Improve Knowledge Transfer and Sharing Practices among Service-providers In the Context of E-health:

A Case Study of U-CARE Community

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ABSTRACT

As more and more convenience technology brings to human’s life by breaking through the obstacles of geography and psychology, e-health is being accepted by increasing number of people. It shows great potential to decrease the gap between the needs and satisfaction. However, the potential of e-health is far from being noticed. Knowledge shows inevitable advantages in different domains and of course the same in the health care industry. There are many different aspects that can be investigated and improved to reach the purpose, but in this dissertation, we aims to explore how to achieve a better knowledge transfer and sharing among e-health service-providers in order to create high-quality services that will be delivered to the patients. In general, U-CARE community is the one case that studied in this dissertation to explore how to identify knowledge transfer & sharing practices and what techniques can be used to improve it in the context of e-health. A theoretical framework from Etienne Wenger is applied here to help the author understand community well. Further analysis and discussion are based both on existing theories derived from literature review and empirical data obtained in interviews. The main contribution from the author and conclusion in this dissertation are summarized in a format of framework concerning useful techniques and methods (shown in Figure 9), which involves knowledge transfer and sharing practices related to formal/informal meetings, face-to-face communication, coordinator, online platform, IT tools, change management, documentation management, tracking of requirements & decisions, library of FAQ and personalization. The transferred and shared knowledge investigated in this dissertation is “back-office” data, not directly related to patient data, so the protection of patient personal privacy is not a consideration in this dissertation.

Keywords: e-health, knowledge management, knowledge sharing, knowledge transfer
ACKNOWLEDGEMENTS

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1. Introduction

The first chapter in this dissertation introduces the historical context in which this study is engaged and objectives of this study. Background is provided to explain the research domain and demonstrate knowledge of the main concepts and related ideas. The following problem discussion part displays the motivation for choosing and conducting this research. This part is followed by the presentation of specific research questions, purpose, interested stakeholders and the delimitation of this dissertation as well. At the end of this chapter, an overview of this dissertation is introduced.

1.1 Background

The emergence of internet and many electronic technologies definitely changes the way of people’s living. People can use e-commerce instead of going to a specific shop to purchase and people can use e-learning instead of attending a class in a specific classroom. Meanwhile, people can use e-health to receive treatment from doctors and health staff instead of going to an exact hospital. As more and more convenience technology brings to human’s life by breaking through the obstacles of geography and psychology, e-health is being accepted by increasing number of people gradually. It provides people with chances for better access to therapeutic interventions which have easy engagement and low threshold requirement (Copeland and Martin, 2004; Humphreys and Tucker, 2002). And some studies claim that many people prefer the internet over face-to-face services; they answer questions more sincerely and feel more comfortable in the internet setting (Cook and Doyle 2002; Farrell and McKinnon 2003; Griffiths et al.2006; Richards 2009). Thereby, facing with the increasing huge demands for health care, e-health shows great potential to decrease the gap between the needs and satisfaction.

But, the potential of e-health is far from being mined. In e-health, patients receive the health care services created by e-health staff by means of internet or other related electronic technologies. Thereby, quality of information delivered from the e-health staff will directly influence the quality of health care services received by patients. Since the quality of delivered information has been put into the spotlight, it is also catching the attention that how to increase the quality of the health service created by e-health staff. Of course, there are many different aspects that can be investigated and improved to reach the target. But in this dissertation, we aims to explore how to achieve a better knowledge transfer and sharing among the e-health staff to avoid knowledge loss in order to create high-quality services that will be delivered to the patients.

1.1.1 E-health defined

There are various terms that are roughly interchangeable with e-health, such as health informatics, telemedicine, telehealth, or health telematics, medical informatics. To some extent, these terms can reveal the historical development of e-health and the role of technology over time in this process. The term “medical informatics” is used around 1970 to refer to the processing of medical
information by computers (International Telecommunication Union, 2012). But soon this kind of “information processing” is replaced by “information communication” due to the rapid development and spread of internet. And “medical informatics” is also evolved to “health telematics” or “telemedicine” until to today’s “e-health” (International Telecommunication Union, 2012) in which the prefix “e-” may emphasize the involvement of the internet.

There are more than 50 definitions of e-health. Some scholars regarded this definition as the most suitable one as it emphasizes the role the internet played in e-health (Jung M.L., 2008; Pagliari, 2005): “The use of emerging information and communication technology, especially the Internet, to improve or enable health and health care.” Another definition is regarded as an excellent one (European Integration, 2002; Mossialos et al., 1999): “a means of applying new low cost electronic technologies, such as ‘web enabled’ transactions, advanced networks and new design approaches, to healthcare delivery. In practice, it implies not only the application of new technologies, but also a fundamental re-thinking of healthcare processes based on using electronic communication and computer-based support at all levels and for all functions both within the healthcare service itself and in its dealings with outside suppliers. E-health is a term which implies a way of working rather than a specific technology of application.” And the most quoted one among all the different definitions is (Curtis, 2007; Eysenbach G, 2001): “e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.” It is difficult to decide which definition is the best one but it is not difficult to figure out that the central points in the definition are all related to technology and health care. This is also disclosing the two objectives of e-health. One is to provide the necessary health treatment to the web-based patients. The other objective is to make the interactive communication possible and efficient between the health care staff and the patients through the IT tools.

According to Broderick and Smaltz’s study (2003), there are several dimensions of e-health from which an overall description of e-health’s related work and function:
1. Delivery of key information to healthcare partners;
2. Provision of health information delivery services;
3. Facilitation of interaction between providers and patients;
4. Facilitation of interaction of healthcare industry-related business processes;
5. Both local and remote access to healthcare information;
6. Support for employers and employees, payers and providers.

When it comes down to this dissertation, it mainly aims to enhance the second dimension which is “Provision of health information delivery services”. It aims to present how to develop good knowledge sharing and transfer practices to improve the quality of health information provision.
1.1.2 Current e-health development

Between the year 1998 and 2002, the amount of adults who had used internet for health information increased from 54 million to 110 million (Taylor and Interactive, 2002). According to some studies from 2004 to 2006(3-6), it has found that between 56% and 79% of internet users in US chose to obtain health information online. Additionally, an eight researchers’ study in 2007 which investigated European citizens’ use of e-health services (Andreassen et al., 2007) showed that 44% of the total sample which is consisted of 7934 respondents from seven European countries (Norway, Denmark, Germany, Greece, Poland, Portugal and Latvia), 71% of internet users, had used the internet for health information services. Comparatively, women were the most active users for health purpose among internet users. Even though the demands from the internet users for health purpose are increasing, e-health shows great advantage to fill up this gap between the demands and the satisfaction.

Basically, the rapid development of e-health can attribute to several aspects. Obviously, the first reason should be the explosive growth of the internet use over the years. As an efficient medium for spreading or gathering information, it not only made full use of computer and other telecommunications, but also made the interactive communication between remote distances possible. At the same time, more investment is put into the technical infrastructure for health care to overcome the coming challenges related to health care and finance (Broderick and Smaltz, 2003). Last but not least, the development of wireless technology should be another reason attributed to, which enables internet users to have easy access to the internet no matter where they are.

Inevitably, e-health is facing challenges during the development process as well. E-health programs are implemented in 53 Commonwealth countries, but a report to Commonwealth Secretariat (Seabrook W. and Ruck A., 2008) pointed out that there are few mechanisms in place to support:

- Coordination of existing e-health initiatives across the Commonwealth;
- Fostering of alignment between Commonwealth e-health initiatives and e-health initiatives supported by other international bodies or countries;
- Coordination of e-health policy at both a regional and global level;
- Facilitation of communication on e-health at the regional and global level;
- Building on best practices in e-health used successfully in one country and extend them to other countries;
- Coordination of the private sector to realize efficiencies of scale and help to ensure sustainability;
- Building on existing initiatives and infrastructure;
- Developing regional access to required testing and diagnostic tools.

1.1.3 Knowledge management

There is never lack of research related to knowledge since knowledge has long been regarded as
crucial organizational resources and its effective management is increasingly considered as a good way to increase competitiveness to achieve success (Egbu, 2000; Nevo and Chan, 2007). But to the organization, there is still lack of awareness and understanding related to knowledge management which is shown according to the interviews in the case study part of this dissertation, so even not the effective management. It is necessary to state the definition of knowledge management. It also evolves over time which enables to reveal the change of focus on knowledge manage study. The following table is a review of different Knowledge Management’s definitions from Nevo and Chan’s study (Nevo and Chan, 2007).

<table>
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<tr>
<th>Year</th>
<th>Definition</th>
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<tr>
<td>2006</td>
<td>“Knowledge management addresses policies, strategies, and techniques aimed at supporting an organization’s competitiveness by optimizing the conditions needed for efficiency improvement, innovation, and collaboration among employees.” (C.A.A Sousa et al. 2006)</td>
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<td>2005</td>
<td>“KM is defined as doing what is needed to get the most out of knowledge resources.” (R. Sabherwal et al. 2005)</td>
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<td>2003</td>
<td>“Knowledge management is defined as the organized and systematic process of generating and disseminating information, and selecting, distilling, and deploying explicit and tacit knowledge to create unique value that can be used to achieve a competitive advantage in the marketplace by an organization.” (G.T.M Hult, 2003)</td>
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<tr>
<td>2003</td>
<td>“Knowledge management may be defined as doing what is needed to get the most out of knowledge resources. Knowledge management focuses on organizing and making available important knowledge, wherever and whenever it is needed.” (R. Sabherwal et al. 2003)</td>
</tr>
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<td>2003</td>
<td>“Knowledge management concerns an organization’s ability to develop and utilize a base of intellectual assets in ways that impact the achievement of strategic goals.” (N.A. Morgan et al. 2003)</td>
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<td>2003</td>
<td>“We can conceptualize knowledge management as a process whose input is the individual knowledge of a person, which is created, transferred and integrated in work teams within the company, while its output is organizational knowledge, a source of competitive advantage.” (C. Zarraga et al. 2003)</td>
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<td>2001</td>
<td>“Knowledge management refers to identifying and leveraging the collective knowledge in an organization to help the organization compete. . . . “Knowledge management is largely regarded as a process involving various activities . . . At a minimum, one considers the four basic processes of creating, storing/retrieving, transferring, and applying knowledge.” (M. Alavi et al. 2001)</td>
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<td>1999</td>
<td>“Knowledge management is the formal management of knowledge for facilitating creation, access, and reuse of knowledge, typically using advanced technology.” (D. O’Leary, 1999)</td>
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<td>1999</td>
<td>“Knowledge Management is a business process. It is the process through which firms create and use their institutional or collective knowledge. It includes three sub-processes: Organizational learning—the process through which the firm acquires information and/or knowledge Knowledge production—the process that transforms and integrates raw information into knowledge which in turn is useful to solve business problems Knowledge distribution—the process that allows members of the organization to access and use the collective knowledge of the firm.” (M. Sarvary, 1999)</td>
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<td>1999</td>
<td>“Managing knowledge is a multidimensional process. It requires the effective concurrent management of four domains: content, culture, process, and infrastructure.” (L.P. Chait, 1999)</td>
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<td>1998</td>
<td>“[a] term which has now come to be used to describe everything from organizational learning efforts to database management tools.” (R. Ruggles, 1998)</td>
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| 1996 | “[t]he management of knowledge goes far beyond the storage and manipulation of data, or even of information. It is the attempt to recognize what is essentially a human asset buried in the minds of
individuals, and leverage it into an organizational asset that can be accessed and used by a broader set of individuals on whose decisions the firm depends.” (R.Maier, 2004)

“In its broadest sense, knowledge management (KM) is a conceptual framework that encompasses all activities and perspectives required to making the organization intelligent-acting on a sustained basis. KM includes activities to gaining overview of, dealing with, and benefiting from the areas that require management attention by identifying salient alternatives, suggesting methods for dealing with them, and conducting activities to achieve desired results.” (K.M.Wiig, 1994)

Table 1: Definition of knowledge management (source: Nevo and Chan, 2007)

To summarize, knowledge management is an organizational process by which knowledge will be created, captured, acquired, structured, transferred and applied effectively to support organization goals (Egbu and Botterill, 2002). Basically, knowledge is an abstract word which may have different meanings in different contexts. In an organization, knowledge is regarded as the professional intellect such as “know-what, know-how, know-why, self-motivated creativity, best practices, concepts, values, beliefs and method of working that can be shared and communicated”(Bose, 2003).

According to Ranjit Bose’s study (Bose, 2003), knowledge management cycle is composed of four processes that are knowledge creation, knowledge structuring, knowledge dissemination and knowledge application. The figure is provided below.

Figure 1: The knowledge management cycle (source: Bose, 2003)
The process that is mainly investigated in this dissertation is knowledge dissemination. It is mostly related to improve the knowledge sharing and transfer practices among staff in the e-health organization in order to create high-quality e-health service to e-health users.

There is some discussion between the two terms: information and knowledge. In this regard, the accumulation of the organized facts or data which has a meaningful context is information (Egbu, 2000; Bose, 2003). And knowledge is on a higher level of understanding than information. According to Egbru’s study (2000), on the basis of information, knowledge is composed of truths, beliefs, perspectives, judgments, methodologies and exists in different forms. For Sanchez et al’s point of view, knowledge is not only the certain and independent neural process of thinking or understanding regarding one phenomenon, but a set of beliefs based on the selectivity and judgment on causal relationship between phenomena. Namely, organizational knowledge is a set of shared beliefs about causal relationships that may be held in different individuals in an organization (Egbu and Botterill, 2002). In Ranjit Bose’s study, it is pointed out that the well structured and managed information that is available to the right people and processed at the right time becomes knowledge (Bose, 2003). From the above, it is not difficult to figure out that knowledge is another more meaningful and active existence of information and knowledge adds more people’s value to data and information.

