

Preserving a careful epistemological view is, however, challenging when conducting research with practitioners. The close relationship that I established with the clinic (at least in the first part of the research engagement described in section 5.2) made it difficult for me to preserve conceptual distance from the practitioners and to avoid too much immersion (Forsythe, 1999). How could I avoid immersion when I was constantly drawn into situations where I was continuously reminded to mention the clinic as a source for the research initiatives (e.g., when I interviewed staff from other clinics in B.C.), or situations where I was presented as 'their researcher,' as one of their staff (e.g., in seminars and meetings with decision makers and the vendors)? I was not only struggling with preserving conceptual distance, but also physical distance. As mentioned in the previous chapter, I was kindly provided with an office at the clinic and this allowed me to create stronger bonds with the staff with whom I would have lunches and who gradually began sharing with me information about internal conflicts in the clinic. However, by being provided an office, a series of new challenges and social commitments were attributed to me. It required me to provide immediate technical support as I was on site for a longer period of time than I had initially anticipated. Furthermore, being provided with an office made it difficult for me to sit in the clinic and write memos about the *clinic staff*.

I have described earlier the multiple roles I have occupied and the different titles, responsibilities and interventions attached to them. At times, the roles I occupied were scripted in such a manner that I was asked to replace my learned jargon, for example, when communicating with patients and when writing EMR meeting minutes (where I was asked to discard nouns, use adjectives and write in bullet point format). I have also described how on multiple occasions the clinic presented the research activities that 'we'—myself the researcher and the community partner—had undertaken. Such incidents influenced me and a couple of times I found myself writing about the changes that 'we' had in 'our clinic.' I noticed I was so immersed in the field and was on the edge of going totally native. It made me think about whether it is possible to preserve a critical stance while being so closely involved in the project (Lynch, 2004; Mesman, 2007).

It is only through the process of reflective thinking and adopting a confessional writing style that I was able to dig deeper, trace and reconstruct my thoughts and feelings

as they were at that time. This has indeed been an immensely challenging process as I was forced to put aside what I already know and feel at the present time, in order to try to think about how things were back then when I was in the midst of all the uncertainties I encountered. It is only through reflections on these moments of uncertainty that I learned that past roles and interventions were shaping my present intervention space. Furthermore, it allowed me to become more aware of the different dynamics and social relations I had with the clinic at different events and in different contexts. For instance, I became aware of the way the clinic used me as an ally when they introduced me as 'their researcher'—as someone who has 'scientific' or 'expert' knowledge—to gain epistemic authority and a strong credible position in seminars and meetings with decisions makers and the vendor. Through the process of reflections, I also learned that particular roles associated me with particular groups, and in some situations influenced data collection. As explained earlier, being perceived as 'the community partner's researcher' when interviewing other clinics about their EMR experiences led some informants to selectively share successful stories; or for example, being perceived as an 'EMR-consultant' led some patients to associate me with someone who is advocating for the EMR system.

In retrospect, I can now see how hard the incoming executive director was struggling with being accepted (and respected) in the clinic. I could see signs of her struggle but I did not fully comprehend how serious it was. The struggle was something she confessed in the last meeting I had with her. Reflecting retrospectively upon all the challenges the incoming director faced taught me about the strong social bond cultivated amongst the clinic staff who had been working there for many years. It also made me aware of the very different work-cultures that exist across different healthcare sectors. In my last interview, the incoming executive director told me about the gaps she sees between her views, which were based on her previous work experience as a nurse in a hospital, and the views of the staff at the clinic. In sum, the incoming director was not only new to the team but she also came from a different healthcare sector wanting to change existing work practices and policies in the clinic. Retrospectively, I can now better understand the context surrounding and leading up to the incoming director's comment during the medical meeting about how I have been 'keeping an eye' on the staff for the past few years. It seems to me that the incoming executive director, whose office is physically separated from the staff, tried to use me indirectly to monitor their practices. Back then, I was frustrated with the way I was introduced by the director and did not know how to explain the situation. I can now, however, see a link between several moments of uncertainty I faced. The link is to the initial wish the incoming director had for me to monitor or evaluate the staff's work practices. Although I had explained to her several times that I cannot and do not want to be in the position of evaluating work practices, I kept being asked by other staff whether I was evaluating their practices. I can now better understand why what I said got lost in translation and was misunderstood, and

why some staff thought I was evaluating their work practice. This was a result of the conflicting interests of the incoming and the outgoing executive directors, the conflicting interest between the incoming executive director and the staff, and the differences between the interests of the incoming director and my own interests. In sum, I have tried to illustrate how uncertainties can be used as providers of knowledge, by for instance, shedding light into new things and new ways of seeing things.

The research collaboration described above cannot, however, so easily fit into a normative, dichotomous and simplistic view. I cannot describe the relationship with the clinic as simply 'good' or 'bad,' 'useful' or 'useless,' or that either party co-opted the other. As should be clear by now, the nature of a relationship in action research is rather complex and dynamic and cannot be explained using 'either-or' categories. I have described in section 6.3.2 the norms that are enacted in IS action research, and I will now revisit these norms while discussing them in relation to action research in general.

6.5 Action Research Norms - Revisited

In this section, I will go back to traditional action research as presented in section 2.4.1, and will illustrate how it portrays itself in a very ostentatious manner overstating its purpose. I argue that this is an unnecessary and misleadingly idealistic portrayal. Instead of focusing on hostile attacks toward traditional social research, action researchers should rather acknowledge some of the challenges that are related to action research and accommodate critical debates that problematize central notions such as action, participation, usefulness, researcher's intrusiveness, etc., notions which have rarely been questioned in the action research literature.

As mentioned in Chapter 2 (section 2.4.1), action research has received much criticism from traditional social researchers (e.g., positivists and postpositivists) with regards to its quality and validity. Reading the literature about traditional action research, it is my impression that in an attempt to address these critiques, some action researchers end up portraying action research in a very grandiose and ostentatious manner, claiming that it is 'better' than traditional social research. For example, consider the following claim: "Indeed we might respond to the disdainful attitude of mainstream social scientists to our work that action research practices have changed the world in far more positive ways than has traditional social science" (Reason & Bradbury, 2006b, p. xxii). Another similar claim:

> To be sure, we can argue that [action research] leads to 'better' research because the practical and theoretical outcomes of the research process are grounded in the perspective and interests of those immediately concerned, and not filtered through an outside researcher's preconceptions and interests. (Reason & Bradbury, 2006a, p. 4)

While I agree with the fact that one of the strengths of action research is its grounding of theories in empirical material and people's own perspectives, I feel the claim that this leads to 'better' research is somehow unnecessary and in fact misleading. Claiming that action research leads to better outcomes simply because these are grounded in the perspective of those being studied (or those directly affected by the change) indirectly renders other perspectives irrelevant. While it is important to include the perspectives and interests of those immediately concerned, it is also important to balance these views with those of other stakeholders, to consult literature and other textual discourses about the subject, etc. Finally, I argue that the statement above is based on the false assumption that the research outcomes that are grounded in the perspective of those immediately concerned are not filtered through the researcher's presumptions. However, as explained in the previous section, the assumption that it is possible to do research in an unbiased and neutral manner has been strongly questioned by postmodernists. Therefore, researchers in the postmodern era acknowledge that they are no longer faceless and invisible (Fontana & Frey, 2003, p. 87), and that they can no longer follow the naïve view of being a 'fly on the wall' or claim to objectively talk 'in the name of' the subject. Instead, there is an acknowledgement of the fact that the researcher is a dynamic participant actively engaged in the construction of the field site and the knowledge generated.

While some scholars claim that the primary purpose of action research is to produce theories that are grounded in empirical knowledge, others seem to be tremendously ambitious, claiming that:

> the primary purpose of action research is not to produce academic theories based on action; nor is it to produce theories about action; nor is it to produce theoretical or empirical knowledge that can be applied in action; it is to *liberate the human body* , *mind* and *spirit* [emphasis added] in the search for a better, freer world. (Reason & Bradbury, 2006a, p. 2)

Consider this quote which echoes a similarly pretentious tone as the one above:

> while action research practitioners suggest slightly different emphasis in their work—'*quest for life*,' '*make the world better*,' '*loving*,' '*freer*'—there is broad agreement that the purpose of human inquiry is the *flourishing of life* [emphasis added], the life of human persons, of human communities, and increasingly of the more-than-human world of which we are a part. (Reason & Bradbury, 2006a, p. 11)

The above quotes illustrate how the purpose of action research is dramatically overstated with the claim that it is supposed to 'liberate the human body, mind and spirit.' Furthermore, the action researcher is portrayed in a heroic manner, as someone whose 'quest for life' is to 'search for a better and freer world' and to 'liberate ways of knowing' by working with people and addressing concerns in their everyday life. Action

research is now viewed not only as a tool for change (as Lewin originally thought of it (described in section 2.4.1.2)), but also a tool that can 'help us build a better, freer society' (Reason & Bradbury, 2006a, p. 1), a more just and sustainable world. As mentioned before, action research emerged as a response to traditional research practices that were perceived as domesticating people to research and policy agendas imposed on local groups. But what happens when pre-defined policy agendas are imposed on researchers and what are the implications of this on our research practice? Such questions should be raised both in traditional action research and in IS action research which often tend to portray the relationship between the researcher and the practitioners in an unproblematized manner.

Therefore, while STS action researchers do acknowledge the strength of action research as a method for bringing about social change, improving practices, etc., they also warn us that it can be used as a tool for normalizing or domesticating people and policy agendas often imposed by managers or institutions far removed from the local concerns of people. For example, although the participation of groups may lead to the belief that they have *real* influence on *actual* matters, it may also be used to silence marginalized groups. In other words, participation provides the *potential* to influence, but it does not necessarily lead to or guarantee *actual* influence. Latour (1986) reminds us that there is a difference between power '*in potentia*' and power '*in situ*,' and the same can be said about the power to influence through participation. Critical debates within the STS literature about action research acknowledge that in the pursuit to bring about change, the researcher may have good intentions but also limited control (2007a). In sum, I ask us to be cautious and critical regarding notions such as action and participation, and avoid viewing these as things that automatically lead to desired change or improvement. When discussing the participation of community partners or the usefulness of research, it is important to keep in mind critical questions about whose interest we are serving. And who will our research be useful for? After all, action research may end up serving the political interests of those already in power, the interest of those they initially criticized (e.g., policy makers, management, IT vendors);[145] or the research may end up having no impact on outcomes at all.

[145] As discussed in section 2.4.1.2, action research emerged as a response to the orthodoxy of some traditional research which serves the political interests of the powerful and reproduces social structures. But at the same time, as can be seen in Jensen's (2007a) case, action research may end up supporting political agendas which they initially criticized.

6.6 Losing my Religion[146]

Reading some of the quotes provided at the outset of the previous section (6.5) on how traditional action research portrays itself in the literature, one gets the impression that researchers *can* bring about social change, *if only they care* enough about what they are doing. It is almost as if those researchers who do not, or are not able to, bring about change or improvement, are 'disinterested' in the everyday experience of ordinary people. These are false assumptions and beliefs which I suspect I, as an action researcher, used to subscribe to. I have learned, though, that the quest for change is far more complex than originally portrayed in much of the literature about action research. When I began the research collaboration, I had very high hopes and aims about the sociotechnical change I thought I could contribute to and that would be desirable to our community partner. But I learned that I was not exactly the hero portrayed in the quotes above; the action researcher whose 'quest for life' is to 'search for a better and freer world' by working with people and addressing concerns of their everyday lives.

I have described in the previous chapter the various attempts I made to bring about changes and illustrated how, at times, my interventions led (directly or indirectly) to subtle and moderate changes (e.g., when trouble-shooting software, creating a script for scanning old paper charts and prompting negotiations and suggestions for changes in work practices); however, other times, my interventions were either simply rendered invisible or had no (significant direct) impact (e.g., when creating the patient education material which, to the best of my knowledge, was never given to patients[147]). Furthermore, in my attempt to demonstrate usefulness and practical value to the clinic, I responded to their requests, interviewed patients from their clinic and health care practitioners from other clinics. I even created technical reports summarizing these studies, and created posters and patient education material, as well as guidelines for using the EMR system. I also did not refuse the invitation to become a super-user, in spite of my concern that they would be disappointed by my technical skills or that this role would conflict with my future role as an observer.

I described in chapters 5-6 the various methodological challenges I encountered and my struggle with fulfilling the "methodological gold standards"—the criteria and norms found within IS action research literature. I began reflecting critically upon these

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[146] This title is inspired by one of the songs of R.E.M (an American rock band), released from their 1991 album, *Out of Time*.

[147] This may have occurred for many reasons, one of which is that these handouts were submitted to the clinic at the same period as the managerial changes (replacement of the executive director) were taking place. It is interesting to note, however, that I received a request from a clinic in the US who saw the patient educational material on the project's website and who wanted to use it to alert and inform their patients about the transition to an EMR.

norms and found that these mostly concern normative views about what is formally considered as 'acceptable' IS action research, followed by a long list of recommendations about what the researcher *should* or *should not* do. These reflections were interesting enough in terms of grasping the 'core values' of action research in the IS field. However, these were rather limited and less than fruitful as they left little space for understanding and managing the empirical uncertainties and dilemmas I experienced in the field.

My reflections gradually evolved, drifting away from focusing on the predefined normative criteria and principles found in much of the IS action research literature. Instead, I began exploring the literature on action-oriented research found within the STS field as it focuses on unpacking empirical complexities faced in such endeavors. At this stage, I left the norms and 'core values'—'the religion'—of action research, and instead of trying to fit my interventions into particular value schemes of what is formally considered to be 'right' from 'wrong,' I began questioning the implicit assumptions found in much of the action research literature. It was during the process of self-reflection that I lost my religion. I use the metaphor of losing religion to refer to the process whereby I gradually drifted away from thinking about 'how' action research is *normatively supposed* to be conducted to thinking about how action research is *actually performed* in practice. Hence, religion can be understood as referring to pre-defined set of criteria and norms that one must subscribe to if one wishes to conduct action research.

However, by *losing my religion*, I do not claim to have lost completely my belief in action research. Rather, I argue that action research is a continuously changing phenomenon, which must be investigated carefully in all its complexities instead of being 'hidden' or masked behind sets of pre-defined normative principles, criteria, and rules that one must subscribe to. In other words, it is not my intention to claim that action research is too complex, and that we should go back to the 'academic empire' that is protected from real life concerns. Remaining truthful to the aim to change the social world, we should view ourselves as *part* of the world rather than distancing ourselves from it. So perhaps if we acknowledge the fact that such action research implies intervening and affecting the research, we can move the discussion a step further toward a more detailed and reflective exploration of such engagement and of local and practical strategies to deal with such complex collaborations.

