eHealth Systems —User Experiences from Healthcare Workers

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Abstract

This article focuses on practices, perspectives and values by healthcare workers, by analyzing how they experience the use of eHealth systems. The empirical data is from a qualitative case study, is derived from a number of eight participating health clinics use of eHealth systems, by healthcare workers. The analysis shows that by adopting a simple, small-scale and user-oriented approach, and by focusing on the needs and circumstances of users instead of advanced technology, it was possible to reveal domestication of eHealth systems. While these findings cannot be generalized, they provide insight into and shed light on trends concerning the negotiations of healthcare workers with eHealth technology. Themes related to the experience of user interfaces in eHealth systems have generally not been explored in detail. This research thus contributes new insight to the field. This study is significant for more knowledge related to healthcare and use of technology. The promotion of research in this area will provide use and development of eHealth systems that will benefit healthcare workers and patients.

Key words: eHealth system, domestication, technology, work practices, user interface

Introduction

The implementation of information and communications technology (ICT) in the healthcare sector, also known as eHealth, has been claimed as having the potential for drastic improvements in efficiency, quality and safety (Silverstone et.al.,1992; Oh et. al., 2005). To handle the healthcare services in the future is a huge challenge, and technology in healthcare has therefor become a prominent area of focus. Many countries focusing of implementing ICT in the healthcare sector (Aanestad & Olaussen, 2010). There is a need for more research in healthcare services to meet the different needs for the future. Most healthcare workers have direct contact with people, but in the future they have to use technology more often, and technicians and engineers need to develop solutions according to the needs of healthcare workers.

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This article highlights the use of electronic health systems (eHealth) by healthcare workers, using such systems in their daily work. eHealth has considerable potential for improving communication, not simply between the various level of service providers, but also with patients and other users (Andersen, 2013). Use of various technologies is an integrated part of the everyday work for healthcare workers, who must have the digital competence required to actively benefit from ICT in their work and implement it in quality improvement activities (Venkatesh, 2006). Reforms and strategies emphasize the use of ICT as critical, but there are few, if any, standards highlighting the competence required, and for whom. The same also applies to how healthcare workers in all areas of the sector will acquire the competence required to use ICT tools (Andersen & Riise, 2012). Whenever new situations arise, people will always try to find a new resource they can apply and adapt, for use in their everyday lives. This phenomenon is called technological domestication (Silverstone et.al.,1992; Sørensen, 2002; Sørensen, 2006). The technology is integrated into the user's everyday practices, and the user and the user's environment adapt to the technology (Sørensen, 2002; Sørensen, 2006; Venkatesh, 2006). Challenges related to the experience of information from different eHealth systems are also related to the level of quality assurance in the system in question. More research is needed into the specific practices and experiences of users; how are the eHealth systems used, and how do they affect healthcare workers? I believe this article will contribute to highlight challenges healthcare workers face on a daily basis. Is the user interface, aligned with actual use? By focusing on practices, perspectives and values, i want to answer the following question: *What is the healthcare workers experiences in use of eHealth systems?* This article contributes to a stronger focus on and more research into how healthcare workers actually experience the use of various eHealth systems.

Clarification of terms

eHealth information systems should, among other things, encompass both legal and professional principles. They must be good enough, and not be detrimental to the patient's health as a result of patient data being collected and combined electronically. An *information system* (or IS) is a system for the collection, storage, processing, transfer and presentation of information (Oh et al.,2005). In principle, an IS can be completely manual, but the term is often reserved for systems based on information and communications technology (ICT). The term information systems is also used about the field studying the development and use of such systems. *The user interface* of a

computer system makes it possible for a user to communicate with a device (Oh et al., 2005). For computers, user interfaces can be further divided into graphical and textual user interfaces. User interfaces enable intuitive human-computer interaction, in that users easily understand how to proceed to get the result they want from the user interface. Icons, windows and buttons are used to communicate. This encompasses both what we see on the screen and what happens when we click a key or check a box. Most operating systems work this way. In Windows, which is the most commonly used operating system in the health sector, applications rely on graphical user interfaces to communicate. Bevan's *International Standards for Human-Computer Interaction (HCI) and Usability* covers use of the system, user interface and interaction, among other things (Bevan, 2011). Maguire (2001) claims that by developing a user-friendly system, organizations may benefit in many different ways: increased productivity and efficiency, reduced likelihood of documentation errors, reduced costs related to training and user support, and last, but not least, a higher degree of user acceptance.