1.2 Problem discussion

As more and more people realize that the first wealth is health and health care becomes a most concerning topic among people, e-health has gained increasing amount of attention which enables internet users to have easier access to health care services. The ability and potential of e-health to satisfy increasing needs of health care services and to fill up the gap between the demands and satisfaction could not be ignored. E-health becomes an important supplement in health care industry. And the potential of e-health is far from what is recognized.

The organizational intangible assets are considered as significant factors in developing competitiveness (Egbu, 2000; Edvinsson, 2000). As an important component of intangible assets in an organization, the development and effective management of knowledge should be taken into consideration. Different organizations in different domains have realized that knowledge management should be the primary step of effective management in development in the future and also put knowledge at the centre of the organization (Nevo and Chan, 2007). At the early stage of research in knowledge management theory, the emphasis is mainly on IT tools, methodologies and roadmaps, but now the focus is shifted to the view of “human-centered” knowledge management (Antonova and Gourova, 2006). That is, as the unique holders of knowledge, people are considered to play an important role during the process of knowledge management especially the knowledge exchange between people. The knowledge networks and working groups can support the sharing and transfer of knowledge well and can motivate the generation of new knowledge and ideas (Antonova and Gourova, 2006). This is also the motivation of this dissertation to put research focus on analyzing the knowledge sharing and transfer among staff in the organization.
Knowledge shows inevitable advantages in different domains and of course the same in the health care industry. To some extent, the quality of health care is decided by the quality of knowledge management practice within the community or across the organizational boundaries (Jadad et al., 2000). One challenge that health care practitioners are facing now is how to make effective decisions via the available information at hand (Bali et al., 2011). It is challenging because the condition of overload information in the organization. So the effective and right decision is influenced by the effective delivery of information and effective transfer of information and knowledge. It is necessary for health care practitioners to know how to make the best knowledge sharing and transfer in the context of an organization. Especially in the industry of e-health which mainly depends on the on-line information to deliver to the patients, it is even more important to make better knowledge sharing among experts in order to get better health care outcomes. Most of the internet user, who have different roles, education levels, backgrounds, can encounter the anxiety because of the poor organized and available knowledge online. And the poor knowledge management practice can also result in the conflicts during the process of making decisions or offering health treatment if decision makers can not have the accurate and consistent information available at the same time (Jadad et al., 2000). But health care systems don’t have adequate mechanisms to support knowledge sharing and transfer practices (Greiner and Knebel, 2003). There is a demand to analyze and develop some mechanism or framework to support better knowledge sharing and transfer practices.

Now, e-health is a program supported by the Commonwealth Secretariat which is developed to support the development of health systems. The Commonwealth is a worldwide voluntary association. It consists of 54 countries to support and cooperate with each other towards the common goals in development. And the Commonwealth Secretariat is the department to execute the plans from Commonwealth Heads of Government (Commonwealth Secretariat). According to the Commonwealth Health Ministers Meeting (CHMM) in 2008, there were some requirements that Secretariat was mandated to do:

- Pursue high-level policy dialogues involving the health and information technology sectors, the private sector, health professionals and civil society on the opportunities and the challenges of e-health; they also requested the Secretariat to facilitate these dialogues;
- Explore setting up e-health pilot projects in all regions of the Commonwealth;
- Pursue public-private partnerships (PPPs) in e-health;
- Share knowledge, expertise and technical assistance between Commonwealth countries, both North-South and south-south;
- Leverage additional resources to support the further development of its work on e-health and development.

It is shown that the knowledge sharing and transfer could be the focus trend in the e-health development in the future. And to set up the whole knowledge sharing and transfer mechanism across countries is a big work and project, so starting to set up a solid mechanism in one community could be a starting point and good choice.

There are some studies have already conducted research on some strategy, framework or models of knowledge management on a high level (Holsapple & Joshi, 2002; Quinn et al., 1998;
Rubenstein-Montano et al., 2001). At the same time, there is a paucity of research and studies specifically in the field of knowledge transfer and sharing between individuals in organizations and empirical data has just begun to reveal some relationships in the complex process (Ipe M, 2003). This dissertation aims to mainly focus on knowledge sharing and transfer practices in the domain of knowledge management. And it will combine with an analysis of a specific e-health community to put forward some practical measures both from process and technology view and then summarize a whole framework in the context of e-health. So it can be general and also specific.

1.3 Research question

Consequently, the research questions that will be investigated in this dissertation are:

1) How to identify existing knowledge sharing and transfer practices in the context of e-health?
2) Identify and assess methods and techniques to achieve better knowledge sharing and transfer in an e-health community.

1.4 Purpose

The aim of this dissertation is to enhance interactive communication among e-health staff to achieve the best knowledge transfer and sharing practices within the e-health community. A case study is conducted. Some techniques are introduced both from the process view and practice view.

1.5 Interested stakeholders

All the research questions that will be investigated in this dissertation are all in the context of e-health and knowledge management, so the interested stakeholders could be:

- Health care communities;
- Academic institutions;
- Health professionals and the associations;
- Managers and staff in the health care community;
- Students or scholars who are interested in e-health or knowledge sharing and transfer.

1.6 Delimitation

E-health contains many different technological tools and applications that can offer health care services to the e-health users, such as internet or telephones. But e-health discussed in this paper is just limited to internet-based health care treatment and other communication technologies are not discussed in this dissertation. The investigated range of knowledge sharing and transfer practice in the case study is limited to one-community-based organization in the e-health field. We didn’t take the problem of budget into our investigation in this dissertation. The transferred and shared knowledge which is discussed in this dissertation is “back-office” information and knowledge, not
directly related to patient data. So the protection of patient personal privacy is not a consideration in this dissertation.

1.7 Dissertation outline

Chapter one introduces the historical context in which this study is engaged and objectives of this study. It involves background, problem discussion, research questions, purpose, interested stakeholders and delimitation of this dissertation.

Chapter two offers an explanation and justification of research method used to collect research data and techniques to interpret and analyze the data.

Chapter three provides a summary of literature review. Firstly, some basic concepts and theories are provided. In the second section, a summary of existing knowledge transfer and sharing frameworks in previous literature is given. In the last section, we explain a framework that we chose to use in case study and introduce other three alternatives as well.

Chapter four presents some key aspects in the case study in a format of case study report. These aspects contain the focus, context of the case study, description of the data collected, credential of the investigator and methods used for the case study and trustworthiness.

Chapter five presents empirical findings and the results of analysis and discussion which are the main contribution of this dissertation. It is divided into four sections: (1) empirical findings are provided first according to the data from interview which is the foundation of all analysis and discussion; (2) prerequisites for knowledge transfer and sharing are discussed according to literature and empirical data; (3) techniques and methods are presented in order to improve knowledge transfer and sharing in U-CARE community; (4) the conclusions and results are summarized in a format of framework with specific techniques, which are the main contribution of this dissertation regarding how to achieve better knowledge transfer and sharing practices (as shown in Figure 9).

Chapter six concludes the analysis of the study and provides the answers to the research questions. Finally, summarizes the implications for both theory and practice and provided further work.
2. Research methodology

This chapter offers an explanation and justification of research method used to collect research data and techniques to interpret and analyze the data.

2.1 Overview of research approach

There are many alternative research approaches to guide researcher to achieve research purposes. But the suitable research approach can lead the researchers to gain justifiable research results with respect to research questions and research purposes. So after the research questions and purpose being defined, the following significant step is to choose suitable research approach for this dissertation.

Actually, choice of research approaches to collect and interpret research data are all based on research questions and purpose. Since the emphasis in this dissertation is on identifying knowledge transfer and sharing practices in the e-health community and investigating how to improve corresponding practices to achieve better knowledge transfer and create high-quality e-health services, this dissertation is an exploratory study. Additionally, in the stage of investigating the practices in U-CARE community, a framework was used to describe the characteristics of the practices. So this dissertation is a descriptive study as well. Based on the research questions and purpose, the data needed in this dissertation are all non-numerical data, so qualitative methodology is applied in this dissertation. Because the focused investigated area (e-health) and target group (staff) are all fixed, case study is considered as the suitable research strategy in this dissertation chosen among different strategies in the domain of qualitative methodologies. The case study was conducted in U-CARE community, which is an e-health community located in Uppsala. In order to support our data analysis and discussion both from theoretical view and practical view, we collected data mainly through literature review and interview. Interviews were conducted among staff in the workgroup of U-CARE. Last, approach used for the transcription of the interviews is thematic coding approach, which analyzed empirical data according to different themes.

2.2 Research design

As Colin Robson writes in his book Real World Research (2002): “Design is concerned with turning research questions into projects”. A research design is an initiative scheme for collecting, interpreting and analyzing research data, and it depends on the purpose of the research and the strategies and tactics that you choose to conduct the research depend on the type of research questions you are coming up with (Robson, 2002; Cooper and Schindler, 2003). In one of Hakim’s (2000) several books that are focusing on research design issues, a comparison between designers of research projects and architects is made (Robson, 2002).

“Design deals primarily with aims, purpose, intentions and plans within the practical constraints of
location, time, money and availability of staff. It is also very much about style, the architect’s own preferences and ideas (whether innovative or solidly traditional) and the stylistic preferences of those who pay for the work and have to live with the final result”.

Regarding the models of research design, there are many created models. The framework of Colin Robson (2002) is introduced here:

![Framework for research design](source: Colin Robson, 2002)

It is shown that all the aspects are interrelated to each other. The purpose of the research and the conceptual framework used in the dissertation can decide what kind of research questions should be defined. Once research questions are decided, you are able to specify the methods and sampling strategy that can be used in the research. As mentioned above, the research design is much more related to the research questions. Additionally, there are three basic types of research design: exploratory design, descriptive design and causal design. Thus referring to each research design’s characteristics, it is easier to decide which design is suitable for the dissertation. A comparison among these three research design is shown in Table 2:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Exploratory</th>
<th>Descriptive</th>
<th>Causal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery of ideas and insights</td>
<td>Describe characteristics or functions</td>
<td>Determine cause and effect relationships</td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td>Flexible, versatile; often the front, end of total research design</td>
<td>Marked by the prior formulation of specific hypotheses; preplanned and structured design</td>
<td>Manipulation of one or more independent variables; control of other mediating variables</td>
</tr>
<tr>
<td>Methods</td>
<td>Expert surveys</td>
<td>Secondary data</td>
<td>Experiments</td>
</tr>
<tr>
<td>Pilot surveys</td>
<td>Surveys</td>
<td>Panels</td>
<td></td>
</tr>
<tr>
<td>Secondary data</td>
<td>Observation and other data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Comparison of three basic research designs

When it comes down to this dissertation, the purpose of this paper is mainly trying to explore ideas and insights regarding methods or techniques that can be used to improve knowledge sharing and transfer practice in e-health industry. Yet in the stage of investigation into U-Care community,
a framework is used first to identify and describe the existing characteristics of practices in the
U-Care community. Referring to Table 2, it is easy to figure out that exploratory research design
and descriptive research design are used in this study.

2.3 Qualitative and quantitative methodologies

Basically, there is a basic decision should be made when conduct a social research: which research
approach should be applied (Robson, 2002). The two alternatives of research approach that are
clarified in social research industry are quantitative and qualitative research (Robson, 2002).
According to Colin Robson (2002), the research route in so-called “natural” science is almost
quantitative approach, such as physics, chemistry and biology, which is mainly focusing on the
data in the numerical or statistical form to figure out the relationship between different variables.
Contrarily, the advocates of qualitative approach asserted that, different from natural science,
social science emphasizes on human beings, including language, consciousness and interactions
between people which are in the verbal or non-numerical form (Robson, 2002). Because
qualitative data is concerned with words, description or narratives, it is collected through
unstructured interviews or observation (Hair et al., 2007).

Regarding this dissertation, qualitative approach is much more suitable than quantitative approach.
Firstly, the purpose of this dissertation is to identify the knowledge sharing and transfer practice in
a community and then investigate how to make improvements. So the necessary data that need to
be collected and analyzed in this dissertation is the information regarding the current existing
practices regarding knowledge sharing and transfer. They were all collected through
semi-structured interviews among staff in the U-Care community. All the following analysis and
discussion phases are based on the collected data. These collected data are all qualitative data. And
this choice is also matching the characteristic of exploratory research design which commonly
exists in qualitative research.

2.4 Research strategy

Research strategy represents different ways of collecting and analyzing empirical evidence
(Robson, 2002). Research strategies contain experiments, surveys, case studies, history and
archival analysis (Yin, 1994). According to Colin’s study (2002), the typical features of case study
are:

- Selection of a single case (or several related cases) in a specific context;
- investigation of the case in its context;
- Collection of information via data collection methods such as interviews, observation or
documentation analysis.

Because the investigated industry (e-health) and target interview group (staff) are all fixed, case
study is supposed to be the suitable research strategy to get detailed and intensive knowledge in a
single case (Robson, 2002).
2.5 Data collection

The data needed in this dissertation is mainly to support the data analysis and discussion both from the theoretical view and practical view. So the approaches used for theoretical and empirical data collection in this dissertation are literature review and interview.