By not submitting to a particular religion of theory and method, I expanded the space for reflections and articulations about what I *actually do* when conducting action research. I proposed to take moments of uncertainty and dilemmas from the field seriously, as these can be fruitful in sparking insights into new things, and new ways of seeing things. Furthermore, I illustrated how such moments of uncertainty can be both transformed into presumably fruitful practical interventions (section 6.4.2) and utilized as knowledge providers (section 6.4.3). That is, they can spark insights into practical ways

of dealing with the uncertainties and insights into theoretical approaches to understanding the social context.

6.7 Summary and Concluding Remarks

I have changed during the three and a half years of my action research project. My intention with this chapter was to document and share some of the transformations I have gone through to shed light on the insights I have acquired as these have both practical and theoretical implications for action research. I began this chapter by describing the beginning of my IS action research journey (section 6.2). I then drew upon the various methodological challenges discussed in the STS literature about action-oriented research (section 2.4.3), and provided a more nuanced articulation of the challenges by analyzing these in relation to changes in the dynamic relationship between researchers and practitioners. In particular, I discussed the transition in types of engagement, from doing research *with* to doing research *about* practitioners, and the impact this has on the researcher's roles, authority and distance to reflect, as well as practitioner's commitment, involvement and access to the field (section 6.3). I argued that the nature of action research collaboration cannot be understood simply as a dichotomous relationship. Rather, in practice, the research collaboration is more fluid and dynamic, and the researcher may alternate between different types of engagements (e.g., 'for,' 'with,' 'about,' 'by' or 'against'). I investigated the norms that are enacted within IS action research which also have repercussions for action research in general, and I argued that these norms are often based on ideal and unproblematized relations between the researcher and the community partner (section 6.3.2).

Taking into consideration the early historical roots of action research (section 2.4.1.2) where it has been viewed as a tool for change, while addressing my critique of the norms enacted within IS action research (sections 2.4.2-2.4.3, 6.2.1) and the dichotomous views found within action research literature (section 6.2.1); and given the empirical complexities described in chapters 5-6— how then can we conceptualize the complex nature of action research collaborations? I proposed conceptualizing action research as a network with the different connections that are established and reconfigured during the course of the research (section 6.3.3). Applying a network model enables us to see how interventions become part of a larger network where future interventions and roles are interpreted through past connections. A network view is, therefore, fruitful for understanding the researcher's space for interventions and for taking into account the continual transition in types of engagements as it may have tremendous consequences on the research project and the challenges that are faced.

Given that the nature of collaboration established within action research is complex, constantly emerging and changing, and that the researcher's space for interventions is shaped by multiple and conflicting roles and interventions—how then can

we deal with these complexities while acting with practices? One strategy I proposed is to take moments of uncertainty and dilemmas from the field seriously, as these can be fruitful in sparking insights into new things, and new ways of seeing things. I illustrated in section 6.4 how such moments of uncertainty can be both transformed into presumably fruitful practical interventions (section 6.4.2) and utilized as knowledge providers (section 6.4.3). Finally, I would like to modify the 'turn to action' (explained in section 1.1.3)—whereby a growing number of researchers are engaged in various types of participatory and action-oriented research—into a 'turn to reflexive action.' Thus, I call for the need for greater critical discussions about reflexive action research; a need which is become increasingly more pressing in the current research climate where increasingly more funds are going to such types of research.

CHAPTER 7: CONCLUSION

This dissertation is based on an action research project about the implementation of electronic medical records (EMRs) in the primary healthcare sector in B.C. It has a double focus: on the one hand it aims to understand technologically mediated work practices by studying the implementation of EMRs over nealy three years. On the other hand it aims to understand the role that the action researcher may have in bringing about such changes.

The work presented here originated from theoretical and methodological issues and phenomena I encountered throughout my research project and which became the focal point of this dissertation. In the process of studying the transition process to an EMR system in a general practitioner setting, I gradually began encountering various empirical complexities in the field. This sparked an immense interest in me and led to the development of critical reflections about my three and a half years of research experience. This dissertation thus comprises two components, with two distinct empirical foci, research questions, theoretical platforms, and contributions. The first component focuses on the implementations of EMRs, and the second component focuses on the action research method used for studying the EMRs. In the first component I drew upon first-order inquiry (Pedretti, 1996) focusing on reflections related to the object of study (EMRs), and in the second component I drew upon second-order inquiry (Pedretti, 1996) focusing on reflections related to the methods used for studying the object (action research). While the first component focuses on the *findings* or *end-product* of the research about EMRs, the second component focuses on the research *process*, meaning the work that went into constructing the empirical research project. Thus, in the first component I analyzed the experiences of health practitioners, and in the second component I analyzed my own experiences from this research collaboration. For the EMR component I used action research as a method, and for the action research component I drew upon reflexive research methodologies, first-person action research and confessionals. I will now briefly summarize each component by reflecting upon the relevant chapters.

The first component set out to investigate the transition to an EMR system in a general practitioner setting, with the aim to provide a deeper understanding of the sociotechnical change processes that occurred during the transition to an EMR. I, therefore, followed the EMR as it was being adopted and used by different health care practitioners, designed and continuously modified by the vendor, viewed by the patients, and advocated for by the provincial health authority. I reviewed the existing literature

about healthcare IT and medical practice found within different fields, while focusing primarily on three main fields: namely Computer-Supported Cooperative Work (CSCW), Information Systems (IS), and Science and Technology Studies (STS). Drawing upon technology studies from these fields helped me explore the relations between social and technical phenomena, and guided my analysis of the way in which social and technical phenomena are linked to each other and affect one another. I explored the insights that are offered by the IS and CSCW literature on EMRs, and I illustrated how these fields offer a wide range of concepts useful for understanding the complexities of organizations and work practices (Strauss et al., 1985; Suchman, 1983; Suchman, 1987). I also identified problematic issues and questions which the literature fails to address adequately. I explained how IS studies fail to take into account the role of the actual technological artefact, as this is often black-boxed or absent from the analysis. I drew upon a constructivist approach as this can help questioning and unpacking the object of study and the assumptions underlying its existence. I offered an illustration of the kind of insights that a constructivist approach can bring to the study of technology by surveying the EMR literature found within the STS field. I also explained how CSCW and IS researchers tend to separate technical from organizational factors and adopt the view that a successful technology implementation depends on fitting the EMR system to the users' needs and the existing medical work. I argued that such a view is problematic as it fails to take into account the fact that technology and organization are interconnected and transform one another in unpredictable ways.

I, therefore, draw upon STS constructivist insights as these can be fruitful in moving away from the exclusive focus on the social, and looking at how the social and the technical are simultaneously co-constructing each other. Adopting a constructivist stance, implies among other things, the view that in order to understand the consequences of technological change, one must take into account the social, political and cultural factors through which the development and use of technology takes place. I used the tools of Actor-Network Theory (ANT) to study the impact of technology without assuming that either the technological or the social determines final outcomes. Instead, we view the technical and the social as being co-constructed. Following ANT, technology is not viewed as passive, a resource or constraint that is activated and controlled by humans. Rather, technological artifacts become activated as non-human actors who have the ability to act and produce effects (Latour, 2005). The refusal to make an a priori distinction between social and technical elements implies a move away from the idea of fitting technologies to work practices (or vice versa); an idea which as I mentioned earlier exists within some of the CSCW literature (Vikkelsø, 2005). Within the STS constructivist tradition, work practices and technologies are viewed as interconnected and irreducible entities that transform one another in unpredictable ways (Aanestad, 2003; Berg, 1999c; Berg et al., 2003; Jones, 2003; Svenningsen, 2002).

The aim of the EMR study was to provide detailed and in-depth analysis of the sociotechnical changes that emerged during the EMR adaptation process. I formulated two research questions which contained two elements. First, I wanted to know:

> *How does the technology transform the medical practice, and how do the health care practitioners configure and adapt the technology to the existing situated work practices?*

I began my analysis of the EMR component by unpacking the definition of the EMR, and showing how even though there is no standardized agreement as to what an EMR system actually means, the implementation of these technologies is framed in various media and policy discourses in such a way that it gives the impression that there is a universal agreement about the *need* for electronic records. I unpacked further the various visions underlying the implementation of an EMR and showed how these changes depend upon different relevant actors (i.e., the health authority, the vendor, health care practitioners and patients). I also showed how similar to the discourse in media and policy documents, the transition to electronic records in the clinic has been enveloped by a technologically deterministic and instrumental frame. Finally, I unpacked the actual EMR system and looked at the components constituting it and how it is interpreted and used in practice. I explained how such an approach of starting the analysis by unpacking the object of study, questioning it and looking at how it acts/performs in practice is grounded within the STS constructivist ontology that underlies the work in this dissertation. I also explained how unpacking the technology being studied can help avoid taking for granted the technological artefact and its use (Hanseth et al., 2004; Orlikowski & Iacono, 2001), as has been the case for some studies of EMR within the IS field.

I draw upon theoretical concepts from CSCW and IS to analyze how the health care practitioners configure and adapt the technology to their situated work practices. I identified and analyzed the different technology-in-use practices that were developed, and distinguished between initial and emergent technology-in-use practices. These technology-in-use practices were supported by the EMR meetings, which I identified as one of the important factors promoting the adaptation process. Within the CSCW and IS fields we can find research that argues for the importance of project meetings and the involvement of all actors affected by the changes taking place (Berg, 2001; Berg, 1997). I expanded the notion of project meetings by providing a conceptualization of the essential aspects of these meetings. This includes the importance of supporting the emergence of technology-in-use practices and allowing reflection on technology use in practice. I have conceptualized the meetings as continuous reflection-on-practice activities through which technology-in-use practices were constructed. Reflection-on-action (Schön, 1983) and practice activities are internally initiated and involve critical reflections by the

participants, who continuously evaluate and question work practices in relation to technology.

Based on the analysis of the empirical material, I found that reflection-on-practice activities were essential for constructing and developing emergent technology-in-use practices. Moreover, I argued that reflection-on-practice activities can be characterized by ongoing, frequent encounters of negotiations of work practices and technology use, providing internal actors a space for systematic and iterative evaluations of suggested changes. I further argued that it is essential that the reflection-on-practice activities are based upon a contextualized understanding of the overall changes and redistribution of tasks. Finally, I found that making centralized decisions about technology-in-use practices at the committee meetings, as well as having mechanism for communicating new changes and closely following the actual integration of these changes into the daily work, strongly supports the adaptation process. In sum, the above contributions can be located within the CSCW and IS fields, as they are dedicated to understanding the collaborative work and identifying factors that support better design and implementation of health care technologies.

I then drew upon theoretical insights from STS (in particular ANT) to analyze how the technology transforms the medical practice. I adopted a sociotechnical perspective (Berg et al., 2003) where technology is viewed as intermeshed with the medical practice, and I acknowledged that the EMR brings about the emergence of new changes which makes it harder to single out factors for success or failure (Berg, 2001; Jones, 2003). I illustrated how some of these changes reflected realizations of some of the formulated and shared visions behind the dream of implementing an EMR, for instance, moving toward a 'paper less clinic' and standardizing charting practices. Other changes, however, reflected realization of standards and formal protocols, or improvements of existing practices, for example, ensuring good follow-up mechanisms, standardizing charting and billing practices as well as enhancing clinical decision making processes.

I also illustrated how in some situations the EMR brought about unexpected consequences. One example is the SOAP template which constrained the charting practice, increased speed and intensity of the clinical decision making process, and discouraged GPs from conducting in-depth analysis. In other situations, the EMR brought along new practices and thereby extended the GPs' medical practice by shedding light on patterns and connections that were previously invisible or simply impossible. Graphs that enable visual representation of patient's progress over time, and 'practice searches' and rules that provide an overview of a whole patient population illustrate this feature nicely.

Similar to other CSCW research on EMRs I have illustrated how the EMR brought about new charting practices (Berg, 2001; Gregory, 2000), changes in representation of workload (Lundberg & Tellioglu, 1999), division of labor and distribution of work (May et al., 2001; Stanberry, 2000; Vikkelsø, 2005). In line with

EMR studies within CSCW and IS, I have also illustrated how at times, the EMR supports collaborative work and other times, it constrains the work. However, findings from my research move a step further and identify essential differences between two types of sociotechnical changes and their implications. This includes initial changes that occurred in the beginning of the implementation process which had straightforward, direct, and immediate effects; and the emergent changes which appeared after using the system for nearly three years, with their implications which I characterize as being broader and having a deeper level of impact in the long term. Identifying such emergent changes facilitate a more nuanced description of the way in which the EMR has come to play an increasingly central role in the delivery and organization of care. Thus, the EMR does more than simply support coordination or increase/decrease workload; it modifies the clinical decision making process (by accelerating its speed and intensity, and limiting it to one chief complaint per patient) and changes the way GPs think (by demanding different reflection and cognitive skills, and enforcing thinking in a linear manner through the SOAP template).

Through the lens of ANT, I showed how the EMR is neither a tool that simply enables/constrains the medical practice, nor does it passively re/present GPs' thoughts and practices. Rather, it is an active actor that is participating in creating new practices and gradually transforming the medical profession. This analysis can be positioned among the studies within the research field of IT in healthcare that draw upon different insights from ANT (Bruni, 2005; Danholt, 2008; Grisot, 2008; Jensen & Winthereik, 2002; Vikkelsø, 2005). Finally, by bringing analytical and theoretical insights from the field of STS into the field of CSCW and IS, the study hopes to contribute to the understanding and conceptualization of IT implementation in healthcare. This study was, therefore, aimed at providing a detailed and in-depth understanding of the sociotechnical changes occasioned by the introduction of new computer systems in health care settings and its impact on the medical profession.

