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MARILLA PALMÉN

*Midwives, Families and
Everyday Health Information
and ICT Interactions*

Exploration of Identities and Social Networks

PUBLICATIONS OF THE UNIVERSITY OF EASTERN FINLAND
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Dissertation

ABSTRACT

In Finnish health care, the documentation of patient data today is carried out by electronic means at all levels of care. For many health professionals, the compelling question is no longer whether to accept or resist the use of information technology, but rather how to adjust to it without losing one's identity as a care worker and how to bring in the information technology dimension in the care worker's identity. Furthermore, health care clients increasingly employ information and communication technology (ICT) to advance their health and wellbeing, which has led to a gradual but significant change in the ways health care professionals and clients relate to each other, and how health care clients relate to the world around them. How this affects health care clients' pattern of use of health services and what the consequences are for service providers are important issues that are still not fully understood.

Taking the perspective of everyday life information and ICT use in health care, the aim of this research is to describe how health care workers and health care clients interact with health-related information and ICT. The research focuses on two areas in these interactions: how health care workers and clients construct information- and ICT-related identities and how they form ICT-supported health advancing social networks. The research examines these questions in the context of Finnish maternal and child health care.

The dissertation is based on three peer-reviewed articles and a summary part. Empirical qualitative data was collected on three separate occasions during the research process. The research participants were midwives and maternity care nurses (n = 16), families with young children (n = 8), and mothers with newborn babies (n = 7). The data collection methods were longitudinal focus groups,

virtual focus groups and thematic interviews. Moreover, the method of narrative literature review was used.

The findings show that in their everyday interactions with health information and ICT, both health care professionals and maternity care clients actively constructed information- and ICT-related identities. These identities were based on professional affiliations, age, self-evaluated competencies and membership of peer groups. Also, the study provides an empirically grounded description of the structures, contents and tools in social networks that families form in the context of their everyday lives when advancing their health and wellbeing. Three kinds of networks emerged as particularly relevant in analysing families' everyday health advancing activities, each of them with a particular flowing constellation of network actors, tools and resources. *Patient-centric networks* are networks formed by families as health and human service users in interaction with the official Finnish health care system, which includes health and human service providers in the public, private and tertiary sectors. *Consumer-centric networks* are networks in which the core structures are formed by families and the numerous commercial services available to them. *Citizen-centric networks* are the most holistic networks extending to any area of life outside the formal health care system and commercial services that a family interacts with while seeking to advance its health and wellbeing.

The research presents a new approach and contributes to the knowledge of health-related information and ICT interactions as socially constructed phenomena through the pragmatic actions and situated use of information and technology, both in maternity care organizations and in the everyday lives of families with children. The findings also contribute to the knowledge of families' approaches to seeking health information and ICT use by employing a network perspective. The study makes practical contributions to the field of health services development including suggestions to improve ICT skills training in health care organizations and suggestions on how the role of primary care maternity care clinics could be reorganised to meet the needs of families today.

Keywords: Health communication, Health information technologies, Maternal and child health services, Social identity, Social networks

Palmén, Marilla

Kätilöt, perheet ja arjen vuorovaikutus terveystiedon ja tieto- ja viestintätekniiikan kanssa. Tutkimus identiteeteistä ja sosiaalisista verkostoista. 91 s.

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Väitöskirja

ABSTRAKTI

Suomalaisessa terveydenhuollossa asiakastiedot kirjataan sähköisesti kaikilla terveydenhuollon tasoilla, sekä julkisella että yksityisellä sektorilla. Keskeisin kysymys monille terveydenhuollon ammattilaisille ei ole enää hyväksyäkö vai hylätä tietotekniikan käyttö, vaan pikemminkin miten sopeutua siihen menettämättä hoitoa antavan työntekijän identiteettiä ja miten liittää hoitavaan työhön tietotyön ulottuvuus. Myös terveydenhuollon asiakkaat käyttävät tieto- ja viestintätekniiikkaa lisääntyvässä määrin edistäessään terveyttään ja hyvinvointiaan, mikä on johtanut asteittaiseen mutta merkittävään muutokseen tavoissa, joilla terveydenhuoltohenkilöstö ja asiakkaat kommunikoivat keskenään. Miten nämä tekijät vaikuttavat terveydenhuollon asiakkaiden palvelujen käyttöön ja mitä seurauksia niillä on palvelujen järjestäjille, ovat ilmiöitä, joita ei vielä täysin ymmärretä.

Tutkimuksen näkökulmana on arkielämän tiedon ja tieto- ja viestintätekniiikan käyttö terveydenhuollon kontekstissa. Tutkimuksen tavoitteena on kuvata, miten terveydenhuollon työntekijät ja terveydenhuollon asiakkaat toimivat vuorovaikutuksessa terveystiedon ja tieto- ja viestintätekniiikan kanssa päivittäisessä elämässään. Tutkimuksessa tarkastellaan erityisesti kahta vuorovaikutuksen osa-aluetta: miten terveydenhuollon työntekijät ja asiakkaat konstruoivat tietoon ja tieto- ja viestintätekniiikkaan liittyviä identiteettejä ja miten he muodostavat tieto- ja viestintätekniiikalla tuettuja terveyttä edistäviä sosiaalisia verkostoja. Näitä kysymyksiä tarkastellaan suomalaisen äitiys- ja lapsiterveydenhuollon kontekstissa.

Väitöskirja muodostuu kolmesta vertaisarvioidusta artikkelista sekä yhteenvedosta. Tutkimuksessa kerättiin empiiristä laadullista aineistoa kolmessa eri vaiheessa tutkimukseen osallistuneilta terveydenhuollon työntekijöiltä (n = 16), pikkulapsiperheiltä (n = 8) sekä äitiysneuvolan asiakkaana olleilta vastasyntyneiden lasten äideiltä (n = 7). Aineistonkeruun menetelminä käytettiin pitkittäisiä ryhmäkeskusteluja, virtuaalisia ryhmäkeskusteluja sekä teemahaastatteluja. Lisäksi tutkimusmenetelmänä käytettiin narratiivista kirjallisuuskatsausta.

Tulokset osoittivat, että toimiessaan vuorovaikutuksessa terveystiedon ja tieto- ja viestintäteknikan kanssa sekä terveydenhuollon ammattilaiset että äitiyshuollon asiakkaat konstruoivat aktiivisesti niihin liittyviä identiteettejä. Nämä identiteetit perustuivat tiettyyn ammattiryhmään kuulumiseen, ikään, itsearviointuihin kykyihin etsiä ja käyttää terveystietoa ja tieto- ja viestintäteknikkaa, sekä kuulumiseen tiettyyn vertaisryhmään. Tutkimus tuotti myös empiirisen aineistoon perustuvan kuvauksen perheiden arkielämässään muodostamien sosiaalisten verkostojen rakenteista, sisällöstä ja verkostoissa käytettävistä tieto- ja viestintävälineistä, kun tavoitteena on perheiden terveyden ja hyvinvoinnin edistäminen. Kolme erilaista verkostoa osoittautui merkittäväksi analysoitaessa perheiden terveyttä edistäviä toimintoja verkoston toimijoiden, välineiden ja verkostossa liikkuvien resurssien näkökulmasta. Potilaskeskeiset verkostot ovat verkostoja, joita perheet muodostavat toimiessaan suomalaisten sosiaali- ja terveystieteiden käyttäjinä, joko julkisella, yksityisellä tai kolmannella sektorilla. Kuluttajakaskeiset verkostot ovat verkostoja, jotka muodostuvat perheiden verkostoituessa erilaisten kaupallisia hyvinvointi- ja terveystuotteita tarjoavien palveluntuottajien ja -myyjien kanssa. Kansalaiskeskeiset verkostot ovat kokonaisvaltaisimpia verkostoja, joita perheet muodostavat edistäessään terveyttään tai hyvinvointiaan millä tahansa varsinaisten terveys- ja hyvinvointipalvelujen tai -tuotteiden ulkopuolisella elämänalueella.

Tutkimus tuottaa uutta tietoa ja uuden tavan tarkastella tieto- ja viestintäteknikan kanssa vuorovaikutuksessa toimimista sosiaalisesti konstruoituna ilmiönä sekä äitiyshuollon organisaatioissa että pikkulapsiperheiden arkielämässä. Tulokset tuottavat myös uutta tietoa pikkulapsiperheiden terveystiedon etsinnästä ja tieto- ja viestintäteknikan käytöstä verkostonäkökulmasta. Tutkimuksessa esitetään ehdotuksia sovellettavaksi terveystieteiden kehittämisen käytännön työhön, kuten esimerkiksi tieto- ja viestintäteknikkakoulutukseen sekä äitiys- ja lastenneuvolapalveluiden kehittämiseen, jotta palvelut vastaisivat mahdollisimman hyvin tämän päivän perheiden tarpeita.

Asiasanat: terveysviestintä, hyvinvointitekniikka, äitiyshuolto, identiteetti, sosiaaliset verkostot

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1 Introduction

Advanced information technology is changing the scene of health care delivery with consequences that affect the daily lives of all of us. Information technology intertwines with and changes the nature of care given and care received from health care professionals, and affects the ways care is sought by citizens themselves for self-care. Information technology helps hospitals handle medical and administrative data, and it helps citizens to make appointments with their preferred health provider or to seek assistance in monitoring medical conditions and find latest evidence-based information on them. Advanced information technology also offers new ways to deliver health care that are not bound to traditional health service delivery institutions (see e.g. Eysenbach 2008; Swan 2009; Åkesson et al. 2007). All these changes are related to the ways we experience health care today in our daily lives. In this research, my interest is to understand how people interact with health-related information and information and communication technology (ICT) in their everyday lives to obtain, store, retrieve and exchange health advancing resources and how these interactions are reflected in their health information- and ICT-related identities and in their engagements in social networks. This research will examine these questions particularly in the context of Finnish maternal and child health care (see Figure 1).

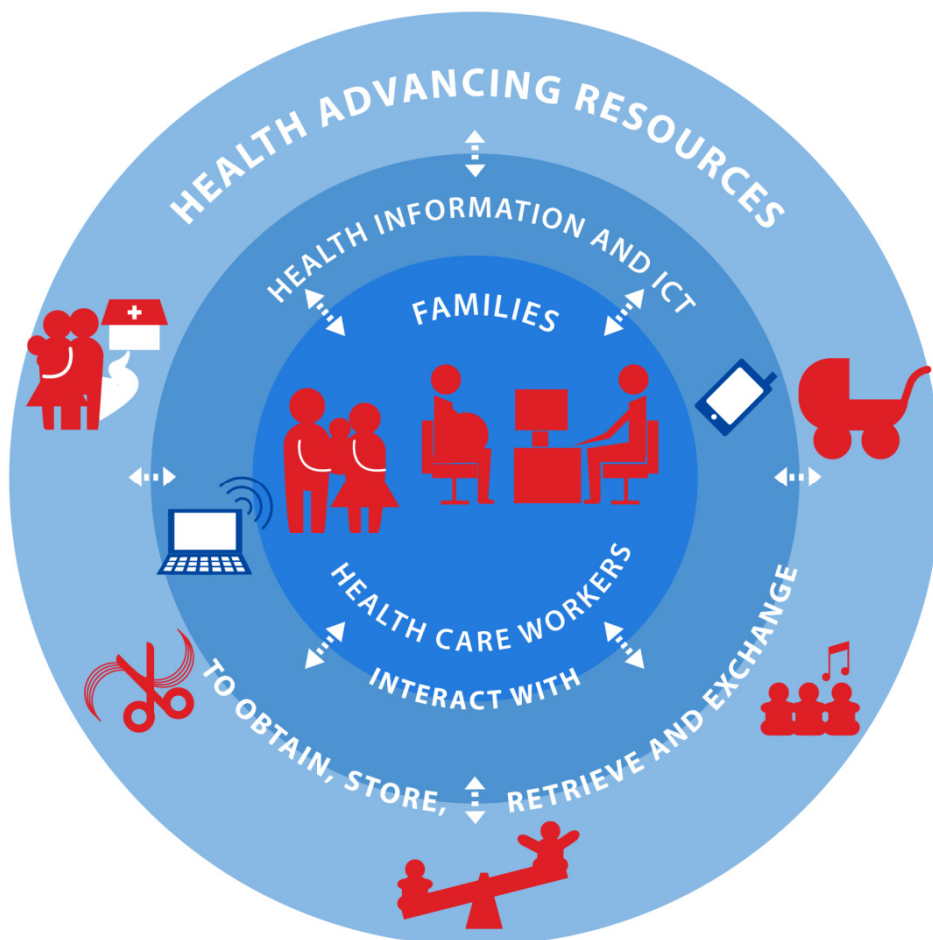


Figure 1: The starting point of this research: Families and health care workers interacting with health information and ICT to obtain, store, retrieve and exchange health advancing resources.

The very origins of this research lie in my profound interest as a phenomenologically oriented anthropologist in bringing up and making visible our lifeworld – the experiences we have of our mundane, daily environment, and the thoughts and emotions that accompany these experiences (see e.g. Jackson 1996; Overgaard & Zahavi 2008; Zuboff 1988). The field I became immersed in was that of health care, and more specifically health informatics. The starting point for this study was to explore how changing information technology is affecting the way health care services are produced and consumed in today’s Finland. More precisely, I was interested in health information- and ICT-related experiences of health care workers and service users in the context of maternal and child health care. Looking back at the research process, I can see

now that my implicit aim in this research has been to find alternatives to some widely used frameworks in the study of ICT experiences in organizations including hospitals, such as the technology acceptance model (TAM) (Davis 1989; Ammenwerth et al. 2003) and the fit between individuals, task and technology (FITT) framework (Ammenwerth, Iller & Mahler 2006). Since the beginning I have felt that these kinds of approaches were too narrowly tied to the organizational management perspective and therefore served very particular interests without giving possibilities for research participants to have their voices expressed and heard outside these interests.

As the research process unfolded, what started to interest me particularly was how my respondents constructed their technology-related identities through narration of their experiences of technology and service use, and how seeking health information affected their formation of social networks in the context of their everyday life. In this research, I understand identity as a socially constructed reality of self and the research is built around the idea that identities can also be constructed along the dimension of information and ICT use. The formation of identities is understood as a process of active reflection and interpretation of experiences in the context of people's everyday lives. Social networks are seen in this work primarily as structures that enable the flow of resources in people's everyday lives. In other words, my emphasis is on depicting social networks specifically from the point of view of how health-relevant factors such as disease, information and social support flow between network actors that people actively form and sustain.

The study of information and ICT use in the context of health care is justified by several factors that contribute to its growing importance in people's everyday lifeworld. From the organizational and health care workers' points of view, for example, it is a fact that the nature of health care work has changed dramatically in the past few years as paper-based technologies have been replaced with digital information systems (Hartikainen et al. 1999; Hämäläinen et al. 2009; Winblad et al. 2012). Health care professionals today are not only care workers, but also IT workers. In Finnish health care services, all patient data documentation is collected and stored by electronic means at all levels of care, both in the public and the private sector (Winblad et al. 2012). For health professionals, the crucial question is no longer whether to accept or resist the use of information technology, but rather how to adjust to it without losing one's identity as a care worker and how to bring the IT dimension into the care worker's identity.

Also, health care clients are increasingly willing to use ICT to advance their health (Åkesson et al. 2007). This has led to a gradual but significant change in the ways health care professionals and patients relate to each other (Swan 2009). In the past, health professionals used to be the authorities who passed knowledge of diseases and symptoms on to their patients. Today, knowledge in

health care has become subject to a process of interpretation, and there is less ultimate certainty in knowledge. Our culture is increasingly based upon a ceaselessly interpretative notion of knowledge (Smith 1986) as the most recent health- and wellbeing-related information is easily and quickly available to everyone interested. How this affects patients' pattern of use of traditional health services and what the consequences are for service providers are important issues that are still not fully understood.

Behind the nearly ubiquitous coverage of information systems in the health care sector, policymakers and health service management have a long-term interest to exploit the full potential of ICT in order to improve service equality, efficiency and effectiveness (OECD 2010). In the Finnish health care planning and management sectors, this interest has been expressed again recently at the national policymaking level through the current National Development Plan for Social Welfare and Health Care ("Kaste Programme"), which explicitly aims to promote the use of "information and data systems in support of clients and professionals", giving ICT development a high priority in the current Ministry of Social Affairs and Health agenda (Sosiaali- ja terveystieteiden ministeriö 2012). The government has also invested heavily in health care ICT development in the past few years, which is a topic for heated and ongoing discussions in today's Finland (Valtiontalouden tarkastusvirasto 2011). At the local level, where services are created and provided by local health care practitioners to the community, it has long been recognized that there is a need to create partnerships between practitioners and families to develop the quality and increase the integration of the currently fragmented services (Lawlor & Mattingly 1997; Raussi-Lehto et al. 2011). The rapidly developing ICT may play an important role in this.

The work for this thesis started back in 2006 with the beginning of the first of three sub-studies I conducted during the research process. Sub-studies II and III followed in years 2008 and 2009 and the following years were spent preparing the manuscripts to be published and in conceptualizing this summary part of the research. In this summary, my attempt is to take a look back over the research process during these years and to come up with a new angle to the original research questions I had in mind then. The summary, therefore, is based on secondary analysis of the original empirical data reflected through the literature reviewed in chapter 2 of this thesis.

Finally, this research is inspired by the view that the only parameter that information technologies should be designed, employed and evaluated against is how far they are able to benefit the human condition and "good life" (Stolterman & Croon Fors 2004; Venable et al. 2011). This objective is not self-evident as there is a long tradition of, for example, information system research to ally with businesses to increase business efficiency, effectiveness and competitiveness without questioning the value base driving the research

(Constantinides et al. 2012; Venable et al. 2011). I hope that this work will be seen as a contribution to families' empowerment and self-determination and ultimately to the wellbeing of their children in terms of improved maternal and childcare information and services available to them.

2 Background

The literature review presented in this chapter was carried out as a narrative literature review, known also as a narrative overview (Baumeister & Leary 1997; Cronin, Ryan & Coughlan 2008; Green, Johnson & Adams 2006). Narrative literature review contrasts with qualitative systematic reviews and quantitative systematic reviews or meta-analyses, as the purpose of the review is not to cover systematically a given research topic (Green et al. 2006; Jones 2004). Rather, narrative literature review has typically as its aim to give a comprehensive synthesis of previously published research by summarizing the contents of each study. Narrative literature review may also include critique of the studies included and provide thought provoking ideas and expose controversies in them and may also help identifying research gaps and narrow down a broad research question into a more detailed one. (Cronin et al. 2008; Green et al. 2006.) These have also been the guiding principles in this literature review.

I can best describe the literature review process as a downward spiral. In the beginning, the topics searched were broad and general. In the later phases, the search topics gradually narrowed down and led to the final formulation of the research questions. Originally, my aim was to identify key approaches in looking at ICT interactions as a socially constructed phenomenon on the one hand, and to identify approaches in looking at everyday ICT interactions as a way to contribute to health and wellbeing on the other hand. Also, I decided to cover in the literature review past studies on ICT interactions in the context of Finnish maternity care. Later, the review narrowed down to cover relevant theoretical orientations and research frameworks related to the study of people's health information- and ICT-related identity construction and to the study of ICT-supported social networking in health care. I have noticed that an issue rarely discussed in research reports is how the empirical data at hand also necessarily guides the literature review and the final formulation of the research questions. In this research, the empirical data that had been collected some years before this summary part of the research took place set the stage and directed the literature review to cover certain topics that emerged as more relevant than others.

The main research databases consulted were the Social Sciences Citation Index (SCCI), Education Research Information Center (ERIC) and PubMed. Also, the journals *Annual Review of Sociology* and *Annual Review of Anthropology* were searched manually to look for key review articles on ICT interactions from the social science perspective. Moreover, important past research literature was identified through the reference lists of key literature

identified at the initial stages of the review process. As a general rule, I included in the literature search only studies published in the English language and studies that were published less than 15 years ago, although I made some exceptions to this.