2.5.1 Literature review

A very important part of qualitative data in the research that can be used to support opinions and ideas is the existing study or research. Of course, literature can provide key concepts’ interpretation and solid theoretical background as pillars of the dissertation. Literature review is the process of reading, understanding and collecting knowledge and views related to your research field. An excellent and effective literature review can set up the foundation for advancing knowledge (Webster and Watson, 2002). It can collaborate with different wisdoms to get in-depth knowledge for each specific topic and analyze the question by different opinions from different angles. Last but not least, literature exposes the gaps and uncertainty in knowledge and dispute areas which can be a guide or direction for the motivation of the dissertation or further work (Robson, 2002). The documents that can be reviewed are articles, books, journals, dissertations, electronic media, etc.

Before start to search for the literature, it is important to choose the accurate key words to search the literature. This can be achieved by checking the dissertation’s purpose and research question. So through checking the purpose and research questions in this dissertation, the chosen key words to search for literature are: e-health, knowledge management, knowledge sharing and knowledge transfer.

Regarding the searching process of literature, there are mainly three means offering literature assets: library, electronic databases and search engines. These three means were all used in this dissertation. Owning a library card, it is convenient to borrow books or journals in university or other academic libraries in Sweden. And the key words are also applicable in the search engine in the library. The electronic databases and search engines used in this dissertation are Google, Google Scholar, LIBRIS and DISA. Besides searching for literature by using the key words, you can also evaluate the references in the articles that you have already found, and select the articles related to your research question and purpose.

2.5.2 Interview

Interviews are commonly applied as the method of choice for researchers to use qualitative approaches in both psychology and sociology field (Potter and Hepburn, 2005; Robson, 2002). Since the basic idea of this dissertation is to evaluate how the existing knowledge sharing and transfer practice used first, and then to focus on the improvements for better sharing and transfer mechanism. Especially for this kind of “how” “what” questions, interview is a suitable method to
get in-depth information with a focus group.

**selection of interview type**

The most commonly used division of interviews is structured interview, semi-structured interview and unstructured interview (Robson, 2002). As it is introduced in Colin Robson’s book *Real World Research* (Robson, 2002), the structure level is to some extent related to the ‘depth’ of feedback sought. Survey interview is an extreme example of highly structured interview. It has a list of ordered and standardized questions and responses to most questions should be chosen from the offered options. Structured interview has all the fixed questions with predetermined wording and order, and unstructured interview is totally informal with a general topic area (Robson, 2002). Semi-structured interview was chosen to be employed in this dissertation. In semi-structured interview, interviewer has a checklist of topics and questions to be covered and there is a default wording or order for those questions (Robson, 2002). The expression and order may be changed because of each interviewee’s condition, such as some unplanned follow-up questions. So the way of semi-structured interview is flexible. It leaves a flexible space for interviewer to express all the concerning questions but still follow the main outline of the interview, and also gives the interviewees a comfortable and smooth environment to express themselves. Interviews can be carried out in different setting, such as face-to-face, telephone or e-mails. We decided to choose the face-to-face interview since expect to get more and in-depth information through the direction communication between interviewer and interviewee. And the interviews were in the form of one-to-one since there were 9 interviewees from different positions in the U-Care community.

**issues need to think about before the interview**

Interview is not that easy as expected, and there are still some issues that need to pay attention to before the interview. According to the interview experience in this dissertation, the main issues need to be considered are:

- What tools are you going to use to tape the interview?
- Where are you going to carry out the interview?

The tape can keep a permanent record and allow you to focus on the interview. The number of the records and the way that you plan to analyze the data can affect whether you could make a full transcript or not (Robson, 2002). We also considered using video to record each interview process, but it may influence the normal behavior of interviewee to communication with interviewer and some nervous mood may affect the feedback from interviewees, which may influence the final interview result to some extent. So we finally chose to tape the interview using recorder. We also prepared two recorders to make sure the safety of the data in case any one of them breaks down.

When choose the place to conduct the interviews, two points should be taken into consideration: is it convenient to the interviewees; is it quiet enough to carry out the interview. Considering all the interviewees are full-time workers, the interview time and place mainly depends on them. They were more likely to choose the places near their offices which is both convenient for the interview and their normal work. Whether the place is quiet or not is also very significant element. If there is
unnecessary noise, it will increase the difficulty index of transcribing tapes and analyzing the data.

- **How did we carry out interview**

After decided to use interview for the empirical data collection, we followed these steps to carry out the interviews:

1. Organize the main questions based on the research question and the framework that used to investigate a digital community (shown in the Appendix);
2. Contact the coordinator to get permission for the interview by telling her our purpose and requirement for the interview. And ask for the cooperation regarding the selection of the respondents;
3. After getting the recommended name list for interviews, contact each person on the list to arrange each appointment and send the question list to them;
4. When carry out the interview, follow the recommended sequence from Colin Robson’s study (2002): Introduction, Warm-up, Main body of interview, Cool-off and Closure;
5. When record the whole interview, make some notes at the same time;
6. After each interview, fix some inappropriate places in the interview questions, such as inappropriate expression that interviewee cannot understand.

- **Advantages and disadvantages of interview**

Interview is a flexible way of getting required information from the interviewees. Face-to-face allow the interviewer to modify his/her expression of enquiry and to give follow-up questions interested in that questionnaire or e-mail interview cannot achieve. And during the process of interview, interviewee’s body language and hesitation in the statement can also reveal some information regarding their opinion or attitude. But interview is time-consuming. Before the interview when make the preparation, it is necessary to make arrangement for each interviewee, to reschedule appointment according to each person’s condition, to confirm the presence, which takes a lot of time (Robson, 2002). In the actual interview session, it is also a skill to decide the length of the interview. If the interview is under half an hour, it seems that valuable information will be difficult to obtain. If the interview is over an hour, it will cause inconvenient for the busy interviewee. Remember that, the interviewer is the host of the interview, he/she is responsible for getting something from the interviewees but also closure it properly (Robson, 2002).

**2.6 Selection of respondents**

The focus group of this dissertation is the staff in the e-health community, so the range of selection of respondents for the interview is limited to the staff in the U-Care community which is the case investigated in this dissertation. Through the interview, the main purpose that we want to achieve is to get in-depth information regarding how the knowledge sharing and transfer practices are applied in the daily work between different departments in the community, what are the existing problems during the process of knowledge sharing and transfer. In order to get reasonable and reliable empirical data, the most important two characteristics of the selected respondents in this research are diversity in functional roles and diversity in levels of experience. The range of
respondents should cover different functional role from different departments and also both senior and junior workers in each department.

Before selecting the respondents, we contacted the coordinator of the community first in order to get the permission to conduct the interview among the staff and also to tell her our aim and requirements for the selected respondents. Soon we got the reply from the coordinator, and she not only gave us the permission for conducting the interview, but also the recommended name list which contains all the persons she considered suitable for taking the interviews. Then we contacted each person on the list to get permission and arrange schedule for each interview. Finally, we got 9 interviewees which contain 1 coordinator, 3 psychologists, 2 health staff and 3 developers. The interview was conducted anonymously.

2.7 Transcription of the interview

As introduced in the book of Colin Robson (2002), three main approaches to qualitative analysis and interpretation contain: quasi-statistical approaches, thematic coding approaches and grounded theory approaches. For quasi-statistical approach, it depends on the conversion of qualitative data into the format of quantitative data. It is achieved by using word or phrase frequencies and relationship between them as the main method to reveal the relative importance and relationship of concepts and terms (Robson, 2002). For thematic coding approach, all the qualitative data are coded and labeled. Codes with same label are grouped together as a theme. Themes can be determined from relevance to research purposes or other theoretical considerations (Robson, 2002). Themes and corresponding codes in each theme can be the foundation of further analysis and interpretation. Regarding grounded theory approach, it is the reverse of traditional model of research, in which research applies a theoretical framework to study a phenomenon. To some extent, it is a version of thematic coding approach, where qualitative data are coded according to researcher’s interpretation of the meanings in the text and related data are grouped into a theme. This approach is used to develop a theory based on the data (Robson, 2002).

The approach used to qualitative data analysis in this paper is thematic coding approach. Themes are determined by the purpose of interview in the case study. The focuses predefined before the interviews are: the role of interviewee, interaction between roles, interaction with outside world, resources & constraints, activities and tools, acceptance for change, acceptance for technology boundaries and extra needs. So after the collection of interview data, they were coded and grouped into these themes, which helps to get clues for further analysis.

2.8 Reliability and validity of the research

In the qualitative researches, reliability and validity are two key factors to be addressed especially in the stage of data collection. Merriam (2002) stated “Reliability refers to the extent to which research findings can be replicated”. Interview is an appropriate instrument to obtain first-hand reaction and responses from the interviewees in their own words. So it can reflect the real thoughts of the interviewees and reality in the community. Before the interviews, we also studied a lot of
literature to understand the key concepts and theories to make expressions clear and concise. In order to get good interview outcomes, we applied a framework regarding investigating practices in digital communities to help us define the interview questions. Before conducting the interviews, the interview questions were sent to my supervisor first to check the questions.

Validity shows how much the research findings are accordant with reality (Merriam, 2002). It mainly depends on the participants in the interviews. So on the basis of interview, we chose 9 persons covering main functional roles in the U-CARE community, which contains both senior and junior person in each functional role, to help us to get as valid results as possible. This enables us to get different perspectives from different functional roles and experience levels.

Additionally, theoretical and empirical data are analyzed and discussed without any bias through entire dissertation. No matter the suggestion or conclusion are all presented without any bias. Reliability and validity are two issues taken into consideration throughout the whole dissertation.
3. Literature review

This chapter provides a summary of literature review. In the dissertation, we aim to conclude a framework that can be used to identify the knowledge transfer and sharing practices in the context of e-health community, and furthering provide some suggestion what techniques and methods can enhance corresponding practices. Thus, in the first section some basic concepts and theories are provided. In the second section, a summary of existing knowledge transfer and sharing frameworks in previous literature is given. In the last section, we explain a framework that we chose to use in case study and introduce other three alternatives as well.

3.1 Concept and theories

3.1.1 Different types of knowledge

Knowledge is broadly categorized into tacit knowledge and explicit knowledge. Tacit knowledge is considered as the knowledge existing within the cognitive environment (e.g. human brain) which is not expressed by words (Gibbons et al., 2010; Smith, 2001). It is highly personal, subjective form of knowledge, informal and can be inferred from the people’s statements (Sternberg, 1999). Explicit knowledge is technical or academic information or data which are described exactly in formal words, such as manuals, facts and so on (Smith, 2001). Explicit knowledge can be obtained through formal education or systematic study.

Knowledge is an abstract concept. Knowledge may exist in different carriers according to the context. In health industry, the knowledge sources exist in the format of documents, knowledge warehouses/Marts, applications, best practices and discussions (Bose, 2003). According to Ranjit Bose’s study (2003), it lists the specific existence of knowledge in each format, as shown in the following table:

<table>
<thead>
<tr>
<th>Documents</th>
<th>Knowledge Warehouses/Marts</th>
<th>Applications</th>
<th>Best Practices</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient admission;</td>
<td>Patient record;</td>
<td>Knowledge mining &amp; analysis – clinical,</td>
<td>Procedure &amp; care management;</td>
<td>Cost reduction</td>
</tr>
<tr>
<td>Billing &amp; payment;</td>
<td>Providers’ clinical log;</td>
<td>financial &amp; administrative;</td>
<td>Disease diagnosis &amp; test;</td>
<td>Fraud &amp; abuse prevention;</td>
</tr>
<tr>
<td>Health administration;</td>
<td>Medical procedures;</td>
<td>Decision-support;</td>
<td>Pharmacy, emergency &amp; nursing practice;</td>
<td>Performance measurement;</td>
</tr>
<tr>
<td>Medical research literature;</td>
<td>Hospital operations</td>
<td>Quality assurance</td>
<td>Claims processing</td>
<td>Coordination of care</td>
</tr>
<tr>
<td>Drug references</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Knowledge sources in health care (source: Bose, 2003)

In Elizabeth’s study, the author summarized the ways that tacit and explicit knowledge used in the workplace and evaluated them basically from ten categories.
It is shown in the figure above that no matter tacit or explicit knowledge are both resource of value to apply and never lack of. According to Rnjit’s study, it asserts that organizations that make good use of their employee’s steadily increasing wealth of tacit and explicit knowledge resources to solve problems and make decisions have a big competitive advantage (Bose, 2003).