The second component in this dissertation shifted the focus away from the study of *technology* (EMR) toward the *method* (action research) used for studying and participating in the implementation of these technologies. I wanted to know:

> *What are the methodological complexities that are encountered when conducting action research and what are their implications? How can we deal with these complexities in practice? And how can we conceptualize the complex nature of action research collaborations and the researcher's roles?*

To answer these research questions, I began my work by reviewing the literature about traditional action research in general, and action research as it is perceived and

practiced within two IT related disciplines, namely the IS field and the STS field. The IS literature about action research offers a wide range of guidelines for participating and facilitating sociotechnical changes aimed at improving organizations. I argued that there has been a great emphasis within IS action research literature on *practical* reflections on the researcher's *actions*, yet scant attention has been paid to work that scrutinizes critically *methodological* reflections on the *process* of conducting action research. Furthermore, the guidelines provided in IS action research literature contain long lists of fairly strict and static criteria and norms the action researcher is expected to subscribe to, leaving little space for understanding and discussing ways of dealings with deviations from the norm. I argued that these guidelines are built upon a rigid, objective, standardized platform which is similar to the one that traditional action research was originally opposed to. I also argued that these guidelines and norms fail to critically address ways for managing uncertainties and dilemmas encountered in the field. These problematic aspects of IS action research led me to propose adopting a constructivist STS approach as it provides more critical insights into action research, questioning taken-for-granted notions and providing greater nurturing space for methodological reflections of empirical uncertainties.

Adopting a constructivist stance encouraged me to reflect upon the way in which the methodology shaped the findings. Furthermore, a constructivist epistemology shaped the way I situated my reflexive voice, and the way I engaged with the field site and the research subjects. I acknowledge that I am not passively 'mirroring' the social reality I observe; rather, in the process of describing the reality I am also co-constructing it. Inspired by early constructivist ANT work (Latour, 1987) of unpacking science and looking at how facts were constructed, I developed an approach for studying action research 'in the making,' which refers to the idea of unpacking action research and looking at how findings are constructed. I also draw inspiration from recent work within ANT, which focuses on explorations of multiplicity, performativity of enactment, and configuration of the subject (Law, 2004a; Law & Mol, 2002; Law & Singleton, 2003; Mol & Law, 1994; Moser, 2006). I use these insights to analyze and discuss the ordering and configuration of the action researcher (myself) in a diversity of contexts and settings, as well as the sociomaterial connections and arrangements that enabled the enactment and configuration of particular subjects.

In the description and analysis of the action research, I focused on the nature of collaboration forged with the community partner and the impact this had on my research in general and my role as a researcher in particular. Following a self-reflective and critical epistemological stance, I shed light on various methodological issues and challenges faced when working with a community partner and conducting this type of research. These issues include the multiple roles and positions I enacted in the different contexts, how these impacted my space for interventions, and the way I was perceived by the informants and the type of information they shared with me. I also unpacked the

various roles I enacted, and I described some of the challenges I faced when enacting multiple *different roles* in the *same context*, and when enacting the *same role* across *different contexts*.

I revisited the IS action research literature to discuss my research journey. I here argued that the nature of research collaborations within IS action research is portrayed in a dichotomized manner, and I explained the problematic aspects with such frameworks where research projects are expected to fit into 'either-or' categories. To counter this tendency I drew upon the various methodological challenges discussed in the STS literature about action-oriented research, and provided a more nuanced articulation of these challenges by analyzing them in relation to changes in the dynamic relationship between researchers and practitioners. In particular I discussed the transition in types of engagement, from doing research *with* to doing research *about* practitioners, and the impact this has on the researcher's roles, authority and distance for reflection, as well as the practitioner's commitment, involvement and access to the field. I argued that the nature of action research collaborations cannot be understood simply as a dichotomous relationship. Rather, in practice, the research collaboration is more fluid and dynamic, and the researcher may alternate between different types of engagements (e.g., 'for,' 'with,' 'about,' 'by' or 'against'). I investigated the norms that are enacted within IS action research which also have repercussions for action research in general, and I argued that these norms are often based on ideal and unproblematized relations between the researcher and the community partner.

Taking into consideration the early historical roots of action research where it has been viewed as a tool for change, while addressing my critique of the norms enacted within IS action research and the dichotomous views found within action research literature; and given the empirical complexities I described, I asked: how can we conceptualize the complex nature of action research collaborations? I proposed conceptualizing action research as a network with the different connections that are established and reconfigured during the course of the research. Applying a network model enables us to see how interventions become part of a larger network where future interventions and roles are interpreted through past connections. A network model is, therefore, fruitful for understanding the researcher's space for interventions and for taking into account the continual transition in types of engagements as it may have tremendous consequences for the research project and the challenges that are faced.

Given that the nature of collaboration established within action research is complex, constantly emerging and changing, and that the researcher's space for interventions is shaped by multiple and conflicting roles and interventions—how then can we deal with these complexities while intervening in practice? One strategy I proposed is to take moments of uncertainty and dilemmas from the field seriously, as these can be fruitful in sparking insights into new things, and new ways of seeing things. I illustrated

how such moments of uncertainty can be both transformed into presumably fruitful practical interventions and utilized as knowledge providers. Finally, I proposed modifying the 'turn to action'—whereby a growing number of researchers are engaged in various types of participatory and action-oriented research—into a 'turn to reflexive action.' In other words, I called for the need for greater critical discussions about reflexive action research; a need which is becoming increasingly pressing in the current research climate where more funds are going to such types of research.

Drawing upon action research as a framework for studying EMRs had implications on the degree of access I was provided in the field and the kind of findings regarding EMR adaptations. There is a dialectic relationship between the object of study (the EMR) and the researcher (the field site) whereby they transform mutually. The two components upon which this dissertation is based: the EMR study and the methodological reflections of action research can, therefore, be seen to reflect sets of mutually transforming practices.

A similar approach was adopted in both components, reflecting upon constructivist ontological and epistemological assumptions underlying this dissertation. I began both components by unpacking the object of study (the EMR and the action research), and looking at the visions and discourses surrounding these. I questioned the taken-for-granted notions and assumptions about EMRs which are viewed as a vehicle for saving money and lives; and the taken-for-grant notions within action research (e.g., usefulness, relevance, participation). I also questioned the unrealistic promises and views about EMRs and argued that rather than constructing grand visions, it may be advisable to construct concrete yet flexible goals which are achievable in the foreseeable future (e.g., having paper less organizations). Similarly, I questioned the unrealistic promises and views about action research and argued that we should rather focus on subtle and moderate interventions to which the researcher could contribute.

I criticize the conceptual fit found within some of the EMR literature from CSCW and IS, as it can lead to the assumption that if only we had proper knowledge of the situated work practices, we can design better technologies. A similar conceptual fit is found within IS action research, whereby there is an assumption that if the researcher follows the norms and criteria properly, this will lead to a successful action research project. The problem with the notion of 'fit,' is that it follows a static and simplistic view of the dynamics involved between the different actors, for example, between the community partner/field site and the researcher, and between the health care practitioners and the EMR system. Such views leave little space for articulating complexities, dilemmas and uncertainties. They are also often built on the false assumptions that the different actors are static, independent, objective, etc. As I illustrate throughout the dissertation, each of the actors (e.g., the EMR, the health care practitioners, the action research project, the researcher) are co-transformed through a dialectic relationship.

Actors are conditioned within specific networks; that is, they depend on the sociomaterial arrangements within the networks in order to be able to act and produce effects. Furthermore, actors depend not only on the relationships within the network, but also on the relationships between networks. Thus, the dependence here is not only between the parts, but also within each part. Therefore, actors are to some degree unpredictable and unstable, and it is misleading to view them as static and independent.

Questioning taken-for-granted notions and moving away from the notion of 'fit' is intended to encourage alternative conceptualizations of the actors and networks, whereby the researcher should avoid overemphasizing one actor over another (e.g., in the EMR case, this implies a move away from overemphasizing the social or the technical). Rather, the focus is on the *associations* between the heterogeneous actors, looking at what happens when the different actors interact and what enables them to perform in particular ways. Following a performative approach, the researcher is encouraged to look at how the object of study (EMR or action research) enacts different practices in various settings. I illustrated in the EMR component how the sociotechnical changes did not emerge from pre-defined standards or formal protocols, but were based on the situated work practices. Similarly, I illustrated in the action research component how the researcher's interventions emerged from the context existing at different points in time in the network. The various complexities, challenges, dilemmas and uncertainties discussed throughout the dissertation needs to be addressed when researching EMRs and drawing upon action research, as these are paramount issues which have implications on the research project.

The EMR study presented in this dissertation followed the adaptation process of an EMR over a period of nearly three years. Having the opportunity to conduct empirical research over an extended period of time allowed me to observe different kinds of sociotechnical changes occasioned by the introduction of the EMR. It would be interesting to conduct further research on EMRs in empirical settings where these technologies have been used for a longer period of time, as such settings may enable the exploration of the various ways in which the EMRs are gradually transforming the medical profession. The EMR study focused primarily on the health care practitioners' point of view. A potential direction for further research may be to explore the patients' views on the EMR, and further investigating the ways in which the EMR is transforming the relationship between the general practitioners and the patients. Finally, the research presented was based upon a theoretical platform which constituted insights from the field of STS, CSCW and IS. The intersection between these three fields is another interesting topic to explore, in particular, by investigating further how these different fields can contribute to each other by introducing particular insights and/or extending discussions about issues that are either often left unquestioned or rarely given critical scrutiny.

In the action research component, I analyzed critically the criteria and norms found within traditional action research that are also echoed in IS action research. It

would be interesting to conduct further critical investigations of the norms that are embedded within the various fields, and to look at what kind of configurations these norms provide for the action researcher and what kind of research projects and interventions these norms are producing. I proposed conceptualizing action research as a network with different sociomaterial attachments which produces particular roles at different points in times. Greater methodological explorations of this conceptualization would have been interesting.

APPENDICES

Appendix A: Interview Questions (Users)

Two different sets of questions: factual (i.e. about the organization) and questions regarding organizational transformation.

For the purpose of this study, users are defined as those employees who use the system to retrieve, enter, and examine patient information. Users are not the actual patients.

Factual Questions:
Patients:
- How many patients do you have in your practice?
- How would you describe your patients population (e.g., demographics)?

Clinic:
- Number of physicians in practice?
- Did physicians have computers in their offices (consultation rooms) prior to the implementation of the EMR?
- When will/did you start using an EMR system and which parts/components?

Informant:
- How long have you been working in the clinic?
- Your roles/position in the clinic (e.g., main tasks/responsibilities)?

Organizational Transformation Questions:
I want to address three different sets of questions here, the first is in regards to the needs analysis phase of implementation, the second is during implementation and the last covers post implementation questions.

1) Pre-implementation
Why do/did you decide to make this change and implement an EMR?
- What do/did you want to achieve from this change?
- Why the Wolf system?
- Who was included from the organizations side on decisions regarding this change?
- When did you make the decision to implement an EMR?

Physicians:
- Did physicians have computers in their offices (consultation rooms) prior to the implementation of the EMR?
- When did you start using an EMR system?

2) Implementation
How was the process planned and carried out?

- What kind of challenges/issues did you face? (e.g., workflow, training, budget, patient education, hardware, unforeseen issues, etc.)
- How did you resolve these issues?
- What kind of vendor support did you receive during this time?
- How long did the implementation process last and what are the criteria that had to be met to indicate the completion of this phase? (e.g., scanning all paper charts, entering all information from paper charts into the EMR system)
- Patients' perspective: Did you prepare your patients for this change (the transition to EMR)? If so, how? What were the patients response/reaction pre- and post-implementation?

3) Post implementation

What has changed since the implementation?

- What were the changes the EMR brought about to your work practices? (e.g., scanning, medication refill, updating allergies and other information, billing, communication/interactions with patients and within other health care practitioners, etc.)
- Did the EMR change boundaries of professional practice (e.g., between GPs and MOAs)? If yes, explain.
- How does the practice seem in terms of the objectives/expectations that were set out at the beginning?

Outcomes/lessons learned:

- Could you share with me some of the best outcomes and experiences you have had and some of the challenges in implementing the Wolf system?
- Space for IT-knowledge creation…
- What would you do differently? (transition funds?)

Notes:

Other informants you advise me to talk to?

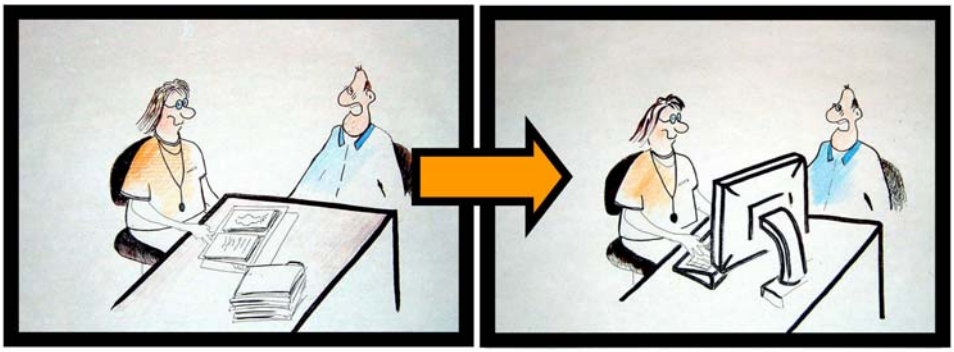
Appendix B: Interview Questions (Patients)

List of topics:

- What do you think is an EMR?
- How does a consultation proceed now, and how do you think it will be after the implementation of the EMR?
- What questions do you have about EMR?
- What concerns do you have about EMR?
    - What are your expectations?
    - Benefits?
    - Concerns?
- What are the criteria for providing a good health care service? What is quality care for you?

Appendix C: Patient Flyers[148]

WE ARE MOVING WITH THE TIMES



PUTTING AWAY PAPER CHARTS → **SWITCHING TO ELECTRONIC CHARTS**

Why are we doing this?

- To ultimately provide you with better care

- We know this will take time,
- We will try to make this change as smooth as possible
- We ask for your support

We would like to hear from you and learn more about your opinion on this project. If you have any questions or you want to hear more about the introduction of the project, come and talk to Nina on Wednesday's between 2:00-4:00 PM. Or if you have something to say, leave her a note in the suggestion box. (Nina is our PhD student studying health communications. She would like to hear your thoughts about putting away the paper charts and going electronic.)

midmain community health clinic

[148] Graphic above used with permission © Nicki Kahnamoi.