2.1 INFORMATION AND ICT INTERACTIONS AS SOCIALLY CONSTRUCTED

In this study, the role of human agency is underlined as the primary object of interest in studying the phenomenon of human behaviour related to health information and ICT use. The use as well as user experiences' in this research are understood as socially constructed interactions with health related information and ICT. The reason I chose to take a social constructivist approach in the study of human–technology interactions, is the fact that social constructivist perspectives take seriously into account the micro social reality of people's everyday lives as experienced and interpreted by human actors. Also, understanding advanced information technology as socially constructed means that I see technology as a distinctive social practice that can be analyzed also in its own right (Pfaffenberger 1992; Bray 2007). By labelling the approach I have chosen as social constructivism, I am aware, however, that parallel to the many studies conducted under this framework there are plenty of other studies conducted under theoretical frameworks such as phenomenology, symbolic interactionism, structuration theory, ethnomethodology and critical theory that essentially try to capture similar phenomena. If one would like to find an umbrella term that would cover such an array of different approaches, it could probably be "interpretivism" (see e.g. Liker, Haddad & Karlin 1999; Meyers 1997).

Applying social constructivism in the study of technology started gaining popularity some 30 years ago. For example, a research approach called social construction of technology (SCOT) developed by Pinch and Bijker (1984) emerged in the 1980's with its subtopics such as actor-network theory (ANT) introduced by Callon (1986), Latour (1987) and Law (1992) emphasizing the role of users representing different social groups as agents of technological change. In SCOT, the units of analysis are particular social groups (e.g. women, consumers, particular occupational groups) and the analysis is historical. The advantage of SCOT has been its interpretative flexibility which acknowledges that each technological artefact has different meanings and interpretations for various groups (Kline & Pinch 1996). However, SCOT has also been criticized for being superficial and for ignoring those social groups who have no voice in the technology development process and yet be negatively affected by it

(Winner 1993). Another research tradition looking at a particular social groups in relation to technology use are gender and technology studies (Bray 2007). However, as a difference to SCOT and to gender and technology studies, the present study does not address a particular social group nor does it look at long term historical developments of information and ICT use.

Looking at research emphasizing the micro-social realities of technology use within organizations, a family of theoretical lenses understood as social constructivist studies of advanced information technology use in organizations have been popular by and large since the 1980's. The social constructivist approach became widely accepted after theories such as contingency theories and socio-technical system theories holding a deterministic view of technology lost gradually their popularity (Leonardi & Barley 2010; Matusik & Mickel 2011; Orlikowski 2010). The social constructivist approaches to technology use emphasize the role of human agency in shaping the environment to achieve goals (Fulk 1993; Leonardi & Barley 2010; Matusik & Mickel 2011). What constructivist perspectives have in common is the view of social action as the driving force for organizational change during technology implementation. This social action comprises of people's responses to both the technology's constraints and affordances, and to other people (Leonardi & Barley 2010). The early focus of these studies was on how individuals' attitudes about and interpretations of technology shaped technology pattern and use. Gradually, the interest grew also past an individual level of analysis to include issues such as the role of organizational politics in the dynamics of technology implementation.

Leonardi & Barley (2010) have argued that studies understood as social constructivist studies of technology implementation are actually a family of different research orientations that can be further grouped in five different perspectives: perception, interpretation, appropriation, enactment and alignment (Table 1).

Table 1: Summary of perspectives on the social construction of technology implementation (Leonardi & Barley 2010).

	Perception	Inter-pretation	Appro-priation	Enactment	Alignment
Phase of implemen-tation	Adoption	Use	Use	Use	Adaptation
The social pheno-menon cons-tructed	Attitudes, beliefs, values	Schemas and frames	Patterns of deviation and conformity	Work practices	Roles and relation-ships
Cons-truction process	Social influence	Trans-ference	Intra-group interaction	Situated improvi-sations	Inter-group interaction

In the *perception perspective*, the focus of technology use is in its early phase of implementation, the adoption of technology. The interest of the researches applying perception perspective is on describing how certain groups of users share similar perceptions of a technology’s usefulness, and how these shared perceptions affect whether they will adopt the new technology. The social construction in these studies occurs through the construction of shared attitudes, values, and beliefs among the groups of potential technology users. (Leonardi & Barley 2010.)

In the *interpretation perspective*, the phenomenon of interest is not on explaining why people adopt or don’t adopt certain technology, but rather on describing how people use technology. What affects people’s technology use in this theoretical perspective, are their shared interpretations of the technology at hand, which are drawn originally from another domain. The social construction occurs when people transfer interpretations or cognitive schemas from one domain to another, and thus draws on familiar schemas or frames to make sense of a new technology. (Leonardi & Barley 2010; Orlikowski & Gash 1994.) Meanwhile, in the *appropriation perspective*, the object of analysis is to understand how technology users conform or deviate from designers’ perceptions of how the technology should be used. Interaction inside user groups is where social construction occurs, when group members negotiate how they will use the technology. (Leonardi & Barley 2010.)

Research applying the *enactment perspective* concentrates on technology use similarly to the interpretation and appropriation perspectives. The focus in these studies is, however, not on abstract values or cognitive schemas, but on the

changing work practices of technology users. Social construction is thought of taking place during the daily interactions of users with technology through pragmatic action and situated improvisations. Finally, in the *alignment perspective* researchers are interested in explaining how the structure of an organization adapts to new technology. The view to technology implementation is macro-social. The focus of analysis is on how institutions shape technology use and how the use of a particular technology affects an existing social order. (Leonardi & Barley 2010.)

In the health care domain, plenty of social constructivist studies have been conducted since the 1980's from the organizational point of view (Leonardi & Barley 2010), but less so from the point of view of people's everyday lives. In this study, however, my interest is to explore people's social networks and identities related to the use of technology in their everyday lives. In organizational studies, I feel the closest perspectives to my study are *the interpretation* and *the enactment perspectives*. As explained above, the interpretation perspective focuses on the transferred cognitive frameworks shared in groups and the enactment perspective on the pragmatic actions and situated use of technology, both of which are relevant to this study.

In the context of health care, recent research from the interpretation perspective includes studies on user interpretations of information systems in clinical practice (e.g. Agarwal et al. 2010; Jensen & Kjaergaard 2010; Karsten & Laine 2007) and on stakeholder interpretations of government information technology programmes (e.g. Greenhalgh & Stones 2010). Studies conducted from the enactment perspective include, for example, studies on the process of information systems implementation (e.g. Aarts et al. 2004; Peute et al. 2010) and a study on changing work practices after information systems implementation (e.g. Lium et al. 2008).

The study by Karsten and Laine (2007) is relevant from the point of view of this study, as it explicitly sought the interpretations of different occupational groups (nurses, doctors, unit secretaries, and the system implementation project team) of the electronic patient record (EPR) system that was being implemented in a Finnish teaching hospital. What influenced the interpretative frames within each occupational group were the work role of the particular group in the organization, staff members' knowledge about the new system, and their attitudes towards the old system. The researchers observed that the interpretations differed significantly across the groups, particularly between the administrative/technological staff members and medical professionals suggesting that professional identity may play a role in how users interpret their interactions with information and ICT.

Similarly, the study by Jensen and Kjaergaard (2010) of EPR implementation in two Danish hospitals is also significant from the point of view of the present study, as it underlines the importance of health professionals' identities affecting

the outcome of meaning construction related to technology implementation. In their study, professional identities were constructed and reproduced in the ways doctors and nurses talked about the EPR system implementation, how they interacted with it, and in the amount of resources they decided to put into the system implementation process. In this study, I will carry further this theme of identity construction and how it interacts with health-related information and ICT use both in the world of health professionals and in the everyday lives of health service users.

As a summary, past research on ICT in organizations within the paradigm of social constructivism has been conducted through perspectives such as perception, interpretation, appropriation, enactment and alignment of technology in organizations (Leonardi & Barley 2010). Although this research is not purely a study of ICT in organizations, it bears, however, similarities to the studies conducted particularly from the interpretation perspective, such as the studies by Karsten and Laine (2007) and by Jensen and Kjaergaard (2010). Both studies indicated that health care professionals' identity during an information systems implementation process is an important analytical category helping to understand their relationship to the new technology introduced in the organization.

2.1.1 Identity as a social construction of self

The original approach I had to the research of user experiences was by applying a framework I loosely label as everyday information management. The concept of everyday information management refers to our daily information practices, activities, and experiences: the ways we acquire, store and exchange information constantly while interacting with our everyday environment, including our emotions and feelings. Since the beginning, my emphasis in the research has been on the importance of bringing in the subjective lifeworld of the actors in information management (Croon Fors 2006). The aim of the research at that point was to bring a new angle in the research of everyday interactions and subjective experiences of people interacting with information and information and communication technology in the context of health care.

A turning point for the study was the moment when I understood that asking people about their experiences is actually a two-way process. Through my asking and the respondents answering, we actually engaged ourselves in a mutual process of constructing something new. What started to interest me particularly was how my informants constructed their technology-related identities through narrating their experiences of technology and service use. At the same time, I came to realize that although identity as an analytic category has for long been an important concept in disciplines such as sociolinguistics, sociology, social psychology, media and consumer studies, the topic has been in a marginal position in fields most concerned with user attitudes to ICT and

technology implementation in organizations, such as information systems research (e.g. reviews: Howard 2000; Owens et al. 2010; Nach & Lejeune 2010; Stryker 2008, see also Bamberg et al. 2010; Deaux & Martin 2003; Hogg & Ridgeway 2003; Howarth 2002; Woodruffe-Burton & Elliott 2005).

Identity is understood in this research as a socially constructed reality of self. Through identity, individuals attempt to differentiate and integrate a sense of self along different social and personal dimensions, such as gender, age or occupation (Bamberg 2009). Similarly, this research is built around the idea that identities can be constructed along the dimension of information and ICT use. Identities are constructed through active reflection and interpretation of experiences in everyday life. Identities are not fixed, but something that are routinely created and sustained in the reflexive activities of the individual (Giddens 1991).

By understanding identity as a reflective process of everyday experiences I draw a line between this research and social psychology identity research (Stets & Burke 2000) that focuses explicitly on internalization of social positions within a self-structure such as Stryker's and Burke's identity theory (Stryker & Burke 2000). Rather, the emphasis of this study is more on how social contexts elicit certain identities and shape their meanings as in Tajfel's social identity theory (Tajfel 1981). In other words, the study looks at how mutually shared cultural identity meanings are enacted within everyday situations in which health information and ICT are present.

From a historical perspective, the concept of socially constructed reality of self, or reflexive self-identity, is a product of the age of modernity (Giddens 1991). Through reflexive action the modern abstract institutions are filtered and become building blocks in the task of individual's identity creation. What is special about modern institutions compared to the institutions of traditional societies is their dynamism, the degree to which they undercut traditional habits and customs, and their global impact. Giddens (1991) notes that an important dimension of the modern institutions is their pervasiveness: the way they interconnect the global to the personal and affect the nature of day-to-day social life and the most personal aspects of our experience. It can be argued that advanced information technology is one of such institutions of a modern society. Put simply, in today's world global IT companies create global technological products that are distributed through global markets to globally dispersed consumers (Morley & Robins 1995). These products have become everyday necessities without which our daily lives would be unimaginable and our identities incomplete.

In this research, I also understand identities as narrative identities. In other words, identities are created through language as stories about the self. Identities as personal narratives relate closely to our experiences: they are born out of experience and gives shape to experience (Ochs & Capps 1996). The

philosophical and linguistical roots of the approach to the study of identities I have chosen are based on the theory of narrative identity of Ricoeur (1984, 1992) and on the theory of narratives as a sense-making and an identity-building strategy (Bamberg 2009, 2011a, 2011b; Bamberg et al. 2010).

From the sociological point of view, it has been argued that an important function of self-narratives is for people to sustain a sense of stability and predictable understanding of the world, particularly when societies are changing fast (Callero 2003). Self-narratives have, for example, been used to provide support in defense of an unstable social environment, where traditional identities are challenged by economic and social exclusion (Callero 2003). In a world in which the tools and means of communication are changing as rapidly as they are today through the development of ICT, I think it makes perfectly sense to wonder whether there is a need for people to create technology-related narratives in their efforts to sustain a positive self-image.

In the field of health care, there is a solid tradition of using narratives as a therapeutic method (Anderson 1997) but also as a research method to study people's experiences of illnesses and of their use of particular health care services, as well as to study professionals' experiences as clinical practitioners (Frid, Ohlén & Bergbom 2000; Harden 2000; Mattingly 1998). The focus in these studies has been traditionally on the meaning-making aspects of illness and healing emphasizing activities through which professionals, patients, and their families construct and negotiate interpretations of their experiences and use these interpretive frames to guide their future actions (Bailey & Tilley 2002; Büssing & Fischer 2009; Mattingly 1998). Narrative approach has been used, for example, to study clinical interactions between occupational therapists and patients (Mattingly 1998), to study women's experiences of infertility and the representations they make of reproductive technology in their narratives (Kirkman & Rosenthal 1999), and to study life experiences of people living with chronic illness and home mechanical ventilation (Dreyer & Pedersen 2009). I believe that these studies provide further support to the idea that a narrative approach is particularly suitable in studying people's experiences and to catch the multiple meanings people attach to the use of information and ICT.

As a summary, in this research I understand identities as socially constructed and I take a narrative approach to studying them. In other words, I look at identities constructed through language as stories about the self. More in detail, I will investigate how health care professionals and maternity care service users negotiate interpretations of their information and ICT experiences and how they say they make use these interpretive frames to guide their actions.

2.1.2 ICT and identity construction

Turning into the field ICT, there is an identity construction research tradition that examines the use of non-human objects as apparatuses of self-construction (Callero 2003). Related to the discussion initiated by Giddens (1991), who links reflective creation of self-identities to the era of modernity, in which traditional social structures such as families and communities have less influence on people's identities, it has been suggested that in modern times objects can also come to serve as a resource for identity building (Silver 1996).

It has been noted, for example, that ICT has served to establish a myriad of virtual communities creating new resources for identity building outside the traditional ones (e.g. Altheide 2000; Papacharissi 2011; Wilson & Peterson 2002). Virtual communities offer people opportunities to play with their identities by adopting online identities that differ from their offline identities (e.g. Cover 2012; Valentine & Holloway 2002; Zhao, Grasmuck & Martin 2008). However, it has been shown that the degree of anonymity in the community affects strongly how much difference there is between the adopted online identity and the person's habitual offline identity. For example, Facebook is an online communication means for people who know and communicate with each other also in real life, such as family members, neighbors, and colleagues. It has been suggested that this kind of offline-based online relationships can be called "anchored relationships" and that the identities produced in a nonymous environment such as Facebook differ from those formed in more anonymous online environments (Zhao et al. 2008). In anchored relationships identities are claimed more implicitly than explicitly, and they stress group and consumer identities over personally narrated ones (Zhao et al. 2008).

Technology-related narrative identity construction has interested also consumer researchers. For example, Kozinetz (2007) used a semiotic and a discourse analytic approach to investigate technology ideologies in consumer technology narratives. He identified four nodes or semiotic squares that characterized the ideologies deployed by his respondents which he labeled Techtopian ("Technology consumption as social progress"), Green Luddite ("Technology consumption as destruction of the natural"), Work Machine ("Technology consumption as economic engine") and Techspressive ("Technology consumption as pleasure). However, contrary to the present study, his focus was not explicitly on technology-related ideologies as resources for identity building, but rather how these ideologies influence consumer-level action and technology consumption.

In the field of information systems research, Nach and Lejeune (2009, 2010) developed an integrative theoretical framework to investigate how information technology affects users' identity. Based on a thorough literature review, they argue that identity as an analytical category is getting increasing attention in the information systems discipline. However, they characterize the research

published so far as a loosely affiliated body of research that leaves the current knowledge of the association between information technology and identity still limited. According to the theoretical framework they propose, people define their identities in response to changes induced by information technology by using strategies such as acting on situation, adjusting the self, cathartic practices and distancing. These strategies in turn may lead to different individual-level outcomes, such as reinforced identity, redefined identity, ambivalent identity and anti-identity. The framework developed by Nach and Lejeune (2010) is an important contribution to the field of identity research in relation to information systems. However, contrary to the point of view of this study, their approach takes people's identities as a fixed category, and their interest is on how information systems shape an identity that already exists as an end-state. In this study, the interest is on the process of constructing identities, and how the relationship to information and ICT affect this process. Nach and Lejeune (2009) themselves have pointed out the absence of this kind of research in the current information systems research, which they entitle research on *identity work*, or the examination of identity construction processes such as forming, strengthening and revising identities, and that is the kind of research that this study aims at contributing to.

In one of the few studies I came across researching identity formation on a collective level in relation to information systems, Mosse and Byrne (2005) investigated the interconnections of collective identity formation of several groups of health professionals and health information systems implementation. In their study, collective identity was understood as a network, and their interest was on looking at the reflective process in which identity is shaped by the position of agents in the networks they are part of. The study discusses how the process of collective identity formation and information systems implementation were interconnected in an action research study that aimed to strengthen the public health care system in Mozambique.

The interaction between professional identities and information technology has been an explicit research focus also in a number of other studies, such as the studies by Eriksson-Zetterquist et al. 2009; Nach 2011; and Walsham 1998. These studies give further evidence to support the argument that in research of interactions between humans and information technology, professional identity is an important analytic category through which human-technology interactions can be observed and analyzed.

As a summary, there is some conceptually elaborated research conducted in the past focusing on the interactions between identity formation and use of ICT. However, as pointed out by Nach and Lejeune (2009), research on identity construction or on identity work in the field of information systems research is still scarce. This research will contribute therefore to the so far small body of

knowledge on identity work in human–technology interactions in the context of health care.

2.2 HEALTH ADVANCING SOCIAL NETWORKS AND ICT

In addition to looking at ICT-related identity construction, I realized that there was another topic needing further exploration that started to emerge along the research process, which was the importance for the study participants to use ICT as a tool to build and sustain social networks that benefited their health and wellbeing. This is not a surprise, as advanced information technology is particularly suitable for creating and maintaining social relationships and social networks based on shared interests (e.g. Licoppe & Smoreda 2005; Wellman et al. 1996). In this chapter, I will review recent research literature on the influence of social networks on different aspects of health and health care, as well as literature on the actual functions of social networks that explain how health-related resources flow between different network actors.

2.2.1 Influence of social networks on health behaviour, health outcomes, and health care services

Social networks are related to health and wellbeing in different ways. From the point of view of health behaviour it has been argued, for example, that social networks and social relationships influence a person's behaviour above and beyond the influence of his or her individual attributes (e.g. Smith & Christakis 2008; Valente 2010). Therefore, by studying social networks researchers have another dimension that can help explain people's health-related behaviour (Valente 2010). From the point of view of family wellbeing, social networks have been found to be crucial to family health (Armstrong, Birnie-Lefcovitch & Ungar 2005; Ell 1996; Åstedt-Kurki, Hopia & Vuori 1999). Moreover, it has been argued that the study of social networks helps to promote multidisciplinary work in maternal and child care as understanding families' social structure has been associated with health professionals' concern for children's physical health and psychosocial development (Poutiainen, Hakulinen-Viitanen & Laatikainen 2013) and with understanding interaction patterns between families and health professionals (Byrd 2006; Jack, DiCenso & Lohfeld 2005).

Typically, social network models are based on describing who knows whom or who talks to whom within a community or an organization, and based on that information network models are composed to show how these relations influence attitudes, beliefs, and behaviors (Valente 2010). Past studies on social networks can be grouped in two categories: studies of egocentric networks (e.g. Haas et al. 2010; O'Malley et al. 2012), in which an individual is located at the

centre of the analysis linking him/her to her social contacts around; and studies of collective, sociocentric networks (e.g. Creswick & Westbrook 2010), that describe all members of a community group and their linkages to each other (Smith & Christakis 2008).

Of the effects of social networking on health behavior, it has been shown for example, that the high level of education of network members and the proportion of network members with high level degrees has positive influence on the frequency of health information seeking and seekers' frequency of use of friends or relatives and the internet as a source of health information (Song & Chang 2012). Other health-related behaviors that have been observed to be influenced by sociocentric networks include smoking, eating, exercise, alcohol consumption and drug use (review: Smith & Christakis 2008). Also, social networks have been found to influence the type of health services patients utilize (Lasebikan et al. 2012). Moreover, measuring the benefits of social networking on health outcomes, there is plenty of evidence of the positive effects of social networking for an individual health status (e.g. Huang & Hsu 2013; Lamarca et al. 2013; O'Malley et al. 2012, Sluzki 2010), although some researchers have pointed out that the mechanisms for this are still not well understood (Cohen & Janieki-Deverts 2009; Griffiths et al. 2012; Thoits 2011). Because the health benefiting mechanisms of social networking are not yet well understood, there is in my view a need to carry out more descriptive research on the micro-social reality of lay people who make use of social networks in advancing their personal and their families' health and wellbeing.