### 3.1.2 Key characteristics of knowledge transfer and sharing in health care industry

In order to design and develop knowledge transfer and sharing activities in the e-health community, getting the basic knowledge of key characteristics regarding knowledge transfer and sharing can offer sound evidence and make use of previous research resources. In the journal of Pentland D. et al (2011), the authors reviewed thirty-three papers regarding knowledge transfer and exchange within the time period between January 1990 and September 2009. The authors pointed out solid research into the area of knowledge transfer and sharing in healthcare is limited and further of analysis and evaluation regarding the characteristics may benefit their practical application more in healthcare (Pentland D. et al, 2011). The following table provides a part of the summary from Pentland’s integrated review:

<table>
<thead>
<tr>
<th>Author and study type</th>
<th>Findings</th>
</tr>
</thead>
</table>

---

Figure 3: Tacit and explicit knowledge in the workplace (source: Smith, 2001)
<table>
<thead>
<tr>
<th>Source</th>
<th>Study Design</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitton et al. (2007)</td>
<td>Systematic review of 81 papers</td>
<td>“Successful knowledge transfer and sharing can be achieved at the individual, organizational and communications levels and factors related to time/timing. Key factors include: ongoing research practitioner collaboration built on trust and clear roles and responsibilities fostered by ongoing face-to-face communications; healthcare organizations should build capacity to encourage readiness for change and foster collaborative research; research outcomes should be summarized with recommendations tailored and relevant to specific audiences and delivered whilst timely. The value of knowledge brokers to facilitate these is indicated.”</td>
</tr>
<tr>
<td>Fixsen et al. (2005)</td>
<td>Meta-syndissertation of 377 papers including 22 experimental studies</td>
<td>“Information dissemination methods alone (research literature, mailings and practice guidelines) are ineffective as is training as a stand-alone method. Employing longer term multilevel approaches to implementation are more effective with evidence for the inclusion of: skill-based training; practice-based coaching; practitioner performance evaluation; program evaluation; facilitative administrative practices; and methods for systems interventions.”</td>
</tr>
<tr>
<td>Best et al. (2008)</td>
<td>Mixed-method review</td>
<td>“Key translational research and knowledge integration factors include: improved communications; collaborative research; support systems; funding and incentives; and consideration of policy development and organizational change principles.”</td>
</tr>
<tr>
<td>Harrington et al. (2008)</td>
<td>Synopsis</td>
<td>“Key enablers of knowledge translation identified as: early, ongoing and face-to-face involvement between knowledge users and researchers; incentivizing knowledge exchange activities; allowing adequate time for collaborations to become established; capacity building both for researchers and practitioners/policy-makers; use of effective and multifaceted dissemination strategies; and use of knowledge brokers to link researchers, research users and policy/decision makers.”</td>
</tr>
<tr>
<td>Harvey et al. (2002)</td>
<td>Literature review and concept analysis (75 papers)</td>
<td>“The presence of a facilitator who provides face-to-face communication and uses a range of enabling techniques has some impact on changing clinical and organizational practice despite variable effect sizes and differing costs. It is difficult to isolate which aspects of the facilitation process or the facilitator role are more or less effective in influencing change.”</td>
</tr>
<tr>
<td>Conklin and Stolee (2008)</td>
<td>Qualitative Study</td>
<td>“Large KT networks may enable the better communication and use of knowledge. The organizational context afforded by Communities of Practice can support the flow of knowledge among participants and enables research evidence and expert opinion to be delivered; variable evidence for cited methods having a direct effect on the behaviors of caregivers.”</td>
</tr>
<tr>
<td>McWilliam et al. (2008)</td>
<td>Mixed-method evaluation</td>
<td>“Facilitators at the organizational level include: geographic proximity; remuneration of efforts; recognition for outcomes achieved; team working is generally seen as highly facilitative of KT; time to build trust important facilitator of KT and more attainable in smaller groups; individual practitioners respond to adequate remuneration for time/effort.”</td>
</tr>
</tbody>
</table>
| Bowen and Martens (2005)     | Multi-method qualitative study                    | “Knowledge Translation approaches should include efforts to: create an environment of interest and openness to research (providing a setting for KT to occur in, including building trust and confidence between partners); provide opportunities for collaborative research; develop and use a shared vocabulary and conceptual base; facilitate an understanding of research findings; foster an
understanding of implications for practice (findings need to be interpreted and applied in relation to specific settings); quality is an important factor in interactions; organizational barriers are an ongoing impediment to KT and capacity building should focus at this as well as the individual level.”

Russell et al. (2004) Qualitative mixed-method

“Several aspects were important in informal KE networks. Skilled staff are needed to establish, develop and maintain the networking process; simple communication methods (e-mail) enables members to draw upon ‘the strength of weak ties’ (best source of new idea is a stranger or not directly related rather than one from the same social groupings); informal networks enables the spontaneous emergence of communities of practice; The network allowed for ‘lurking’—benefitting from the network even without directly contributing – allows spontaneous learning about research use.”

Philip et al. (2003) Case study

“The evaluation of the initiative concludes that the user fellow was a key element in success of dissemination. Tapping into communication networks among practitioners was seen as beneficial (achieved through data-basing and selecting key people); newsletters were useful at stimulating contacts between knowledge users; and practitioners need and appreciate tailor-made forms of dissemination.”

<table>
<thead>
<tr>
<th>Table 4: Summary of related studies (source: Pentland D. et al, 2011)</th>
</tr>
</thead>
</table>
| It is not difficult to infer that several organization factors are regarded as necessary prerequisites for all the activities regarding knowledge transfer and sharing. The organization needs to ensure the sufficient resource in finance, time, human resource and technology (Fixsen et al. 2005; Mitton et al. 2007; Best et al. 2008; Harrington et al. 2008; McWilliam et al. 2008). And also the organization should offer an open and trust working environment that is beneficial for knowledge transfer and sharing (Mitton et al. 2007; Bowen and Martens, 2005).

In the result of Pentland’s study (2011), he pointed out that different definition of knowledge transfer and sharing share a common theme which is to communicate knowledge to relevant stakeholders through different methods. Pentland identified three aspects that are related to the value of knowledge transfer and sharing initiatives (Pentland, 2011): relevance, accessibility and format & method. Successful knowledge transfer and sharing does not mean that every person in the organization should know everything. This may result in inefficient of knowledge transfer and also knowledge loss. It is important to ensure knowledge is transferred and shared to the relevant stakeholders (Mitton et al. 2007; Harrington et al. 2008). Accessibility reveals two aspects of knowledge transfer and sharing: easy access to knowledge and timely delivery. These two aspects may directly influence the results of health staff’s decision making. The format in which knowledge is expressed or presented and the methods used to deliver to relevant stakeholders may directly affect on knowledge’s perceived value and consequently influence the possibility of it being used in real work practices (Pentland, 2011). So the sharing and transfer format of knowledge could be offered in flexible ways in order to satisfy different people’s preferences and demands. There are some studies pointing out that knowledge transfer and sharing activities could be tailored the format and method to adapt to specific audiences’ circumstances and needs (Conklin & Stolee, 2008). In Conklin and Stolee’s study (2008), it indicated that network plays an important role which makes communication infrastructure more readily accessible and allows for
information and expertise be shared timely and effectively.

3.2 Existing knowledge sharing and transfer frameworks

Several knowledge sharing and transfer frameworks have been reported in the previous literature that characterize the activities and infrastructure which support the process of knowledge sharing and transfer from a high level view. However they are lacking of incorporating processes, techniques and technologies that can be applied. So this is also one of the motivation that why this dissertation aims to go further into knowledge sharing and transfer practices both from practice view and process view to make corresponding improvements. Here we provide some description of two existing frameworks.

3.2.1 Framework 1

In Swee C. Goh’s study (2002), he recognized the importance of managing knowledge assets in an organization, so he explored the key elements that can influence the ability to transfer knowledge and integrated them into a conceptual framework to explain how to manage an effective knowledge transfer and sharing in a community. The conceptual framework is shown in the following figure:

![Framework 1](source: Goh S C. 2002)

The higher propensity to share knowledge is the most important prerequisite for the effective knowledge transfer. And this propensity is affected by many other factors such as the support structure, leadership, trusts between people, collaboration and problem seeking/solving. At the same time, knowledge recipient and types of knowledge can also influence the applied mechanisms to transfer knowledge. The author did not content all the factors mentioned were the only factors that can decide to manage knowledge transfer and sharing effectively but they are
important that may influence whether effective knowledge transfer and sharing can be managed. The author stressed that organization should focus on not only “hard” factors, such as technology and working process, but also “soft” factors such as environment, effort or culture. On the whole, this framework is excellent and covers very comprehensive factors that may affect effective knowledge transfer. So what we will do in this dissertation is to go further to explore the valuable techniques and methods to enhance knowledge transfer and sharing.

### 3.2.2 Framework 2

According to a literature review of theories and studies related to knowledge sharing, Ipe M (2003) identified some major factors that influence the process of knowledge sharing between individuals in organizations and summarized a model to show the relationship between these major factors. The four major factors are: the nature of knowledge, motivation to share, opportunities to share and the culture of the work environment (Ipe M, 2003). The model is shown as follows:

![Figure 5: A model of knowledge sharing between individuals in organizations](image)

This model indicates nature of knowledge, motivation to share and opportunities to share are embedded within the culture of the work environment. On the whole, these factors are independent on each other to enhance the knowledge sharing practices in the organization. To a large extent, culture will influence what knowledge is valued, what formal and informal opportunities for individuals are to share knowledge and what rewards for knowledge sharing (Ipe M, 2003). Together these four factors can create an ideal environment for knowledge sharing between individuals within the organization (Ipe M, 2003).

Similar to Framework 1, this model also considered related factors that can influence the process of knowledge transfer and sharing without further analysis and focus on how to apply suitable techniques to enhance and improve knowledge transfer and sharing practices within an organization, and this is just what will be focused on in this dissertation.
3.3 Theoretical framework in case study

3.3.1 Framework applied in case study

Before starting to explore methods and techniques for better knowledge transfer and sharing in the U-Care community, the first and vital step is to know and understand the community well. It is not a wise choice to investigate the practices in the community that you start up to ask or to think anywhere you like without any guidance. Especially in this dissertation, the very significant purpose of understanding the community is to design suitable interview questions which will definitely affect the final research results. Hence it is useful to choose an excellent framework to guide us to understand and develop the technology and practices in the community. And this is exactly what Digital Habitats is talking about. So we chose the framework in this book and followed the structure of Action Notebook in it especially when we design our interviews in case study. The framework is shown in the Appendix.

3.3.2 Why we selected this framework

It develops new literacy to describe the practice of stewarding technology for communities which can help the reader to ground the technology stewardship in theory and also enhance the understanding from a practical view.

This book also received positive comments from several scholars which were stated in their own work:

“For years, Etienne Wenger’s concept of communities of practice has been a powerful but secret key to understanding successful group efforts. Now Wenger, Nancy White and John D. Smith have made the concept both more powerful and less secret, by explaining what communities of practice are, and how to support them using simple communications tools. The book is clear, detailed, and laden with examples; it will be invaluable for anyone who wants to nurture group work.” (Shirky, 2008)

“This team of experts has taken a very complicated subject and assembled the information in an easy to read, easy to understand, and (most importantly) easy to use format. The real-world examples in each section bring the concepts and discussion into sharp focus and allow the reader to frame those lessons around their own personal and professional experiences. The extensive references to source documents, be they papers, books, or links to websites, will prove invaluable to both novice and expert community members, as well as to members of the IT community trying to figure out how best to support their own communities. The Action Notebook is nothing short of brilliant; I have already shamelessly cut those pages out, have laminated them, and now carry them with me as a reminder of all things I should be remembering.” (Jack Merklein, Xerox Global Service)
As mentioned in some scholar’s article, the framework is presented in the format of Action Notebook in Etienne Wenger, Nancy White and John D.Smith’s book (2009). In each section of the Action Notebook, the authors explain every problem that need to be considered in the format of question. So these questions can be directly applied in the interview as the reference to understand U-CARE community. Besides, specific activities and technologies to manage the community’s practices are offered to the reader.

3.3.3 Alternatives to Wenger’s framework

In addition to the framework from Etienne Wenger, Nancy White and John D.Smith, there are several alternative frameworks that can be used to understand and explore the practices in the community. So in this section, we will explain three other alternative frameworks: communities of inquiry (COI), communities of practice (COP) and actor-network theory (ANT). These three are chose because they have distinct and different angles on understanding and evaluating the practices in the community.

- **Communities of inquiry**
  COI is a method related to knowledge inquiry. This method is commonly applied in the context of inquiry-based learning which consists of teachers and students. The essence of inquiry-based learning is a shared experience (Rourke et al., 2007). In an ideal community of inquiry, it is characterized by people sharing expertise, experience and beliefs and learners try to build up personal understanding (Rourke et al., 2007). The purpose of communities of inquiry is to create, develop the knowledge shared in the community and it is mainly achieved through questioning and collaboration (Rourke et al., 2007). Communities of inquiry provide an open space both for the individuals and the public to sharing their own knowledge and learning experiences from others. It bridges the gap between the private knowledge world and the public world to make use of all different knowledge to the maximum extent.

- **Community of practice**
  William M.Snyder and Xavier de Souza pointed out their understanding of what is community of practice (2004): “A ‘community of practice’ is a particular type of network that features peer-to-peer collaborative activities to build member skills as well as organizational and societal capabilities. Communities of practice steward the knowledge assets of organizations and society. They operate as ‘social learning systems’ where practitioners connect to solve problems, share ideas, set standards, build tools and develop relationships with peers and stakeholders.” In Etienne Wenger’s article, he summarized the definition of “community of practice” briefly as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly”. The structure of the community of practice is shown as follows:
Community of practice has three dimensions: domain, community and practice. The domain in the community of practice should focus on a specific area and have a shared domain of interest which is not merely a group of friends or a common network of connections among people (Wenger E. 2011; Snyder W M, de Souza Briggs X., 2004). The members in the community can differ in the levels such as conveners, core group, active and peripheral (Snyder W M, de Souza Briggs X., 2004). Members participate in joint activities and discussions to deliver and share information with each other. The interactive communication between people is one of the main characteristics in community of practice. The dimension of practice in COP may contain techniques, methods, stories, tools and professional attitudes (Snyder W M, de Souza Briggs X., 2004). The main purpose of COP is to foster and enhance the sharing, learning and innovation cross departments, organizational, sector or even geographic boundaries in a specific domain. It provides a descriptive approach for community formation and identity. The framework of COP is also applicable in this dissertation. The domain, practice and community in the U-CARE community fulfill the requirements of COP and the purpose also matches the purpose of COP.