Domestication

The theory of technological domestication has evolved over several decades. In the early 90s, Silverstone et al. (1992), described domestication as a multi-stage process from acquiring the technology to "taming" it, whereupon it acquires a symbolic value for the user. According to Silverstone et al., the domestication of technology can be observed through four stages.

- Appropriation refers to the point at which the technology is acquired, either by a person or a household.
- Objectification refers to the values and applications attributed to the technology in everyday life.
- Incorporation refers to the process of establishing a pattern of use, and how this develops.
- Conversion refers to the stage where the technology has been fully incorporated into the home and gained a symbolic value for the user

This approach focuses on the processes leading up to the domestication of a technology. According to research (Venkatesh, 2006), domestication requires adaptation, not only to society, but to the individual household as well. Children and adolescents who have grown up with a technology are technologically competent, and use the technology in the most advanced ways

(ibid). Sørensen (2002; 2006) introduced a new perspective on the theory; the technology develops from being impersonal and alien to becoming entrenched—a part of the individual's social and symbolic practice. Technologies that have completed this process will be fully incorporated into the user's everyday life as a domesticated technology. On this basis, Sørensen (2002; 2006) developed a new model, the so-called Trondheim model, which, instead of stages, focused on three different dimensions of the domestication of a technology: the practical, the symbolic and the cognitive.

- *The practical dimension* encompasses the practical use of the technology, including routines and habits related to it. This may also include the establishment of agencies, institutions and companies to aid in the perpetuation or development of use concerning a specific technology.
- *The symbolic dimension* refers to the purpose attributed to the technology, and the philosophy behind this purpose. Technology may also create meaning, in that it can serve as a means by which to establish identity and self-concept.
- *The cognitive dimension* is related to the learning process, or the competence required to use the technology. The cognitive dimension also includes developments in the practical and symbolic dimensions, and therefore does not stand alone.

By focusing on dimensions rather than stages, it highlights the notion that order is not relevant (Sørensen, 2006). This model therefore detached the domestication process from a linear timeline, while retaining the original focus on acquisition, practical use and symbolic value. In addition, the model introduced a learning aspect—the cognitive dimension—that had previously not been made subject to analysis.

Method

This study follows the interpretative and qualitative tradition in social sciences and technology research (Myers, 1997; Myers and Avison, 2002; Walsham, 1993). An interpretive study seeks to acquire an understanding of the context and how the process influences and is influenced by the context (Walsham, 1993). This interpretive research is descriptive rather than attempting to identify causal explanations for the phenomenon.   A qualitative research method addresses the understanding and interpretation of data, which are primarily not in the form of

numbers, and is a well suited method when one wants to examine and describe experiences and knowledge of individuals through methods such as interviews, observations and document analysis (Myers, 2008). I have adopted a case study approach, through analysis and reflection to display the dialog with the practicing and self-reflection related to the challenges, dilemmas and opportunities as a researcher I have met. The research approach enabled me to describe and understand personal meaning, social phenomena and the experiences from people through data collecting methods such as interviews and observations in its natural environments (Thagaard, 2009). The research questions provided the direction for the research method and strategy as the research study addresses the approach related to healthcare workers experiences in use of eHealth systems.

The context of this study is the use of eHealth systems in 8 different clinics in the health care sector. The strategic selection of informants includes a total of 25 men and women between the ages of 20 and 69. When the study began, individuals within health clinics were asked to participate by giving interviews related to my research. In total, 25 interviews with 25 informants were conducted (see table1). The informants were health care workers within different clinics, in hierarchical positions (from operational, administrative or strategic levels), and situated in different geographical locations. Before the interviews started, informants were informed that they at any time could withdraw from the interview without having to give any reasons for it. I recruited random informants of healthcare workers by asking them to participate in the study. Even so, I kept an objective distance from the healthcare workers included in the study by only engaging with them during the actual interview.