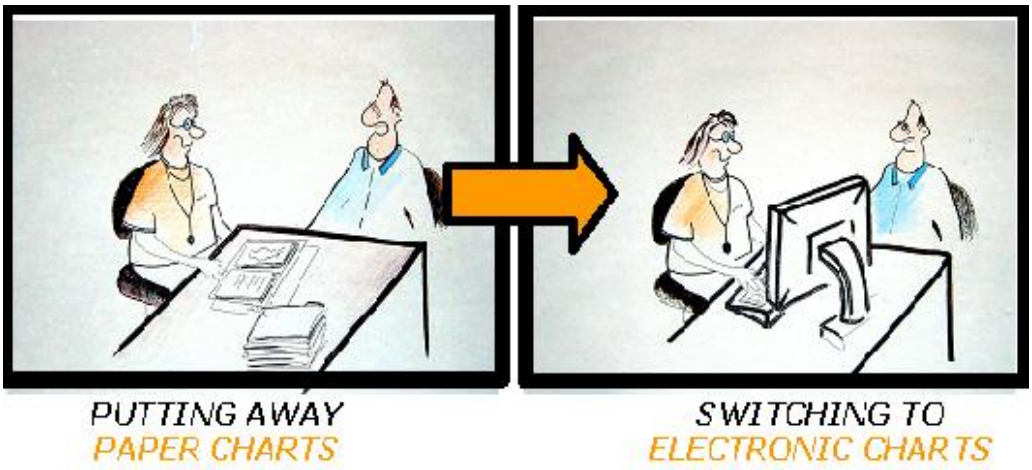
Appendix D: Results of Patient's Study[149]

Applied Communication Technology: Information . Organizations . Networks

16 January 2005

CASE STUDY: MID-MAIN MEETS THE EMR RESULTS FROM THE PRE-EMR PATIENT INTERVIEWS

Project Co-investigator: Ellen Balka
Researcher: Nina Boulus



Nicki Kahnamoui ©

FIELDWORK SUMMARY- PHASE 1

- Timeframe of interviews: 10th Nov 2004 – 15th Dec 2004.
- Consisted of: 5 "rounds/sessions" of interviews (each Wednesday).
  - In total: 22 interviews (duration varies from 10-45 min.).
  - Each interview was recorded after receiving verbal consent from each patient.
  - The material in this report is based on 16 of 22 interviews that have been transcribed thus far (interviewees names were not requested and all information has been handled in confidence).
  - Time spent in the field: ~12 hours.

Simon Fraser University | Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada | Vancouver Coastal Health Research Institute — Healthier lives through discovery

[149] The following are images of the official documents and technical reports that were submitted as part of the ACTION for Health research project.

- Only 4 patients refused to be interviewed (one was a student studying for his exam, the other one did not speak English, the third one was in too much pain, and finally the last one explained that she had been waiting for a long time…).
- Patient demographics vary. Ages: 17-76 years old. The fieldwork includes a broad population, from students, patients with different occupations, patients with disabilities or retired patients.
- Observations followed each session in order to explore and acquire more knowledge about the interaction and communication between and within healthcare personnel and patients.

The aim of this report is to summarize the data that was collected during the first phase of this study which addressed patients' perspectives about the implementation of the EMR prior to the implementation of the EMR. The report is structured in the following way:

- The Patients' Perspective
    - General reflections on patient perspectives
    - Benefits
    - Concerns
    - Expectations
- Suggestions for Patient Education Topics
- Last Words

A few sample quotations are included in the report in order to provide a taste and flavor of the types of comments that were made during interviews.

THE PATIENTS' PERSPECTIVE

Please note that the order of the issues included here represents how frequently (or infrequently) these issues were mentioned. Hence, the issues mentioned by most of the patients appear early in the document, while those mentioned by fewer patients are placed at the end.

General reflections on patients' perspectives:

In general, the various comments from the patients can be divided into three groups, following three types of perspectives:

1. Positive and encouraging perspective:

Most of the patients would fit into this category, in that they view the transition to an EMR as a positive development. Frequently, patients mentioned the benefits first, and it took them a while before they managed to come up with some concerns.

- "Go for it and join the digital age!" [C3:151204].
- "I find that it would make it a lot more progressive, both for the patient and the doctor"...

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

2. "What-does-this-have-to-do-with-me" perspective:

Several patients viewed the transition process as an organizational issue that happens "behind the scenes." They were not interested to know how their doctor retrieved the information about them as long as they could see and talk to their doctor.

- "I don't care one way or another!" [P10]…
- "whatever works the most efficiently for their system" [P5]…
- "This will probably be beneficial for my doctor, but I don't understand how this will affect me" [P20]…

3. Opposition/resistance to the EMR:

This attitude was expressed by very few patients, and it often relates to the concerns about sharing information between the various healthcare providers. Is it interesting to note here that these patients who opposed/resisted (or were not in favor) of the idea of going to an EMR were those who had an unfortunate personal experience with the heath sector.

- "It is bullshit. Cause it doesn't work anyway…if I have to go to the hospital, in an emergency ward, the doctor is unable to get my entire chart- he's too busy to go trough it and find out exactly what's happening. He's gotta be in direct contact with my doctor to begin with. I had so many misdiagnoses" [P4]…
- "What differences does it make; the doctor will still be using time for looking (searching) for information. Whether it is paper or electronic information, there's no difference" [P15]…
- There were a few patients who were worried that we are rapidly and increasingly becoming dependent on technology, and that "there is no way back" after the transition to electronic charts. For example, one patient said "*I think that we already lean on them too much…I think there is too much of it* [computers] *out there in the first place…If they fall apart now, what's gonna happen to us? We depend on them quite a bit for everything"* [P10]…

Benefits:

- Better and faster access to the most updated information.

- In addition, assisting doctors to remember all the various information was seen by some patients as a benefit: "*But I found that, because he* [P1 pervious doctor] *was an older gentleman…his memory wasn't the fullest…So what he would do, is he would type in right there on the spot…And the last time I came in to visit him, he knew exactly what happened the time before, it was all there. He didn't have to go searching through papers and files, cause he just click click- and it comes right*
  up…No matter what kind of information he was looking for, he was able to pull it up and knew exactly where we had ended at"…
- "there has been times where I had to remind [my doctor] of tests that had been done, but that's understandable, because, I'm only one out of 35 patients, or whatever" [P3].
- Various patients believed that EMRs will probably save a lot of time for doctors.
- Several patients also mentioned the advantage that digital information can be accessed independently of a person or a paper-record, and that the EMR can be accessed by several people simultaneously.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- Efficiency: Easy search and retrieval of information.

- Several patients pointed out that less time is being spent on paperwork, and more time can be available for patients.
- Better organization and structure of information have been identified as potential benefits of the EMR by patients: "*everything in one screen*" [P15]…
- "[With computers] you cannot lose or misplace anything" [P7].
- "I've had that happen once or twice where they couldn't find the file in the doctors' office, so it's a good idea […] cause with computers, it's there where you saved it!" [P14].
- Having the prospective benefit to **share information among the various healthcare providers.** "Easier to be transferred to other doctor's offices, instead of using fax machines and having to find certain papers" [P14]…
- **Space factor**: saving room (this point was mentioned by many patients).
- **Better quality of electronic charts:** Records cannot be destroyed as easily as paper charts. *"Having all the information in the computer, we're talking about at least 100 years"* [P]…
- More convenience, easier and faster to write on the computer than using a paper.
- **Environmental perspective:** using less paper implies saving trees (this benefit was mentioned by several patients).
- **Handwriting:** easier to interpret doctor's handwriting.
- Providing the possibility to generate data (e.g. statistical information) for further **research** (e.g. preventive medicine).
- Long term storage.

Concerns:

When patients hear about the implementation of the EMR in general, and specifically installing computers in physicians' offices, they often related this to having access to the Internet, which for many patients is often associated with hackers. P1: *"If you got a computer, then it's accessible to an out or an inline. What's gonna stop somebody from paying somebody to access that, change things, find out information so that they are ahead of time, so they can damage control basically"* [P]…

- Privacy & Access to medically sensitive information:

- In general one can say that it is not clear for many patients *who* will have access to *which* parts of information.
- One of the comments: "to open up access to information that doesn't need to be accessed, gives people power" [P5]…
- This concern was mentioned by most of the patients.
- Hackers:
    - Several patients claimed that it will be easier to access computer files, and more likely to happen, than people breaking into the office to get paper files.
    - Other patients who pointed out the concern of someone breaking in and gaining access to their files accompanied this with comments such as: "*but I don't know if this information is useful* […] *It's about my disease*"…"*I'm not as concerned about it as I would be with my bank*" [P8]…

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- Confidentiality of information:

- The issue of sharing information across organizational borders, as well as national borders was very often mentioned.
- "I'm very conservative…I want the information to stay between me and my doctor" [P]
- The example that was often referred to in talking about privacy and confidentiality of electronic medical records was: "The Patriot Act," which refers to the decision that has been taken by the Ministry of Health to contract out the administration of British Columbia's Medical Service Plan (MSP) and PharmaCare to a U.S. linked company (recently there were several articles in the media, with headlines such as "*British Columbians' personal information is being exposed to the long arm of the FBI*").
- "As long as the info stays in Canada and in the hands of health institutions, I don't care. As long as it doesn't have to go to the U.S."

- Safety of medical records:

- Some patients expressed their concerns about the fact that it might be easier to steal files from a computer, rather than stealing paper charts. However, these concerns were often accompanied with comments such as: "*this will happen here* [in the realm of paper charts] *or there* [with EMRs]"[P1]…Another patient said: "*it's probably safer than just having them lay around in doctors garages and basements. I think it makes more sense to have it on a computer"* [P2].
- **Virus attacks** on computers were a concern to some patients: "the first thing that came to my mind was, "what if there is a virus and [it] will erase all the files" [P8].
- **Technical problems** (in terms of system-crash) and **backup routines** were also of concern to some patients.

- Eye contact with doctors:

- "it'll probably feel more official than having the doctor flip through papers and make notes" [P2].
- Concerns of losing eye-contact with the doctors and feeling, to some degree, left "outside" the decision process were raised by some. One patient explained to me that when his/her doctor puts the paper file in front of them, it is easier for the patient to see what the doctor is writing down, and the patient feels that he/she has more access to the information in his medical files [P2].

- Training for the doctors:

- Very few patients were concerned that their doctors will face many complexities with getting used to computers and/or the system, and emphasized the importance of providing their doctors with adequate training.
- Other patients were concerned that their doctors will be so busy learning about the new system (the EMR), that they will have less time for the patients. "*Everyone can learn the skills* [that are needed for using computers], *but getting proficient at it, is a different story. I kinda like my doctor to really focus on 'the doctor part'"* [P10]…

- Authenticity (validity of the source of information):

Very few patients mentioned the fact that with computers (and digital files), there is no "original copy." The issue of being able to print several copies of the same document concerned some of the patients. They gave examples of using documents from the

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- medical record for insurance companies or in the court, and expressed their concerns about the fact that there must be a mechanism to signal that the information is valid, and had been confirmed by a doctor/author. "*Everyone can print anything from the computer… Somebody has to sign it in order to make it a valid document that contains valid information which should be confirmed by the doctor*" [P10]…

- Financial:

- A few patients mentioned financial concerns, reflecting upon the idea that too much money is being spent on the implementation of IT, and could be spent on other critical problems in the health sector. "*I'm concerned that so much money is being spent on IT"…"this money had been taken from other areas and would have probably been spent on other things in the health sector*" [P15].

- Unemployment due to the expectation that the **computer will "replace" the administrative staff**:

- "*So there will be quite a few people without a job again*" [P6]…This concern was brought up by only one patient, but I included it in the report as it reflects upon the relationships that patients have with healthcare personnel at the community partner's clinic.

Expectations:

- Several patients had the expectation that information will be shared among the various healthcare organizations. Often, they provided the example of being transferred to specialists, hospitals, or other healthcare providers, and expecting that their medical record will be accessed from there (and not only by their GP). This expectation was often accompanied by concerns of *who* will/should have the access to the records.
- A few of the patients who also mentioned the expectation of sharing digital information between the various healthcare institutions expressed their concern that not all the healthcare providers are "computerized". For example, one patient commented that "*The problem is that I don't think that my rheumatologist is computerized. His file is still on paper so…if it's papers from there and it gets here, then it needs to be typed into the computer. Instead of just filing it in the paper-chart...They'll have to retype it right?*" [P8]…This comment shows how patients who are not familiar with computers do not understand how electronic and paper-based information can be shared. Other times they think that 'sharing information' means printing out papers and sending it by mail.
  Several patients expressed that it will probably take some time to get used to having their doctor sitting with a computer, but that this is just a matter of time, and adapting to the new technology. Two patients gave me the example of the bank-machine when they first came onto the market. An example of one of the comments: "*Well, I guess that everybody now is going to computers…I guess it's the same with the bank when they switched to bank machines, I resisted to go to bank machines cause I knew the teller already and the manager, and going to the bank machine you don't know anybody…and it's a machine. And later on, I adapted to it, so that when you're in a rush you can just go to any corner and to the bank machine"* [P8].
- Some patients felt the EMR would help the patient to deal with medical conditions (e.g. diabetes) in a better way (independently from the doctor): *maybe it'll help me to cope with it* [diabetes] *in a better way.* […] *Maybe it* [the computer] *can remind me how to do things* [P6].

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

SUGGESTIONS FOR PATIENT EDUCATION TOPICS

The following section includes lessons that were learned from the following fieldwork, and the information here is based on the interviews with patients.

- Many **patients are familiar with the use of computers** (and/or other **technological devices**) in one way or another. They are either familiar with (exposed to) technology from their work, private use, or because they have seen computers around in the health sector. Therefore, as several patients said, "*I don't have any problem with technology, cause I'm used to it"* [P14] …
- In addition, many patients explained to me that, sooner or later, the increasing development of technology in the health sector would have happened anyway, as in other sectors (e.g. banks). "*It's what happens, it's where the future and the world is going to"* [P14]…Some comments were in fact as extreme as the following: "*yeah, I think that some day, you'll go into your doctor's office and you'll have the computer in front of you and you'll have to answer all the questions, and then you might see a doctor, or the computer will tell what's wrong with you"* [P2]…
- Due to the fact that there were several patients who wondered whether the **old paper charts will be destroyed**, it is advisable to clarify that these will still be stored in the clinic. In addition, it might be good to explain to the patients that although we are "moving with times, and entering the *paperless* world," paper charts will continue to be used for a while. By mentioning to patients that it is a change that will be conducted gradually, we prevent having too high expectations from patients (and prevent comments such as: "*What are all these papers? I thought you said you are going 'paperless'*?").
- I also feel it is important to be cautious with the information that will be provided to patients. Many patients expect that the implementation of the EMR will allow the various healthcare organizations (e.g. hospitals, community clinics, pharmacies, etc.) to communicate electronically (rather than sending a letter or using the telephone). This benefit, which is the most obvious one to the patients, is the ultimate goal which the system will not be able to deliver. Furthermore, since it is obvious to us that it will take a while before we reach this stage, it is important to emphasize to patients that this is the *ultimate* goal. In order to develop more realistic expectations, one can rather try to move the focus over to the other advantages that will be obtained. For instance, we may want to emphasize that the EMR will enhance the way information is gathered, stored, distributed and used; increase access to the most updated information and decrease the time spent on handling activities; support clinical tasks as diagnostic and therapeutic decisions; help manage chronic diseases such as diabetes; etc.
- **Providing teaching and training sessions to** the doctors is paramount, as well as following a *gradual* transition to using an EMR in everyday practice.
- **Placing the screen:** It is advisable to place the screen so that it is in some sense accessible to the patient so that the patient will continue to feel that he/she is conceived as part of the process (just as they used to feel before the EMR).
- **Increase patients' awareness** about the changes that will follow. However, keep in mind that there are several patients who simply do not view this change as something affecting them and believe that they do not need to know about the transition to an EMR (viewed as an issue that is "behind the scenes").