- **Actor-network theory**
  ANT is a theory used in science studies which takes objects into consideration as a part of social networks in a community. So actors in a community are not only human but also non-human. ANT emphasizes on nodes and connections. As discussed in Esnault’s study (2007): “Actors and networks are mutually constitutive, meaning that there is no actor without action; that is, relationship with other actors, and the network is built on the mutual influences and intermediaries that actors exchange between each other”. The inclusion of non-human is the distinct feature and one of the attractions of choosing ANT. It focuses on
the network of actors and interactions between them. It is more appropriate in application in technological communication and interaction environment (Kerawalla et al., 2011).

3.4 Summary of the literature review

Tacit as well as explicit knowledge are resources of value to apply and never lack of. But before the process of knowledge transfer and sharing, there are some prerequisites to be fulfilled. Organizations should have sufficient resources in finance, time, human resources and technology. At the same time, according to previous literature results, key characteristics of knowledge transfer and sharing are relevance, accessibility and format & method. This also offers a thought to the purpose of this dissertation. That is, if we intend to obtain better knowledge transfer and sharing practices, we need to increase relevance and accessibility of transferred and shared knowledge and provide suitable format and method. Existing knowledge transfer and sharing models are presented but the model or framework that will be developed in this dissertation goes further into specific techniques and methods. The framework from the book of Etienne Wenger et.al (2009) is used in the case study when design the interview questions to understand the community even though there are other three alternatives could be used to understand a community from different perspectives.
4. Case study

In this chapter, it presents some key aspects in the case study in a format of case study report which enables to organize the content in a logic flow. These aspects contain the focus, context of the case study, description of the data collected, methods used for the case study. Additionally, the specific analysis and discussion of the collected data will be presented in the next chapter Analysis and Discussion.

4.1 Introduction to the structure of case study report

As mentioned in the methodology chapter, the chosen research strategy in this dissertation is case study. And this case study is supported by the U-Care community in Uppsala which is focusing on research and serving e-health service in the e-health industry. Of course, case study report can be written up in many different ways. As introduced in Colin’s book Real World Research, an excellent case study report format is suggested by Lincoln and Guba (1985, Chapter 13). It can not only explain the background, problems, collected data and methods clearly, but also structure the case study in a well-structured logic flow to show to other audience clearly. So we decided to learn from this format to interpret the case study in this dissertation. This defined case study format is as follows:

1. A description of the focus of the case study (e.g problem, issue, policy option.);
2. A description of the context or setting in which the enquiry took place, and with which it was concerned;
3. A description and analysis of the data collected;
4. A discussion of the outcomes of the enquiry;
5. The credentials of the investigator, to include training and experience, together with a statement about the methodological predispositions and any biases towards the problem or setting;
6. The methods employed and the nature of the case study design;
7. The methods used for the trustworthiness.

Considering the case study is a part of the whole dissertation, we didn’t copy the same format above but made some changes to the format to suit the whole dissertation avoiding the content overlapping with other chapters. So the changed case study report is:

1. A description of the focus of the case study (e.g problem, issue, policy option.)
2. A description of the context or setting in which the enquiry took place, and with which it was concerned;
3. A description of data collected;
4. The methods employed and the nature of the case study design;

Last but not least, in order to respect all the people suffering from no matter the somatic or mental disorders, U-CARE community regards and calls them as “participants” not “patients”. So in the whole case study, we also followed this “rule” and use “participants” to represent all the people
accepting the treatment from U-CARE program.

4.2 Case study report

Our case study is supported by the U-Care program in Uppsala University. It is an interdisciplinary research program at Uppsala University. The mission of activities at U-Care is to prevent and reduce psychosocial ill health in participants and their loved ones in connection with bodily disease. This program is funded by Swedish government and supports the research group of Public Health and Caring Science department in psychosocial care industry.

4.2.1 Focus of the case study

As the only research strategy of this dissertation, the focus of the case study is the same as the purpose of the whole dissertation. And the case study casts the “big” research questions into a context of specific single community which has the focused goals, focused projects and focused workgroup. It enables the analysis and discussion to become possible from a reality and practical point of view. So this case study aims to go specifically and deeply to investigate how to identify the existing knowledge sharing and transfer practices in the context of e-health community and hence provide methods or techniques to achieve better knowledge sharing and transfer from process and practice view.

4.2.2 Background

- Why chose the case of U-Care?

The main reason for choosing U-Care as the context of the case study is that the researcher is studying at Uppsala University and researcher’s supervisor works for U-Care community, which enables easier and convenient access to data collection. However, the Swedish context is also suitable for the e-health research since, no matter for the information technology, internet usage or the e-health’s development, Sweden is in the leading position compared to other countries. Different e-health projects or programs are all in place to support e-health development.

For the U-Care program, it is an interdisciplinary research program integrating knowledge from health economics, psychology, information systems and so on. U-Care community is very open for proposals from related fields and wishes to have collaborations with interested stakeholders. This even motivated us to participate in this program and have a focus and investigation on the topic that we are interested in. This is also proved through this case study. All the staff was willing and glad to accept all the research requirements from us and cooperated very well.

Because the focus of this research is related to knowledge sharing and transfer, U-Care community also makes many efforts into it. It has its own e-health portal to sharing the knowledge and has both formal and informal communication among staff from different research groups. When select
the case for the research, it is also important that we can learn something from the existing excellent practices rather than just aims to make some improvements. Additionally, we hope to recognize the potential of U-Care community in knowledge sharing and transfer and make our contribution.

- Introduction to U-CARE

In Sweden, public health care is provided by public institutions and in the responsibility of 21 country councils. The common e-health care services that offered to the online users are health guides, ask-the-doctor services, renew prescriptions and appointment booking (Marie-Louise Jung, 2008).

As an important attempt in the e-health industry, U-Care not only aims to support and deliver psychological treatment that is not offered in today’s medical care, but also is one of the governments’ strategic commitments to the research field. The government decided to invest SEK 5,270 million in the U-Care program during the time period between 2010 and 2014 since health care industry is considered relevant to Sweden’s continued growth and competitiveness. U-Care is a program at Uppsala University. It mainly supports the research group in the department of Public Health and Caring Sciences which is internationally strong in basic and applied psychosocial care research.

For e-health, it covers different branches of health care industry through offering health care services via internet. The focus of U-Care program is mainly on mental treatment. Research has shown that a proportion of people who suffered from somatic disorders and their loved ones may come across mental problems from different levels, such as stressful, depression and anxiety mental status. But this kind of mental care treatment is not provided yet by any established systems or platforms in the ordinary medical care today. So the purpose of U-Care program is to provide psychological treatment to these people via internet and their established platform and therefore reduce people’s suffering. Many psychological problems that people are not willing to talk with doctor face-to-face can be consulted and solved via the internet. To some extent, online health care treatment increases the availability to the access to the health care service. So U-Care program can improve the corresponding availability to the psychological treatment and to some extent can help to decrease the suffering in somatic disorders.

At present, U-CARE has three target patient groups: children with cancer, adults with cancer and heart attack participants. The treatment program is based on the principles from Cognitive Behavioral Therapy (CBT) and also contains investigation regarding how thoughts, feelings, physiological mechanisms and behavior interact. So what U-CARE program will do is to create positive effect on people’s mental status through providing them with new ways of thinking and acting. U-CARE program has its own U-CARE portal to deliver the psychological treatment service to the participants and to conduct the relevant study. The treatment services are in the form of texts, video and homework assignments to work with on your own weekly, and participants could have a regular contact with a psychologist or therapist via e-mail or portal-based messages for feedback, support and guidance. If the people who are willing to participate in the research
study, they will be offered a questionnaire to measure whether they have negative thoughts or not. People who have symptoms of negative thoughts will be randomly assigned to a normal group or a control group. The participants themselves can decide whether to involve their loved ones or not, and participants can decide to withdraw from the study at any time point without any reason. And the treatment for the person has nothing to do with whether he/she participates in the research or not.

- **Organization of U-Care**

U-CARE community is a big group. The U-CARE program is organized in the following structure:

![Organization of U-CARE](http://www.u-care.uu.se/about-u-care/organization/)

The target group of people in this dissertation is all the workers in the workgroup (shown in the figure) who are responsible for the specific work of different work packages and daily work. So it is not necessary to give details of all the other committees and groups. The focus will be on the workgroup.

The workgroup consists of PHD students, professor and post-doctoral. The specific component in the workgroup is as follows:
4.2.3 Brief Description of data collected

The method for data collection in this dissertation is interview. It took approximately four weeks to carry out all the interviews among the selected respondents. We contacted 9 persons in the U-CARE community and all of them replied that they were glad to take the interviews. So the final interview records consist of 9 staff’s answers, including 1 coordinator, 3 psychologists, 2 health staff and 3 developers. All the interview records are saved as audio files in two different recording devices as the evidences for interview transcription. The average length of each interview is 38 min.

4.2.4 Methodology

Besides interview (already introduced in chapter two) used for the data collection in the case study, we also used other methods to support the whole data collection process. In this section, we would like to present how we designed the interview questions, how we conducted the data verification and what method we used for data analysis.

- Designing the interview questions
  Before designing each interview question, we first read all the introduction material to the U-CARE community to have a general understanding of this organization. Then we had an initial knowledge regarding the structure, purpose, background and function of U-CARE. Because the focus of this dissertation is to identify and improve the knowledge sharing and transfer practices among staff, we defined a checklist of topics that all the interview questions should cover:
  1. The role of interviewee
  2. Interactions between different functional roles
  3. Interaction between U-CARE with outside world
  4. Resources & Constraints within U-CARE community
  5. Activities and tools
  6. Acceptance for change
7. Acceptance for technology boundaries
8. More needs

After defined the topics, we introduced a framework from *Digital Habitats: stewarding technology for communities* written by Etienne Wenger, Nancy White and John D. Smith (2009) to help define the main questions in the interview which is discussed in the chapter of literature review.

The framework in the Action Notebook contains three steps to manage technology and practices in community (Etienne Wenger & Nancy White & John, 2009):

Step 1: understand your community;
Step 2: provide technology;
Step 3: stewarding technology in use.

In step 1, the authors aim to understand the community from community characteristics (lifecycle, constitution and technology aspirations), orientations, technology configuration and the final summarized comparative inventory. In step 2, the authors advocated to provide technology considering resources and constraints, acquisition strategy, seeking for a solution and planning for change. In step 3, stewarding is divided into everyday stewardship and community end-of-life closure.

When we designed the interview questions, we mainly based on the first two steps since we aimed to understand the U-CARE community well and to know their requirement for the technology and practices. Of course, the checklist of topics that we want to know is the core information of all the interview questions. When decide each specific question, we choose the proper ones from action notebook according to what we have already known and what we need to know. So we didn't choose all the questions on the action notebook and deleted some unnecessary ones. We compared our research needs with the Action Notebook in order to figure out the proper interview questions (shown in the following table):

<table>
<thead>
<tr>
<th>What I need to focus on (research need)</th>
<th>Reference (Action Notebook)</th>
<th>Corresponding questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of interviewee</td>
<td>Constitution-diversity(p150)</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Interactions between roles</td>
<td>Orientations(p152)</td>
<td>4, 5, 6</td>
</tr>
<tr>
<td>Interactions with outside world</td>
<td>Constitution-openness(p150)</td>
<td>7, 8</td>
</tr>
<tr>
<td>Resources &amp; constraints</td>
<td>Provide technology(p157)</td>
<td>9, 10, 11, 12</td>
</tr>
<tr>
<td>Activities and tools</td>
<td>Technology configuration(p154)</td>
<td>13, 14</td>
</tr>
<tr>
<td>Acceptance for change</td>
<td>Lifecycle(p150)</td>
<td>15, 16</td>
</tr>
<tr>
<td>Acceptance for technology boundaries</td>
<td>Technology aspirations(p151)</td>
<td>17</td>
</tr>
<tr>
<td>More needs</td>
<td></td>
<td>18, 19</td>
</tr>
</tbody>
</table>

Table 5: Reference of interview questions

These interview questions cover all the main questions need to ask. Since interview type in this dissertation is semi-structured, there were some follow-up questions asked during the process of the interview according to each interviewee’s condition. The interview questions’ checklist is
shown in the Appendix C.

- **Data verification**

After deciding all the interview questions, we sent the question list to the supervisor, Jonas Sjöström, who is experienced in research study and the field of e-health. Afterwards, we had the supervision meeting with Jonas Sjöström and received feedback from him. Some revisions were made according to the feedback. But we should have a pilot interview before the formal interview, which will be introduced in the further work section.