Table 1

Informants, ages, sex, position

Informants	Women	Men
No.	20	5
Age		
20–29	1	
30–39	7	1
40–49	9	1
50-69	3	3
Field	Physician,	Physician,

nurse,	community worker,
unit director,	comptroller,
specialist nurse,	nurse
consultant,	
dental clinic director	

This study has made use of interviews, observations and literature reviews. The interviews were structured by an interview guide, which directed the conversation. Digressions varied from user to user. The individual interviews focused on opinions, perceptions and experiences. It was also possible to interpret the responses, how the responses were given, and the body language of the informants. I have also sought to reveal both complexity and diversity in responses given during the interviews. The aim of using observation techniques was to gain knowledge and obtain data on the interaction between the healthcare workers and different eHealth systems. This was done by observing the different informants in situations like using eHealth systems and telephone. By observing the informants as active participants, I wanted to explore the tension for the healthcare workers active use of technology and the different eHealth systems.

Most informant are between the ages of 40 and 49, however, age was not a factor in the selection of informants; I chose individuals who are active users of the eHealth systems. Empirical data cover gender, age, age range, and user experiences from eHealth systems. I choose to interview the informants from their various educational and competence backgrounds. The informants work in various units within the healthcare sector. Several also have work experience across units. Some informants work in administrative positions, whereas others are directly involved in patient care. All informants have experience with the systems from clinical work, and we must emphasize that several of the systems are used by all informants, but with varying levels of functionality, access and areas of interest. As part of the study, large numbers of documents from reports, strategic documents and manuals have also been reviewed and analyze (see table 2).

Table 2

Activities related to the collection of data, as well as the total number of informants.

	Women	Men	Total
Interview	20	5	25

Literature review	eHealth strategic documents	Reports,	>50
		memos	
		other documents	
eHealth systems	Electronic patient record:		

Use of the eHealth systems has been studied in the appropriate context: how healthcare workers use eHealth systems and their work practices for finding, saving, deleting and documenting information. The informants have listed using the following eHealth systems in their daily work:

- DIPS: Distributed information and patient data system in hospitals.
- Docmap: System for procedure and non-conformity management.
- AMIS, emergency medical information system: booking emergency transport.
- NISSY, national information system for patient travel: booking patient transport.
- PARTUS: used by midwives to report on birth process.
- Clockwork: used to order consumables for the units.
- Profil: electronic patient record.

None of the systems "communicate", and each requires system-specific training. DIPS is the only system tailored for clinical hospital operations. Docmap, for example, is also used in shipping and the petroleum/offshore and logistics industry. The system has not been designed specifically for the health sector and its users. The informants use several different eHealth systems to ensure that their jobs are carried out and properly documented.

User interface experiences

All informants received training in Profil before the system was implemented. This training was given in the form of classroom instruction. Some informants later expressed that what they really needed, was to sit at a computer, training with the help of colleagues who are familiar with the system, as the use of Profil requires coming to grips with a lot of new terminology, new buttons and a new approach to developing a care plan. None informants had any issues with the colors or fonts. Several informants reported problems with system lag, e.g. in moving from one report to

the next, shortcut buttons suddenly disappearing, problems remembering how to get these shortcuts back, and last, but not least, users find Profil opaque and hard to navigate. One informant (55 years old, unit director with HR, documentation and professional responsibilities) stated:

> *"I think the system has a poor user interface. One of the key criteria for a successful professional discourse is a shared understanding, and this is hard to achieve when many of our employees don't see the value of technology as part of the service. They find it difficult. I have previously used DIPS in connection with my work, and I found this to be much more user-friendly and intuitive, even for those who are not so tech savvy. Personally, I find that the organization of information in the various eHealth systems is good, but we should have had a single access portal that does not discriminate between users."*

The informants who work as assistant nurses explained that they usually only read/write reports, but that they contribute in the development of care plans. Nurses report having a hard time remembering all their tasks: even simple IPLOS registration requires them to enter information in a number of places in Profil. These informants also report that the form section of Profil is "confusing", as it is difficult to find the right form. None informants had used the help function; they preferred asking colleagues. The informants also had perception of information in the eHealth systems. One informant (55 years old, administrative employee with financial responsibility, super-user on the systems used at the clinic) reported that:

> "*the clinic has systems used for patient care, and systems used for daily operations. For patient care they use DIPS, which is a patient record. Everything related to treatment and care is registered here. When the patient comes in, we write an admissions memo. We also write examination plans, record the patient's health history, write treatment plans and individual plans, nursing reports, a continuous patient file and a discharge summary when the patient is discharged. We also enter diagnoses and procedure codes. When we take blood samples, we record this in DIPS. It's also possible to write prescriptions, sick leaves, medication certificates and various NAV and Norwegian Health Economics Administration (HELFO) forms.*"

Another informant (39 years old, working in the emergency room, using the eHealth systems Winmed/infodoc) reports that:

"We document everything said over the phone, or in person, and if the patient is seen by a doctor, it automatically sends a discharge summary to his or her primary care physician."

The employees also make use of HELFO's website to determine who their patients' primary care physician is, as not all patients know this. This information is necessary in order to send the discharge summary to the right person.

Analysis

Qualitative methods helped me gain an understanding of how eHealth systems are used, with the help of domestication as a theoretical approach. According to Thagaard (2009), qualitative methods must have a certain degree of flexibility, which a semi-structured approach offers. The questions were designed to invite informants to reflect on the themes addressed in the questions and provide comprehensive answers (2009, p. 91). In order to achieve this, I considered which circumstances would establish a safe and relaxed atmosphere between me as a researcher and the informant, a factor Walsham also emphasized (Walsham, 1995a, 2002, 2006). It was important for me to be self-critical and aware of my own norms and attitudes. Such a reflective posture is essential in order to provide the empirical data with an analytical interpretation. Thagaard (2009) points out that it is essential that you are able to see the importance of your own role in the interaction with users/informants, empirical data and theoretical perspective. Reflexivity starts with me as a researcher's own understanding, based on previous personal and professional experiences. In addition, expectations about how things are, what is to be explored, and the motivation and qualification to explore the field. In addition, perspectives and the theoretical basis in relation to the researcher's education and interests are required (Malterud, 2001, p.484). According to Walsham (1993, p.14) "case studies provides the main vehicle for research in the interpretive tradition". The survey was based on the informants' feedback on their work practices and use. All of the interviews are transcribe[2], and the informants were anonymize. Their responses gave me insight into how they used the eHealth systems, and the manner in which they chose to use them. The informants had a much higher level of reflection and were far more critical of the eHealth system than expected. In qualitative interviews, it is important to protect the integrity of the individuals interviewed, both during the interview itself and afterwards, when the results are

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[2] The text has been translated from Norwegian into English by one of the authors.

presented and interpreted. In an interpretive perspective, I has been involved in both the collection and the interpretation of the data, and these activities have consequently been subject to me as a researcher's subjective assessment. Walsham (2006), therefore pointed out that one must be aware of the risk of becoming blind and biased, less critical of special events, in that much is taken for granted when the researcher becomes "socialized to the views of the people in the field and thus loses the benefit of a fresh outlook on the situation" (p.322). Researchers must maintain an open dialogue concerning their research. According to Myers (2008), qualitative research methods are designed to help researchers understand people and the social and cultural context within which they live. Walsham (2002), emphasizes how important it is for interpretive researchers to have insight into his/her own role in the complex process that emerges between people.

As for the user interfaces of the various eHealth systems, employees point out that a computer application called "phone support for emergency healthcare workers", employees can get advice related to the symptoms of those who call in, what advice to give, who needs to be seen by a doctor, who needs an ambulance, and how urgent something is. In general, informants report finding the eHealth system more time-consuming than the old system of keeping patient records on paper. Even something as simple as changing the phone number of a resident's next of kin can be challenging in Profil; the informants say they don't know how to do this. Profil links to PPS (practical procedures in nursing) and to the Norwegian Catalogue of Medicine (Felleskatalogen), which the informants found useful. PPS is perceived as user-friendly, transparent and always up to date. Whenever an area is not covered by PPS, the nursing home has its own procedures. The informants reports knowing where the procedures are, but they do not read them. Informants who are nurses report that they rarely use the electronic messaging functionality to contact physicians; they prefer calling to get the correct dosage of Marevan, giving messages, etc. They have a direct line to the clinic that lets them "cut in line", and the informants report they find this approach more cost-effective than filling in the form of the electronic messaging service and waiting for a reply. Also, the replies go to the unit supervisor, who forwards them to the relevant nurse. Home care nurses use the system more regularly, but primarily for prescription renewals.