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- It is always advisable to inform patients about the **rationale** for implementing the EMR, and to introduce the various **benefits** that that will be gained from this transition. At the same time, it is advisable to **address concerns** that were presented by the various patients. Based on the interviews, patients were primarily concerned with the following issues: **privacy and access to information** (*who* will have access to *which* parts of the information)**, and confidentiality, and safety of records** (technological problems, hackers and virus attacks).

FINAL WORDS

While reading some literature about the history of EMRs, I found parts that describe the patients' perspective in the early 1970s. It was revealed that **patients had little problem in accepting computers** as part of their healthcare delivery team. In addition, they found that patients were less intimidated by the computer than the doctors. According to my impression from the patients' comments, I feel that this can be applied to our existing situation at the community partner's clinic. As previously mentioned, most of the patients were positive and encouraging about the idea of digitalizing medical records. Moreover, I noticed that patients readily mentioned several benefits, yet often took some time to reflect on their concerns.

Based upon the interviews that were conducted **with** the various **WOLF-users**, as well as the interviews with policy makers, we were informed that **there were no special sessions for introducing the EMR to patients**. The existing practice that the clinic followed was that it was the doctors' responsibility to inform their patients about the fact that they will start 'using computers'.

Most of the patients described the EMR as a medium for restoring digital information. This report provides a general overview of the benefits that patients were aware of, as well as their concerns and expectations. Patients are aware of the most important benefits that are implied in the transition to EMRs. If there is an interest, one can possibly summarize these benefits and include the ones that were not mentioned by the patients. This could help ensure that the various patients have similar levels of knowledge about the EMR. After looking in my notes which include a list of benefits that are related to EMRs, I must admit that the only point that was not mentioned by the patients was the possibility of improving clinical decision-making process (e.g. by producing computerized reminders that record and store abnormal results, allergies to medications, etc.).

- Improve patient management and compliance with treatment guidelines (though one can say that this was actually mentioned indirectly by few patients)
- Improve patient safety.

I hope you will find this report instructive and interesting, and that it can be helpful to the implementation of the EMR.

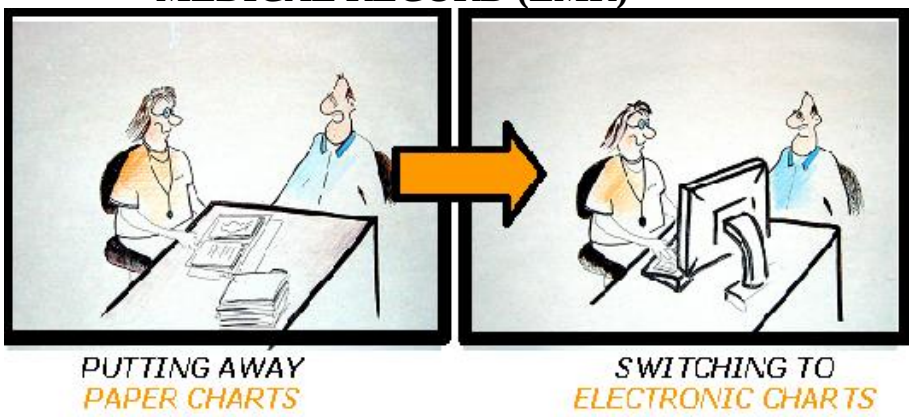
Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

Appendix E: Educational Material for Patients

ACTION for health

Applied Communication Technology: Information . Organizations . Networks

INFORMATION ABOUT THE ELECTRONIC MEDICAL RECORD (EMR)



Motivation:

For the past several years, physicians and staff have been "going paperless" and this change includes electronic medical records. Thanks to the Health Transition Fund, a federal grant through Vancouver Coastal Health, Mid-Main will be implementing electronic medical records (EMRs). It is our hope that by introducing electronic medical records instead of paper charts, we will be able to better coordinate and improve health care service to you.

What is an EMR?

An Electronic Medical Record (EMR) is a way of storing patient information on a computer. Electronic medical records have similar structure to the paper-charts, and these contain all the information that is relevant for the treatment and nursing of a patient. The electronic medical record includes both clinical information: such as diagnoses, allergies, and medicines; and demographic information, such as: personal information, for non-clinical use—an example of such information is the patients' health number.

The records **contain information** that is used for **different purposes**:

- Administrative tasks:
  - Registering patients
  - Scheduling appointments.
- Clinical practices (diagnostic and therapeutic decisions):
  - Computerized prescriptions
  - Lab tests
  - Diagnostic measures
  - Progress notes from different healthcare providers.
- Research practices.

Why use an EMR?

- Electronic Medical Records (EMRs) are expected to allow significant improvements to the way people work at Mid-Main. Replacing paper-charts with the EMR will radically **enhance the way information is gathered, stored, distributed, and used**. Expectations include:
  - Increased availability and accessibility of the whole record at any time from any computer: The time wasted searching for lost charts is completely eliminated since it is continuously available in the electronic format. In other words, all appropriate staff members can access information anywhere at anytime.
  - Decrease in the time spent on "paper-work": Putting charts, undoing then, copying them, and putting them back together requires both physical resources and time. Some offices also use outside copy services. Using the EMR allows staff members to just click and print whenever records are requested (easy to update and print information).
  - Enhancement of the clinical time: Since less time is spent searching for particular information, more time is available for giving care.
  - New opportunities are being opened when staff members can quickly retrieve the most updated information. This in turn is expected to increase consistency and decrease or eliminate duplication of information.
  - Increase access to the same information at the same time from anywhere: Paper records can only be used by one person at the time. So for instance, if a pharmacy calls while the chart is being used, or waiting to be filed, the person taking the call cannot access the information in the timeliest, most efficient manner.
  - Improved structure and organization of information in the medical record.
  - Illuminations of handwriting misrecognition.
  - Digital documentation has a better quality than papers, and it is a safer medium for saving information. It maintains confidentiality and automatically allows multiple levels of security to patient records.
- The electronic medical record **opens up new opportunities** when it **allows sharing and exchanging information** among various healthcare practitioners. The ultimate goal is to allow the doctors to connect directly with other doctors, pharmacies, laboratory and radiology facilities, etc. This way, doctors will have the information they need to make the best decisions, and patients will benefit from better outcomes.
  - Increase collaboration between various professions:
    - Allow comprehensive documentation to other medical professionals.
    - Improve and measure outcomes and compare clinical and administrative process.

- Workflow efficiency: Today, a majority of the activities are still conducted by phone, fax or mail, including payments, treatment referrals and approvals, prescriptions and test results. Most of the activities can be conducted electronically (through e-mail or other communication channels)→ this way, the time spent handling (communication) activities as leaving messages and waiting to hear back, or waiting to look up for information, is significantly reduced. Hence, the information flow and workflow documentation are improved, and healthcare providers can spend their time productively.
- Improve clinical decision-making process. Electronic medical records can for example prompt automatically reminders regarding abnormal results, allergies to medications, or any other information that the doctors should be aware of.
    - Improve patient management & compliance with current treatment guideline→ EMR is also a management tool that will be able to improve the timeliness and quality of care. It can for example notify doctors of new medications, dosages, etc.
    - Improve patient safety by reducing treatment errors.
    - Increase efficiency, coordination and planning, and consequently→ decrease waiting times for patients and costs.
- Opens up the possibility for participating in medical research studies.
- Opens up possibilities for patient education:
    - Appropriate printed instructions in the patient's language.
    - Allow patients to participate online with their chronic illness care, including keeping the patients apprised of their current medical condition.

Why invest in an EMR?

While for some people it might look like an astronomical amount of money is spent on electronic medical records, this investment would pay off quickly in terms of safety, quality and cost of care. As many as 24,000 Canadians die annually due to health errors. In addition, it was estimated that one of four X-ray and MRI tests are repeated because diagnostic results are misplaced or lost. Using electronic records will, to a large extent eliminate these problems.

The information that is provided here is related to the study that we conducted about the patients' perspective. We would therefore like to **thank** the patients that participated in this study and took the time to talk to Nina (whom is our PhD student studying health communications). Your answer had been a valuable and helpful contribution for us. If you have any questions or thoughts that you want to share with Nina, please leave her a note in the suggestions box.

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Appendix F: Users' Experience of EMR Implementations in Clinics in B.C.

MARCH 15, 2005

WOLF EMR USER'S EXPERIENCES- PRELIMINARY RESEARCH NOTES

This document provides a brief overview of users' experiences with the implementation of Wolf computer systems. The preliminary information that is included here is based on interviews with various users such as General Practitioners (GP) and Medical Office Assistants (MOA), and presentations from the Collaborative organized by Vancouver Coastal Health (VCH) Primary Health Care Transition Funds (PHCTF). The various clinics that are included in this research are at different stages of the implementation process. Hence, some of the clinics used the EMR for 36 month, while others used it for a year. The intention of this document was to obtain information about implementation projects of WOLF (EMR). This includes a reflection of user's experience in order to apply these lessons to Mid-Main Community Healthcare Centre.

Pre-Implementation:

Receiving transition funds

- Most of the clinics indicated that the period of time that elapsed between when they applied for funds, and when they actually implemented the billing and scheduling modules was longer than they anticipated it would be.
- There were three clinics that chose not to use the funds for renovations and/or hiring a nurse practitioner.
- Small clinics cannot afford an IT person and hence experience greater dependency on the vendor and the hardware-staff (a third party support provider).

Choosing EMR-Vendor (Software)

- This was a difficult task for all the clinics, and many said that they just had to make a decision and "just give it a try."
- All the clinics attended the event that the VCHA organized where the different vendors presented their systems.
- Wolf was chosen by most of the clinics, mainly because of good customer service (contrary to another EMR vendor as two others mentioned). In addition, Dr. Brendan Byrne (Wolf's president), made a good presentation, and users felt that it would be easier to work with Brendan, as he is a doctor and could understand their needs.

Choosing technical support (Hardware)

- All the clinics followed Wolf's advise and chose the recommended technical (hardware) solution and support team solution (a third party support provider). Third party support proved problematic for some clinics and not others.
- Wireless network: here there were different experiences with using wireless networks. Some users were satisfied, while others suffered from system crashes.
- Tablets: One of the clinics had a bad experience with tablets that often crashed. However, it is worth mentioning that the problem might have been with these specific tablets that the clinic purchased.

Computers in consultation rooms

- For all the clinics, implementing the EMR implied installing a computer in the consultation rooms.
- No special information about the introduction of the EMR was provided to patients. After learning that no clinics had developed strategies for informing patients about the introduction of the electronic record system, one clinic developed and implemented a communication plan designed to assist users in learning about the EMR.

Date entry and the EMR

- Clinics imported all patients from previous systems and deleted manually those who are not active.
- All clinics used some kind of "summary-sheets" that included a short summary of the most vital information about the patients.
- Data entry had been conducted gradually for the most active patients (patients who often visit the clinic).
    - In some clinics, doctors had responsibility for data entry. Doctors had to work overtime in order to cope with immensely high workloads.
    - Other clinics hired students that had some kind of medical background to enter the data. However, according to these clinics, this turned out to be a bad idea since the students tended to enter information in the wrong fields, and there was a lot of misspelling. Some clinics, therefore, asked the students to enter only demographics, while the doctors were responsible for medical information.
    - One clinic temporarily hired students to replace the front-staff, and asked the front-staff (who were familiar with the patients, the information structure, etc.) to enter the data into the EMR.

The Actual Implementation:

Implementation techniques

- Most of the clinics first implemented the billing and scheduling systems, and thereafter implemented the workflow and clinical parts of the EMR.
- One clinic implemented all the modules at once. However, they said that they will not advise anyone to follow this implementation technique as it can be too overwhelming to deal with so many new things simultaneously.

Connection to other systems

Apparently, some clinics are able to receive lab results through the Wolf EMR, while others are facing complexities related to this issue. The reason for such differences is unclear.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

The Chronic Disease Management Toolkit (CDM Toolkit) or Wolf? This is the question

- All the clinics I interviewed (except one) used the ministries' CDM Toolkit.
- When implementing the Wolf EMR, the clinics did not re-enter the data from the CDM toolkit to Wolf.

Scanning

All the clinics will not be scanning the paper-charts. Some scan (or will scan) lab results and reports from surgeons, while others have not started scanning yet.

Intercom system

While conducting an interview in one of the clinics, I observed the use of an intercom system (installing loudspeakers in the various rooms). This was undertaken so that when the system is down, all the staff could be informed about the problem and know that there is someone dealing with it (this could be used instead of running up and down the stairs, looking in the different rooms to find a staff member to deal with the problem).

Training and support

- Most of the clinics expressed the need for better training sessions. Some suggested having shorter sessions but more often, and discussing small components and different functions in each session.
- Individual training is something that several clinics considered, but none have tried it yet.
- The need for better advance training was also expressed by most of the clinics. Several doctors said that they are familiar now with the basic and general functions, but would like to develop their knowledge further about specific issues (i.e. changing templates).
- Many users expressed their disappointment about the poor support that Wolf has been providing lately (it is hard to get in touch with them through the phone; they often don't return phone calls; they reply to e-mails faster than phone calls).
- Among all of the users that were interviewed, no one was familiar with the FAQ (Frequently Asked Questions) section that exists on Wolf's website. Users did not know about the online discussion groups (in Wolf's website), or about the Webinars.