- **Data analysis**

The method that we used to analyze the interview data is qualitative comparative analysis. Qualitative comparative analysis is a technique used for solving the problems that are caused by making causal inferences on the basis of only a small number of cases (Rihoux B. & Ragin C.C, 2009). It tries to make as many comparisons as possible across the cases under investigation to get the right inference. In the U-CARE case, there are totally 9 interviewees as 9 cases. So regarding the objective questions, we used the qualitative comparative analysis to make comparison across different answers from interviewees, trying to get the “right” answer. But for the subjective questions, there was no “right” answer and we tried to respect each interviewee’s response and keep their own ideas.
5. Analysis and discussion

In this chapter, the empirical findings and the results of analysis and discussion are presented. It is divided into four sections: (1) empirical findings are provided first according to the data from interview which is the foundation of all analysis and discussion; (2) prerequisites for knowledge transfer and sharing are discussed according to literature and empirical data; (3) techniques and methods are presented in order to improve knowledge transfer and sharing in U-CARE community; (4) the results are summarized on a high level in the format of a framework and specific techniques.

5.1 Empirical findings

As discussed in the previous chapter, the data analysis method that we used to get empirical findings is qualitative comparative analysis. The number of interviewees that are involved in the interview is 9, so it is not a big amount to make this kind of comparative analysis to get the “right” inference. Next, the results regarding each theme are provided.

5.1.1 The role of interviewee

If we look into the component of U-CARE community according to the education level, most staff in the workgroup is PHD and some are post-doctoral or professor (as shown in Figure 8). If all the staff is categorized according to function roles, U-CARE community contains researchers, psychologists, health staff, registers, developers, coordinator and guests. Almost all the staff in the U-CARE community is located in Uppsala and they are working in a fixed corridor in BMC in Uppsala. Most of them are full-time workers. The following is the specific description regarding each functional role:

Coordinator: coordinate different work groups; manages requirements in the backlog and prioritizes them;
Researcher: plans and conducts U-CARE related studies;
Psychologist: offers Cognitive Behavioral Therapy treatments to be used in internet-based interventions; plans, develops and evaluates e-health service offered by internet; plans and implements related studies;
Developer: develops U-CARE IT platform;
Health staff: helps to plan, develop and evaluate Cognitive Behavioral Therapy treatments and psychosocial support;
Register: people in the clinics, put new participants in the system;
Guest: staff that help other users.

As presented in the chapter of methodology, we totally chose 9 workers from different departments with different level of experience in order to get reasonable and reliable empirical results, so in each functional role we chose both a senior one and a junior one. Additionally, the
common knowledge transfer and sharing process happens among coordinator, psychologists, health staff and developers. So finally, we chose 1 coordinator, 3 psychologists, 2 health staff and 3 developers as our interviewees.

5.1.2 Interactions between roles: activities & tools

Regarding this question, all the respondents have a unanimous answer. To some extent, U-CARE community refers to some working principles of Agile Method, and each week works as a short sprint. Next, we list all the interactions between different roles related to knowledge transfer and sharing within U-CARE community:

(1) Formal meeting
All the staff in the workgroup has a formal meeting every Monday to discuss what has been done last week and plan for the following week. Especially the IT problems they came across will be discussed among health staff, psychologist, coordinator and developers in order to get solutions.

(2) Informal meeting
So far, they have three ongoing work packages (children with cancer, adults with cancer, heart attack participants). Within each work package, there is a research group which is focusing on the specific research area. They have their own meetings to discuss ongoing research plan, problems and so on.

(3) Face-to-face communication
Since the whole U-CARE community is located in a fixed place, it is convenient and efficient to directly talk to the right person to discuss problems face-to-face.

(4) Tools on U-CARE portal
U-CARE community created U-CARE portal which is primarily for their research study but also aims to deliver e-health service to the participants. So on U-CARE portal, there are some functions supporting the knowledge transfer and sharing interactions among the staff. The most frequent mentioned function in all the interviews is backlog on the portal. The backlog is most used as a place to get ideas, opinions and requirements from researchers, psychologists or health staff regarding what function is needed or what needs to be fixed. Coordinator is responsible for prioritizing all the requirements to decide what to be worked on first and later. Once the problem is solved, all the staff is able to view the solution in the backlog. What’s more, when developers check the requirements in the backlog, they can assign each problem to specific responsible person to solve it. According to the feedback from all the respondents, backlog shows great advantages in daily work with friendly-use and high efficiency.

In addition to backlog, two respondents mentioned Message function and Forum function on the portal as well. One respondent mentioned that they also had the intranet. But they are not used so often as backlog.

(5) Other tools
Besides the tools mentioned above, they often use email to contact each other and use Dropbox to share documents. Some respondents use Skype, telephone and message to contact others. But at the same time, there are some respondents who do not prefer these tools. One respondent is not willing to use Skype because he/she does not want to use private Skype in
the work. Another respondent does not prefer email because it is not easy to track all the information.

(6) Coordinator

As an important role in the whole U-CARE community, coordinator is responsible for prioritizing all the things in the backlog, managing all the requirements, coordinating between researchers, health staff and IT developing team. Besides, coordinator is in charge of conveying massages between different working packages.

As presented above, U-CARE community has already had a solid basic knowledge transfer and sharing mechanism. This mechanism contains not only a suitable working process but also a powerful online platform. This is a good thing, but, on the other hand, it increases the difficulty degree to make improvements in knowledge transfer and sharing.

5.1.3 Interactions with outside world

Most respondents thought there were not so much interactions with other similar communities, and some respondents said that there was communication with different clinic centers. In Sweden, there are some conferences for communities in health care industry to communicate with each other. Within U-CARE community, experts in the advisory board have a conference once a year. But on the whole, U-CARE community is one-based community. The knowledge transfer and sharing that is investigated in this dissertation is also limited in one-based community.

5.1.4 Resources & constraints

(1) Resource

The resource existing in the community mentioned by most respondents contains IT tools/software, programming skills from IT team, expertise from health staff and psychologists, knowledge of knowing how to do things. If extract all the mentioned information, the existing resources can be divided into two categories: technology and knowledge. As one of the main resources in the community, knowledge plays an important role in the development of U-CARE program. Then, the investigation of knowledge transfer and sharing is necessary and useful. When it comes down to the subject of this dissertation, the two main existing resources also provide two views to achieve better knowledge transfer and sharing. One is to exploit knowledge as much as possible existing in the community and the other one is to use technology to transfer and share valuable knowledge to a maximum extent.

(2) Constraint

The barriers or constraints that respondents thought could affect their work are not enough time, people not in the same place, language barrier, different knowledge and education backgrounds.
5.1.5 Acceptance for change

All the respondents thought U-CARE program is improving all the time and not settled. It is restless and needs useful changes to become better. Respondents can accept changes and try to learn the changes if only they are easy to follow, they are worthwhile to use, has positive consequences and would not affect the participants so much.

5.1.6 Acceptance for technology boundaries

There is no specific requirement for technology boundaries pointed by any respondent. They are willing to learn new technology if it is worthwhile to use, has strong advantages and has positive consequences. Most respondents stated that even though they are not at the frontier of technology but they have strong learning ability to learn new tools. Three respondents (developers) thought they are excellent at technologies and there is no difficulty for them to use new tools. Most of them prefer the simple tools with low cost for change.

5.1.7 More needs

On the whole, knowledge transfer and sharing mechanism, not only the complete work process but also the powerful U-CARE portal, works very well in the daily work in U-CARE community. That is why some respondents stated that they did not have more needs and current system is good enough. At the same time, since U-CARE program is developing and improving all the time, some respondents still considered there could be more improvements. They have different feedback regarding this question: “We need to consider how to track decisions and share meeting proposal (or store)”; “It is necessary to think about how to handle versions and how to handle changes”; “It will be easy to have a library of Answers to look up for us”; “We are a lot of people and there’s a big meeting and you can do that process easier. Small units forget to share information that everybody wants to have. You just share with your group (workshop seminar).””; “There should be a suitable structure before doing things”; “One repository is needed to put all the documents. Sometimes it is hard to track requirements and understand the requirements because it is just brief comment rather a user story”. Some respondents pointed out their own opinions like this. These extra demands from respondents can be summarized as: change management, documentation management, track requirements and decisions and library of Q&A. The specific analysis the existing problems and demands from the respondents will be provided in the later section “Techniques and methods can be used to improve knowledge transfer and sharing in U-CARE”.

5.2 Prerequisites for knowledge transfer and sharing

As stated in Elias M.A and Hassan M.G’s book (2004), technology is not the only prerequisite for knowledge transfer and knowledge sharing. As discussed in the section of key characteristics of knowledge transfer and sharing in health care industry, it is pointed out that several organizational factors should be taken into consideration as prerequisites for knowledge transfer and sharing. It is
necessary for organizations to ensure the sufficient resource in finance, time, human resource and technology (Fixsen et al. 2005; Mitton et al. 2007; Best et al. 2008; Harrington et al. 2008; McWilliam et al. 2008). And also the organization should offer an open and trust environment that is beneficial for knowledge transfer and sharing (Mitton et al. 2007; Bowen and Martens, 2005). Some of these factors were also mentioned by interviewees in the interviews as constraints that may affect the efficient knowledge transfer and sharing. So if these prerequisites are fulfilled first, it also can benefit knowledge management practices.

In the first framework introduced in the chapter of literature review, the issue of prerequisites is also stated. According to the results from Goh S C. (2002), higher propensity to share knowledge is affected by support structure, leadership, trusts between people, collaboration and problem seeking/solving.

In Elias M.A and Hassan M.G’s book Knowledge Management, prerequisites for knowledge transfer and sharing are discussed as well. The following is an interpretative description of Elias and Hassan’s opinion (Awad and Ghaziri, 2004):

- Have an atmosphere of trust in the community
- Adjust the culture to the changes
- Reasoning before process
- Remember that doing is far better than talking
- Know how to deal with mistakes
- Ensure that cooperation and collaboration are not competition
- Identify what counts
- Take a close look at the managers and how they view knowledge transfer
- Assess employee job satisfaction and the stability of the workplace

So we synthesize and summarize relevant information about the prerequisites of knowledge transfer and sharing, a comprehensive outline of prerequisites is obtained:

1. Sufficient resources in finance, time, human resource and technology;
2. Higher propensity to share knowledge:
   - Open, trust, stable working environment
   - Organization culture: accommodate to change; encouragement from managers; positive collaboration
   - Working methods: reasoning before processes; mistake/problem solving
3. Identify what counts and valuable to transfer and share

An excellent knowledge transfer and sharing mechanism does not mean that every person in the community knows everything. And according to Ranjit Bose’s definition of knowledge, it also raises two important points in the study of knowledge management: “who are the right people” & “what is the right time”. In the context of e-health community, there is clear division of work and responsibility. Different groups own different education backgrounds, so it is not essential and practical to make every person know everything. For example, health staff and psychologists do not need to have programming skills; IT team does not need to own too much information or knowledge regarding e-health treatment.
5.3 Techniques and methods can be used to improve knowledge transfer and sharing practices in U-CARE

If we intend to enhance and improve the knowledge transfer and sharing practices in U-CARE community, we need to proceed from the current existing problems and respondents’ demands rather than applying any technique or method directly into a community. So according to the answers from the respondents, we extracted four main themes or aspects that can be the starting points:

1. **Change management**: changes here contain system version update, new requirements and new solutions’ update in the backlog.
2. **Documentation management**: documents here contain user manual, research proposal, research planning, research related papers/articles.
3. **Track requirements and decisions**: requirements contain new features for the portal, new use cases for the portal, bug fix; decisions contain not only the decisions from the formal meeting every Monday but also the decisions from each research group/work packages.
4. **Library of Q & A for staff**: frequent asked questions contain IT related questions, questions of portal’s operation and so on.

There are two important strategies in knowledge transfer and sharing: codification and personalization (Disterer G., 2001). The codification is mainly based on information technology: knowledge is codified and saved in database or platform for people to search and to use (Disterer G., 2001). No matter change manage, documentation management, tracking of requirements and decisions or library of Q & A mentioned above, they are all the application of codification strategy which uses information technology to put all the knowledge in use. Based on the feedback from the respondents, strategy of personalization is seldom mentioned and applied. As a good way of customizing of content, personalization can tie required knowledge directly to the person who created or developed it (Disterer G., 2001). So this person-to-person may increase the efficiency of knowledge transfer and sharing. Hence, we add the fifth aspect that we intend to develop:

5. **Personalization**.

We do not content that these five aspects are the only aspects need to be improved regarding knowledge transfer and sharing. But at least according to the condition of U-CARE community and feedback from 9 interviewees in different positions in U-CARE and literature review, these five aspects are important ones that may affect the process of knowledge transfer and sharing. Next, we discuss the corresponding solutions and improvements for each aspect.

5.3.1 Change management

During the process of knowledge transfer and sharing across different functional groups (coordinator, IT team, health staff, psychologists), the changes here mainly refer to the update of system’s version, new requirements from health staff and psychologists and the update of new solutions in the backlog. Change management refers to the process of introducing and approving
changes formally. In the context of U-CARE, the purpose of good change management is to inform the right persons with right message and to let corresponding workgroup know the change efficiently and effectively. So next, we introduce different change management practices according to different types of change.

As the technology is improving and the requirements for the system and platform are increasing, the version of the portal is updating all the time. The best way to manage all the version update information and keep track of detailed version update information is to create a separate file on portal to record all the detailed version update information, such as update date, updated features, responsible person and released date. This file is available not only for IT team but also for coordinator, health staff and psychologists to check. But only specific IT person has the right to edit. As we know, coincidently after the interviews, U-CARE group is working on this function and nearly completed and ready to use.