There is also a third way social networking is linked to health and health care. The easiness people and businesses are able to stay connected today through technology is undoubtedly affecting the ways health and wellbeing are managed both by individuals and by health care industry. It has been argued that ICT-enabled social networking plays an important role in changing patterns of health and illness in communities, as it offers a new way of accessing health promoting resources free from the constraints of traditional health care services (Griffiths et al. 2012). Particularly, the use of social media is changing strongly the landscape of health communication and altering the way health care professionals and lay people interact. Health information becomes dynamic and is constructed in networks of individuals and communities consisting of both professionals and patients, whether on- or offline (Lefebvre & Bornkessel 2013). It has been argued also that the ICT enabled social networking can restructure the provision of health services, and lead to a reformulation of the role of health professionals (Griffiths et al. 2012; Masic et al. 2012).

As a summary, based on past research reviewed above, three angles emerge in explaining how social networking is linked to health and health care services: how social networks influence the behavior of their members, how social networks benefit the health and wellbeing of their members as a directly

observable and quantifiable outcome, and finally, how social networking using ICT transforms the landscape of traditional health care services and the ways health care professionals and lay people communicate – which, in turn, may influence again the first two angles.

In this research, my interest has been to contribute to the understanding of the micro-social reality of mothers and health care professionals, and how information and ICT use takes place in their everyday life and work contexts. In other words, my interest has not been in evaluating the direct outcomes of particular network patterns on the health status of individuals, nor on the effects of networks in changing behavior. Therefore, this research builds mainly on the third theme, and aims at describing how in the context of Finnish maternity care the study participants construct actively ICT-supported social networks to advance their own and their families' health. Also, the study aims at understanding the implications of this networking for the ways health care professionals and patients communicate and for the array of current maternity care services.

2.2.2 Social networks enabling flow of health and wellbeing related resources

In this research, I understand social networks primarily as structures that enable flow of resources in people's everyday lives. In other words, my emphasis is on depicting social networks specifically from the point of view of how health-relevant factors such as disease, information, and social support flow between network nodes (El Sayed et al. 2012), or actors in the network. Past research shows that social networks can serve multiple functions for those seeking to promote their health and wellbeing (Heaney & Israel 2008). For example, social networks may influence people's ability to cope with an illness and the type of health services they seek (Gage 2013). Social networks can also be used as a channel to distribute health-related resources, such as information, health services, strategies for managing care, emotional sustenance, reassurance and validation of caregiving, material goods and logistical support (Byrd 2006; Gage 2013; Heaney & Israel 2008).

In terms of information exchange, topics that people may want to discuss can include experiences of bodily symptoms, clinical diagnosis and treatment options, adverse treatment effects, sources of medical evidence, experiences with individual providers, and opinions about their quality (Griffiths et al. 2012). The use of social networking for emotional sustenance has also been well documented in the past (e.g. Ell 1996; Somhlaba & Wait 2008; Thoits 2011). Seeking emotional sustenance may translate, for example, in looking for expressions of caring and love, as well as for practical assistance (Ell 1996). Also those in need appreciate receiving empathy, active coping assistance, and role modeling from similar others (Thoits 2011). Although the use of ICT is changing

the mechanisms and tools people connect with each other, past research suggests that ICT is not actually changing radically people's relationships. Rather, for the majority of people, use of advanced information technology becomes embedded in their existing networks as part of a larger communication system that individuals use to stay socially connected (Boase 2008).

Throughout the research process, I have emphasized the importance of the present research in supporting the development of actual, real-life health and wellbeing services. There is a long research tradition of using social network approach as a basis for developing health promotion interventions (e.g. Eriksson 2011; Valente 2010), and my objective is that this research would similarly offer some relevant knowledge on social networks among maternity care service users for those who are in charge of looking for the most effective way of organizing these services. The focus of the present research is on taking a holistic family centered view on how social networking takes place in people's everyday lives. However, past research linking social networks and maternal health has focused rather narrowly on understanding networks only as a form of social support (e.g. Balaji et al. 2007; Cronenwett 1985) or on statistical correlations of networks and maternity service use (Aizer & Currie 2004; St Clair et al. 1989). To my knowledge, there are no past studies that would aim at providing descriptive knowledge the micro-reality of mothers and families who form and use social networks to exchange health and wellbeing resources. Therefore, this study fills a gap in research by providing a description of the structures (network members), contents (resources that flow) and tools (ICT and other tools) in the networks that mothers and families form and make use of in their everyday lives.

2.3 INFORMATION AND ICT INTERACTIONS IN THE CONTEXT OF FINNISH MATERNITY CARE SERVICES

There is a strong research tradition looking at family health and wellbeing as well as at maternal and child care services in Finland. The emphasis of this research has been particularly on the nursing perspective (e.g. Hakulinen 1998; Pelkonen 1994; Poutiainen et al. 2013; Salonen 2009; Viljamaa 2003; Vuori & Åstedt-Kurki 2013; Åstedt-Kurki 2010; Åstedt-Kurki et al. 1999). Research focusing on information and ICT use by families and maternal health professionals in Finland has, however, received less attention until now. In this chapter I will review relevant studies in this field in order to situate my research in the larger context of information and ICT interactions in Finnish maternity care.

Past research on information and ICT in the context of Finnish maternity care services that are relevant for this study can be grouped around three distinct

themes. The first theme is the development of maternity care services based on advanced information technology. From the point of view of information systems development, past research has looked at the daily practices of information management in Finnish maternity clinics, and assessed the existing information systems and their integration needs (Häkkinen & Korpela 2007). The result of the study by Häkkinen and Korpela (2007) was the understanding that the software applications and other information management tools that were in use in the maternity clinics observed did not meet the needs of health care work, suggesting there was a need for integration of the applications and tools on different levels of clinical work. However, the study did not propose explicit solutions to the integration needs, but rather served as an awareness raiser in the participating maternity clinics.

The development of new innovative maternity care services is a complex process and requires careful documentation of issues such as the baseline characteristics of the intended service beneficiaries, as well as understanding of the characteristics of the project management behind the innovation. Some studies have addressed specifically these aspects of the service innovation process. For example, before designing an internet-based support intervention for parents and infants, Salonen et al. (2008) implemented a study that revealed significant differences in fathers' access to social support in maternity hospitals, in mothers' breastfeeding practices, and parents' understanding of their infants' cues and behavior, and this information was used as guidance for the design of the intervention (Salonen & al. 2008; Salonen 2010). In another maternity care service innovation process, Kouri et al. (2005) gathered information about the project management and their attitudes to the service development project in order to evaluate the success of it (Kouri et al. 2005). Also, within the same maternity care service innovation project Kouri and Kempainen (2000) conducted research on the technical details of how to implement information security within the project.

The second theme I have outlined in the research on information and ICT in the context of Finnish maternity care services focuses on how maternity services based on advanced information technology influence service users, in other words, mothers and families who are pregnant or who have recently given birth. Past research that has focused on this theme, includes studies on the contents of families' online discussions during pregnancy (Kouri et al. 2006a; Kouri et al. 2006b) and studies on the effectiveness and long-term impact of internet-based support services designed for families in the post partum period (Salonen 2010; Salonen et al. 2011; Salonen et al. 2013). Kouri et al. (2006a) conducted an analysis of the contents of families' online discussions during the service innovation project which revealed that communication between families gradually shifted from formal information exchange to emotion exchange, and finally, to real-life support exchange. The possibility to communicate on-line

also helped families to construct new social networks during pregnancy, and when maternity care professionals were part of the on-line discussion group it provided them with an opportunity to receive valuable feedback from the families to improve the services they offer (Kouri et al. 2006b).

Surprisingly, a study conducted immediately after childbirth and 6-8 weeks post partum on a statistically representative sample of Finnish parents showed that an internet-based intervention including an information database, an on-line peer discussion forum and a question/answer service which was designed to strengthen parenting satisfaction did not have a statistically significant effect measured when parents included in the intervention were compared to parents who were excluded (Salonen et al. 2011). However, parents in both groups showed an increase in parenting satisfaction during the postpartum period, although this was not related to the intervention offered. A recent study by the same group confirmed these findings after a follow-up period of up to 12 months post partum (Salonen et al. 2013). Therefore, it seems that designing an ICT-supported service in the context of maternity care that would have a statistically measurable impact on Finnish families is not a simple task. It has been suggested that in the future such interventions could be directed to specific risk groups who might be better able to benefit from an intervention tailored to suit their particular needs (Salonen et al. 2013).

The third research theme focusing on information and ICT in the context of Finnish maternity care services is research on the everyday life on maternity care service users. There is one previous study on mothers' and families' information actions from the point of view of everyday information use (Parkkola et al. 2009). This study was implemented as a background study for an eventual technology development initiative to provide baseline information on the needs of the potential technology users. The study identified six different clusters of families' information and communication actions: those related to communication, information storing, family resource management, publishing, controlling the use of technology, and use of public services. However, this study did not emphasize the viewpoint of health and wellbeing related actions, and therefore is not very informative for health service design and development.

As a summary, past research on information and ICT in the context of Finnish maternity care services has concentrated on three themes: 1) the development of maternity care services based on advanced information technology, 2) how maternity services based on advanced information technology influence service users and 3) on the everyday life on maternity care service users. This study will contribute and build on the past research particularly on themes 2 and 3 by describing how service users experience the use of new maternity care services and how these experiences are reflected in their health information- and ICT-related identities. Also, the research will produce descriptive knowledge on how information and ICT-supported service

use takes place in the context of mothers' and families' everyday lives, and forms the basis of their health advancing network construction.

3 Research objective and research questions

This is an exploratory study of health information- and ICT-related identities and health advancing social networks in the field of health care, particularly in the context of Finnish maternity care services. First, the aim of the study is to arrive at an empirically grounded account of how identities are shaped in midwives', maternity care nurses' and mothers' descriptions of their everyday information and ICT interactions. Second, the study aims at an empirically grounded description of the dimensions of health advancing networks that families with small children form and sustain in their everyday lives.

The specific research questions can be formulated as follows:

1. What kind of health information- and ICT-related identities do midwives or maternity care nurses and mothers construct in the descriptions of their experiences as health and wellbeing information and ICT users?
 - 1.1. How does the socially constructed sense of self influence the way people interact with ICT and how is that sense of self constructed through the interaction?
 - 1.2. How does the context in which interaction takes place influence health information- and ICT-related identity construction?
2. What kind of social networks do families and mothers of young children construct to advance their health and wellbeing?
 - 2.1. What kind of health advancing social networks do families and mothers form and regard as important?
 - 2.2. What is the function of these networks in mediating health- and wellbeing-related information?
 - 2.3. What are the implications of these networks on the current maternity care services?

The two main research interests of this thesis, health information- and ICT-related identities and social networks, are illustrated in Figure 2.

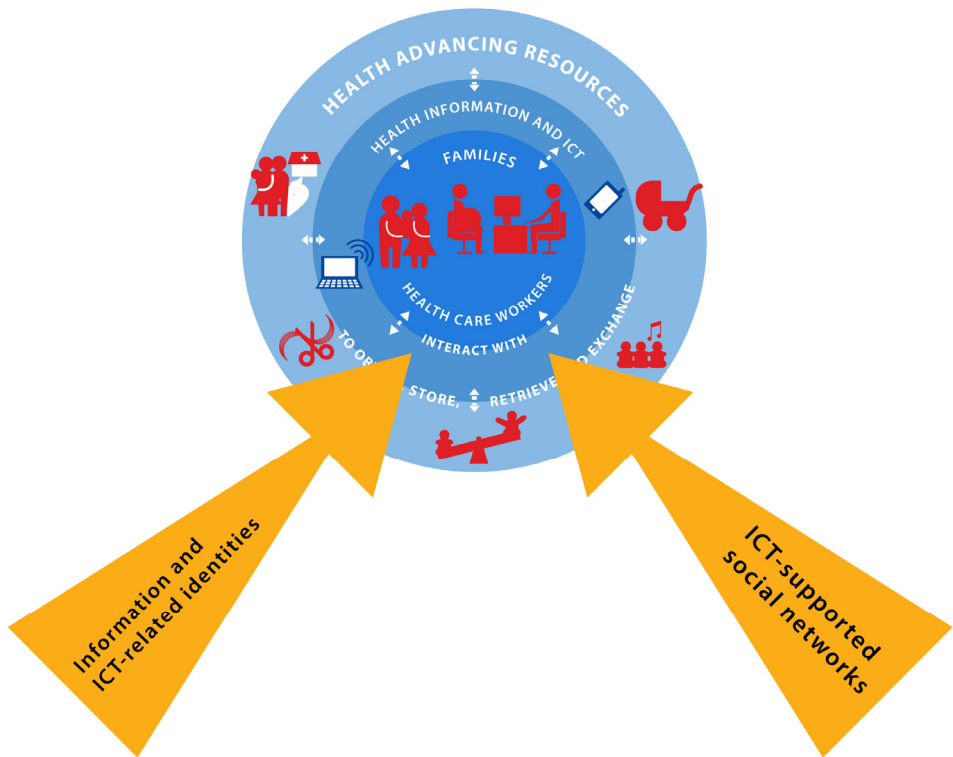


Figure 2: The two viewpoints of this research on information and ICT interactions: identities and networks.

The overall aim of the study is to contribute to the research on identity and network construction processes in human–technology interactions in the field of health care. The practical aim of the research is to provide empirically grounded evidence on information and ICT interactions to benefit the design of improved health and wellbeing services for families with young children.

4 Research approach and research design

4.1 RESEARCH APPROACH

In this chapter I will make an outline of the different conceptual premises on which the research is built on in terms of ontological and epistemological assumptions, health and human services informatics, and descriptive and design research. I will also highlight some of the conceptual contradictions inherent in these approaches, which I experienced quite challenging during the research process.

4.1.1 Ontological and epistemological assumptions

The present research on information and ICT interactions is based on two different ontological assumptions. In studying identity construction related to information and ICT I take the assumption of reality as socially constructed. Therefore, I understand the world being born in interaction between people in a social system and existing through institutionalized concepts and mental representations that persons and groups create over time (Berger & Luckmann 1966). In researching social networks I take a critical realist view of the world. According to this view, the world exists independently of those who observe it and real mechanisms operate behind the observable events (Bhaskar 1975).

Although these two views differ quite radically on the nature of reality, they are quite similar in their postulations concerning epistemology or how we can gain knowledge on reality. In both views, knowledge of reality is created by social actors and cannot be understood independently of them. In the critical realist view, therefore, the reality and the observation of reality operate in two different realms. Whereas reality is intransitive and relatively enduring, observation of reality is transitive and changing (Bhaskar 1975). Both research philosophies have been applied in the past in the study of information systems, although they have been in a largely marginal position (Dobson 2002; Fox 2009; Morton 2006; Orlikowski & Baroudi 1991). In health and social research, combining research perspectives based on different ontological and/or epistemological principles is a common practice particularly in research using mixed methods (Bowling 2002; Brannen 2005; Creswell 2003; DeForge & Shaw 2012). Applying these assumptions in the current work I claim that health

information- and ICT-related user identities exist only as social constructions. My aim is to describe how health professionals and lay people create these identities in relation to their information and ICT interactions. Also, I claim that social networks exist in the world independent of human observation. However, following the tenets of critical realism I am aware that I can describe how families form and create health advancing social networks within the context of everyday life only through their subjective observations about them.

4.1.2 Situating the research in the field of health and human services informatics

This study aims at contributing knowledge to the scientific discipline of health and human services informatics. As a scientific discipline, health and human informatics is a relatively new field. Health and human services informatics concerns not only the acquisition, processing and interpretation of patient or client data but is also strongly interested in the entire management of information in health care (Imboff et al. 2001). Recently, Kuusisto-Niemi and Saranto (2009), as well as Saranto and Kuusisto-Niemi (2011, 2012) have made an effort to define the scientific paradigm of health and human informatics and the areas of research that it covers. In their understanding of the field, there are four basic nodes interacting with each other that form the context of health and human services informatics. The four nodes are labelled as data, actors, action, and technology (Figure 3).

Context: Health and Social Care

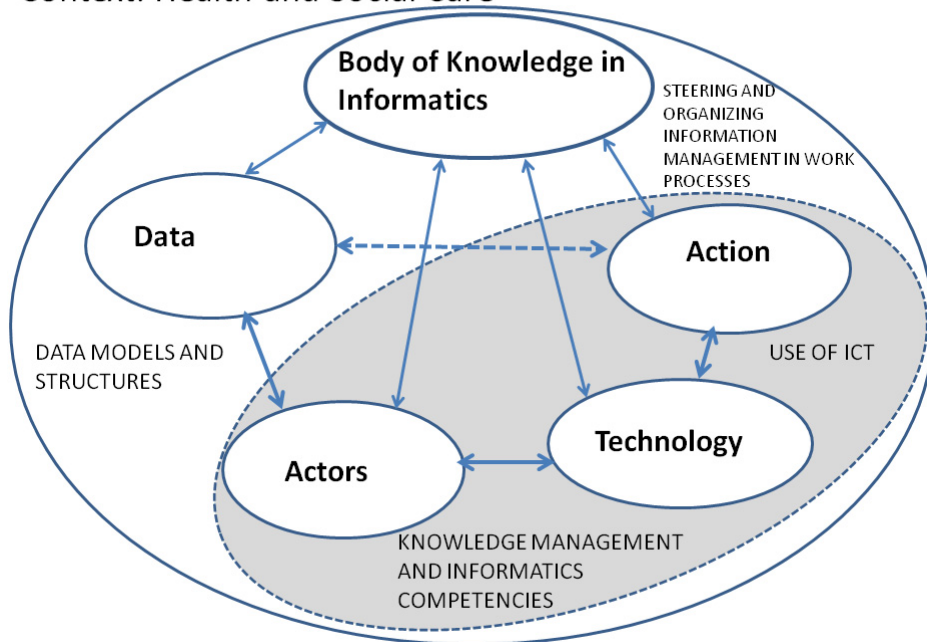


Figure 3: The scope of the present study in the context of health informatics research paradigm (Kuusisto-Niemi & Saranto 2009; Saranto & Kuusisto-Niemi 2011, 2012).

In this paradigm, data refers to a hierarchical continuum from data to information and to knowledge, in which data represents the most simple and knowledge the most complex format of information. Actors in this paradigm are understood as the users or providers of health and human services, either as individuals or as communities. Action refers to the overall management of these services: service planning and development, service implementation, service use, and service evaluation. The fourth node, technology encompasses the technical and social practices related to information management, storage, and exchange. Research in health and human informatics can focus of any aspect of the four nodes or on the interaction between them (Kuusisto-Niemi & Saranto 2009; Saranto & Kuusisto-Niemi 2011, 2012). The scope of this research is highlighted in Figure 3 as the darkened area. It is concerned with actors, technology and action as well as with the interaction between actors and technology (use of ICT).

4.1.3 Situating the research between interpretive descriptive research and design research

During the research process I came to realize that there is a discrepancy between research that aims to produce new *descriptive knowledge* about health information and ICT use and people's interpretations on it on the one hand, and research that aims to produce *knowledge that serves design purposes* on the other hand. The research was carried out mostly in multidisciplinary research and development teams consisting of both members of the academic community as well as of the business community, in which different research and practical development objectives were present simultaneously.

As a researcher in a multidisciplinary team I felt I served the two ends. I was committed to both describing and understanding information and ICT users' thinking and behaviour as well as to using this knowledge for pragmatic ends to design better health care services. This was an issue that led to a philosophical reflection I carried on throughout the research process as I felt it was far from a simple endeavour to incorporate interpretive research on people's experiences with technology in the technology design process. Moreover, I felt the pressure to translate the results in the language of academic research in which the objective is to ground knowledge production in sound philosophical constructs (Light 2006).

The contradiction between the two approaches of description and design is well illustrated by Hirschheim and Klein (1989) in their mapping of the different paradigms in information systems development along the four sociological paradigms of functionalism, social relativism, radical structuralism, and neohumanism (Table 2). I situate this research between the paradigms of social relativism and neohumanism, with the ultimate intention that it would feed also systems development as conceptualized in the functionalist paradigm, although there seems to be a wide discrepancy between the purposes and methods between the paradigms that develop systems "from within" and those that develop systems "from without".