Recommendations from Other Users:

Longer staff meetings (including IT discussions)

A few clinics advised having staff meetings more often, and including issues concerning the EMR (IT discussions). They explained that this provides an opportunity to share and exchange knowledge and experience.

Typing courses for doctors

One of the clinics advised sending doctors to typing courses.

Positive experience

Most of the clinics expressed their strong satisfaction with the messaging feature that allows better communication channels between the doctors and the front-desk staff.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

Problems faced

- Some clinic experienced problems with unstable systems.
- Difficulties living with a hybrid information system where both paper charts and electronic records are being used simultaneously were noted by all the clinics. However, all the users are aware of the fact that this will occur only during a transition period.

Conclusion

The bottom line is that all users were satisfied and said that the Wolf EMR is a good system that needs to be developed further. On the whole, no user would go back to paper charts!

Note

Though it has been immensely difficult to contact users from the various clinics, most of them expressed their interest in the project and wanted to maintain contact with us (including invitations to their clinics in a later stage). In addition, they expressed their appreciation toward the community partner's clinic's initiative to conduct this study.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

Appendix G: Analysis of Issues Discussed in EMR Meetings

In association with Simon Fraser University & the Vancouver Coastal Health Research Institute

ACTION for health

Applied Communication Technology: Information . Organizations . Networks

NOT FOR CIRCULATION

FOR INTERNAL CIRCULATION

FOR PUBLIC CONSUMPTION

Issues Discussed in EMR Meetings

(09/27/06)

ACTION for Health 2006

Document Status:

- ☐ Published Paper
- ☐ Working Paper
- ☒ Report
- ☐ Draft
- ☐ Presentation
- ☐ Practitioner's Pointers
- ☐ Briefing Note
- ☐ Research Tool
- ☐ Overview

Prepared by:

Nina Boulus

Simon Fraser University

Document Contact:

Ellen Balka

Centre for Clinical Epidemiology & Evaluation

828 West 10th Avenue

Vancouver, B.C., Canada V5Z 1L8

tel: +1.604.875.4111 ext. 66240

email: act4hlth@sfu.ca

website: www.sfu.ca/act4hlth/

Audience:
This document is intended for Wolf Medical Software and for various health services delivery in British Columbia.

Aim:
This document summarizes briefly empirical data that was collected from Electronic Medical Record (EMR) meetings. The information presented here is based on in-depth analysis for a single clinic.

Background:
After using the EMR for a period of time, the staff in one of the clinics in Vancouver decided to establish an EMR committee constituted of a representative from each professional group (administrative staff, front desk and doctors). In their weekly meetings, the group discussed concrete challenges and complexities they faced with the implementation of the EMR, and defined new goals for further changes of the existing work practices. The establishment of an EMR committee was highly significant in terms of having a group that can continuously evaluate the transition process.

EMR meetings involved negotiations of chains of issues that are continuously reordered and reconstructed to accommodate the work practices as they change in relation to the introduction of the EMR. Work practices are situated in an actual clinical setting, and change in relation to the culture of that clinic, the clinic's work organization, and the interruption of past work practices related to the EMR. Since these meetings gathered the different groups of EMR users, these meetings were viewed as a central place for increasing awareness of changes in activities, exchanging knowledge across professional boundaries and reaching mutual decisions.

Various issues were discussed at the EMR meetings, and the implementation of the EMR was progressively redefined to cover new domains, beyond the technical infrastructure. As can be seen in Figure 1, these newly defined domains included various organizational changes and work practice adaptations, the regulation of policies and ethical issues that arose in relation to use of the EMR, financial changes related to IT costs/investments, and changes required to create an ergonomic work environment in relation to increased use of computers in the clinical setting.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

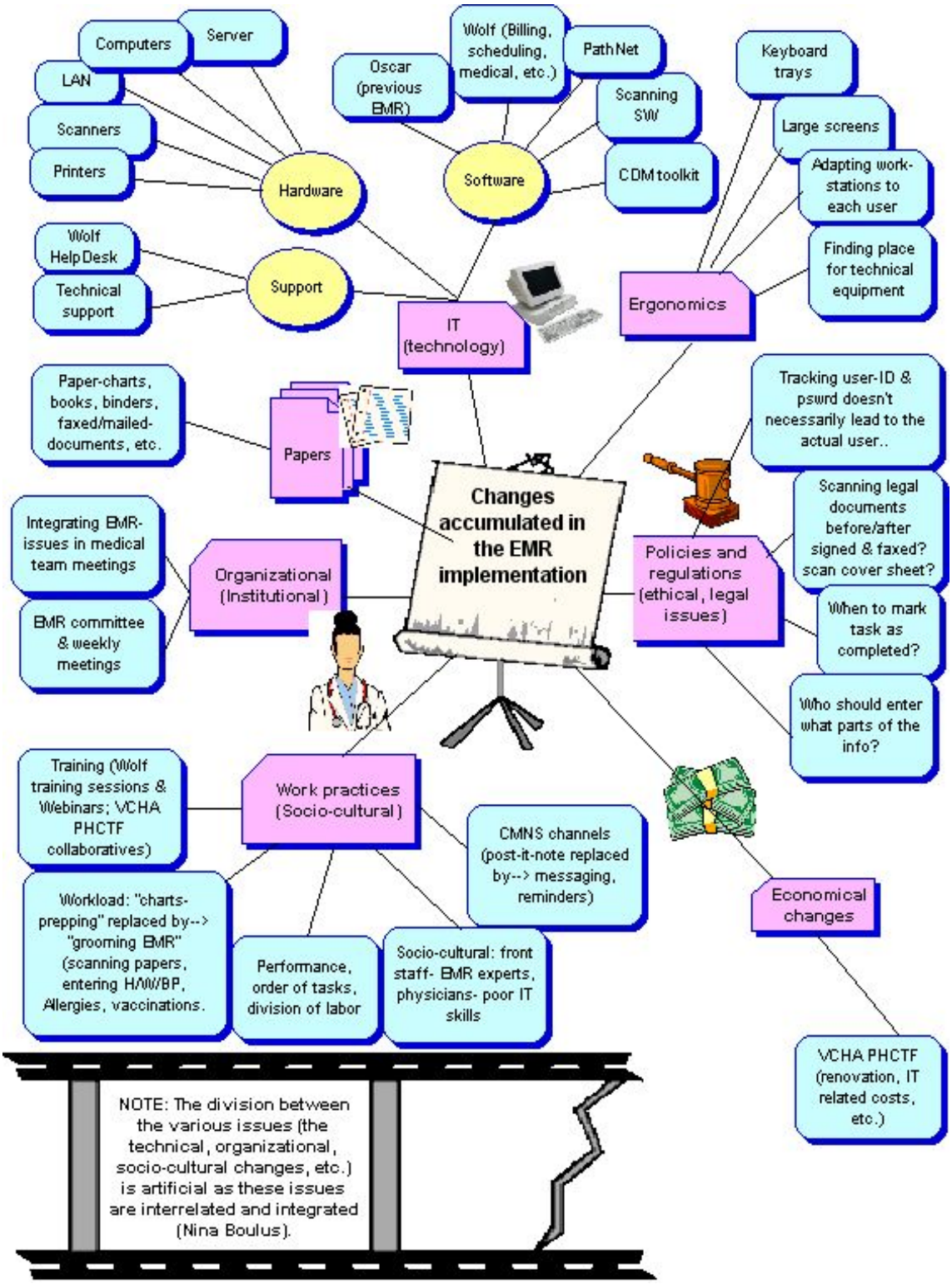

Figure 1: General overview of changes accumulated in the EMR implementation.

General notes:

The charts in Figures 2 and 3 show the range of issues discussed each month in one of the clinics that is using Wolf. The issues were defined by the clinic and presented as agenda items during the EMR meetings. Please note that an 'issue' here is not necessarily a complexity or a challenge that is faced, but rather something may be recorded as an issue if it required clarification or an update of new information.

The changes can be observed in the charts:

- A decrease in the frequency of meetings: From weekly to biweekly meetings.
- A gradual decrease in the number of issues discussed each month.

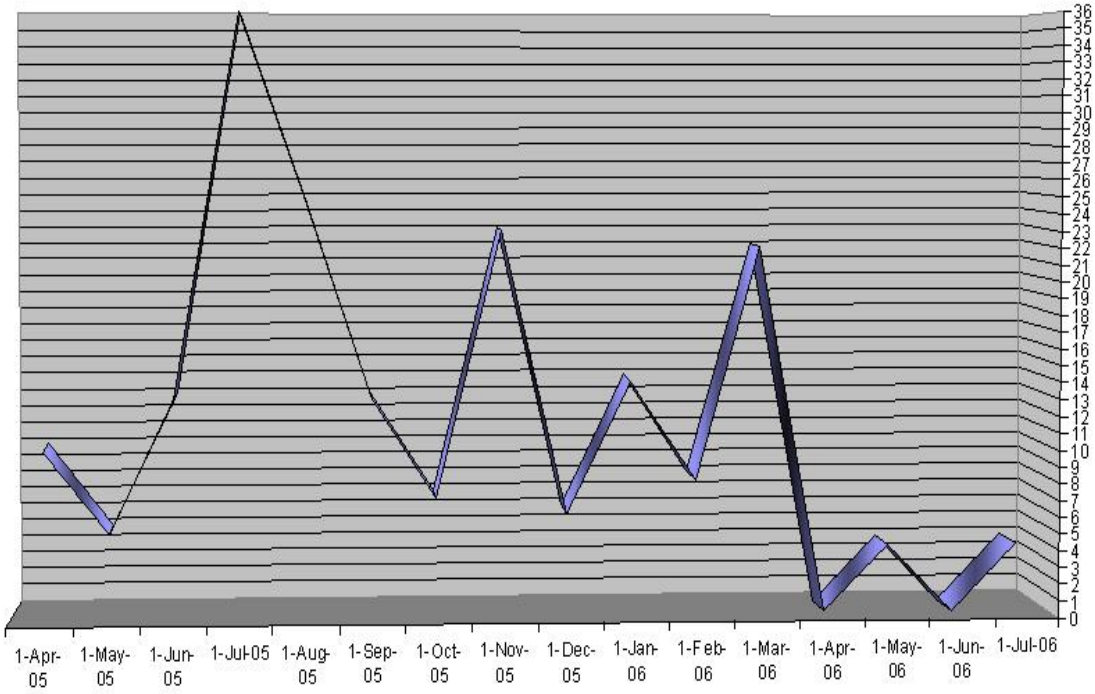

Figure 2: Number of Issues discussed each month.

With time, the various healthcare personnel become more familiar with Wolf (the EMR) and have established a common platform of knowledge related to the socio-technical changes brought by the implementation of Wolf. At the same time, the complexity of challenges increases as new applications are implemented (i.e. new templates, server, PathNet).

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

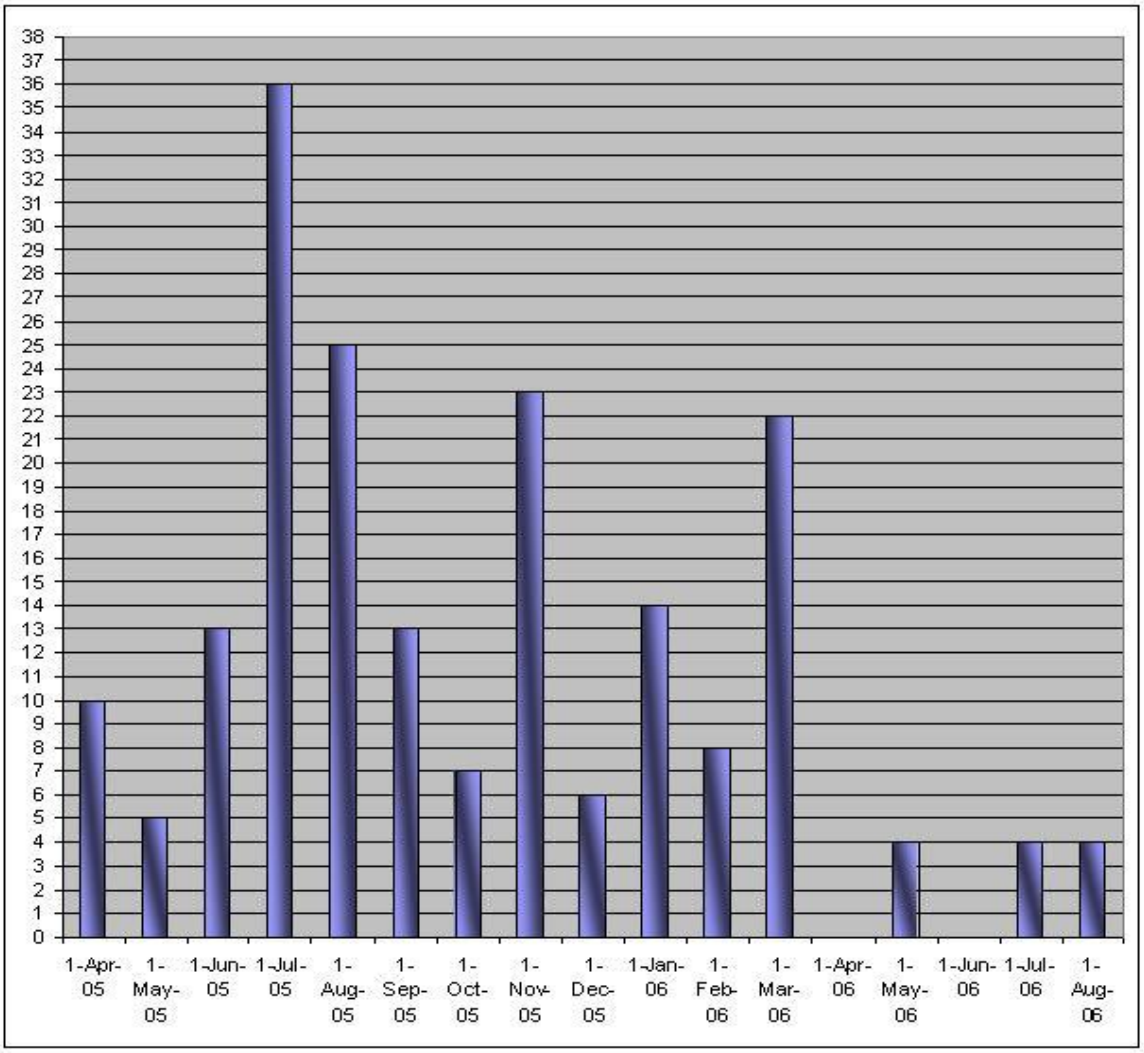

Figure 3: Number of issues discussed each month.