All informants wanted a way to communicate electronically with the local hospital to eliminate the problem of having loose paperwork everywhere. In addition, this paperwork is often

sent through inconvenient channels, often by fax. Papers from the hospital are not scanned into the patient file at the nursing home, which is another drawback. One of the informants pointed out that age and computer skills are key factors in the use of eHealth systems. The majority of the informants reported that they have observed how those most confident in the use of ICT are often "appointed" to handle ICT-related tasks. Most younger people are comfortable working with computer tools, but computer skills vary considerably among the older employees. The analysis shows that a higher number of male informants would have been beneficial, as it could have shown whether there are any gender differences in how users perceive the eHealth systems they use in their everyday work.

My interpretative approach has a practice-oriented approach which include both epistemological (i.e., related to the nature of knowledge) and ontological (i.e. related to the nature of being and reality) implications (Gherardi, 2006). During my research, I have studied how processes and practices related to healthcare workers use of eHelath systems, but also how they experience this practical use, which calls for an exploratory and interpretative approach. Documentation of health data is mandatory, and registration is primarily digital. Electronic records are hailed as being efficient time-savers, increasing the quality of services. The theory of domestication, based on the practical, symbolic and cognitive dimensions of the Trondheim model (Sørensen, 2006), has been used as a tool to analyze the informants' use of eHealth systems across the health sector. Generally, the informants reported that they usually were able to find the information they needed in the various eHealth systems, but that the process was a struggle due to the complicated nature of many systems. A good user interface for an electronic patient file system will be dependent on who will be using the system, and the situations in which the system will be used. There are many different views of what a good user interface is like, and these views develop over time (Nielsen, 1995; Maguire, 2001; Bevan, 2011). Consequently, there is no point in making detailed demands for user interfaces in this type of standard. Individual suppliers are free to design the user interface of the systems they provide, and it is up to the individual organization to consider which supplier has the best user interface for their needs. This type of standard therefore only specifies a few major requirements deemed relevant for all types of user interface. One should note, however, that while this basic standard does not include specific user interface requirements, such requirements may be specified in various content standards. This survey focuses on the

situation in the healthcare sector. The use of technology and various eHealth systems is part of the work practices of all informants.

This analysis shows that the negotiations users have with technology on their own, both at work and at home, is designed in different ways. Silverstone et.al., (1992), pointed out that whenever new situations arise, people will always try to find a new resource they can apply and adapt for use in their everyday lives. He called this technological domestication. When this is job-related, it may be related to a lack of standardization or a basic structure, and that too much has been left up to the developers and the individual units (e.g. nursing home, home care nurses, etc.), allowing them to design the features that work best for them. In a home setting, technology is used as a naturally integrated part of the user's everyday life, and the user and the user's environment adapt to the technology (Sørensen et al., 2002; Sørensen, 2006).

Findings

The findings are in detail described in the analysis, however, I will present the ares of questions schematically in table 3. The area of question and answer made in the interview are presented as a schematic overview of the results of the informants. The interviews in the survey included several questions. The questions in the table are presented as + which means: positive, opportunities, or as – which means: challenging, obstacle. The table also shows the number of women and men who have answered and the result of the area of question.

Table 3

Area of questions for the informants

Area of questions*	Women	+	-	Men	+	-
Competence/no competence in use of ICT and eHealth systems		15	5		2	3
Clearly/not clearly defined goals for the job		17	3		4	1
Easy/not easy to find relevant procedure for the job		9	11		2	3
Access/no access to ejournal		19	1		5	
Access/no access to electronic messages, other information		14	6		4	1
User-friendly/ not user-friendly user-interface		12	8		4	1
Critical/ not-critical to eHealth system		13	7		4	1
New/not new work practices in use of eHealth systems		17	3		3	2
New/not new learning processes in use of eHealth systems		18	2		5	

Super-users/lack of super users in use of eHealth systems	16	4	4	1
Training/lack of training in use of eHealth systems	12	8	4	1
Need of more/not more training in use of eHealth systems	17	3	5	
Use of different eHealth systems to document your job	17	3	4	1
Easy/not easy to use form in eHealth systems	8	12	2	3
Challenges using eHealth systems, - your own experiences				
* answer are defined in column + (satisfied) or – (not satisfied)				

Application of the three dimensions of domestication theory made it possible to categorize the findings, even during the analysis, it was able to gain an understanding of the types of responses that were relevant and which could be eliminated (table 4).