New requirements and new solutions are all created in backlog. Backlog is a common place for all the functional groups over U-CARE community to check requirements and solutions which makes knowledge transfer and sharing easier. What we need to do is to find useful techniques to make this notification process efficiently. As presented in the model of knowledge management cycle by Ranjit Bose (2003), knowledge dissemination contain: mobilizing content, automated notification & subscription, knowledge retrieval & searching, knowledge support for virtual teams, personalized distribution, search engines & agents and webcasting & push. The suitable techniques for change management here are automated notification. For IT team and coordinator, if there is a new requirement published in the backlog, they will receive a push notification regarding the update in the backlog. For health staff and psychologists, if there is a new solution regarding the requirements or bug request publishing in the backlog, they will receive a push notification. To some extent, the push notification can decrease the time of knowledge retrieval and increase the efficiency of knowledge transfer and sharing.

The above technique is applicable when the recipient is a whole functional group. If recipient is a target person/people, we need to consider what the suitable technique to notify a specific person is. In the practices discussed in the book of Etienne Wenger et.al (Etienne Wenger et.al. 2009), tagging function is an important feature mentioned in activities and tools for individual participation. Tag the person/people that you are aiming to notify in the backlog, and the target person/people will receive corresponding notification himself/themselves. One point that needs to clear is that this tagging function is different from the function “Assign” which already exists on the portal. The purpose of “Assign” is the specify target responsible person. However, the motivation of “Tagging” is just to inform the target person to make the process of knowledge transfer and sharing exactly and efficiently.

5.3.2 Documentation management

Based on the feedback from respondents in the interview, some stated that they sometimes used Dropbox to store and documents and some said they did not know the repository to put files and documents. There is no unanimous opinion regarding the tool for documentation management. But
Dropbox is a good choice for the documentation management here. First, it has easy access to documents in the Dropbox for all the workgroup and research groups since opening the file folders is extremely easy through double clicks. Secondly, editing and changes to the documents are easy to be achieved. Uploading a new file can be achieved directly through dragging the file from your local computer into the Dropbox file folders and it will be saved automatically. Editing the file can be achieved through opening the file and editing in it and the changes will be saved directly. Last but not least, the whole community should have the unanimous opinion about the tool chosen for documentation management - Dropbox.

When it comes down to U-CARE community, it has three different work packages and IT team, so there would be different files and documents they want to share in different subgroups. So it is more efficient to create a concrete file folder for each subgroup to save their work related files and keep a common file to store some general documents that is used for the whole community.

**5.3.3 Track requirements and decisions**

To some extent, requirements can decide what outcome a project can achieve. Its management contains the process of documenting, analyzing, prioritizing, tracking and agreeing on requirements among related stakeholders (Philips J.R, 1983). Requirements occurring in the U-CARE program mainly refer to new features, new use cases and coming up bugs from health staff or psychologists that they intend to have or fix on the portal or any other new ideas and opinions. Staff can put their own requirements with a short description directly in the backlog on the portal. The coordinator is the responsible person who works to prioritize them with high, medium or low priority and then developers will firstly work on the requirements with high priority. Comparing current condition of requirements management in U-CARE with standard definition of requirements, tracking requirements is the missing segment among the standard process. It is also pointed out by some respondents in the interviews that he/she did not know whether a new feature was published or not, he/she did not know the rationale of coming-up problems.

Requirements traceability is the process of documenting the life of a requirement in order to trace back to the origin of the requirement and every change to the requirement (Gotel O.C & Finkelstein C.W., 1994). In the U-CARE program, the life cycle or status of each requirement can be recorded in a separate file to achieve requirements traceability. For example, use “to do” “under way” “done” “published” to clarify requirements; interpret the rationale for each requirement and the reason for high, medium or low priority; mark the specific responsible person and assessed time period for each requirement. The example is as follows:

<table>
<thead>
<tr>
<th>Priority</th>
<th>Rationale</th>
<th>To do</th>
<th>Under way</th>
<th>Done</th>
<th>Published</th>
<th>Responsible by</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R1</td>
<td>Tommy</td>
<td>3 weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>R2</td>
<td>Eva</td>
<td>1 week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>R3</td>
<td>Anna</td>
<td>1 week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the context of U-CARE, there are many meetings in the daily work either formal meetings for the whole workgroup or informal meetings for sub research groups. This makes the information and decision derived from each meeting complex and difficult. Respondent pointed in the interview that it was hard to follow up all the different decisions timely and efficiently in order to know progress in other research group. The key factors to track a decision are concerning time, work group and decision. For those simpler needs, it can be fulfilled through a simple shared calendar with project management milestones (Etienne Wenger et.al. 2009).

5.3.4 Library of Frequently Asked Questions for staff

There are some communities creating value by providing focused access to expertise (Etienne Wenger et.al. 2009). Communities with this kind of orientation try to offer answers to questions, fulfill requirements for advice (Etienne Wenger et.al. 2009). The tools to highlight these key expertise varies in the amount of intentional cultivation they require and some require substantial efforts or attention to create and rich the content. As stated in the book of Etienne Wenger et.al. (2009), “Frequently Asked Questions” area is an important tool to highlight key learning. Library of FAQ is a core place which contains focused and practical knowledge assets that ever used in the U-CARE program. Now in U-CARE community, most questions are solved through putting questions in the backlog, meetings or face-to-face communication. There is lacking of a search engine or knowledge assets that can find solutions to frequent asked questions.

5.3.5 Personalization

Compared to techniques introduced above, personalization is a more complex function. It is a strategy focuses on communication between individuals and ties knowledge to the knowledge sender directly (Hansen, M.T et.al.1999). And in the context of knowledge management, users should be able and have this right to choose what knowledge they want to obtain (Bose, 2003). One representative function in this strategy is subscription (Bose, 2003). As discussed in the book of Etienne Wenger et.al (2009), subscriptions are important tools for following an expert and have access to expertise. But this function needs to combine with who-knows-what systems which shows users whom they should follow and subscribe the corresponding knowledge.

5.4 Summary of analysis and discussion

On the whole, based on the feedback from respondents in the interviews, it is shown that no matter from the view of work process or from the view of related support structure and practice, U-CARE community has built a good infrastructure for knowledge transfer and sharing. For example, in the working process, they have both formal and informal meetings to discuss problems and solutions; they are convenient to conduct face-to-face communication since they are
located in the same place. In the view of practice, they have online platform which contains backlog, message function and online forum; they use Email, Skype, telephone and Dropbox to contact and share information; coordinator plays an important role to deliver messages between different research groups and work groups. Since the knowledge transfer and sharing mechanism in U-CARE works very well in daily work, the degree of difficulty to enhance and improve corresponding practices increased. According to the answers from respondents in the interview, most respondents prefer the simple tool with low cost of change and positive consequences. So what we focused on are some improvements related to specific techniques rather than introducing extra complex software or applications, for example change management, documentation management, track requirements & decisions, library of FAQ and personalization.

As a result, if we synthesize prerequisites, techniques and methods both the ones existing in the U-CARE and the ones suggested, a framework that can be used for identifying knowledge transfer and sharing practices in a e-health community will be obtained. So the framework is shown as follows:

![Figure 9: Framework for knowledge transfer and sharing in the context of e-health](image)

- **Prerequisites**
  - Finance
  - Time
  - Human Resource
  - Technology
  - Higher Propensity
    - Open, trust, stable working environment
    - Positive organizational culture
    - Proper working methods

- **Working Process**
  - **Formal/informal meetings**
  - **Face-to-face communication**

- **Knowledge transfer & sharing**

- **Knowledge internalization**

- **Knowledge Outcome**
  - e-health service

- **Working practices**
  - Coordinator
  - Online platform (tasklog, message, forum)
  - Extra IT tools
    - Email
    - Skype
    - Telephone
    - Dropbox
  - Change Management
    - System version update report
    - Push notification
    - Tagging
  - Documentation management
    - Dropbox
  - Track requirements & decisions
    - Requirements traceability record
    - Calendar
  - Library of FAQ
  - Personalization
    - Subscription

- **Existing process and practices in U-CARE**
- **Suggested practices in this paper**
6. Conclusion

Finally, this chapter concludes the analysis of the study and provides the answers to the research questions. Additionally, we summarized the implications for both theory and practices and provided further work.

6.1 Answers for research questions

In this dissertation, we aim to provide a framework for e-health related community to identify the knowledge transfer and sharing practices in the community and guide them to make corresponding improvements to achieve better knowledge transfer and sharing to create high-quality health care services. Hence, we have these two research questions with the answers in the following:

**How to identify existing knowledge transfer and sharing practices in the context of e-health?**

In general, in order to achieve effective knowledge transfer and sharing, there are some prerequisites that need to be fulfilled first. The prerequisites are concerning sufficient resources, higher propensity in knowledge transfer and sharing and identifying what counts & valuable to transfer. Furthering, knowledge transfer and sharing practices should be analyzed from both work process and practices. In the aspect of work process, organization need to check whether they have formal/informal meetings and face-to-face communication to make sure the regular and adequate knowledge transferred across the whole community. Regarding techniques and methods used in the knowledge transfer and sharing, the suggested practices may offer a reference for the organization to compare with their own condition. The suggested practices are coordinator, online platform, IT tools, change management, documentation management, track requirements & decisions, library of FAQ and personalization. The whole framework is shown in Figure 9.

**Identify and assess methods and techniques to achieve better knowledge sharing and transfer in the e-health community.**

After identifying the knowledge transfer and sharing practices in the community, some lacking techniques and methods will be recognized. So according to the framework introduced, the community could adapt some methods and techniques to apply in their own organization. For example, suitable work process (formal/informal meetings, face-to-face communication), coordinator, online platform (portal) and IT tools (Email, Dropbox, Skype, telephone) to make sure the regular and adequate knowledge transferred across the whole community. Further, version update report, push notification and tagging can be applied to enhance change management; staff should make full use of Dropbox as a repository to manage all the documentation; requirement traceability report and shared calendar can be created to help track requirements and decisions; library of FAQ and subscription can be used to create easier access to demanded knowledge. They are shown in the framework in Figure 9.
6.2 Implication for theory

As stated in the literature review, a theoretical framework from Wenger was applied in the case study. It offers guidelines in a format of action notebook for us to understand the technology and practices in the community. It provides comprehensive dimensions to understand the community, such as community characteristics, orientations and technology configuration. We built up interview questions based on this theoretical framework from Wenger to understand U-CARE community. The outcomes of the interviews satisfied our requirements and offered useful empirical data which supported analysis and discussion well. So the theoretical framework from Wenger is suitable and useful in the similar case study to understand a community. At the same time, some practical techniques are also mentioned in the framework for further improvements in the community.

There are some existing frameworks for knowledge management from a high level in the previous literature. Personally, we have provided a framework for U-CARE community to identify knowledge transfer and sharing practices. This dissertation, obviously, has a clear focus on a specific community (U-CARE community) but we think that the theoretical framework we proposed can offer some suggestion or guidelines to organizations which is faced with similar situation to U-CARE such as knowledge-intensive organizations. This framework can be used as a new theory for them (shown in Figure 9).

6.3 Implication for practice

The framework proposed in this dissertation is also attached with some specific techniques and methods that can be used for better knowledge transfer and sharing practices. So in the case of U-CARE community, the knowledge transfer and sharing practices could not only limited to suitable work process (formal/informal meetings, face-to-face communication), coordinator, online platform (portal) and IT tools (Email, Dropbox, Skype, telephone), but also can be extended to change management, documentation management, tracking of requirements & decisions, library of FAQ and personalization. Version update report, push notification and tagging can be applied to enhance change management; staff should make full use of Dropbox as a repository to manage all the documentation; requirement traceability report and shared calendar can be created to help track requirements and decisions; library of FAQ and subscription can be used to create easier access to demanded knowledge.

Similar to the theory mentioned in 6.2, even though we proposed all these practices through focusing on U-CARE community, it also can provide a guideline for organizations with similar conditions in a broader sense. Namely, the proposed framework in this dissertation may be also beneficial to knowledge-intensive organizations which try to get better knowledge transfer and sharing within staff by means of proper working process, IT tools and online platform. All the mentioned practices, not only practices suggested but also the existing practices in U-CARE community, could be a reference for them to apply according to their own condition.
6.4 Further work

There are a lot of scopes and possibilities for improvements in this area of study. Of course, regarding this dissertation, there are some places to be improved as well to get more accurate results of qualitative data.

For further developing of this study, a pilot interview is recommended to be taken into consideration to make sure all the expressions in the interview are easy to understand and to answer in their own words. To some extent, it helps to get a more positive interview outcome as expected.

For further developing in this area of study, it would be interesting to explore how to identify and improve knowledge transfer and sharing practices across communities or even across countries. More factors will be involved into consideration, such as boundary factors. Since this dissertation is only focused on internet-based e-health, other electronic tools-based e-health, such as telephone, can be further directions for studies in this area.
References


European Integration, 2002. Promoting E-health in Europe: Challenges and Opportunities


Appendix

Appendix A: Letter to the coordinator of U-CARE

Hi Helena,

I am a master student in the major of Information Systems in Uppsala University and have been working on the master thesis, which aims to improve knowledge management practice especially knowledge transfer and sharing in the context of e-health.