Explanation:

Highlights from the most intense EMR meetings, documenting when the most important issues were discussed for the first time, follow:
July 2005:

- Follow-up/Messaging/Patient-to-Come-In (PCI)/ Reminders/ Recall: These features were discussed most often as there was a need for precise clarification about the technical differences between each of these categories of messages. Clarification required included determining who receives a copy of a message (doctors/front desk) and what happens when a task is marked as completed by either the doctors or the front desk (i.e. when the front desk mark a task as completed, is it automatically removed from the doctor's list?)
- Updating Narcotic agreements and entering information into Wolf.
- Chronic Disease (CD) Template.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- Ultrasound and X-ray requisitions.
- Registering allergies in Wolf: who was to conduct the data entry and when?
- Use of existing templates and creation of new templates is one of the issues discussed most often throughout the year.
- Scanning patient's handouts: It was suggested to scan and save the various patient's handouts that are in the file cabinet, in order to make them easily accessible to the doctors who are interested.
- Entering vaccinations and flu shots into Wolf: discussions arose regarding how to deal with the clash between the existing work practices were two different providers execute these tasks, and the system that does not allow the editing of pre-entered information.

Aug 2005:

- Dealing with urgent messages.
- Finding strategies and communication channels to disseminate knowledge to all doctors about the EMR and changes to work practice related to the EMR as well as technical information about the EMR.

Nov 2005:

- WCB claims: how to request and organize training session about the WCB electronic claims...How to deal with the challenges faced when using the WCB claims template that is very comprehensive and long, and contains many questions (compared to the paper based version). In addition, discussion arose regarding the existing work practice and whether there is a need to change it when going to electronic claims. Currently, the front staff enter demographic information and the clinicians fill up the rest of the form.
- MSP billing in Wolf: How to standardize the heterogeneous documenting and billing practices. This includes standardizing the existing codes (diagnostic and extended codes) as well as adopting a more systematic and coherent use of these codes.

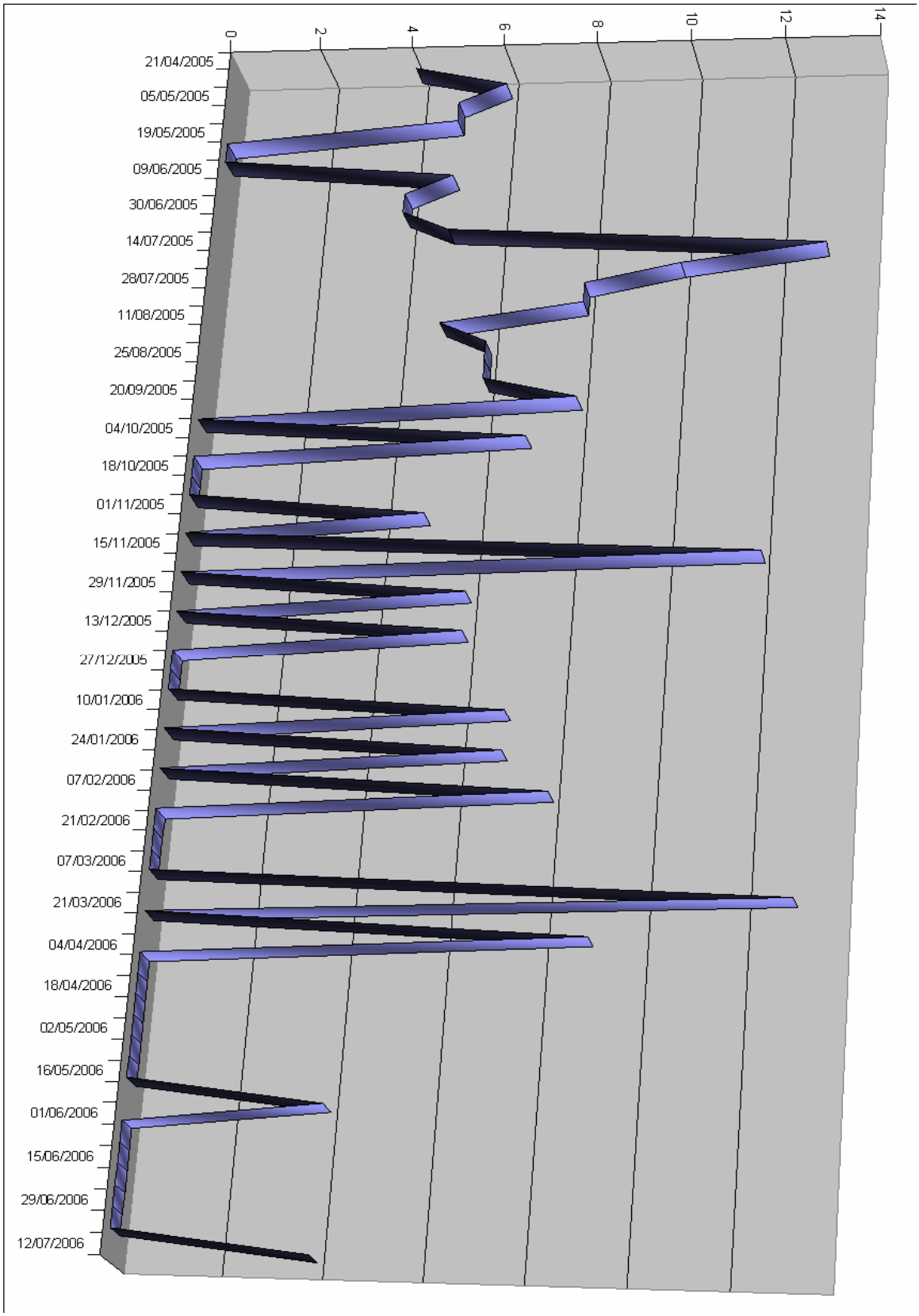

Figure 4: Number of issues discussed in each EMR meeting.

How often each issue was discussed:

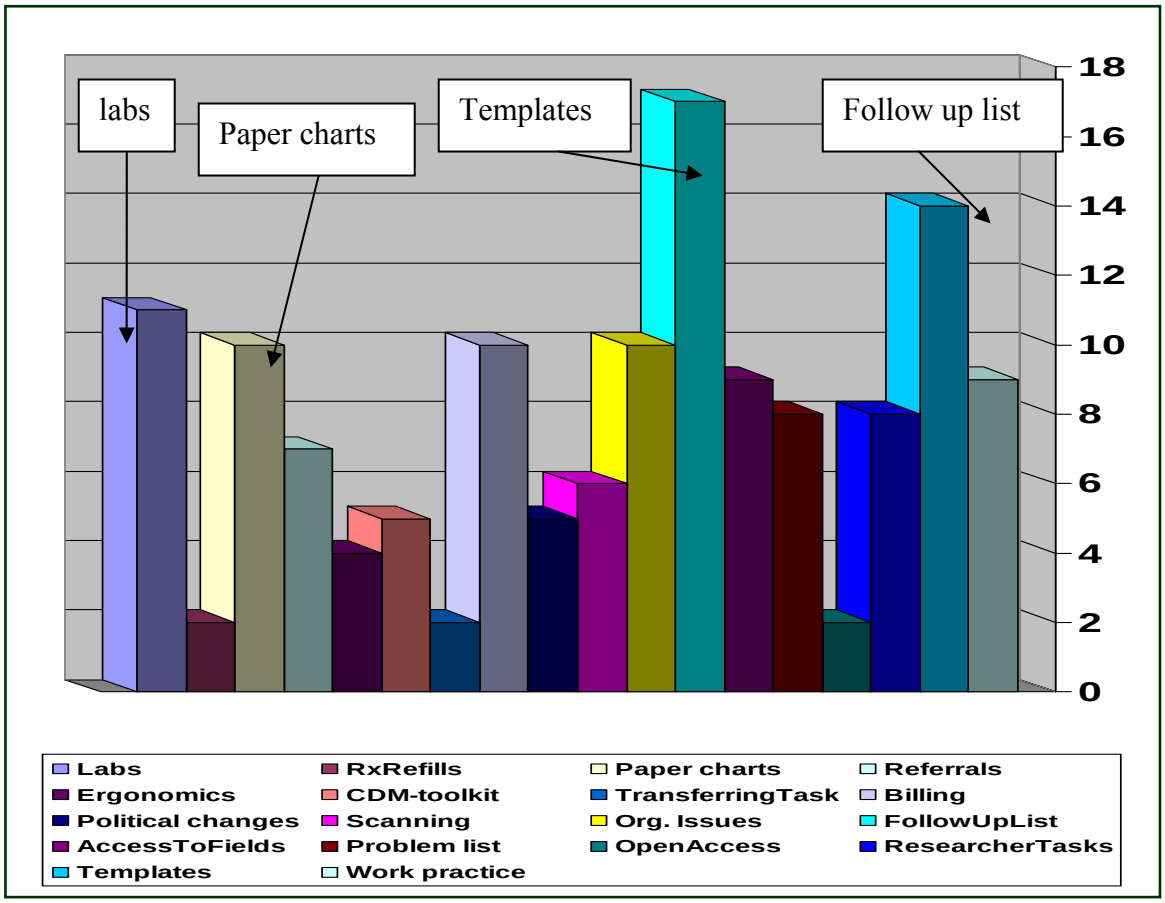

Figure 5: How often each issue was discussed.

Based on the partial analysis conducted thus far, issues most often discussed (see Figure 5) were:

- Follow-up list (discussed 17 times): How to deal with the problem that tasks do not disappear from the doctors' follow-up list when marked as completed by front desk. The EMR is based on a best-practice model where the doctors are responsible for determining the trajectory of tasks and making sure tasks are completed. But the doctors in this particular clinic distinguish between the execution of clinical tasks (i.e. different examinations) and administrative tasks (i.e. calling a patient). Hence, the doctors consider an administrative task completed immediately after sending it to the front staff. Currently, the doctors have such long follow-up lists that they have lost the overview of their tasks.
- Creation and use of templates (discussed 14 times): As the front desk staff and clinicians became familiar with Wolf, they gradually started using existing templates (i.e. SOAP template, allergy shots template, consult letters), as well as requesting the modification of existing (i.e. customizing the generic requisition template to ultrasounds and x-rays requisitions and adding pictures to templates). In addition, there was an increase in the staff's requests for design of new templates (i.e. Blank document, transmission template, Well-Baby template, Smoking questioner, etc.).

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

- Labs (discussed 11 times): How to deal with the transition period of duplicates of paper and electronic labs. How to deal with exceptions related to critical results, i.e. how to redirect results when the pharmacist is away (INR's can be sent either to all doctors or one doctor). What to do with lab results of unknown patients (labs restrict deletion of patient record). What to do with labs that do not follow the standard and must be entered manually into EMR.
- Paper charts (discussed 10 times): establishment of a policy governing how doctors would stop pulling and signing off charts.
- Online billing (discussed 10 times): This includes both MSP and CDM billing. An important issue that was discussed is how to standardize the different billing practices as well as the use of diagnostic and extended codes. Organizing training for the clinicians to use WCB forms, and finding a way to deal with incomplete billing.

Examples of issues that were less discussed:

- Transferring tasks (discussed twice).
- Open access (discussed twice): this refers to a different project that is implemented in the clinic and has indirect impact on the use of EMR.

It is important to note however that the fact that some issues were discussed more often than others can, but not necessarily, imply that these were more important/crucial. This could be due to the significant complexity of the technical function.

Chronological order of issues:

When looking at the chronological order in which the issues were discussed, one can note the following:

- A progression from simple features to sophisticated and advanced ones (i.e. from grooming paper-charts and data-entry into Wolf→ Templates→ Urgent messages and Recalls).
- A progression from the most common and general functions to more concrete and specialized ones (i.e. from Referrals (which applies to many patients)→ to Vaccine, Flu shots, and Pap tests (which are usually conducted a few times a year).

Identified criteria for prioritization:

Issues that were prioritized:

- Issues that were crucial for new and/or existing work practice.
- Issues that were viewed as beneficial in the long term.
- Issues that have financial implications.

Issues that were on a lower priority:

- Scanning patient's handouts.
- Registering vaccinations and flu shots.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

How are decisions made and by whom?

- Some issues were solved individually and locally in the clinic. In most cases, decisions were made by the person who is affected by the change.
- Other issues were forwarded to the clinical or team meetings. This applies to situations where important issues were discussed and the EMR committee wanted to ensure decisions were communicated to all staff. Issues were postponed to clinical meetings when the representative doctor did not want to make a final decision independently of all clinical personnel.
- Issues that cannot be solved internally in the clinic were often forwarded to the vendor and support staff.

Nina Boulus, PhD Candidate
Simon Fraser University, ACTION for Health, School of Communication,
8659 Shrum Classroom Building, 8888 University Drive, Burnaby, B.C. Canada, V5A 1S6
Phone: 604.268-7265 or (778) 881-5596 www.sfu.ca/act4hlth E-mail: nboulus@sfu.ca or ellenb@sfu.ca

Appendix H: Consent Form

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ACTION for health
Applied Communication Technology: Information . Organizations . Networks

INFORMATION SHEET FOR SUBJECTS:
Participants of EMR Case Study project

Title of Project: **Action for Health (Applied Communication Technology: Information, Organizations Networks)**

Project description:
In this project we are interested in learning about the organizational transformations health care organizations go through in implementing new Electronic Medical Record systems.

Procedures to be followed by researcher(s):
Researcher will provide explanation of project and will ask research participant to sign a consent form. Upon consent of participant, researcher will conduct a semi-structured interview, which will be taped. The transcribed interviews along with the tapes will be kept in a secured location, accessible only to project researchers. Individual data will be viewed by research staff.

Risks to research subjects:
Persons agreeing to participate in this research project may find some of the questions uncomfortable, challenging, or may enjoy talking about their experiences in implementing electronic medical record systems.

Benefits to the research community:
Information from this study will assist researchers in understanding organizational challenges in implementing Electronic Medical Records and will help in identifying social intervention that can be utilized to realize the potential of Electronic Medical Records.

ONCE SIGNED, A COPY OF THIS CONSENT FORM AND A SUBJECT FEEDBACK FORM SHOULD BE PROVIDED TO THE SUBJECT.