Table 2: The four paradigms of information systems development (Hirschheim & Klein 1989).

Paradigm	Developer archetype	Systems development proceeds	Elements used in defining IS	Examples
Function- nalism	Expert or Platonic Philosopher King	From without, by application of formal concepts through planned intervention with rationalistic tools and methods	People, hardware, software, rules (organizational procedures) as physical or forma, objective entities	Structured analysis, information engineering
Social relativism	Catalyst or Facilitator	From within, by improving subjective understanding and cultural sensitivity through adapting to internal forces of evolutionary social change	Subjectivity of meanings, symbolic structures affecting evolution of sense, making and sharing of meanings, metaphors	Ethno- graphic approaches
Radical structu- ralism	Warrior for Social Progress or Partisan	From without, by raising ideological conscience and consciousness through organized political action and adaptation of tools and methods to different social class interest	People, hardware, software, rules (organizational procedures) as physical or formal, objective entities put in the service of economic class interests	Trade-union led approaches
Neo- humanism	Emancipator Social Therapist	From within, by improving human understanding and the rationality of human action through emancipation of suppressed interests and liberation from unwarranted natural and social constraints	People, hardware, software, rules as physical or formal, objective entities for the technological knowledge interest; subjectivity of meanings and intersubjectivity of language use in other knowledge interests	Critical social theory

There is also another way of conceptualizing the seemingly profound division between the contrasting and complementing epistemological and ontological differences in the different research approaches that at the same time 1) aim to provide interpretive descriptive knowledge about the current state of the world and 2) aim to serve the practical interests of developing or designing something new. It has been suggested that two competing and complementing research paradigms have been in use in the field of information systems research to address the two objectives: behavioural science and design science (Carlsson 2005; Hevner, March, Park & Ram 2004; Järvinen 2004; Walls et al. 2004). The behavioural science paradigm, on the one hand, seeks to develop and justify theories that explain or predict organizational and human phenomena when analysing, designing, implementing, managing and using information systems. The design science paradigm, on the other hand, has its roots in engineering and the sciences of the artificial and the explicit purpose of research in that paradigm is to solve problems or to enhance utility of artefacts (Carlsson 2005; Hevner et al. 2004).

Hevner et al. (2004) argue that in information systems research these two paradigms are actually inseparable as the realm of information systems research is typically at the confluence of people, organizations, and technology. Following this postulation Hevner et al. (2004) have described a conceptual framework for information systems research that connects these two paradigms under a single framework. Below, I have adapted this framework to describe the overall design of this study graphically (Figure 4).

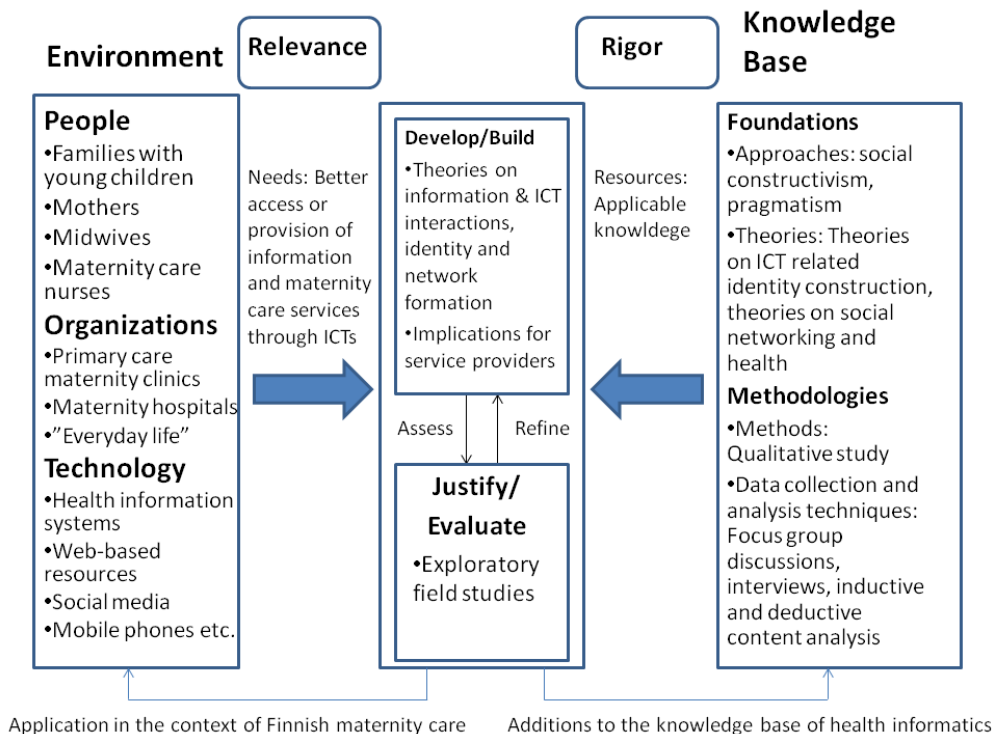


Figure 4: The overall research design of this study adapted from the information systems research framework by Hevner, March, Park & Ram (2004).

Put briefly, the current research is situated in the broad field of health and human services informatics with an attempt to integrate interpretive descriptive research and design research objectives. It brings together the research knowledge base based on the philosophical approaches of social constructivism and critical realism, as well as on the theories on technology-related identity construction and health advancing social networking on the one hand; and the environment in which with the help of information and ICT maternity care services are provided by health professionals in health care organizations and consumed by families with children in their everyday lives on the other hand. In an interactive process, the knowledge base offers theoretical foundations and tools that I have applied in exploratory field studies, and the research findings in the field studies as well as in the current study have helped to develop and build further the theories on information and ICT interactions (knowledge base) as well as to suggest practical changes for those in the position of developing the maternity care service system in Finland (environment).

4.2 RESEARCH DESIGN

4.2.1 Qualitative descriptive study as the research design

The design of this study is a qualitative descriptive study (Sandelowski 2000; Sullivan-Bolyai, Bova & Harper 2005). Qualitative research is the study design typically used in social constructivist studies aiming at discovering subjective meanings and experiences people create through language in social interaction (Creswell 2003, Myers 1997). Therefore I believe qualitative research is well suited to explore the phenomenon of interest in this research, the construction of health information- and ICT-related identities. Qualitative research is suitable also to describe phenomena that—following the ontology claims of critical realism—exist independently of those who observe it, and therefore in my view suits also the objective of this research to describe social networks that families form in their everyday lives (Myers 1997).

An important feature of qualitative research designs is that they are typically naturalistic. In a naturalistic inquiry, the research takes place in real-world settings, in which the phenomenon of interest unfolds naturally and there is openness to whatever emerges during the course of the research (Lincoln & Guba 1985; Patton 2002). Naturalistic inquiry has also been the explicit objective of this research, and the research has been mostly implemented in authentic settings, i.e. in maternity hospitals and clinics giving an opportunity to observe people's behavior and ask about their experiences where they work or seek help in health-related issues. It has been pointed out that in research taking place in the context of health care, qualitative research designs have as their particular advantage the ability to give service users a voice, which happens both through the research process itself as well as through the following reports, documents and presentations (Jones 2004). Also in this research, this empowering effect has been undoubtedly an important aspect of the whole research process.

I define my research design as a qualitative *descriptive* study to make a distinction with many other typical qualitative research designs, such as case study, grounded theory and ethnography (Creswell 2003; Myers 1997; Sandelowski 2000; Sullivan-Bolyai et al. 2005). Qualitative descriptive study does not aim explicitly at a thick description, theory development or interpretative meaning of an experience. Rather, the primary goal in qualitative descriptive studies is to be less interpretive and conceptual, and to stay closer to the original data (Sandelowski 2000; Sullivan-Bolyai et al. 2005) and this has been the explicit objective of this research as well.

4.2.2 Research and development projects in maternity care as the context of the research

The overall context in which the present study was carried out were the different research and development projects in which I took part as a researcher and as an employee first of the University of Kuopio and later of the University of Eastern Finland in the years 2006-2013. The projects varied in size, in the number and the background of the stakeholders involved, as well as in their geographical presence, but they all had as a common denominator by and large ICT and maternity care services.

The study was implemented in two phases. In the first phase of the research process, empirical research data was collected on three separate occasions. The first empirical data collection period took place from October 2006 to October 2007 within the Äippä (“Mommy”) project funded by the Work Environment Fund resulting in the published sub-study I. The second empirical data collection period took place from November to December 2008 within the OmaHyvinvointi (“MyWellbeing”) project funded by the Finnish Funding Agency for Technology and Innovation TEKES and resulting in the published sub-study II. The third empirical data collection took place in October 2009 again within the MyWellbeing project funded by TEKES and resulting in the sub-study III.

An overview of the setting of empirical data collection, the research participants, the methods of data collection and their relationship to the research questions are outlined in Table 3.

Table 3: Overview of the empirical sub-studies and the summary of the research in relation to the research questions.

	Sub-study I	Sub-study II	Sub-study III	Summary
Research phase	I	I	I	II
Contribution to research questions	1.1; 1.2	2.1; 2.2; 2.3	1.1; 1.2 & 2.1; 2.2; 2.3	1.1; 1.2 & 2.1; 2.2; 2.3
Research focus	ICT and information interactions in health care settings	Health advancing social networks in everyday life	ICT and information interactions & health advancing social networks in everyday life	ICT and information interactions & health promoting social networks in health care settings and in everyday life
Data	12 focus group discussions with midwives and nurses (n = 16)	6 virtual focus group discussions with families with young children (n = 8)	5 thematic interviews (one-to-one and couples) with mothers of babies (n = 7)	Literature review, original empirical data, published articles I-III
Empirical setting of the data collection	2 maternity hospitals (Kuopio, Helsinki) & 2 maternity care clinics (Kuopio, Helsinki)	Everyday life of families with young children (Kuopio)	Primary care maternity care clinic & everyday life of mothers with babies (Kuopio)	See sub-studies I-III
Data analysis	Thematic analysis	Inductive content analysis	Deductive content analysis	Deductive content analysis
Time period of the empirical data collection	October 2006 – October 2007	4 weeks in November-December 2008	One morning in October 2009	See sub-studies I-III

4.2.3 Research participants

In the sub-study I the research participants included 16 maternity care nurses and midwives who were recruited in the 4 participating clinics and hospitals by the head nurses. The inclusion criteria was that they would have minimum 2 years of clinical work experience at the time of the study. The participants were all women, and their ages ranged from 27 to 57 years, median age being 47.

The 8 families who took part in the sub-study II were identified by putting advertisements to local maternity clinics. Because through this approach enough participants could not be found, the snow-ball method was also used, which means that some research participants were identified through personal networks of my colleagues. This was the only group of research participants that was not affiliated with a particular health care organization i.e. with a maternity hospital or a clinic. The inclusion criteria were that the family was either expecting a baby or had a child who was under 2 years of age. Only one parent from each family was asked to join the study and when necessary was asked to consult the other parent. The age of the participating parent in the family ranged from 29 to 35 years and 2 of them were men and 6 women.

Finally, the 7 mothers who participated in the sub-study III were identified by the local maternity clinic nurse who advertised the study among her clients. The inclusion criteria were that the woman had given birth less than 12 months ago, was an active member of the group coordinated by the local maternity clinic, and had been using the web service created particularly for this group of mothers. The age range of the mothers who volunteered to take part in the study was 22–32 years with a median age of 26 years. Each of the 3 sub-studies was implemented independently and there was no connection between the 3 groups of study participants.

4.2.4 Data collection and analysis methods

The details of the empirical data collection and data analysis methods are described in the published papers 1-3. However, in this chapter I will give a brief summary of the methods used in each sub-study.

In the sub-study I, the data collection method used was a longitudinal focus group study as the purpose was to elicit participants' subjective experiences of their daily information work and understand the complexities in the interaction between continuous technological changes and daily work practices. Three rounds of focus group discussions were conducted over a 7-month-period with the same team of nurses or midwives in each of the four participating health care organization, resulting in 12 discussions in total. The discussions were audio-recorded and later transcribed and resulted in 216 pages of single spaced text. The data analysis method was thematic content analysis, in which themes partly identified by the researcher and partly by the research participants guided the analysis.

The data collection method in the sub-study II was a virtual focus group discussion. The 8 families selected for the study participated in an ongoing virtual group discussion over a 4-week period on an internet platform (Moodle) provided by the University of Eastern Finland. I acted as the moderator of the group by posting a new discussion theme on the platform every few days. As the comments made by the research participants were originally in a written form there was no transcription process involved in the data collection phase. The amount of written data obtained in this sub-study amounted in 59 pages of single spaced text. Finally, the data was analyzed using the method of inductive content analysis.

In the sub-study III the data collection method was thematic interviews with pre-prepared open-ended questions. The interviews were conducted face-to-face either with one participant or as couple interviews at the maternity clinic where the group met regularly to share a cup of coffee together while attending to their babies. The interviews were audio-recorded and transcribed, and the amount of written text obtained in this sub-study was 20 pages of single spaced text. The data analysis method used in this sub-study was deductive content analysis in which the pre-prepared study questions guided the analysis.

In the second phase of the research process (summary), the research methods included a narrative literature review and a secondary analysis of the empirical research data collected in the sub-studies I-III. The method of analysis utilized this part of the study was deductive content analysis in which the research questions guided the analysis.

4.2.5 Ethical issues

Finally, I would like to say a few words about ethical issues related to this work. Ethical issues involved in the sub-studies have been already discussed in detail in the published articles. To summarize, an approval of the host organization was sought and received for the sub-studies I and III that were conducted in collaboration with hospitals and maternity clinics. The sub-study II was conducted in the everyday life context of the participating families and therefore applying for a formal research permit was not a relevant issue in that case. Participation in the research was voluntary. In all of the sub-studies participants were given either oral or written information about the overall aims of the study and of their right to withdraw it any time they would feel the need to do so. Also, they were informed that their anonymity would be secured throughout the research process from data collection to data analysis and reporting. In practice, this was done during the data transcription phase by deleting all personal information from the transcribed texts, such as names of individuals, organizations and geographical areas the participants had referred to. Understandably, it is impossible to achieve a complete anonymity regarding

geographical locations or organizations in a small country, particularly among those who live or work in these places.

One ethical issue to think of in research using volunteers is the amount of burden that the study puts on them. In this research, I believe that the empirical data collection was not that extensive to represent an inappropriate burden to the participant individuals or organizations. Moreover, in the sub-study II the participants were given a gift voucher of a relatively small amount of money, 40 Euros, to compensate for their time dedicated to the research.

5 Findings

In this chapter I describe the findings contributing to the research questions of the study presented in chapter 3. At the end of the chapter I will make a concise summary of all the findings.

5.1 INFORMATION AND ICT INTERACTIONS AS IDENTITY CONSTRUCTION

Identity construction in relation to health information and ICT was empirically observed in this study in two very different contexts. One context was inside a health care organization, either a maternity hospital or a primary care maternity clinic. The other context was the everyday life of mothers who were taking care of their newborn babies. In presenting the research findings I will consider these two contexts separately as the social forces that shape and structure people's experiences and identities in them are very different.

In giving an account of the different ways the study participants constructed their identities in relation to health and wellbeing information and advanced information technology my emphasis is on describing how mutually shared cultural identity meanings were enacted within everyday situations in which health information and ICT are present. In this research, I look at identities as narrative identities. In other words, I understand identities as stories about the self created through language. Although identities become visible in the actual work situations, as a researcher I am only able to listen to the stories or narratives that people tell when describing their actions and the motives behind them.

In chapter 2 I argued that previously published research seems to have ignored a viewpoint in which identity construction would have been looked at both from the point of view of information use and from the point of view of the tools and technology that facilitate the flow of information. This bias in the past research to describe solely people's relationship to the material artefacts (technology) is not, in my opinion, relevant from a health services developer's point of view. In the field of health care, what matters most for those who seek to improve the availability of information, is to understand how people access and use information, whether the information flows through technological artefacts (e.g. sophisticated hospital applications) or through human beings (e.g. social networks). Both channels can represent obstacles or have benefits from the

individual's point of view, and discovering these will give valuable insight to the dynamics of health information flow in the everyday life context.

5.1.1 Midwives' and maternity care nurses' health information- and ICT-related identities in health care organizations

Throughout the research process the basic assumption I have about health information- and ICT-related identities of midwives and maternity care nurses is that these identities are actively constructed through mutually shared cultural identity meanings acted out in maternity care workers' everyday work situations and expressed as narratives in the group discussions. I can remember how I started to realize at a very early stage of the research process that identity could play a role in describing health professionals attitudes and experiences to information and information work: as I entered as a researcher the two maternity care hospitals and the two primary care maternity clinics to facilitate group discussions with nurses and midwives about their information work, it soon became clear that the participants described often their personal experiences of interactions with information systems through their membership in their professional groups. That is, what seemed to determine largely their construction of their relationship with the changing information system environment was their identification with the midwifery or with the nursing profession. This preliminary finding related to how they perceived their relationship with ICT through a specific identity was further confirmed by carrying out a secondary analysis of the interview data and the published articles.

Cultural categories that emerged in the secondary analysis of the empirical data that were particularly powerful in shaping midwives' and maternity care nurses' constructions of their health information- and ICT-related identities can be grouped in four categories: 1) age, 2) midwives' and nurses' professional identity, and 3) midwives and nurses relationship as a professional group to the health care organization they work in.

Age was a cultural construction that midwives and nurses drew upon in several occasions to explain why or why not they felt motivated to learn to use new information systems. Age was therefore, for the study participants a cultural category that helped them organize and shape their experiences on ICT use. The discussion on the influence of age on information systems use was most lively in groups that included both very young workers (20+) and workers closer to the end of their midwifery or nursing career (50+). For the young midwives, the constant pressure to learn to use new applications particularly in the hospital setting was not perceived as a threat. Using computers to enter patient data was perceived as natural, as they had learned to do it already during their professional training, as one 27-year-old hospital midwife explained:

“I think that we, who are younger and got experienced with the computers at school, because they use computers in teaching, we don’t have the problem with typing...” (Hospital midwife, age 27, FG 2)

So, in a way, you got used to the idea that [using computers] is part of your work as midwives? (Facilitator)

Yes, they taught us how to access information with the computer... (Hospital midwife, age 27, FG 2)“

Similarly, midwives and nurses who had received their professional training in the 70’s or 80’s when computers were not yet widely used in the Finnish health care brought up their age as a factor that explained why they felt a lack of motivation in interacting with the latest information system applications that were introduced at their workplace.

“I think it is mainly insecurity and lack of skills that lead to a lack of motivation [to use computers]“ (Hospital midwife, age 57, FG2)

Young age was, therefore, an empowering factor for nurses and midwives in their construction of ICT-related identities.

Midwives’ and nurses’ understanding of themselves as caring professionals was another factor that influenced strongly their identity construction in relation to clinical information and use of information systems at work. When reflecting on their relationship to clinical information and information systems use, the reasoning turns often into a deep discussion on what it means to be a midwife or a nurse. This, I understand, is how the study participants expressed and constructed their professional nursing and midwifery identities by contrasting their view of the professional identity with the values they perceive are inherent to their daily information work. In particular, the expression of professional identity was visible in the ways nurses and midwives discussed their time use – especially how the increasing demands of information work contradicted with the time they were able to spend doing caring work. However, the construction of professional identity interacted with the age of the study participants, and for younger midwives, for example, it was easier to accept that technologically advanced information work is part of current midwifery work:

“I used to think that I was never trained for this kind of work. I was trained to be a nurse and a midwife and I thought I should have been left in peace to do that work without having to mingle with computers, which I thought was secretarial work. For example, making an appointment with a patient or receiving a patient and entering her data in the computer, I didn’t think it was my duty at all...” (Hospital midwife 4, age 57, FG 2).

“Was this a common feeling between you?” (Facilitator)

“No, I really don’t think everybody felt that way. Some took it easier, and maybe were more dexterous...” (Hospital midwife 1, age 47, FG 2)

“That’s it. I think that us who are younger and got experienced with the computers at school, because they use computers in teaching, we don’t have the same problem with typing...” (Hospital midwife 2, age 27, FG 2)

There was also a feeling among the study participants that their professional identity was in the process of changing because of the increasing use of advanced information technology in their work:

“And I feel that... along these continuing changes [in the clinic] they mold and shape our values and thoughts and attitudes, little by little constantly... I feel that we as nurses, we become more and more technical... (Maternity clinic nurse 2, age 46, FG 4)

Professional nursing and midwifery identity was, therefore, a strong determinant of the ways the study participants explained their relationship towards their information work during their everyday clinical work.