Discussion, Conclusion and Implications

The research question: What is the healthcare workers experiences in use of eHealth systems? The findings show that application of the three dimensions of domestication theory made it possible to categorize the findings (see table 4) in three dimensions; the practical, the symbolic and the cognitive dimension.

Table 4

Categorizing of the findings.

Dimension	The practical dimension	The symbolic dimension	The cognitive dimension
	Knowledge in use of ICT in eHealth systems was based on the individual informant's role, skills and authority.	Hard to find a procedure that works for the circumstances.	
	The healthcare workers had clearly defined goals for their work.	eHealth systems created new practices, new learning processes within ICT.	
	Users assessed the information and eHealth systems on their own.		

The practical dimension

Through the lens of domestication, I identified several domestication strategies. For example, while the practical use of the eHealth systems by healthcare workers may be identical, there were many different approaches to the symbolic negotiations with the technological solutions. According to Sørensen (2006), this type of situation elicits different strategies for domestication of the technology. Some informants used the eHealth systems to achieve specific goals, such as documenting, finding and/or saving data. All of the informants reported that they sometimes did not know exactly where to log data in the running report, and they also found it difficult to read reports, due to the incoherent structure of documenting things in different places. Access administration, i.e. giving an employee access to Profil, requires many, many "keystrokes" before access is granted. For example, the same information has to be entered twice, in different modules, which makes the system difficult to use, and a lot of time is wasted. Many of these problems could have been saved by simplifying the process. Sørensen (2006), points out that the introduction of new technology is meaningless until it is "put to work and given meaning" (p. 23). Other informants used eHealth systems because they wanted to learn more about different diseases and how different types of medication could contribute to improved health. Some informants used the eHealth systems to maintain their own level of proficiency in the use of various eHealth systems. According to Andersen & Riise (2012), the use of ICT is emphasized throughout national reforms and strategies, with no clear guidelines as to which kinds of competence are required, and for whom. The overall impression was that knowledge of the use of technology and various eHealth systems was based on the individual informant's role, skills and authority. Something that became clear over the course of this study into the work practices of healthcare workers, was the level of individuality enabled by the technology. The healthcare workers had clearly defined goals for their work. They carried out their work on their own, they used the eHealth systems on their own, and they assessed the information on their own. None of the healthcare workers made use of the eHealth systems a joint task for colleagues to work on together. It became clear that several different decision support systems were in use within a single clinic, and these systems were crucial for both quality and operations. According to Langøen (2003), decision support systems are systems providing information, knowledge or recommendations to healthcare workers in a format tailored to the decision-making situation. Decision support systems are intended to fill the role of expert helping the inexperienced, but most decision support systems "are most useful for

healthcare workers who have enough experience to recognize when the advice provided by the application is relevant, and when it is not (Langøen, 2003).

The symbolic dimension

While the practical use of the eHealth systems is relatively similar from one informant to the next, the meaning behind this use may differ considerably. By emphasizing the symbolic dimension, we can identify the meanings and purposes informants attribute to their use of the eHealth systems, as well as the values these represent. Both Dips/Partus and Docmap are supposed to aid in ensuring the quality of the treatment patients receive by registrations in the electronic patient file and updated procedures. However, all informants report that the search process is difficult and yields poor results, and that the help provided by the "help functionality" of the systems in question yields poor results. All of the eHealth systems specified above require dedicated user access in the form of username and password. In practice, this constitutes a major problem, in that the systems you use least often are the ones where you are most likely to forget your log-in information and password. This is a recipe for user frustration. Applications for user decision support are too "advanced" and time-consuming to learn and navigate. Langøen (2003), points out that this is not caused by a lack of information, but rather by "information overflow". If a computer system can assist the healthcare worker in retrieving the information needed in the moment when it is needed, we have a decision support system. The fact that the various systems don't "communicate" and that some are not up to date, poses a challenge for system users. In order to create and maintain a good system for the individual unit, one or several individuals with sufficient resources and knowledge of the system, so-called superusers, are required. Docmap is particularly vulnerable, as unit operation takes priority over time with superusers. The informants report that they try to reduce their use of Docmap due to the difficult searching functionality. It requires good search terms, log-ins, document cataloguing, etc. Without log-in credentials, users risk getting a high number of results, and some of them will be irrelevant to the search term. If the unit where the employee works does not have a dedicated procedure, the same applies (both with and without log-in credentials). Users have a hard time finding a procedure that works, as well as determining which procedure is the right one for their circumstances. In addition, it is a drawback that it is not possible to link a procedure from Docmap to the patient's treatment plan in Dips, for example for the purpose of documenting and describing the procedure to be used in the patient's