SIMON FRASER UNIVERSITY

ACTION for health
Applied Communication Technology: Information . Organizations . Networks

Informed Consent By Subjects To Participate In A Research Project
The Role of Technology in the Production, Consumption and Use of Health Information in Varied Settings: Implications for Policy and Practice
Subproject: EMR Case Study

The University and those conducting this project subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of subjects. This form and the information it contains are given to you for your own protection and full understanding of the procedures**.** Your signature on this form will signify that you have received a document which describes the procedures, possible risks, and benefits of this research project, that you have received an adequate opportunity to consider the information in the document, and that you voluntarily agree to participate in the project.

Having been asked by Ellen Balka, or her research assistant Nina Boulus, of the School of Communication of Simon Fraser University to participate in a research project, I have read the procedures specified in the document INFORMATION SHEET FOR SUBJECTS. I understand the procedures to be used in this research and the personal risks to me in taking part.

I understand that if I consent to participate in this project, I may withdraw my participation at any time. I also understand that I may refuse to participate in this project and that if I do refuse to participate in this project there will be no repercussions.

I understand that my employer's approval was not sought for this research and that my employer may require me to obtain his or her approval prior to my participation in this study.

I also understand that I may register any complaint I might have about the project with the researcher named above or with Dr. Martin Laba, the Director of the School of Communication of Simon Fraser University, Burnaby, B.C. V5A 1S6.

By signing this form I am granting permission to be interviewed and I understand that the interviews will be taped and that all the research material will be held confidential by the Principal Investigator.

I may obtain copies of the results of this study, upon its completion, by contacting:
Dr. Ellen Balka, School of Communication, Simon Fraser University, Burnaby, B.C. V5A 1S6.

NAME (please type or print legibly): _____

ADDRESS: _____

_____

SIGNATURE: _____ **DATE**: _____

WITNESS: _____ **DATE**: _____

SIMON FRASER UNIVERSITY
UNIVERSITY RESEARCH ETHICS REVIEW COMMITTEE
SUBJECT FEEDBACK FORM
Participants of Wolf case study project

Completion of this form is **OPTIONAL**, and is not a requirement of participation in the project. However, if you have served as a subject in a project and would care to comment on the procedures involved, you may complete the following form and send it to the Chair, University Research Ethics Review Committee. All information received will be treated in a strictly confidential manner.

Name of Principal Investigator: Dr. Ellen Balka

Title of Project: **ACTION for Health (Applied Communication Technology: Information Organizations Networks)**

Address: School of Communication, Simon Fraser University, Burnaby, B.C. V5A 1S6.

Were you asked if you were willing to answer questions today? **____ (Yes or No)**

Were there significant deviations from the originally stated procedures?**___(Yes or No)**

I wish to comment on my involvement in the above project which took place:

_____

(Date) (Place) (Time)

Comments:

_____

_____

_____

_____

_____

Completion of this section is optional

Your name: _____
Address: _____
Telephone: (w)_____ (h)_____

form should be sent to the Chair, University Ethics Review Committee, c/o Vice-President, Research, Simon Fraser University, Burnaby, BC, V5A 1S6.

Appendix I: Policy Documents

In association with Simon Fraser University & Vancouver Coastal Health Research Institute
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Simon Fraser University
School of Communication
K 8659 - 8888 University Drive
Burnaby, BC, Canada V5A 1S6

Tel: 1 604 268 7295
Fax: 1 604 291 4024
Email: act4hlth@sfu.ca
web: www.sfu.ca/act4hlt

Implementing Electronic Patient Records – Practitioner Experience

Research Summary

Investigator: Nina Boulus. Nina is a PhD Candidate working with Principal Investigator **Ellen Balka, PhD** on the Theme II sub-project, *Mid-Main meets the EPR: Practitioners Views of Electronic Health Records*.

Research Projects

1. Implementations of EMRs in BC

Major Themes: To study the implementations of Electronic Medical Records (EMRs) in various clinics in British Columbia.

Research focus: This project is conducted at Mid-Main Community Health Centre which is a non-profit primary care clinic. In 2003, the Vancouver Coastal Health authority chose Mid-Main to be one of the clinics that will receive primary health care transition funds for 3 years. Parts of these renewal initiatives include the implementation of the Electronic Medical Record (EMR).

This project focuses on obtaining information about implementation projects of WOLF (EMR). This includes a reflection of user's experience in order to apply these lessons to Mid-Main clinic. The fieldwork started in October 2004 and lasted for approximately six months. The information in this document is based on interviews with various users such as General Practitioners (GP) and Medical Office Assistants (MOA), and presentations from the collaboratives organized by Vancouver Coastal Health (VCH) Primary Health Care Transition Funds (PHCTF).

Key Findings:

Pre-EMR implementation:

Transition funds:

- The transition funds provided by the health authority to support the implementation of EMRs has been necessary as many clinics had to build a new technical infrastructure to allow the implementation of an EMR. This includes installing Internet connection and/or wireless network, and placing computers in the charting room and/or consultation rooms.
- Some of the clinics chose to use the transition funds for renovations and/or hiring a nurse practitioner. Several users expressed the importance of having a nurse practitioner in their clinic.

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Simon Fraser University
School of Communication
K 8659 - 8888 University Drive
Burnaby, BC, Canada V5A 1S6
Tel: 1 604 268 7295
Fax: 1 604 291 4024
Email: act4hlth@sfu.ca
web: www.sfu.ca/act4hlt

- Small clinics cannot afford hiring an information technology (IT) person and as a result, they experience greater dependency on the vendor and the technical support team. Having funds dedicated for hiring an IT person is viewed as immensely important, especially during the initial stages of the implementation. An IT person would have the technical knowledge needed to determine which hardware (i.e. computers, printers, scanners, server) and software (i.e. the EMR, scanning software) is needed for the EMR system. In addition, an IT person would be able to assist with the actual installation of the hardware and software, and provide on-site immediate support to health care practitioners.

Choosing EMR-vendor (Software):

- All the clinics that were interviewed attended the event that was organized by the health authority, in order to meets the different vendors and become familiar with the various EMRs systems. This event helped the clinics in choosing an EMR system.

Actual implementation:

Data entry:

- Having funds and resources for hiring a person to enter data into the EMR is very important, especially during the initial phase of the implementation. Most of the clinics had various systems that contained information (i.e. demographic data) that needed to be imported to the EMR. In addition, information from the paper charts needed to be entered into the EMR and it had to be updated. The activity of exporting parts of the information from the paper charts into the EMR is highly time consuming and crucial for allowing a smoother and faster transition to an EMR. Lack of information in the EMR will lead to increase use of paper charts and delay in the transition.

Scanning:

- All the clinics will not be scanning the paper-charts. Some scan (or will scan) lab results and reports from surgeons, while others have not started scanning yet.

Implementation techniques:

- Different implementation techniques were used in each clinic (some implemented all modules at once, while others followed an incremental implementation strategy).

Backup and emergency routines:

- Prior to the actual use of the EMR, there should be clear routines for backups and emergency procedures.

Training and support:

- Most of the clinics expressed the need for better training sessions. Some suggested having shorter sessions but more often, and discussing small components and different functions in each session.
- Alternative between groups training and individual training is an option that some clinics considered.

Simon Fraser University
School of Communication
K 8659 - 8888 University Drive
Burnaby, BC, Canada V5A 1S6
Tel: 1 604 268 7295
Fax: 1 604 291 4024
Email: act4hlth@sfu.ca
web: www.sfu.ca/act4hlt

- Basic training was viewed as important, to become familiar with the basic and general functions. At the same time, advanced training was also viewed as important, and several GPs expressed interest in developing their knowledge further about specific issues (i.e. templates).
- Technical support was crucial.

Connection to other systems:

- Ensuring proper and stable connection to other systems (i.e. labs, CDM toolkit) is important in order to allow synchronization of information.

Recommendations from other users:

Longer staff meetings (including IT discussions):

- A few clinics advised having staff meetings more often, and including issues concerning the EMR. They explained that this provides a space to share and exchange knowledge and experience.

Typing courses for doctors:

- One of the clinics advised sending doctors to typing courses.

Positive experience:

- Most of the clinics expressed their strong satisfaction with the messaging feature that allows better communication channels between the doctors and the front-desk staff.

Final words:

- Difficulties living with a hybrid information system where both paper charts and electronic records are being used simultaneously were noted by all the clinics.
- In sum, all users were satisfied and said that the Wolf EMR is a good system that needs to be developed further. On the whole, no user would go back to paper charts.

2. The community partner's clinic meets the EMR

Major Themes: To study the implementations of Electronic Medical Records (EMRs) at the community partner's clinic.

Research focus: This project is conducted at Mid-Main Community Health Centre which is a non-profit primary care clinic. In 2003, the Vancouver Coastal Health authority chose Mid-Main to be one of the clinics that will receive primary health care transition funds for 3 years. Parts of these renewal initiatives include the implementation of the Electronic Medical Record (EMR). This project focuses on obtaining information about implementation projects of WOLF (EMR).

Key Findings:

- Transition funds provided by the health authority seemed necessary condition for establishing an adequate technical infrastructure necessary for implementing an EMR.
- Establishing a committee that will be dedicated to dealing with daily local challenges and changes is immensely important for providing continuous support of the implementation. Such a committee should constitute representatives of each professional group (i.e. MOAs, GPs).

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School of Communication
K 8659 - 8888 University Drive
Burnaby, BC, Canada V5A 1S6
Tel: 1 604 268 7295
Fax: 1 604 291 4024
Email: act4hlth@sfu.ca
web: www.sfu.ca/act4hlt

- Hiring an IT person, which will be dedicated to providing continuous and daily support is immensely important, especially during the first phases of the implementation. In addition, such a person will be responsible for configuring and adapting the EMR system to the local situated needs.
- Standardization of information to allow adequate synchronization and exchange of information across organizations and IT-systems. The clinic uses various IT systems, in e.g. for labs, Chronic Disease Management (CDM) Toolkit, the EMR, etc. It is therefore important that these systems are connected properly and that information is transferred properly between the various systems.
- The need for better coordination of inter-provincial practices has also been observed.
- It is advisable to provide better support and guidance regarding policies and procedures that should be followed when implementing an EMR. In e.g. clarifying rules and regulations related to paper charts, whether an electronic signature is adequate on legal documents, what to do when the EMR-system is down, etc.

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Simon Fraser University
School of Communication
K 8659 - 8888 University Drive
Burnaby, BC, Canada V5A 1S6
Tel: 1 604 268 7295
Fax: 1 604 291 4024
Email: act4hlth@sfu.ca
web: www.sfu.ca/act4hlt

Electronic Patient Records – Patient Experience

Research Summary

Investigator: Nina Boulus. Nina is a PhD Candidate working with Principal Investigator **Ellen Balka, PhD** on the Theme II sub-project, *Mid-Main meets the EPR: Patient Views of Electronic Health Records*.

Research Projects

1. Patient's experience of the EMR.

Major Themes: To study the patients' perspective of the Electronic Medical Records (EMRs) at the community partner's clinic medical clinic, in Vancouver BC.

Research Focus: The aim of this project was to obtain information about the challenges patients at the community partner's clinic face with the introduction of EMRs. The objectives of this project were two fold:

- Interviews were conducted in order to assess patient's awareness of the new system and explore patient's perception, including a reflection upon concerns, benefits and expectations.
- The researcher had the responsibility to introduce the EMR, including answering questions, clarifying unclear issues, etc., and gather information to develop educational material.

Key Findings:

General reflection on patient's perspective: Most of the patients seem to have a positive perspective, supporting the implementation of the EMR. Other patients were not interested in knowing how their doctor retrieves the information, as long as they could see and talk to their doctor. Finally, a small group of patients signaled resistance/opposition to the EMR.

Patients' concerns:

- *Privacy Concern*: Many patients associate the installation of computers in physicians' offices, to having access to the Internet, which is often associated with hackers, viruses.
- *Privacy Concern:* Confidentiality, privacy and access to medical private information (this concerned is related to "The Patriot Act," which refers to the decision that has been taken by the Ministry of Health to contract out the administration of British Columbia's Medical Service Plan (MSP) and PharmaCare to a U.S. linked company
- *Privacy Concern:* Concerned was expressed regarding sharing information amongst healthcare providers and/or beyond organizational borders. It is often unclear to patients *who* will have access to *which* parts of information.
- Concerns related to technical problems that might arise related to an increase dependency on technology.

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- *Interpersonal Concern:* Loosing eye contact with doctors.
- *Financial Concerns:* too much money is being spent on the implementation of IT, and could be spent on other critical problems in the health sector.
- Concern that technology will lead to unemployment by replacing staff in the clinic.

Benefits mentioned by patients:

- Better and faster access to the most updated information.
- Possibilities for quick search and retrieval of information were expected to contribute to increase efficiency.
- Other benefits mentioned by the patients includes the environmental factors (less papers), saving space, easier to interpret doctor's handwriting, long term storage, the possibility to generate data (e.g. statistical information) for research (e.g. preventive medicine), etc.

Patient's expectations:

- Expectation that information will be shared among the various healthcare organizations (i.e. specialists, hospitals, or other healthcare providers). This expectation was often accompanied by concerns of who will/should have the access to the records.
- Several patients expressed that it will probably take some time to get used to having their doctor sitting with a computer, but that this is just a matter of time. Two patients gave me the example of the ATM-machine when they first came onto the market, and how people had to become familiar with this technology.
- Some patients (especially those with chronic diseases) expected the EMR to help them practice self-care.

Lessons learned: One way to address the various concerns patients have is to create educational material that will be available for patients. Such document could include the following issues:

- Clarify to patients that old paper charts will not be destroyed, at least in the near future. Although we are "entering the *paperless* realm," paper charts will continue to be used for a while.
- Be cautious with the information that will be provided to patients. Many patients expect that the implementation of the EMR will allow the various healthcare organizations (e.g. hospitals, community clinics, pharmacies) to communicate electronically (rather than sending a letter or using the telephone). This benefit, which is the most obvious one to the patients, is the ultimate goal which the system will not be able to deliver. In order to develop more realistic expectations, try to move the focus to the other advantages that will be obtained. For instance, emphasize that the EMR will enhance the way information is gathered, stored, distributed and used; increase access to the most updated information and decrease the time spent on handling activities; support clinical tasks as diagnostic and therapeutic decisions; help manage chronic diseases such as diabetes; etc.
- To address the concern of hackers, clarify to patients that an EMR is a system that is running locally on the clinic's server, and that information does not cross organization boundaries (yet). Explain the differences between Local Area Network (LAN) and Internet connected.
- Address issues related to privacy and confidentiality of access to information.

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