A third type of identity that had an important influence on the ways nurses and midwives discussed their relationship with information and ICT use, was their relative professional identity, that is their relationship as a professional group to other professional groups, such as medical doctors, administrative staff and the management of the hospital or clinic they worked in, and how they perceived their professional group’s position in the social hierarchy of their workplace. The perceived group position influenced particularly the way midwives saw their possibilities to influence the continuous changes in their daily information work. In their view, their negotiation power was limited, and changes were imposed from above rather than collaboratively discussed before e.g. implementing a new information system.

“For example, not long ago, the hospital decided... You see, before that we used to have administrative secretaries in morning shifts, in evening shifts, in labour wards and in ordinary wards... and now, when Obstetrix [labour and delivery information system] was recently implemented, they threw out all the secretaries, it was just unbelievable! This was the thank you we as midwives received, for doing and running like crazy people...” (Hospital midwife 1, age 47, FG 2)

Nurses and midwives gave the impression of being confused between increasing demands to engage in more and more complex and time consuming information work on the one hand, and on their limited possibilities as a

professional group to contribute to the discussion on the implications of these demands on their daily caring work on the other hand.

5.1.2 Mothers' health information- and ICT-related identities in the context of everyday life

Compared to the organizational context of maternity care information and ICT use, the context of mothers' everyday life as caregivers of small babies is somewhat different. The mothers who took part in the study were at the time of the interviews all on maternity leave and absent from their usual work or study. During their typically quite long, around 11-month-long maternity leave, their main responsibility was to take care of their newborn babies. They all lived physically close to each other in the same neighborhood and used the same maternity clinic and health services. All but one of the interviewed mothers were cohabiting with the father of the baby, but fathers were absent during the day. What united these mothers was that they had all accepted to become test users of the pilot web-service initiative of the local maternity clinic. Their daily ICT and information interactions were explored in this context, mainly as their experiences as web-service users.

In the case of mothers, their relationship to the technological tools did not emerge as important an issue to discuss as it was for the nurses and the midwives in sub-study I. In general, they found the usability of the web-service quite good, and using the different functions available through the web-site did not pose difficulties. Compared to the situation of health care professionals, the everyday information technology environment of this group of mothers was much simpler, as the use of the web-service required only the ability to browse the internet and to use relatively simple applications on their PCs, for example, to handle photographs and videos.

On the contrary, what characterized more the narratives of the mothers on their information interactions was their relationship to health information and information seeking. The narratives reflected how mothers constructed an identity of being a member in a community of trustworthy friends, which facilitated their exchange of personal health information within the group.

"I think the best thing about it was that, it was this "our" group... that we indeed became friends with each other. I mean, now it was a closed group, so none of us could ask others to join in, it always had to go through the nurse... so it was the same people always present there. So I mean, if, for example, suppose that one of us had asked a friend to join in from the outside, I think it would have lost its meaning, it wouldn't have felt so much our thing then, and I wouldn't have written so easily that "my baby this and that..." But it really was ours, and I knew exactly who would be reading my message..." (Mother 1, age 32)

In building identity as a member of an on-line community of mothers, sharing same values was mentioned by one mother as an important element contributing to the sense of community and sense of trust.

“As a channel this is certainly something I can trust, and trust that the information that is available there is real and good kind of information... often, for example, I really don't like, for example, those web-sites of Kaksplus [well-known Finnish family magazine] where mothers write... and I just don't know these mothers, and I don't know their children, nor their backgrounds... I just don't trust them. I prefer my friend, whom I know, and the child of my friend, I know she has the same values as I do, and the same way of doing things... ” (Mother 3, age 25)

In searching factual information, i.e. information written by health professionals, one type of identity that influenced the information seeking behavior of the mothers was the identity of a competent health information seeker.

“So, as you said, you have been looking for health information through the web-service. But tell me more... where is it that you would look for it, that is if there is something that worries you, where is it that you would get information about it? (Researcher)

Well, for example, if I think of the wellbeing and the health of the baby, then, I think, I would go to the sites Terveystieto and Duodecim... (Mother 2, age 26)

That is, you would find the information directly on the internet? (Researcher)

Yeah... that's right... I mean, I would use first the search engine, but then, I would evaluate myself... which sources are reliable, that's how I would do it. ” (Mother 2, age 26)

The two identities, therefore, that influenced the interviewed mothers' interactions with health and wellbeing related information were the identity of being a member of a community of trustworthy friends, and the identity of being a competent information seeker.

5.2 HEALTH ADVANCING NETWORKS IN FAMILIES' EVERYDAY LIFE

In this research, I understand health advancing social networks as networks that people form and use to advance their personal or their families health and wellbeing. In this chapter I will describe the structures, contents, and tools of the networks that families with young children form and use in their attempts to advance their own and their children's health and wellbeing. I will also give an account how families and mothers actively created these networks according to their shifting needs. Also, I will explain what implications these networks may have to the ways professionals and patients communicate and what services should be provided in the future.

5.2.1 Structures, contents and tools in families' health advancing networks

Based on the original interview data in sub-studies II and III as well as on the published articles II and III, I classify families' health advancing networks in three groups, which are 1) patient-centric networks, 2) consumer-centric networks and 3) citizen-centric networks.

In each of these three types of networks, the core structures or network actors, contents or resources that flow, and tools used to connect to network actors form distinct entities. When the networks are observed in their larger context, the Finnish society, another important dimension has to be taken into consideration that affects these three networks differently, which is legislation. Also, from the point of view of developing these networks or making use of them for some specific purpose, such as designing better health services, or meeting the needs of the families, it is advantageous to consider each type of network as a separate entity (see Figure 5).

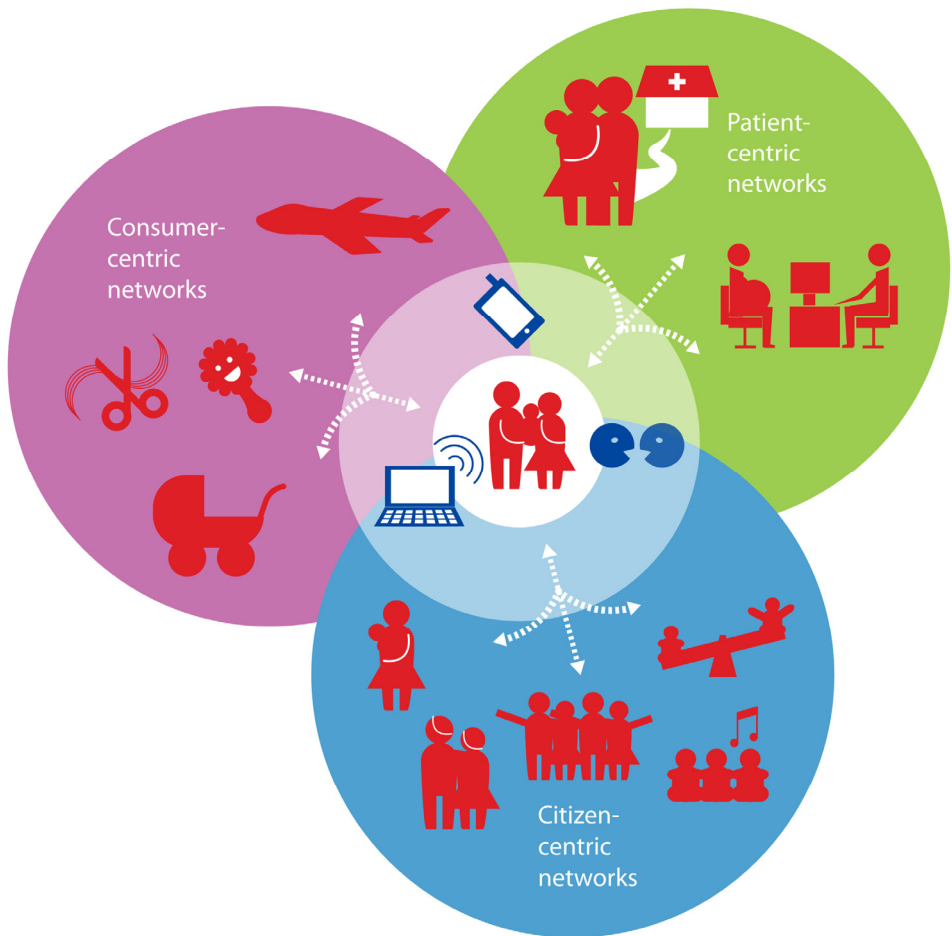


Figure 5: Families' health advancing social networks.

Patient-centric networks are network constructions formed by families as health and human service users who interact with the official Finnish health care system that includes health and human service providers either by the public or the private sector or by the tertiary sector. It may also include any ICT facilitated services offered by these service providers, such as the web-service described in paper III. Health-related resources that flow in these networks are mostly health care and human services, information and financial support. The main tools used in these networks are visits in real-life, telephone, the internet, and documents on paper (see Table 4).

Table 4: Patient-centric networks: network actors, resources and tools.

Network actors	Resources that flow	Tools in use
<ul style="list-style-type: none"> • families in the role of patients/health service users • primary care maternity clinic • private maternity clinic • tertiary care maternity hospital • emergency health care services • dentist • pharmacy • KELA Social Insurance Institution of Finland • municipal day care service providers • health information web-sites maintained by trusted public authorities (e.g. Terveystietti.fi) • web-services managed by the official health care systems 	<ul style="list-style-type: none"> • information on pregnancy related abnormalities, giving birth, child development, child diseases, social benefits, private health insurance, child care • prescriptions for medicines • medical services • social services • social benefits or financial support 	<ul style="list-style-type: none"> • real-life visits by appointment • telephone calls • internet queries • e-mail

Consumer-centric networks are networks in which the core structures are formed by families and the myriad of commercial services available to them. What flow in these networks are information, products sold in the market, and real or virtual money paid for products. The main tools used are visits in real-life, and the internet (see Table 5).

Table 5: Consumer-centric networks: network actors, resources and tools.

Network actors	Resources that flow	Tools in use
<ul style="list-style-type: none"> • families in the role of consumers • retail shops for child accessories & clothes • transportation services (e.g. airlines) • beauty and wellbeing treatments (e.g. hairdresser) 	<ul style="list-style-type: none"> • products sold by network actors • information • money paid for purchases, virtual or real 	<ul style="list-style-type: none"> • visits in person • telephone calls • internet queries • fax

Citizen-centric networks are the most holistic networks. Having the family as its centre, a citizen-centric network extends to any area of life that a family interacts with while seeking to advance its health and wellbeing. Resources that flow in these networks are multi-faceted, and include emotional and social support, information, financial support, physical objects needed in everyday life, services etc. Tools used in these networks include mostly face-to-face meetings, telephones, and the internet (see Table 6).

Table 6: Citizen-centric networks: network actors, resources and tools.

Network actors	Resources that flow	Tools in use
<ul style="list-style-type: none"> • families as citizens • trusted friends • other family members • internet communities/online support groups • social media communities • TV programs • outdoor play parks • church related clubs • baby music/gymnastic groups • breastfeeding support groups • family and women's magazines 	<ul style="list-style-type: none"> • social and emotional support (real-life and virtual) • health and wellbeing related information • scientific articles on the internet • information on pregnancy and child-care • financial support • food • material goods • photographs • entertainment 	<ul style="list-style-type: none"> • meeting in real-life • telephone • internet/e-mail • television • skype phone

5.2.2 Implications of families' health advancing networks to patient-professional communication and current service provision

In presenting the findings regarding implications of families' health advancing networks to patient-professional communication and current service provision, I take explicitly the point of view of families as patients or public sector health service users.

The core of health advancing activities as mirrored in the networks is formed by actual health and wellbeing services received in person through visits to health care providers such as primary care maternity clinics and maternity hospitals. Besides these actual visits, a large share of health advancing activities of the families takes the form of information seeking and sharing. This information can be information exchange with the service provider directly related to a specific service (e.g. making appointments, receiving test results, applying for a social benefit) or it can be more general information seeking on a health and wellbeing related topics.

A finding that bears implications to the current maternity care services is the fact that much of families' information seeking takes place nowadays through

the internet. Therefore, the role of local service providers seems to be diminishing as sources of factual information distributors when the information needed does not require the involvement of a health care professional but is more generic in nature. A practical implication of this finding is that local service providers could eventually allocate fewer resources in thinking how to make generic, factual information available to their clients as this could be done in a more centralized way in the country through the already existing web-based health information resources.

Another finding relevant to the existing service array is the large need of families to get emotional assurance that everything is alright in their particular situation, especially when they have received contradictory information from different health provider sources. In other words, having enough factual information available does not always translate into a sense of wellbeing, especially if the information received is contradictory. Therefore, there seems to be a need not only to provide latest up-to-date medical information, but also ensure that the emotional needs of parents are fulfilled. This challenge could be embraced, for example, by primary care maternity clinics who could take a more active role in assuring every family expecting a baby is offered an opportunity to become a member of a local peer-support group. Web-based, social media services as the one presented in sub-study III offers an example of such clinic-led group that was highly appreciated by the mothers who got involved with it.

5.3 SUMMARY OF THE RESEARCH FINDINGS

In this chapter I will present the findings of this study in a nutshell (see Table 7 and Figure 6).

Table 7: Summary of the research findings.

Identities in health care organizations	Identities in everyday life	Types of networks	Implications of networks to communication and services
<ul style="list-style-type: none"> • Age • Professional identity • Relative professional identity 	<ul style="list-style-type: none"> • Member of a network of trustworthy friends • Competency in information seeking 	<ul style="list-style-type: none"> • Patient centric • Consumer centric • Citizen centric 	<ul style="list-style-type: none"> • Less resources for making factual information available • More resources to ensure needs for emotional and social support met

Identity was constructed in different ways depending on the context where information and ICT use took place. For example, in hospitals and maternity clinics, midwives and maternity care nurses drew upon three different cultural constructions to explain their health information- and ICT-related attitudes and behavior that influenced their daily information work.

Age was a cultural construction that midwives and nurses drew upon in several occasions to explain why or why not they felt motivated to learn to use new information systems. In their thinking young age was an empowering factor in their construction of ICT-related identities. Midwives' and nurses' *professional identity* which was reflected in their accounts of themselves as caring professionals was another factor that influenced strongly their identity construction in relation to clinical information and use of information systems at work. Seeing themselves as caring professionals resulted in viewing information and ICT use conflicting with their primary interest - that of staying close to mothers and babies they were taking care of. Nurses and midwives often seemed to resent the time and effort they were required to put in documenting

patient data in the middle of their hectic nursing tasks. Information work was not in their view conceptually integrated in clinical nursing and midwifery work.

Finally, a third cultural category that had an important influence on the ways nurses and midwives discussed their relationship with information and ICT use, was their *relative professional identity*, that is their relationship as a professional group to other professional groups, such as doctors, administrative staff and the management of the hospital or clinic they worked in, and how they perceived their professional group's position in the social hierarchy of their workplace. There was a common feeling of being put down in the internal hierarchy of different professions. In the view of the nurses and midwives, their negotiation power was severely limited, and they felt changes in clinics and hospitals were imposed from above rather than discussed collaboratively before, for example, implementing a new information system.

Looking at mothers with young babies in their everyday life context, two categories of identity influenced mostly the interviewed mothers' interactions with health and wellbeing related information. These were the identity of *being a member of a network of trustworthy friends*, and the identity of *being a competent information seeker*. The narratives reflected how mothers constructed an identity of being a member in a network of trustworthy friends, which in their view facilitated their exchange of personal health information within the group. Also, viewing themselves as competent health information seekers helped them to find relevant factual health and wellbeing related information.

Findings related to the structures, contents, and tools of health advancing networks constructed by families with small children showed that there are three types of networks that are particularly relevant in analyzing families' everyday health advancing activities. *Patient-centric networks* are network constructions formed by families as health and human service users in interaction with the official Finnish health care system that includes health and human service providers either by the public or the private sector or by the tertiary sector. *Consumer-centric networks* are networks in which the core structures are formed by families and the myriad of commercial services available to them. *Citizen-centric networks* are the most holistic networks. Having the family as its centre, a citizen-centric network extends to any area of life that a family interacts with while seeking to advance its health and wellbeing.

Implications of the networks to the current maternity care services include an observation that local service providers could eventually allocate less resources in thinking how to make generic, factual information available to their clients as this could be done in a more centralized way in the country through the already existing web-based health information resources. Instead, local maternity care providers could play a more active role in ensuring that the emotional needs and needs of social support of parents are fulfilled.

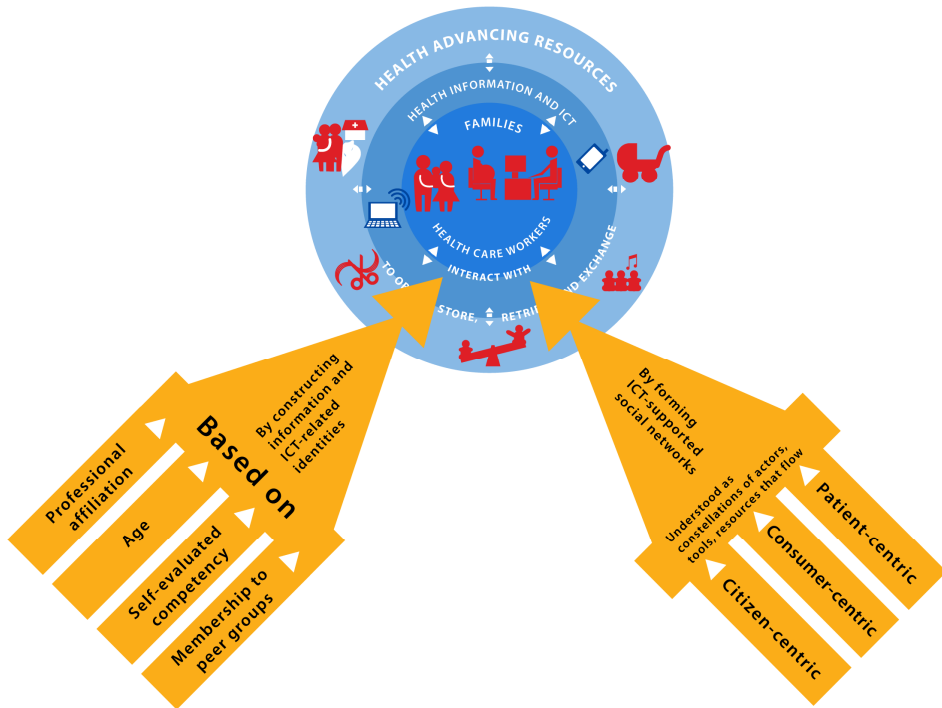


Figure 6: Summary of the research findings building on the starting point of the research and on the two viewpoints of identities and social networks.

Finally, in Figure 6 these research findings are presented visually in a nutshell and linked to the original idea of the research presented earlier in Figures 1 and 2. Figure 6 should be read in the following way: Families and healthcare workers interact with health information and ICT to obtain, store, retrieve and exchange health advancing resources. These interactions are shaped by their active construction of identities based on professional affiliation, age, self-evaluated competency and membership to peer groups. Families' interactions with information and ICT take place also by forming ICT-supported social networks, which are understood as constellations of actors, tools and resources that flow, and they can be patient-centric, consumer-centric or citizen-centric.

6 Discussion

In this chapter, I will return to the main research questions and findings of this study and assess the contributions of the study to the wider research on health information- and ICT-related identity construction and on research on network construction in health care. I will also evaluate the potential of the study to contribute to the practice of health services development in Finnish maternity care. Finally, I will evaluate the methodological strengths and limitations of the study and come up with suggestions for further research in this area.

6.1 THEORETICAL CONTRIBUTIONS

6.1.1 Implications and suggestions for further research on identity construction related to information and ICT use

The research focusing on identity construction in relation to information and ICT use took a long road from my original idea of a phenomenological study of technology users' experiences through to the final research questions and findings presented in this research. In the literature review in chapter 2, I pointed out the absence in current information systems research concerning identity work defined as identity construction processes. This study offers empirically grounded evidence of how identity construction related to information and ICT use takes place in everyday life both in health care organizations and laypeople's lives.