treatment. According to Andersen (2013), eHealth systems hold considerable potential for improving communication, not simply between the different levels of service providers, but also with patients and other users. Some systems are compatible with Dips, but these have not been implemented. This also applies to Practical procedures in nursing (PPS). Every procedure specifies one or more areas of application, which means that if a procedure is not applicable for the unit where you work, it should/must not be used, as it is not approved for use in that particular unit. For example, Docmap does not require technical nursing procedures to be evidence-based, and despite the availability of a template and a "required" format, we see that this is not consistently applied. It is also important to point out that for the most experienced nurses, the decision-making process is different from that of more inexperienced nurses. While the practical use of the eHealth systems is relatively similar from one informant to the next, the meaning behind this use may differ considerably. In other words, domestication of eHealth systems created new practices, which, in turn, created different symbolic values and new learning processes within technology and communication. This is in line with previous research (Sørensen, 2002; Sørensen, 2006), which points out that the technology is integrated into the user's everyday life, and the user and the user's environment adapt in response to the technology.

The cognitive dimension

Domestication theory can contribute to an understanding of how and why eHealth systems are used, including the user's experience. Among other things, one would be able to determine which practices, values and perceptions are at the heart of the domestication of eHealth systems. According to Sørensen (2002), a domestication perspective will be focused on *why*. The Municipal Health Services Act requires each municipality to plan, organize and facilitate for healthcare workers to be able to uphold their record-keeping obligations and duty to perform their jobs safely. Furthermore, municipalities are obligated to provide necessary training in all electronic systems implemented (Aune, 2007). The goal of several electronic patient file systems is to boost efficiency and improve the quality of patient care. However, most evaluations into electronic patient file system implementations show that the expectation of hospital administrations rarely correspond to actual results. The informants had differing perceptions of the systems described. Dips is perceived as a good and intuitive system, but there is potential for improvement in the technical solution. For example, informants request more information boxes. Dips is also used

differently from unit to unit. Some units use the treatment plan, whereas others do not use this functionality at all or only to a limited degree. With training and a greater understanding of the shared benefits to using the treatment plan, the system could potentially be used by more users, which would also improve the quality of nursing documentation. One informant reported that the user interface of Dips was too advanced and complicated. As a result, the system was rarely used; it took too long to find the information users wanted (the help button), and users didn't use it (Nielsen, 1995).

To gain a better understanding of the eHealth systems, I looked into whether any existing practical domestication strategies, could be identified in the work practices of healthcare workers. Through the interviews, I gained an understanding of why the informants acted the way they did. Also I gained insight into their work practices, which could explain some of the choices they made. This stage yielded the highest number of digressions, in that the informants usually started reflecting on their own use and what this entailed. Commonalities in the interviews include informants reporting varying and inadequate training in the use of the systems specified. Several informants wondered whether the system could reduce documentation quality, resulting in a poorer outcome for the patient. Also, could poor training of healthcare workers potentially reduce digital communication between professional groups? The survey showed that there are considerable organizational and didactic challenges associated with the practical implementation of the eHealth system Dips. It seems to have been implemented without any follow-up. Ordinary healthcare workers who are also users, experience that they are often asked to train others. The survey showed that there are key areas of competence or knowledge users either have to have or must acquire in order to achieve optimum use of the system. One of the informants believed use of the eHealth system could result in additional work. According to Langøen (2003), this can sometimes be resolved by the healthcare workers dedicating themselves to ensure that they get sufficient training in the eHealth system to ensure that all use is optimized and rational. Sørensen (2002), emphasizes that domestication of technology leads to new practices, perceptions and cognitive skills and new learning processes within technology and communication among users.