The findings of the study showed that health care professionals and mothers reflected on their daily interactions with information and ICT through actively constructed identities. These identities, however, varied according to the context in which they were observed. In the case of maternity care nurses and midwives, the narratives mostly reflected their professional identities, but age was also an important identity category. Mothers who were studied in the context of their everyday lives also described their information and ICT interactions through the lens of different identities, although these identities related mainly to the individual characteristics in ad hoc situations, such as self-evaluated competency in information seeking and membership in a group of trustworthy friends.

Nurses and midwives referred to age as an identity-building category, which in their view affected their attitudes towards information and ICT use. In their narrations of how age was related to information work, they made use of the

cultural notion of associating old age with incapacity and reluctance of technology use. Although statistically speaking younger age groups are more active than older ones in using ICT in Finland (Statistics Finland 2012), past research on older adults' use of ICT suggests that the relationship between age and ICT use is not that straightforward (Neves & Amaro 2012; Selwyn 2004). A more realistic image of older adults' use of ICT would be understanding that it is multifaceted and mediated by local contexts of individual and community technology use (Selwyn 2004). However, in the case of the nurses and midwives studied, there seemed to be an explicit willingness on their part to draw on the cultural construction that associates old age with difficulties, and even resistance to, using advanced information technology, and sees old people as dependent, feeble, non-productive and subject to irreversible bodily decline (Talarsky 1998; Vincent 2008) that affects even their ICT use. I will reflect on the likely reasons for this in what follows.

The finding regarding the importance of professional identity as a relevant identity category in the study of human–technology interactions is not surprising as it confirms related findings in earlier studies looking at professional identity and ICT use among IT workers and business managers (Eriksson-Zetterquist et al. 2009; Nach 2011; Walsham 1998). This study was conducted in the context of maternity care. In their narratives of information and ICT use, maternity care nurses and midwives made a strong distinction between work that involves use of computers and work that they saw purely as caring work. This is similar to earlier research (Burri 2008) applying Gieryn's (1983, 1999) concept of boundary work and Bourdieu's concept of "doing distinctions" (1977) in explaining how radiologists achieve prestige and honour – understood as symbolic capital – through social practices related to technology use to increase their relative power between various medical specializations in a hospital setting.

This study concerned nurses and midwives who hold a relatively low position in the internal hierarchy of hospitals and clinics in relation to physicians and hospital and clinic management – although in Finland this hierarchical distinction is probably less pronounced than in other countries. The lower status of nurses and midwives compared to physicians has been observed in the past to lead to continuous power and authority negotiations and to attempts to avoid humiliation and devaluation in their daily work (Deppoliti 2008). In this study, however, nurses and midwives did not use ICT to increase their symbolic capital in Bourdieu's terms in relation to other professional groups. On the contrary, for nurses and midwives, use of the latest hospital applications seemed more like an obligation or another chore added to their already heavy workload. By making a distinction between information work and caring work they were possibly declaring their desire for more professional autonomy by not wanting to adhere to those work practices, such as using hospital information systems,

which bind them strongly to the hospital hierarchy with little freedom of decision-making of their own.

A similar observation regarding identity building in relation to ICT use in a hospital setting has been made by Nach and Lejeune (2010) with a case study originally reported by Doolin (2004). In the case study, it was physicians who resisted using a new computerized resource management system. The interpretation by Nach and Lejeune was that doctors perceived the system as threatening to their identity because they interpreted it as a system representing the hospital management. Their strategy was to voice an anti-identity by stating that they did not want to be “a doctor who would like to be dictated what to do in providing health care” (Nach & Lejeune 2010, p. 626). The present study reinforces the understanding that use of ICT and attitudes towards them in clinical work are also a result of a social interaction between different groups of professionals. ICT is never implemented in a social vacuum. Referring to discourses on identity is one way health care professionals try to assert their position and increase their symbolic capital in a never-ending battle between the different occupational groups working side by side in multi-professional teams with the same objective of taking care of patients.

Turning to the identities of mothers in the context of their everyday lives, an identity that affected their information seeking and use was that of being a member of a community of trustworthy friends. In published paper III, I have already discussed how the use of social media facilitates the emergence of a sense of (virtual) community. There is also extensive past research on how the sense of community contributes to the feeling of trust and connectedness, which in turn facilitates sharing information and knowledge and receiving support from others (Blanchard & Markus 2004; Leimeister et al. 2008; Ridings et al. 2002; Welbourne et al. 2013). This finding therefore supports earlier research and confirms the importance of a sense of belonging to a group – or a sense of community – as an important factor helping to share health- and wellbeing-related information and to give and receive support from peers.

Another type of identity observed in this study in the context of mothers' everyday lives was that of being a competent information seeker. The self-evaluated competency in information seeking that was found to influence mothers' abilities and willingness to look for health information in a web-service is a concept that bears similarities to the concept of self-efficacy much discussed by Bandura (1977) in his social cognitive theory of learning. According to the theory, it is the cognitive representation of one's ability to succeed in specific situations that affects one's behaviour. The sense of self-efficacy can play a major role in how one approaches goals, tasks and challenges, such as seeking health- and wellbeing-related information on the internet as in this study.

The concept of self-efficacy has also been applied in empirical research on seeking health information using the internet. In this context, researchers refer to

it as internet self-efficacy, which is a concept explaining one's ability to accomplish general internet-related behaviours (Eastin & LaRose 2000; Rains 2008). Internet self-efficacy has an important role in predicting web use and, ultimately, patient empowerment. It has been argued that merely having access to the internet is insufficient to succeed in acquiring useful information: a sense of self-efficacy is also required in helping to overcome barriers related to internet use and plays a role in the confidence individuals have about the information they find online. It has been proposed that confidence in the information acquired online may have an influence on health behaviour as well (Rains 2008). The present study provides further qualitative evidence of how internet self-efficacy is grounded in everyday interactions of users with information and ICT through pragmatic action and situated improvisations.

Identities that emerged in the course of this study proved to be multifaceted and reflected the different contexts in which the empirical data collection took place. In future research, it would be interesting to focus on one aspect of identity construction highlighted in this study, such as internet self-efficacy or professional identity, and design a larger research focus around that theme. Such research could make use of different methods, including quantitative surveys, to get more widely generalizable results. In this study, the viewpoint of both health care workers and health care clients were taken into account. However, health care workers included only maternity care nurses and midwives, and ignored other clinical professional groups such as physicians, who occupy a completely different position in the social context of hospitals and clinics. Although some research has already been conducted in Finland to look at physicians' attitudes towards the use of ICT (Viitanen et al. 2011; Martikainen et al. 2012), replicating this study on identity construction could provide some further insights into the issues affecting physicians' information and ICT use.

6.1.2 Implications and suggestions for further research on health advancing social networks

Research on health-related social networks seems to be gaining more popularity again, mirroring its popularity some 30 years ago in the 1980s (e.g. Berkman 1985; Fox 1988; Hall & Wellman 1985; Hammer 1983; McClain 1987). This renewed interest in looking at how networks influence health and health care is most likely related to the current advances of the internet and smart technology and technology's new role as a facilitator of networking in people's everyday lives. Furthermore, in health informatics the strong interest at the moment in exploring possibilities to transform health care models from institution-centric to patient-centric with the help of technology is renewing researchers' interest in looking at laypeople's or consumers' behaviour in the context of their everyday lives (Eysenbach 2008; Swan 2009). In this way, the present research fills a gap by presenting empirically grounded knowledge on social network building that

I believe is timely and relevant. However, I am aware that technology as well as health services develop fast and that the structures, content and tools of networks typical of families with young children in Finland may already have changed compared to the situation at the time of the empirical data collection for this study.

In this research, I presented an empirically grounded description of the structures, content and tools in social networks that families formed in the context of their daily lives when looking for health- and wellbeing-related information. This kind of detailed ethnographic description of how people manage information in their everyday lives is still a novel approach in research that in my understanding only few researchers have attempted to do in the past, including Jones (2007), Kalms (2008) and Moen and Brennan (2005). By taking a network approach in this study of the everyday health information management activities of laypeople, I hope to make a connection between the present research and the wider field of studies on social networking in health care and health informatics.

The networks observed in this study formed three different types centred on the role of the family in the middle: that of a patient, consumer and citizen. This finding is probably a reflection of the families' points of view of today's Finnish society and how health and wellbeing information and services are organized and offered. In some other countries, where the role of public services is less determining, the picture would probably have been different and the families' role as a consumer is likely to have been more accentuated, offering a more complex network to interact with for circulating health-related resources.

The tools that families in this study used for creating networks reflected the everyday culture in Finland at the time of the study. Although physical visits and phone calls were still the main media for exchanging health-related information, the internet was also a daily communication tool for them. However, as I have already pointed out, technology-related culture is a rapidly changing field which means that the findings of this study have to be interpreted in their historical context. What is relevant in the study of families with young children is the fact that compared to elderly people's use of information and ICT, there is less concern about the effects of a digital divide. In general, as was seen in this study also, young people are willing and able to take up the use of the latest technology and health services developers should take that into consideration when thinking of new service concepts.

The health- and wellbeing-related resources that flowed in these networks were similar to those brought up in previous studies (Byrd 2006; Gage 2013; Griffiths et al. 2012) and included information, services, tangible products such as childcare accessories, financial resources, as well as social and emotional support. As observed in past studies (Moen & Brennan 2005) laypeople's actions related to self-care and health maintenance are largely invisible and under-

articulated. Through the description of families' health advancing networks, the present work aimed to make visible the actual actions and technology that people employ when seeking health and wellbeing. The study confirms the observations made in the past studies that seeking health and wellbeing involves information and resource exchange in myriads of everyday life contexts and not just in the context of the formal health care system. As such the study advocates a holistic understanding of how laypeople actively contribute to their health and wellbeing in their micro-social contexts as a basis for future health services development.

This research was an exploratory snapshot of social network construction by families at a given time in a given geographical location with an emphasis on the micro-mechanisms explaining the pathways of resource flows. It would be interesting to add a longitudinal perspective to this study by following up with families at given intervals to see how the networks evolve as the children grow up. Past research shows that the resources that flow in social networks are not always beneficial to health, for example, in the case of transmission of diseases such as HIV/AIDS and substance abuse (Valente 2010). In the present research, I was not able to detect any negative influences of the networks on families' health and wellbeing but certainly it would be an important aspect to look at in future research. One of the original purposes of sub-study II, of which original data was also used in the study of network construction, was to provide baseline data of technology that families use in their everyday information interactions that would feed further technology design. Although at that point the results of the sub-study were not exploited in actual ICT design, it might be an idea to reconsider this in future research.

Finally, in this work I have looked at the two areas of health information- and ICT-related identity construction on the one hand and social network building on the other hand as separate phenomena. In the future, it would be interesting to join these two concepts together to look at identity building in ICT-facilitated social networks as some researchers have already done outside the health care context (e.g. Merchant 2004). Adding the dimension of health seeking in such a study is an area not yet covered by past research and would give interesting insights into how patients, for example, create online identities in peer support groups and how those identities differ from identities constructed in encounters with medical professionals.

6.2 PRACTICAL CONTRIBUTIONS TO HEALTH SERVICES DEVELOPMENT

This work contributes to different areas of maternity and child health care services management and development. One important contribution that it makes is in the area of information and ICT management in health care organizations. For example, the need to reinforce clinical workers' ICT skills has been recently identified as one of the key areas in human resources development in organizations offering child health and welfare services in Finland (Perälä et al. 2012). This study provides an understanding to clinical workers' ICT use that takes seriously into account the social context of an organization and understands how information and ICT interactions are embedded in the existing social structures. By looking at technology use through nurses and midwives professional or age related identities it could be possible to create strategies for ICT skills training and implementation that take into account these realities. An analysis could be conducted, for example, of the opportunities and threats that specific occupational groups perceive in technology use, and opportunities could be created for the different groups to see how they benefit from the envisaged changes and how they can use them as an opportunity to create symbolic capital to advance their perceived power position within the organization. Involving the different groups in the various phases of the technology implementation process could be one way to achieve this.

The study has also some important contributions to make to the field of health services development, particularly for maternal and child health care services. I have already suggested that maternity and child health clinics which are in charge of all families in their local operating area could think of a shift in their working culture from emphasizing provision of information to emphasize their role as facilitators for emotional support. This study showed that families today are able to access factual information quickly through the internet, which suggests that factual information that local clinics would like to distribute to their clients could be provided in a more centralized way in the country through the already existing web-based health information resources. Centralized distribution of health and wellbeing information by primary care maternity and child health clinics would also increase equity of families because the same information would be available to all Finnish families regardless where they reside. This would counteract partly the current trend of continuous fragmentation of the array of services available to families in primary care maternal and health services and increase families' equity of access to services regardless of the municipality they reside in (Raussi-Lehto et al. 2011). Also, based on the finding in this research that information self-efficacy, i.e. the way mothers and fathers think of their abilities to find trustworthy information affects their web information search and use, some thoughts could be given to

the idea that in the future, maternity clinics may have to pay more attention to their educational role in reinforcing families' health information literacy skills.

Local maternity and child health clinics could also think of redirecting their resources increasingly into ensuring that social and emotional support is available to all families with children. In practice this could happen by providing opportunities for every family to be connected to a social network that will offer them emotional and social support needed in their challenging phase of life. The web-based service innovation that was presented in the published article III provides one example of how social media can be utilized effectively to bring together families living in the same neighborhood. Ensuring social connectedness would be a powerful way to decrease marginalization of families, particularly of those with special needs, and evolving ICT provides new opportunities to think of innovative service concepts that would enable this cost-effectively. I genuinely wish to see that service developers take seriously the promises of the new technology in rethinking their role as supporters of family wellbeing and this way take the opportunity to move closer to the ideal of family centered care based on the principles of respect and dignity, information sharing, participation, and collaboration (Lewis 2013; Svavarsdottir 2006).

6.3 STRENGTHS AND LIMITATIONS OF THE RESEARCH

This research was conducted as a qualitative study. There is an ongoing debate concerning how quality should be evaluated in qualitative research and how it differs from evaluating traditional scientific research using mostly experimentally based methodologies and methods (Patton 2002, p. 544; Schwandt 2007). The widely accepted criteria of rigor in traditional research are internal and external validity, reliability and objectivity, which long ago have been suggested to be replaced in qualitative interpretive research by credibility, transferability, dependability and confirmability that would reflect the overall trustworthiness of the research (Lincoln & Guba 1985; Lincoln & Guba 1986). Other criteria to assess qualitative research, suggested for example by Silverman (2005) include criteria such as building useful theories, using a self-critical approach, thinking about appropriate research methods, and making a practical contribution. Also, based on published qualitative research, the following seven evaluative criteria have been identified as being valued by practicing qualitative researchers: research is ethical, research is important, research report is clear and coherent, methods are appropriate and rigorous, there is evidence of researcher reflexivity, research validity and credibility have been established, and research is verifiable or reliable (Cohen & Crabtree 2008). In this research, the strengths and limitations of each sub-study have been evaluated separately in the

published articles I-III. In this chapter, I will evaluate the strengths and limitations of the whole research process reflecting on the four criteria proposed by Lincoln and Guba (1985).

Credibility in qualitative research can be sought by prolonged engagement in the field, persistent observation, triangulation and member-checking (Lincoln & Guba 1985). In this research, I was able to establish a long-term relationship with the participating nurses and midwives as well as with their organizations during the first sub-study. During that period I visited each organization four times and recorded not only the formal focus group discussions, but kept also a field diary during the research process. Having a prolonged engagement with the field (12 months) enabled me also to do member-checking. I started the data analysis already early in the research process and presented my preliminary first findings to the research participants who were able to actively comment on them and suggested their views. However, in the sub-studies II and III the engagement with the research participants and contexts did not last as long (4 weeks and 2 weeks respectively) reducing the possibility to reflect my findings along the process with the field.

Triangulation refers to multiple data collection techniques used to study the same issue (Lincoln & Guba 1985; Patton 2002, p. 555). The advantage of triangulation is that it is possible to get a better grasp of the research subject by looking at it from multiple angles for example by combining interviewing, observation, and document analysis. I used triangulation in different degrees throughout the research process (e.g. triangulation of methods by combining observation and focus groups), but probably most extensively in the second phase of the research, the summary part. This was done with data triangulation by combining both empirical data and data from document analysis and using these as data sources. Researcher triangulation, particularly in the data analysis phase, would have also been beneficial in this work to increase the credibility of the findings, but was not possible due to resource constraints.

Transferability refers in qualitative research to the external validity of findings or generalizability, or in showing that the findings are consistent and could be repeated or transferred to other contexts (Lincoln & Guba 1985). As numbers of interviewees ("sample size") is usually quite modest in qualitative research, it is impossible to claim that the finding would be applicable to the wider population in the same sense that is required from studies using statistical research methods. It has been argued that generalizability the way it is required from research using quantitative methods cannot be the ultimate objective of qualitative research. Qualitative research is by nature context bound, and if there is a need to assess whether the findings apply to other contexts then the study should be replicated employing the same methods (Shenton 2004). However, there is also another way of thinking generalizability in qualitative research, for example, by understanding it as theoretical generalization where findings are extrapolated in

relation to their theoretical application (Brannen 2005). In this research, empirical data collection was done in four different contexts in three different time periods – primary care maternity clinics, maternity hospitals, everyday life context of families with young children, and everyday life context of mothers who had recently given birth and who were clients of the same maternity clinic. It would be impossible to claim that the findings of the study are generalizable to the wider populations of Finnish maternity care nurses and midwives, let alone Finnish families or Finnish mothers. The findings are therefore highly context depending, but likely to be generalized to contexts that resemble the ones studied in their key characteristics such as geographical location (e.g. urban or rural) and socio-demographic characteristics (e.g. gender, age, ethnicity, level of education etc.).

Dependability refers to the idea of reliability in conventional research and to showing that the findings of qualitative research are consistent and could be repeated (Lincoln & Guba 1985). In practice dependability is ensured if there is careful documentation of all data related to the research process including empirical research data, description of methods and decisions taken during the research process and these are laid open to external audit. Also, researcher triangulation is a way to increase dependability of qualitative research. In this research, care has been taken to document carefully each step of the research process and to describe them as much in detail as possible in the research articles as well as in the present text. Also, I have not been working alone as there has always been the back-up of the research team and sub-study steering committees to whom I have been accountable for along the research process.

Confirmability is in conventional research understood as objectivity. Confirmability refers to the degree to which the findings could be confirmed or questioned by others. Like dependability, confirmability relies on auditing as a means to demonstrate quality and one method to prove it is to document the procedures during the whole research process (Lincoln & Guba 1985). An important aspect of showing confirmability is to engage in active self-reflection during the research process (Shenton 2004). Besides documenting the different steps of the research process, I have made a deliberate attempt to document my reflections regarding important choices I have made during the research process and what influenced those e.g. when deciding for the research objectives and questions. However, I feel that conducting research in a multidisciplinary field that draws from different academic traditions in which the dominant way to present research findings in a concise standard format has restricted somewhat my use of self-reflection in this work.

6.4 CONCLUSIONS

This work is a presentation of a qualitative study of everyday information and ICT interactions observed in the field of maternal health care in Finland. More specifically, it is an exploratory study of the processes of identity and social network construction by health professionals and by laypeople in their everyday interactions with health and wellbeing related information and ICT.

Both research approaches – the study of identities and the study of social networks – led to a detailed understanding of the microreality of health care professionals and their clients as users of information and ICT in their everyday life tasks. The findings of the research contributed to the ongoing academic research in looking at ICT interactions as socially constructed in the pragmatic actions and situated use of technology both in health care organizations and in the daily life of families taking care of their children. The findings also contributed to the research investigating lay people's health information seeking and ICT use by employing a network perspective. Finally, the study led to the identification of some important issues that health care managers and health services developers could look at in the future.

This research was an exploratory study applying two different perspectives to understand everyday life health and wellbeing information and ICT interactions in the context of maternal health services. I see the value of it mainly as providing an alternative to research that understands technology use mainly as a top-down process or as a question of acceptance or rejection of specific tools. Through this research I wished to offer new and less common angles to look at everyday information and ICT use by taking seriously under investigation and making visible what seems so obvious to all of us in our daily lives as family members and as employees in different organizations.

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Articles

UNDERSTANDING NURSES' AND MIDWIVES' INFORMATION WORK: "WE JUST HAVE TO FIND A WAY TO GET ALONG WITH THE COMPUTERS"

Palmén, M, Korpela, M & Saranto, K (2014). Understanding nurses' and midwives' information work: "We just have to find a way to get along with the computers". *International Journal of Technology and Human Interaction* 10(2).

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MATERNITY CLINIC GOING ONLINE: MOTHERS' EXPERIENCES OF SOCIAL MEDIA AND ONLINE HEALTH INFORMATION FOR PARENTAL SUPPORT IN FINLAND

Palmén, M & Kouri, P (2012). Maternity clinic going online: Mothers' experiences of social media and online health information for parental support in Finland. *Journal of Communication in Health care* 5(3):190-198.

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Article II

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Identifying health and wellbeing related information management activities and needs in families with young children

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Abstract

Understanding how families manage health and wellbeing related information in their everyday lives is important in the user-centric design of information and communication technology (ICT) supported services. Using activity theory as a conceptual framework, the aim of this exploratory research was to make visible families' everyday health and wellbeing information management activities and needs. We applied a qualitative study design using the method of longitudinal virtual focus group discussion with eight households (n=8) over four weeks of time. As a result, we identified nine information management activities and grouped them under three role categories that families with young children play in the Finnish society when seeking health and wellbeing: families as users of health and social services, families in the role of consumers in the market of goods and services, and families in the role of citizens who aspire to a sense of wellbeing in its widest meaning. Furthermore, we identified information management activities with which families felt mostly dissatisfied. The study provides a baseline understanding of everyday information management in families with young children to be applied further in ICT supported family health and wellbeing service development and innovation.

Keywords: family health, health service innovation, information management, activity theory

Introduction

Models for health service delivery are changing. There is a growing interest to redesign health care processes and related communication technology tools from institution-centric to patient-centric solutions [1, 2] and, in parallel, to increase the accessibility of consumers to valid and relevant information about their health status [3, 4]. These developments have led managers and developers of health and social services to think of new service concepts that tap, for example, the potential of the internet and address better the needs of the service users [5]. At the same time, consumers are becoming the primary authorities of their own health management, and therefore have an increasing responsibility to acquire and interpret the vast amount of information available and get more engaged in activities related to healthcare [6]. Families with young children are an example of a significant group of service users that could benefit from easier access to health and wellbeing related information and improved links between service providers and communities [7]. New parents need information and support to fulfill the demands of their new role [8-12] and information plays an important role in ensuring the availability of these [10, 13-15].

There is also an increasing demand to develop and design services in collaboration with the service users [16]. One of the early steps in participatory innovation and service development is the needs analysis in order to identify user behavior and needs relevant to the innovation under development [16]. Involving users in product and service development process is not a simple task, however. It has been pointed out that users are often unable to verbalise their needs, requiring the researcher to reflect carefully on the choice of research methods. A radically novel service or product renders the situation particularly challenging [17].

In this article we present an exploratory study which aimed at modeling families' everyday practices of health and wellbeing information use. The objective of our study was to make families' everyday health and wellbeing related information management activities visible and to identify potential contradictions and problems in the current situation to arrive at a baseline description to be utilized in further service development. For the purpose of this study, we defined information management as everyday practices of the family members that relate to the six distinct, but related information management processes: identifying information needs, acquiring information, organizing and storing information, developing information products and services, distributing information, and using information [18]. However, as these processes refer originally to information management processes in organizations, some flexibility is needed in adapting them to the context of families. In order to gain an understanding of the most important activities of daily health and wellbeing related information management activities and needs in families with young children, the question we sought to answer was what kind of situations do families engage with when seeking their child's or their own health and wellbeing? What type of information management needs arise in these situations?

Previous literature and conceptual framework

Family information management is not a phenomenon that has received much attention in the past empirical information management research. In our literature review, the closest we came across were studies on household information management [19, 20] and on personal information management (PIM) [21]. Also, a research tradition called domestication research has some relevance for family information management studies [22, 23].

Moen and Brennan [19] studied health information management in the household (HIMH) using a five-element human factors model of work based on a socio-technical approach to understand the interwoven networks of people, tools, routines, sources, and responsibilities in the household. Their key finding was the identification of

the robust and complex information storage strategies that households employ which reflect the location of the artifacts of health information and the anticipated urgency in the need to retrieve it. Kalms [20] investigated households as information systems in order to build theoretical understanding of the dynamics of why and how households process and manage information. A central conclusion of the study was that households constitute negotiated human information systems, based on the observation that household information practices emerge from continuous negotiation and interaction between householders and information, information-related devices and services, other householders and information providers. Both household related studies are relevant in family information management research. However, because the origins of this study lie in the development and design of improved health and wellbeing services for families, our decision was to use the concept of family as it is already well established in health services development and research such as the family-centered care movement [24-26].

The theoretical approach of this study is based on activity theory. In a nutshell, activity theory understands human activity as a systemic entity directed by a motive of achieving a joint outcome, embedding a number of actors involved in mediated actions on a shared object, and having mediated relations with each other [27-30]. A central tenet is that an activity system is not a static entity. On the contrary, all the elements of an activity system, the subject, the object, the means and tools of construction, and social relations are in a continuous process of being constructed and transformed leading to the eventual expansion or contraction of its current state [27]. Taking a close look at the developmental dimension of an activity system provides the researcher and practitioners a way to understand and make visible those dimensions of the system that are not yet there, but under the process of being constructed or expanded from their present state [27].

Families' health and wellbeing related information management is collaborative by nature [31], and therefore fits well in activity theoretical thinking. Family information management can be understood as a collective human activity facilitated by technological means in which several groups of actors are bound together with the aim of achieving a joint outcome. Conceptualizing families' health and wellbeing related information management through the lens of activity theory allows describing and analyzing both its present state and the developmental dimension, providing tools for example for service innovators to visualize how the present state and array of services could possibly be modified. In the area of personal health and wellbeing systems, activity theory has been applied successfully as a tool for information analysis [32]. Our approach in the present study, however, is not to describe and analyze in detail the information that families use, but rather to describe in what kind of situations and for what purposes families use and manage information.

Materials and methods

The research design was qualitative research [33]. The data gathering method applied in this research was virtual focus group discussion. The idea of a virtual focus group discussion is very similar to the standard focus group method. However, instead of having the group getting together physically in one place the discussion takes place over the internet [34, 35]. A total number of 8 families who were expecting a baby or who had a child of maximum 24 months old were recruited for the study. The participants were recruited in the city of Kuopio, a middle-sized city of 97,000 inhabitants in Eastern Finland, by advertising in local maternity clinics and by the snow-ball method through personal and professional contacts of the research team. All the participating families were composed of a heterosexual couple with the number of children varying from none (expecting a baby) to three children. The social and educational background of the participants was very homogeneous. The age of the parents varied from 29 to 35 years. All parents were highly educated having received minimum a college level degree, and all but one

family lived in an urban or semi-urban environment. The families described themselves as regular users of health care services and active users of the internet, all but one family using it daily.

One adult member of each family, six women and two men, took part in the virtual focus group discussion continuously over a four-week period in November–December 2008. The participants were explained the purpose of the study and their right to withdraw from it any time in a face-to-face meeting that took place prior to the internet discussion, during which they gave their informed consent to participate in the study. The internet discussion was moderated by the first author of the paper by regular presentation of the discussion themes and by active participation in the discussion that followed. A new theme and related questions were published every three or four days on the virtual platform provided by an educational institution and respondents were invited to discuss the theme and comment on other participants' answers as long and as often as they felt they had something to contribute until the end of the data collection period (Table 1).

-
1. **Daily information use:** Describe in detail a situation in which you last dealt with health and/or wellbeing related information. Who were the actors, what was the information about, how was the information handled. Were there any problems present? Any particular emotions? (N.B. This theme was posted in total six times along with the other themes).
 2. **Changes as a service user in pregnancy:** Describe how your role has changed as a health and social service user since you started expecting your first baby? How did your information needs change? What kind of support would you have needed but did not get?
 3. **Health information storage at home:** Describe where and how do you store your personal or your child's health and wellbeing related information? Does your storage system work well in your everyday life? Have you ever thought about a digitalized storage system? How should it be so that you would find it useful?
 4. **Preferred communication tools:** Describe your favorite communication methods with health professionals, peer groups, friends, family members and relatives. Has the birth of your child changed this pattern somehow?
 5. **Visualizing the future:** Imagine yourself in year 2020. What has changed with the communication with health professionals? How do you store your personal health and wellbeing related information?
 6. **Elements of good life:** What elements are essential to make life enjoyable for a family with young children? What kind of health and wellbeing related support is fundamental?
-

Table 1. Discussion themes posted on the internet platform.

After the data gathering period, a text file was prepared of the discussions on the internet platform and later analyzed by the inductive content analysis method for qualitative data. In inductive content analysis, the outcome of the analysis is a condensed description of the phenomenon under study through the process of open coding, creat-

ing categories and abstraction [36]. We applied a realist approach in the data analysis treating the data as respondents' descriptions of facts and events reflecting their external reality [37]. The data was read repeatedly to allow immersion, and the coding process started with identifying the smallest meaning units in the data, everyday actions of information use. We then continued the coding process in order to identify the emerging sub-categories, the activities of families' health and wellbeing related information management. The sub-categories were further classified into generic categories of meaning reflecting the roles that families play in society when seeking for health and wellbeing.

Results

The data analysis revealed nine distinct health and wellbeing information management activities that covered most of the everyday actions of information use brought up by the families. From the identified activities we inferred a taxonomy of three generic categories reflecting the different roles that families with small children have in the Finnish society as health and wellbeing seekers. These generic role categories were families as users of health and social services, families in the role of consumers in the market of goods and services, and families in the role of citizens who aspire to a sense of wellbeing in its widest meaning (Figure 1).

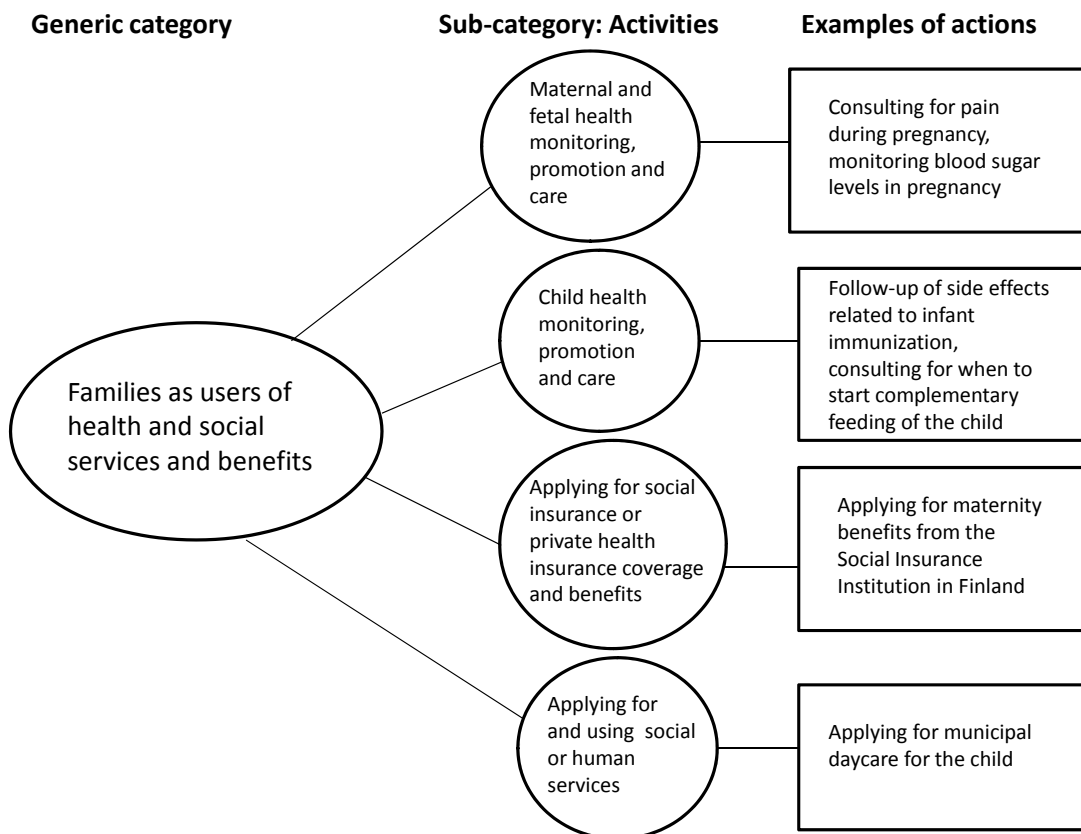


Figure 1. Example of data analysis process: Generic category of activity, sub-categories of activities, examples of actions.

Activities in the role of users of health and social services

Many health and wellbeing related information management tasks in families with small children take place in the context of the formal, and in the Finnish context mostly public health and social service system, in which families act in the role of service users. The many daily situations as service users reported by the families enabled us to identify the following activities in this category:

- Maternal and fetal health monitoring, promotion and care
- Child health monitoring, promotion and care
- Applying for social insurance or private health insurance coverage and benefits
- Applying for and using social services

The everyday actions that required information management in this category included, for example, seeking health professionals' assistance in monitoring or curing ailments related to a pregnant mother's or child's health mainly through physical visits or by telephone consultation.

Family 3: "My wife developed an itching on her tummy and elbows around the 28th week of pregnancy. We knew that this might be caused by hepatogestosis and that's why my wife contacted the maternity clinic straight away to ask for a referral to a liver function test, which she got immediately. The following week we received the results during a consultation visit at the clinic."

Also, interviewees reported often actions that were related to applying for social services provided by the local government, such as daycare for the child, or to applying for welfare benefits to which they are entitled by law in this phase of life, such as maternity benefit or family allowance mostly by the internet.

Activities in the role of consumers of products and services

Expecting a baby or having young children in the family is a phase in life in Western societies during which families suddenly become active consumers in the market of child and pregnancy related goods and services. The activities in this category differ from the first category by the fact that the providers of the goods and services are a myriad of private actors, which poses a different type of challenge for the families and requires plenty of information to be able to make an informed choice. The following two information management activities were identified in this category:

- Selection and purchase of child care or pregnancy related equipment
- Consulting for safe travel during pregnancy or with young children

The interviewees reported many situations that were related to the selection or purchase of, for example, a pram or special clothing for the breast-feeding mother.

Family 4: "This week as I was surfing on the internet I came across a support pillow that you place between your legs while sleeping to support your back, and to ease the pressure on your hips. It was on sale in a net shop, which inspired me to do some comparison between similar products on the internet."

The information management actions in this category were mostly events of information acquisition or information exchange through the internet either directly with the service or good providers, or in informal internet based discussion groups.

Activities in the role of citizens aspiring to a sense of wellbeing

Not all situations concerned with health or wellbeing described by the families were about satisfying health or social service related needs or buying goods or services in the market as an informed consumer. Many situations, in fact, served purposes for which there was no need for specific service or product outside the family context, in

other words there was no health or social service use or product consumption involved in the activity. Activities in this category included:

- Seeking and maintaining peer and community support
- Seeking and maintaining peace of mind on health and wellbeing related issues
- Organizing and storing health and wellbeing related information at home

The actions under these categories reported by the interviewees included, for example, meeting other parents and children in a play park, looking for other parents' experiences about specific health related problems in an informal discussion group on the internet to decide whether the problem needs professional attention, and filing family members' clinical papers in folders at home.

Family 6: "A couple of days ago I was wondering whether our 2-months-old could be having his first tooth as he was drooling a lot. [...] I discussed the issue with my sister-in-law who has 4 children already who was of the opinion that this might be the case."

Activities in this category seemed to support the family members' overall wellbeing and sense of coherence, and seeing the world as meaningful and predictable.

Contradictions in current activities

The second objective of the study was to identify those health and wellbeing information management related activities, in which the participant families felt they had problems that could be understood as contradictions in the system. Based on the theoretical framework of activity theory, the identification of systemic contradictions is particularly important in order to get an idea of which direction the system may be evolving through its developmental dimension and emerging new activities.

It was especially information seeking situations falling under the activities in the third category, seeking and maintaining peace of mind on health and wellbeing related issues, and organizing and storing health and wellbeing related information at home, which had left families sometimes dissatisfied. Seeking and maintaining peace of mind was an umbrella term for situations in which the families searched for information and support on the internet or from peers in situations where professionals had already been contacted, but the professional information received did not satisfy the family or was contradictory in some cases where several professionals had been consulted. The primary purpose or objective for information seeking was not so much to get an answer to a specific health or wellbeing related problem, but rather to be reassured and comforted in a deeply worrying situation. However, this was not always successful.

Family 6: "After our visit to the maternity care clinic [where maternity nurse suspected that the baby's position was distorted while lying on his tummy] I got really worried and started calling friends, some of whom are medical doctors, to ask for more advice. I also looked for information on the internet both from medical sites and informal discussion groups. Knowing more about the problem made me even more worried because I understood that a distorted position can even be an indication of a brain injury, after which my imagination started running wild and the following two nights I was unable to sleep properly..."

Another area in which the interviewed families expressed dissatisfaction was their system of storing and archiving health and wellbeing related personal information at home. Being active users of services, families collect a considerable amount of paper based information such as drug prescriptions and child health monitoring reports, which in most families seem to end up in disorganized paper piles in a bookshelf or on the kitchen table. More active families had a system of plastic folders and files. In many families the problem for a better organization of these papers seemed to be lack of time and lack of interest.

Family 7: "We have saved all our papers and things carefully, I just don't know where. [...] Our filing system really does not work, but at the moment it's the only one we use. I have been planning for the past four years to sort all the papers in folders in the bookshelf, but I always found something more important to do."

It seems that still today households lack simple and usable personal information storage systems.

Discussion

The results of the study reflect the different, although sometimes overlapping roles that families with small children play in the Finnish society when dealing with health and wellbeing related issues: the role of users of mostly publicly provided health and social services, the role of consumers in the private market of goods and services, and the role of citizens seeking a sense of coherence and emotional wellbeing. Somewhat contrary to our expectations, the families included in the study seemed relatively satisfied with the amount and availability of health and wellbeing related information and support in their everyday lives with the existing service system and market structure. Information needs and sources seemed to be easy to identify, and information could be acquired and exchanged smoothly within the existing service systems and technology. The major problems and concerns that the families seemed to have were in areas that fall outside the current professional and/or commercial interest and care. For example, families found themselves in situations of extreme uncertainty, after having received controversial information from both health service providers and internet sources. Families also expressed concerns regarding how to organize and store at home household members' personal health and wellbeing related information to find it easily when needed.

This study focused on a single stakeholder's point of view, that of families with young children. Activity theoretical frameworks have been traditionally used in organizational settings to depict and analyze work activities from the point of view of different professional groups. Our study is an attempt to apply activity theoretical thinking in activities of everyday life. Our starting point was to describe what happens in family life from the point of view of information use. Networks connecting the different actors were not the primary focus of this study. The next step in the research process could be to make visible the inner dynamics of the activities, understood as networks that connect families with service providers, private companies, and family and peer groups interacting with technological tools to manage information. On the other hand, focusing on the end users of a potential new service has value as such. It has been pointed out that the most capable actors to expand their perspectives in relation to the object of activity are the ones concretely interacting with it, while other practitioner groups may remain reluctant to change their perspectives [38]. However, a change in perspectives is required if the aim is to come up with an expanded view of the activity and therefore to contribute to an innovative way of looking at the present situation [38]. In developing user-centric ICT-supported family health and wellbeing services, the first step is to make visible families' everyday use of health and wellbeing related information in the context of complex technology and ser-

vice environment. This research serves as an exploratory study and as such opens up new directions for future research and, as well, we believe, for future service and technology design.

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Article III

MATERNITY CLINIC GOING ONLINE: MOTHERS' EXPERIENCES OF SOCIAL MEDIA AND ONLINE HEALTH INFORMATION FOR PARENTAL SUPPORT IN FINLAND

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Maternity clinic going online: Mothers' experiences of social media and online health information for parental support in Finland

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Abstract

Social support and health information are important elements in maternity care preventive and counseling services, and the internet has a potential role in supporting those services. In a pilot service innovation study, a web service offering social media tools and health information for parental support was created as an extension to the standard preventive and counseling services provided by a local primary care maternity clinic in Finland. In this exploratory qualitative study we examined the experiences of mothers of infants ($n = 7$) of using the virtual service. This study showed that social media coordinated by a maternity clinic can effectively create a sense of virtual community, or a feeling of belonging to a group, and respond to the needs for social support of parents with small children. At the same time, there seemed to be less utility to the mothers derived from the health information made available through the service. This pilot study demonstrated the importance of understanding virtual health service users in their everyday life context, as the utility they derive from the service is largely affected by it.