Generally, the informants reported that they usually were able to find the information they needed in the various eHealth systems, but that the process was a struggle due to the complicated

nature of many systems. A good user interface for an electronic patient file system will be dependent on who will be using the system, and the situations in which the system will be used. There are many different views of what a good user interface is like, and these views develop over time. Consequently, there is no point in making detailed demands for user interfaces in this type of standard. Individual suppliers are free to design the user interface of the systems they provide, and it is up to the individual organization to consider which supplier has the best user interface for their needs. This type of standard therefore only specifies a few major requirements deemed relevant for all types of user interface. One should note, however, that while this basic standard does not include specific user interface requirements, such requirements may be specified in various content standards. This survey focuses on the situation in the healthcare sector. The use of technology and various eHealth systems is part of the work practices of all informants.

The lack of communication between eHealth systems shows that the standardization process has failed, and the different systems do not communicate. Norway excels at implementing and developing information technology. Those who are young today will be even more focused on using this technology than the adult generation (Official Norwegian Report 2011:7). Health service operators have to stay on top of new developments to satisfy the demands of these future users. The share of seniors in the population is increasing, but we see that it can be challenging to meet the needs of senior users in these eHealth systems. Older users are not necessarily proficient users of technology, and they sometimes struggle to perform various tasks, such as making a doctor's reservation online. In applying the theory of domestication, the aim was to examine why the informants use the eHealth system. The empirical data showed that various domestication strategies were applied, For example, while the practical use of the eHealth systems by health care workers may be identical, there may be many different symbolic reasons for their use. This situation leads to different ways of domesticating technology. Some healthcare workers used the eHealth systems to achieve specific goals as part of their work. Other informants used eHealth systems because they wanted to learn more about different diseases and how different types of medication could contribute to improved health. Others still used the eHealth systems to maintain their own level of proficiency in the use of technology in connection with various eHealth systems. Informants mention training as a weakness in all eHealth systems. I find that proficient users require systematic training, preferably as early as possible in the initial period of employment. I

also find that repetition is always necessary to maintain knowledge, especially if there are systems one uses less frequently. Technological domestication focuses on the interaction between humans and technology, where technology is "tamed" and implemented in the user's practical and sense-making everyday life (Sørensen, 2002). Generally, findings from the interviews on the view of healthcare workers of their use of eHealth systems shows little variation. Informants report that they are satisfied with the appearance of the eHealth systems, but that they would like the different eHealth system to communicate with each other. Aanestad and Olaussen (2010) argue that this is typical, yet new projects attempting get the different health service providers and eHealth systems to communicate are developed all the time. This situation is challenging for all informants in their everyday work, in that they have to find secure alternatives to share patient information among themselves and between the different health service operators.

Conclusion

This survey has revealed the roles eHealth systems play in the work practices of healthcare workers, how the technology is used, and why. This research thus contributes new insight to the field. This study shows that training plans, additional technical solutions and a simplified user interface could result in more widespread and proper use of the eHealth systems. Technology use in the form of eHealth systems in the healthcare sector makes it possible to allocate more human resources where they are most needed.

Domesticated technology that has been attributed with meaning beyond the technical can be perceived as a fully integral part of everyday life. Healthcare workers have always recorded health-related information and part of their work practices with pen and paper, such as reports, discharge summaries, logs, etc. eHealth systems offer a way to do this by technological means, even at an individual level. The challenge lies in the experience of control provided by information alone, in that information should also be assessed subjectively. In addition, we cannot necessarily control who else has access to the information we register in the eHealth systems. The question is whether it is able to generate a higher quality in patient care and improved communication between professions. This study shows that the more flexible the eHealth system, the easier it is for healthcare workers to use the technology to meet their needs.

Implications

While these findings cannot be generalized, they provide insight into and shed light on trends concerning the negotiations of healthcare workers with eHealth technology. Themes related to the experience of user interfaces in eHealth systems have generally not been explored in great detail. The disadvantages using descriptive research is that this study may not be 'repeatable' due to their observational nature.

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