Keywords: Maternal-child health centers, Parenting, Internet, Social media, Consumer health information

Introduction

Becoming a parent is a life-changing event, and parents often welcome help from the outside to be able to cope with the new situation. Research shows that both support received from health care

professionals and social support received from people that parents have a personal relationship with has positive effects on parenting. Adequate social support has been associated with a good couple relationship, less risky behavior, less postpartum depression, better compliance with medical regimen, and a decreased incidence of low birth weight infants.¹ When making decisions on the health and wellbeing of their children, parents wish to receive appropriate and updated information, have an opportunity to share their views and everyday experiences with other parents in the same situation, and be in control of the decision-making process themselves.²

The rapid change in society in the use of the internet as a source for health information and social support has led managers and developers of health and social services to develop new service concepts that tap the potential of the internet and address better the needs of the service users.³⁻⁵ Some of these benefits are, for example, the fact that services are not bound to any specific opening hours or to any designated place. Virtual patient communities also benefit their members in many ways that a traditional clinic would not be able to do, for example, by offering a sense of trust and belonging that help group members feel supported in their difficult life situation.⁶ However, significant obstacles for health professionals' adoption of social media have been observed primarily due to a lack of understanding on how social media would be used in healthcare.⁷ Also, legislation on healthcare services has an important impact on the development of the industry, limiting currently, for example, the use of social media as a tool for service provision in many countries.⁵

Background

Finland has a national healthcare system funded through general taxation with nearby health services available to all residents in the country. Nearly all pregnant women in Finland use the free-of-charge preventive and counseling services of the public maternity clinics while more specialized maternity care services are available to families at regional and university hospitals through a referral system. At the primary health care level, maternal and child care services are largely carried out by maternity care nurses who have specific training in preventive work.⁸ Social support and health information are important elements in maternity care preventive and counseling services, and the internet has a potential role in the provision of those services.

As in many European countries, the internet has gradually become an everyday information source and communications and collaborative tool for the majority of the population in Finland. According to the Finnish National Statistical Service, 58% of people between the ages of 16 and 74 in Finland said they had used the internet to seek health-related information during the 3 months prior to the survey in 2011.⁹ Younger age groups are more active than older ones in using the internet for health information seeking, a trend that has been observed in the United States as well.^{9,10}

The need for involving end users has been found critical in the development of health promotion websites that are relevant, appealing, and address the needs and interests of the user group.¹¹ This paper reports an exploratory empirical study that aimed at involving end users to contribute to the design of a health service innovation by eliciting their views on the use of the service in the context of their everyday lives. The research builds on earlier research on the use of health and wellbeing-related information and information management needs in everyday lives of families with young children.¹² Understanding how parents of infants experience a web service is based on a holistic understanding of user behavior in which users are understood to develop their own construction of utility, which may be distinct from the service developers' and service management's point of view.¹³ Specifically, our aim was to examine the experiences of mothers of using a web-based service built as an extension to the traditional preventive healthcare services offered by a local maternity clinic. The research questions for the empirical study were: Why did mothers use or why did they not use the web service? What did mothers see as the main

benefits of the service? How did the use of the web-based service fit the everyday-life activities of the mothers? What did mothers think about the usefulness and trustworthiness of the professionally written information offered by the service?

Previous research on the use of internet to support parenting

Previous research on the use of the internet as a tool to support parenting has concentrated on the availability and usefulness of web-based support to parents^{14,15}; how parents' socioeconomic status affects the use of web-based support^{16,17}; why and how parents look for information on the internet^{18,19}; what parents think about the reliability of the information available on the internet²⁰; and on the contents and topics of the discussions in online support groups.^{21–23} Research has also been conducted on parents' self-help groups operating on the internet²⁴ and on the effectiveness of an internet-based intervention supporting parenting in Finland.²⁵ Also, there is earlier research on the way internet-based social support interventions on parenting have been developed.^{24,26} Previous research shows that there is plenty of up-to-date information available for parents on the internet, but the information may be presented in a way that is not easy to understand by the users. For example, on some English language websites the text passages were found to be too long, and there was a lack of appropriate visual material to support the text. Some pages were found to be difficult to access due to complicated registration requirements.^{14,27} Internet-based support to parents has shown to be effective, and there is no evidence that poor computing skills would hinder the use of web-based support.^{15,16} There is controversial evidence of the impact of socioeconomic status on the use of internet for parental support. For example, a study carried out in Sweden, a country with a relatively homogeneous socioeconomic structure comparable to that of Finland, indicated that low socioeconomic status does not affect parental use of web-based social support.¹⁶ On the contrary, the findings of a research implemented in Texas, USA indicate that significant racial/ethnic and income differences exist in home internet access, frequency of internet and e-mail use, and perceived confidence and skill on women's communication technology use. Women of higher incomes are found to be more interested in receiving health-promotion information through the internet than women of lower incomes, who prefer receiving the same information by mail.¹⁷

Research shows that when the internet has become an everyday source for healthcare information, it is especially women who are the primary users of e-health resources.²⁸ For example, mothers of children with rare diseases have been found to use the internet to interpret, produce, and circulate special knowledge pertaining to their child's condition.²⁹ It has also been pointed out that websites have a role in the de-professionalization of medicine and that websites strengthen self-help social movements.³⁰ Furthermore, the internet emerges as a daily helper linked to the personal health experiences. The use of internet's health information has been found to shape both individual's information seeking and knowledge understanding.³¹

Setting of the exploratory study

The study was carried out as part of the citizen-centered MyWellbeing project, a partnership project between five Finnish universities, government-funded health service organizations, and ordinary citizens with two main goals. First, the project wanted to explore what the needs of citizens are and how these needs can be used as the foundation for different e-health and e-wellbeing services. Second, the project wanted to explore how significant life changes, such as having a baby or retirement should be taken into consideration when different e-health and e-service concepts are defined. As a result, the concept of a Family Coper, a generic, digital support tool for personal health and well-being management based on Ning technology was created in close collaboration between a local maternity clinic, a local university of applied sciences, and a local media production company. The aim of the web service was to facilitate the forming of self-help groups, sharing personal experiences, help managing one's health, and wellbeing, make expert information easily available, and help finding the most appropriate health and wellbeing services. The Family Coper was divided into two areas: the shared area and the individual area. In the shared area there was an opportunity for selected families to start an online community and offer peer support to each other. Sharing photographs and videos and writing a blog was also possible in this area. In the personal area, the aim was to facilitate personal health promotion by making professionally written and edited Finnish language health information easily available, and by offering web-based pregnancy and child care-related information and education through professionally produced videos and photographs. Also, users were offered a directory of

locally available nearby services in support of parenthood. A special group called 'Mamas' was formed for mothers that had recently given birth, and members to this group were recruited at a public maternity clinic in Kuopio, a city of 97 000 inhabitants in Eastern Finland, starting in spring 2009.

Methods

As the purpose of the research was to understand the behavior of the mothers in the digital social and information environment and to explore their own interpretations and meanings given to it, our research design was qualitative. As a research method, we chose interviews with pre-prepared open-ended questions. The interview participants were selected by purposeful sampling from among the clients of the collaborating maternity clinic. We asked those mothers to participate who had been in the past active members of the 'Mamas' group. At the time of the interviews there were 12 registered members in the group, to whom we sent an open invitation to take part in the study. The interviews took place at the maternity clinic which was the natural meeting place for the 'Mamas' group as the clinic had offered the mothers an area where they could meet regularly (approximately once a week) and share a cup of coffee together while attending to their babies. At the meeting we informed the mothers about the purposes of the research and seven eligible mothers expressed their willingness to be interviewed. The remaining five members of the group could not attend the meeting because of family or child-related reasons, and time and resource constraints made scheduling another meeting with them difficult. The interviews were carried out on one morning in October 2009 either one-to-one interviews or as couple interviews by the first author (MP). The second author (PK) assisted with caretaking of the baby while the mother was being interviewed. The study participants were asked to sign a document prior to the interviews indicating their informed consent to participate in the study. Before the interviews, we had prepared a set of eight open-ended questions reflecting the objectives of the research (see Table 1).

The age range of the mothers who volunteered for interviews was 22–32 years and mean age 26.9 years. Four of them had college or university degrees, one a vocational education, and two were university students. Two of the graduated mothers held occupations in the medical fields as a nurse and a laboratory scientist, while the remaining

Table 1: Interview questions for the users of the Family Coper web service.

Theme I: Experiences of the Family Coper web service:

1. You are a registered user of the web service. Have you been using it? What are the most important factors that have influenced your use of the service?
2. How easy has it been for you to use the website?
3. Have you used the health and wellbeing-related information available at through the web service? Why or why not?
4. Have you used the information about available health services in your area?
5. Have you participated in the discussions with the group?
6. Have you shared any photographs or videos with the group or have you used the service to write your personal blog?

Theme II: Expectations for the web service:

1. What kind of information would you prefer to have in the web service? Would you like to have something that is not there yet?
2. Which area of the present ones (health information, information about services, discussion area) is the most important for you? Why? What else would you like to see there?

three had been working in the commercial sector, two as sales representatives and one as a supermarket cashier. The interviewed mothers shared all a similar life situation. At the time of the interview they were all absent from their usual work or study on maternity leave, and responsible for their babies. They all lived physically close to each other in the same neighborhood and used the same maternity clinic and health services. All but one of the interviewed mothers were cohabiting with the father of the baby, but fathers were absent during the day and therefore did not participate in the care taking of the baby.

The first author audio recorded the interviews and transcribed them verbatim later. She also did the preliminary data analysis of the transcribed text using the method of content analysis.³²⁻³⁴ First, a close reading of the transcriptions was done to look for relations and contradictions in the data. Then general themes and were identified and categorized using the study questions as a guide for the analysis. Finally, the first and second authors cross-checked the themes and categories for agreement.

Findings

Social media helps building up a sense of trust in the peer support group: 'it really was our group'

The most important finding of this research was that of all the different functions of the Family Coper web service most appreciated for the mothers were the social media tools that allowed the mothers to know each other and form a tight group in which friendship became possible. In the peer support group the mothers had been able to share news related to their daily family life, share any concerns related to health and wellbeing, and they had been able to make appointments to meet each other. To be in contact with the 'Mamas' group through the Family Coper had been particularly important for the mothers when the baby was very young and the group members were still learning to know each other.

Mother 2: In the beginning we didn't know each other that well yet, so I guess we've become better friends now. I think it has been an excellent place for us to exchange news... especially when we had decided on doing something particular, like going down town or meeting at 'laavu' [an outdoor meeting place], so it was excellent to be able to post that information on the channel. Also, I used to write there a lot about the news of my baby, so I guess it had importance as a forum where I get support from the others... It made it easier to approach the other mothers in the group, especially when we didn't know each other that well yet... still it was easy to write to the channel.

One factor that the interviewed mothers felt increased their feeling of belonging together was the fact that the membership to the 'Mamas' group was restricted only to the clients of the same maternity clinic and the same nurse in the clinic. This had a positive impact on the level of trust in the group and increased the openness of the mothers toward each other, enabling the mothers to share with each other even the most intimate issues. The group started as a virtual self-help group, but turned soon into a real-life group of friends meeting regularly face-to-face.

Mother1: I think the best thing about it was that, it was this 'our' group... that we indeed became friends with each other. I mean, now it was a closed group, so none of us could ask others to join in, it always had to go through the

nurse... so it was the same people always present there. So I mean, if, for example, suppose that one of us had asked a friend to join in from the outside, I think it would have lost its meaning, it wouldn't have felt so much our thing then, and I wouldn't have written so easily that 'my baby this and that...' But it really was ours, and I knew exactly who would be reading my message...

Life situation affects the use of service

An important point of view when designing support services for groups with special needs is how people use their time daily and how it may affect their use and ability to benefit from the services. For caretakers of small children, the day is structured around the needs of the baby and this is reflected also on the way the caretakers use services. The interviewed mothers used more the web-service when their babies were small and sleeping a lot, but as the babies grew and were sleeping less during the day the mothers had less time to use the virtual service.

Mother1: For a long time I just used to go and check what people had been writing on the discussion forum and then one day I went and tried creating my own pages and put some photographs... This kind of extra you can do, if you have the time. But, to tell the truth, I'm having less and less time as the baby's naps are getting shorter, so for a long time now I have not taken a look at these pages.

Some of the mothers said that they felt the need to actively restrict their use of the internet while the baby was small. However, even in this case they always found the time to keep in touch with their virtual peer support group.

Mother5: I can always find time for keeping in touch with the group. But sometimes I don't even go to my computer just because I know I would just be wasting my time browsing whatever I come across.

Trust in health information is a necessary but not sufficient condition for using it: 'I trust but I don't use'
The members of the 'Mamas' group were offered access through the Family Coper to read articles related to important topics on child and family health and child care written or edited by Finnish health professionals. Some mothers appreciated this function of the channel and appreciated the

fact that it enabled them to find trustworthy information quickly when needed.

Mother6: I'm confident I would be able to find myself the information I need on the internet, but in some ways I feel I trust the information better when it is written by someone on purpose and not just by anybody. You know it is reliable information and not just nonsense and, if I suddenly come across something I need more information about, I'm sure I would find it quickly... these things related to maternity and child care.

However, an important finding was also that many mothers said explicitly that they appreciated and trusted the information made available by the service, but still did not use it. The reasons they mentioned were several. One mother said her baby had been so easy and healthy that she actually did not need to look for professional information. Also, one mother mentioned that she had received an answer to all her worries and questions at the maternity clinic. For some, it was mostly a question of personal preferences and habits where to look for the information needed. Some mothers simply preferred to ask friends or family instead of consulting a website. Some thought it was easier to find the expert information they needed by using the search engines on the internet.

Researcher: How about looking for health information? If you are looking for factual information... have you used the channel for that?

Mother3: Yes, I did check what kind of links there were, but actually I have not used it so much because, for me, it has always been easier to use Google and go further from there... or then I go to the same pages I have been used to, so I guess, it is a matter of getting used to something. So if I just got used to looking for the information through the channel, then I guess I would do that.

Future expectations for the web service

When asked about how the web service could be improved from its present form, the interviewed mothers made different suggestions related to the contents of the service, its functionality and the way it was marketed to the potential members. Regarding the contents of the service, mothers

were particularly keen on seeing information about local day care services in the future.

Mother2: There could... maybe be more information about kindergartens and things like that, let's say what the child will need to bring along to the kindergarten... just factual information like that.

One mother said that her biggest expectation for the web service was clarity of the presentation of information. Also, one mother pointed out that the service could have been marketed better as she knew many mothers who had not joined the 'Mamas' group even after being invited. In her view, the clinic should have made a bigger effort in presenting the virtual service to its clients and encouraging mothers to join in.

Limitations and discussion

The study was a naturalistic study of mothers' experiences as clients of local maternity care clinic. The findings are not intended to be treated as facts applicable to the population at large, but rather as descriptions and notions applicable and to the specific context of the study and transferable to similar settings.³⁵ Nevertheless, the study had some important shortcomings. In order to arrive at a more comprehensive understanding of the utility of the web service to the mothers, it would be important to understand also the view of those mothers who decided not to become members of the virtual group even when invited by their maternity care nurse. The fact that participation in the interviews was based on membership in the 'Mamas' community probably gave a too positive view of the utility that women derived from the service. It is possible that some of those mothers who decided to stay out of the group would actually have needed more support than a virtual site was able to deliver to them. Also, the fact that group participants came from a very homogeneous background in terms of ethnicity and social class affected their view of the service positively. The findings of the study might have been very different in a different context even in Finland that has a relatively homogeneous social and ethnic structure compared to many other countries in Europe.

The interviewed mothers felt that they had benefited from being users of the Family Coper service while being caretakers of a small baby at home. In their view, the service was easy to use and they were able to pick those functions that they felt

were most important to them. The findings of this exploratory study reflect two important concepts that have been found fundamental in the design of an online patient support service from the point of view of end users: utility and trust.⁶ Utility can be defined as service users' subjective understanding of the benefits they get from using a particular service. Trust is a subjective experience that users have to develop while using the service. Trust is a multifaceted phenomenon, however. In the case of Family Coper, for example, trust can be discussed as trust in the expert information provided, trust in the other members of the 'Mamas' group, or trust in the health providers – the maternity clinic nurse in this case.

From the findings it seems clear that the utility the mothers got from the web service responded more to their needs of social support rather than to their needs of health information. The social media tools helped the mothers to create a community that went beyond the virtual existence and developed quickly into a real-life support group. These findings reflecting the importance of the support of a group are similar to the findings by Novick *et al.*³⁶ of a recent study on women's experience of another maternity care service innovation, group prenatal care in the USA. The main finding of that study was that women preferred strongly receiving care in groups rather than one-to-one. In groups, pregnant women appreciated how they could learn from talking with other women and how they were offered and listened to advice. The group provided them with companionship, decreased their loneliness and stress, and gave them confidence in being able to cope with the stressful life situation. These findings were present in our study as well, and they could be summarized by saying that mothers felt an attachment to the virtual 'Mamas' group. This experience of a sense of virtual community is a concept often highlighted in studies exploring elements that contribute to the success of an online community.³⁷⁻⁴¹ Similar to the study by Leimeister *et al.*³⁹ on German cancer patients, this study demonstrated how social media coordinated by a maternity clinic can effectively create a sense of virtual community, or a feeling of belonging to a group, and respond to the needs for social support of parents with small children, which was enhanced in this case by the fact that the group was managed by a professional who acted as a gate-keeper and controlled tightly the membership in the group.

On the other hand, there seemed to be less utility to the mothers derived from the health information made available through the service than the

designers initially would have hoped. Many mothers had other resources available to them such as friends and family, the maternity clinic, and the public sites of the internet, or they simply said they did not need this kind of information because their baby was healthy and developing normally. This finding adds to the studies on website utility by showing how important it is to look at users' everyday life in its context. If we had only asked whether the mothers found the information made available useful and trustworthy most of them would have given positive answers. In this case, however, perceived utility of the information did not translate into perceived utility of the service. In other words, some elements of a service can be evaluated positively taken as a question of their quality, yet taking into consideration the larger picture even a service of good quality does not always translate into the actual use of it. A similar idea has been put forward by McLaughlin and Skinner¹³ who suggest that when a new information system is gradually being incorporated in the lives of the end-users, the questions related to the usability of the system are superseded by questions related to its usefulness. In other words, the priority for end-users in the long run is to have a useful information system (or a service) that corresponds to their daily needs in their everyday lives, which is distinct from needing an easily usable or easily accessible system or service.

Trust is a concept that emerged in several occasions during the interviews. In discussing the process of how the sense of community was created in the 'Mamas' group, mothers referred to the trust they had in the other members of the group as a fundamental element. This trust grew, thanks to the fact that the maternity care nurse was managing the group actively by inviting mothers to join in it, as well as keeping access to the group restricted, and keeping the discussion alive in the early weeks of the service and at moments of low activity on the site. The interviewed mothers used the concept of trust also when evaluating the usefulness of the health information available through the web service. The interviews revealed, however, that trust in health information provided by experts is a necessary, but not a sufficient condition for the information being useful.

Conclusion

The findings of this exploratory research illustrate some important aspects of virtual health service use from the users' point of view that would benefit from further research. For example, the

study showed the importance of looking at service users' lives in their everyday context. To be able to find a health service useful is not only a question of perceiving the service as being of good quality. In this case, mothers' use of the different functions of the web service was affected by a myriad of factors such as availability of time, existence of other social networks, established practices for information seeking, and confidence in one's ability to judge trustworthiness of health information. In contrast to traditional usability studies, further research would be needed to explore more in detail the experience of utility and trust in people's everyday life context when using a virtual health service. This type of further research would benefit also those professional groups who are in charge of designing similar service innovations.

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MARILLA PALMÉN
*Midwives, Families and
Everyday Health Information
and ICT Interactions*

Exploration of Identities and Social Networks

This research looks at health-related information and information and communication technology (ICT) use in the context of Finnish maternal and child health care. The aim of the research is to describe how midwives and maternity care nurses as well as families with young children construct information- and ICT-related identities and how they form ICT-supported health advancing social networks in their everyday lives. The dissertation presents a new approach and contributes to the knowledge of health-related information and ICT interactions as socially constructed through the pragmatic actions and situated use of information and technology.



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