At the very beginning of starting the master thesis, I also went through a confusing time period of choosing thesis’s topic. There’s nothing better than choosing a topic you’re interested in which is also related to your major and also willing to spend effort on it. But very soon, I found the direction I want to go, and that is knowledge management in the field of e-health. Fortunately, Jonas, who is my professional teacher and supervisor, is working on the U-Care project, so that I have this great opportunity to working on the thesis related to this project. I think I’m lucky.

I believe the first wealth is health. Spending several months’ effort on health related work and making some contribution to help improve health care system and then offering direct or indirect help to human’s health, this is my original motivation and goal I want to achieve.

The Swedish care system is also facing great challenges now. An ageing population needs to be taken care of by using resources efficiently. To meet these challenges, an intensive effort is being undertaken to develop and make all aspects of health and social care more effective. I think U-Care project is exactly a significant step on this way. It helps to reduce human suffering by giving support and psychological treatment to the patients and their loved ones that is not offered in today’s medical care.

At the same time, knowledge is increasingly being recognized as a vital organizational resource that provides competitive advantage. In some research, it is asserted that knowledge is fast overtaking capital and labor as the key economic resource in advanced economies. The intangible assets in an organization are widely celebrated as vital elements in improving competitiveness. Thus knowledge management (KM) is emerging as a significant concept in management science. When it comes to the U-Care project, knowledge can be considered as experience or expertise of different staff roles in the U-Care community. The purpose of my thesis is to enhance knowledge management during the process of interactive communication to achieve best knowledge transfer and develop project’s capabilities and performance through better use of the individuals and collective knowledge resources. That is, work smarter, not harder.

The plan of my thesis is to conduct a case study on the U-Care project to understand current knowledge management mechanism of U-Care and then analyze, summarize and develop. And in the case study, some interviews among different functional roles in the U-Care community are
extremely important to my whole thesis. So I hope to get your permission and help to conduct the interviews. After the completion of the thesis, I can send you a copy of my thesis which is hopefully useful for the improvement of knowledge management practice in the U-Care project.

Best regards.

Yi
Appendix B: Framework from Wenger (Wenger, E.C., White, N., Smith, J.D., 2009)

Step 1: Understand your community

1.1 community characteristics

<table>
<thead>
<tr>
<th>Lifecycle</th>
<th>Where is your community in its lifecycle?</th>
<th>What you need to focus on:</th>
<th>Special needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just forming: need basic tools to connect, but not sure from there</td>
<td>Discuss the potential of some basic tools with members, explore what ideas it might give them, and see what they might bring in with them</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-designing: in formation stage, but with a strong sense of what it wants to accomplish</td>
<td>Contribute ideas to the design. Analyze systematically the implications of their community design for technology, infrastructure, and technology skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing and restless: ready to add new functionality to its tool configuration</td>
<td>Try to make this a community reflection and self-design event. Does their restlessness suggest a major change, such as a transition to a new platform?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable and adapting: just needing some new tools</td>
<td>How much disruption will the community tolerate? How will the new tools be integrated into or affect existing practices?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Constitution

Diversity: how diverse is your community?

| Diversity: how diverse is your community? | What are the different types of members and what are their levels of participation? | |
|------------------------------------------|--------------------------------------------------------------------------------| |
| How spread apart is it in terms of location and time zones? | | |
| What languages do members speak? | | |
| What other cultural or other diversity aspects may affect your technology choices? | | |

Openness: how connected to the outside world is your community?

<table>
<thead>
<tr>
<th>Openness: how connected to the outside world is your community?</th>
<th>How much do you want to control the boundaries</th>
<th>to be private and secure?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
of your community? does your community need:
- Open boundaries?
- Both private and public spaces?

How does your community need to interact with other communities? Do you need common tools for sharing and learning with them?

### Technology aspirations

**Technology savvy: what are your community’s technology interests and skills?**

How interested is your community in technology?

What is their capacity for learning new tools?

What is the range of skills? If their interests and/or skills are diverse, could it cause conflict or distraction?

**Technology tolerance: what is your community’s patience with technology?**

How tolerant are members of the adoption of a wide variety of tools?

How many technological boundaries are they willing to cross-for example, sign in to more than one web-based tool, learn to use new tools, or give up old favorites? This helps you understand what level of integration you need.

**Technology factors: what constraints are imposed by technology factors?**

What are your members’ technology constraints (e.g. bandwidth, operating system, etc.)?

How much time are members able to be online and from where (office, home, field)? Some people have limited online time, or are able to be online only in specific locations. Others are always on. Very diverse situations ca affect participation.

### 1.2 orientations

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Orientations</th>
<th>Variants</th>
<th>Key activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meetings</td>
<td>Face-to-face/blended Online synchronous Online asynchroneous</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open-ended conversation</td>
<td>Single-stream discussions Multi-topic conversations Distributed conversations</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>projects</td>
<td>Practice groups Project teams</td>
<td></td>
</tr>
<tr>
<td>Instruction</td>
<td>Content</td>
<td>Library</td>
<td>Structured self-publishing</td>
<td>Open self-publishing</td>
<td>Content integration</td>
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<tr>
<td>Access to expertise</td>
<td>Questions and requests</td>
<td>Access to experts</td>
<td>Shared problem solving</td>
<td>Knowledge validation</td>
<td>Apprenticeship/mentoring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>Connecting</td>
<td>Knowing about people</td>
<td>Interacting informally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual participation</td>
<td>Levels of participation</td>
<td>Personalization</td>
<td>Individual development</td>
<td>Multimembership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community cultivation</td>
<td>Democratic governance</td>
<td>Strong core group</td>
<td>Internal coordination</td>
<td>External facilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service context</td>
<td>Organization as context</td>
<td>Cross-organizational</td>
<td>Other related communities</td>
<td>Public mission</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1.3 Technology configuration: inventory

<p>| Platform 1: | |</p>
<table>
<thead>
<tr>
<th>Supported activities</th>
<th>tools</th>
<th>Key features</th>
<th>Usage notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>✴</td>
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<td>✴</td>
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</table>

<p>| Platform 2: | |</p>
<table>
<thead>
<tr>
<th>Supported activities</th>
<th>tools</th>
<th>Key features</th>
<th>Usage notes</th>
</tr>
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<tbody>
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<td>✴</td>
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</tbody>
</table>

Etc…

<p>| Stand-alone tools | |</p>
<table>
<thead>
<tr>
<th>Supported activities</th>
<th>tools</th>
<th>Key features</th>
<th>Usage notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>✴</td>
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<td>✴</td>
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<tr>
<td>✴</td>
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</tr>
</tbody>
</table>
### 1.4 An emerging picture

#### Covering the orientations

Compare the left-hand column of the inventory table (1.3) with the right-hand column of the orientations table (1.2). What do you notice about the match (or mismatch) between your dominant community orientations and the current configuration of tools?

| How well does the technology inventory cover the orientations? |
|---|---|
| Are you almost there? |
| Are there big gaps? |

| What is the range of skills? If their interests and/or skills are diverse, could it cause conflict or distraction? |

#### Achieving integration

Look at all the pieces of your configuration.

<table>
<thead>
<tr>
<th>What level of integration and interoperability has been achieved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where are there big gaps?</td>
</tr>
</tbody>
</table>

#### Balancing the polarities

How is the configuration balanced with respect to each polarity?

- Synchronous
- asynchronous
- Participation
- reification
- Group
- individual

| How well does this balance fit your community? |

#### Note:

This emerging picture becomes the input to step 2.3.

---

**Step 2: Provide technology**

#### 2.1 resources and constraints

**Organizational context**

Within an organization:

- Do you need to develop your technology strategy in collaboration with the IT department?
  - High level of control
  - Some flexibility
  - Relative freedom

- What specific resources and constraints come from the IT department? (get these details in writing if you can).

- What community-oriented technology do they have already? Is it usable?

- Does community-oriented technology need to interoperate with other enterprise systems?
| **software?** | ✷ Firewalls and security standards  
| What standards do you need to adhere to? | ✷ Databases or data standards  
| ✷ Single login protocol  
| ✷ Company look and feel  
| ✷ Policies |

### Across organizations:

<table>
<thead>
<tr>
<th>Which organizations can host the community or provide resources?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What strings are attached?</td>
</tr>
<tr>
<td>What problems can firewalls and security, data standards, and login protocols create across organizations:</td>
</tr>
<tr>
<td>Outside any organization:</td>
</tr>
<tr>
<td>Where will resources for technology and for tech stewardship come from?</td>
</tr>
<tr>
<td>What tools can members contribute and what will happen if they leave?</td>
</tr>
<tr>
<td>What open web standards do you need to adhere to?</td>
</tr>
<tr>
<td>Do you want to “brand” your community through its look and feel?</td>
</tr>
<tr>
<td>If you are an open community, how will you deal with spam?</td>
</tr>
</tbody>
</table>

### Financial strategy

**Investment factors:** what are your financial constraints and plans?
- What is your budget?
- What are your short and long term goals and investment strategies?
- What are the must-haves for today, and what are longer-term needs that could be deferred?

### Installation factors: are you planning to acquire software?
- Who will install and configure you software?
- Where will the software be hosted?
- What is your plan for ongoing technical support?

### 2.2 select an acquisition strategy

<table>
<thead>
<tr>
<th>Do you want to get up and running quickly but aren’t ready to invest in technology yet?</th>
<th>Strategy 1: use what you have</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are members already using in their daily lives (email and telephone)?</td>
<td></td>
</tr>
<tr>
<td>What might hosting organizations let you use?</td>
<td></td>
</tr>
<tr>
<td>Could you repurpose an existing tool or make small adjustments for your community’s use?</td>
<td></td>
</tr>
<tr>
<td>Do skill gaps in the community prevent an existing tool from serving the community fully?</td>
<td></td>
</tr>
<tr>
<td>Do you need something that works across organizations and require no money?</td>
<td>Strategy 2: use free platform</td>
</tr>
<tr>
<td>Are these tools widely accessible enough?</td>
<td></td>
</tr>
<tr>
<td>Can you live with some advertisements?</td>
<td></td>
</tr>
<tr>
<td>How important is control of your community data?</td>
<td></td>
</tr>
<tr>
<td>How much work is it to use/support these tools?</td>
<td></td>
</tr>
</tbody>
</table>

| Does your community live in an organization with an existing IT infrastructure? | Strategy 3: build on an enterprise platform |
| What parts of the infrastructure could you reconfigure to suit your community? | |
| Have you built relationships with people in the IT department and sought their support? | |
| Are other communities in your organization using the enterprise platform? | |

| Do you want one platform with a variety of tools and features all bundled together? Is that convenience critical to your community? | Strategy 4: deploy a community platform |
| Is the platform as good as it looks? | |
| Is the functionality what you need? | |
| Do the platform and the vendor have a history of focus on your critical orientations? | |

| ✷ Do you have very unique that are not met by tools in the marketplace? | Strategy 5: build your own |
| ✷ Do you have deep technological knowledge in your community or access to financial and technical resources? | |
| Are you sure you are ready for this? Really sure? | |
| What are your long-term plans to support a custom-designed platform? | |

| ✷ Does your community wish to benefit and contribute to a larger network of people using the same software? | Strategy 6: use open-source software |
| ✷ Do you have a philosophical preference for free or open-source software? | |
| Do you have the technical skills required to customize current open-source offering? | |
| Have you allocated some of your time to being involved with the open-source community? | |
| Are you interested in new tools that quickly allow you to combine new functionality into basic tools like blogs and web pages? | Strategy 7: patch pieces together |
| Do you like quick, low-cost experiments? | |
| How will you test the functioning and usefulness of a new tool that you patch into the existing mix? | |
| Who will do the addition of pieces and how will that be negotiated? | |
| How do you balance potential benefits/cost to the community of dealing with new things or things that just “sort of work”? | |

### 2.3 Seek a Solution

**Tool Issues**

The polarities: in the new configuration, do you want your choice of tools to affect the polarities of your community in ways that differ from the current configuration? Which way?

- Synchronous
- Asynchronous
- Participation
- Reification
- Group
- Individual

Listing the tools: using the comparison between the current inventory and the orientations tables, sketch out what tools you need to include in the new configuration.

**Platform Issues**

**Adequacy:**

- Is there one platform that has most of the tools that your community needs?
- Using the features questions below, are the version of these tools adequate?
- Which critical tools are not covered?
- Which are extra (there, but currently not needed)?

**Integration:**

- How simple (or intuitive) is the platform to use?
- How well does it combine the tools that your community needs?
- Are key features such as menus, navigation cues, new material indicators, graphic elements, and controls deployed consistently and appropriately across the
| **platform?** |  |
| **Can tools be turned on or off at will?** |  |
| **Performance:** |  |
| How many concurrent members can it handle? How much activity? |  |
| Does it support multiple communities and are new ones easy to launch? |  |
| **Access:** |  |
| Can sub-communities be formed easily? |  |
| Can individual access rights be assigned flexibly to various spaces and items? |  |
| **Pricing:** |  |
| Is the pricing structure per: |  |
| ✦ Free |  |
| ✦ Community |  |
| ✦ Seat |  |
| ✦ Activity |  |
| ✦ Platform |  |
| ✦ Other |  |
| What are the implications for your community? |  |
| What is included in the price: |  |
| ✦ Hosting |  |
| ✦ Support |  |
| ✦ Upgrades |  |
| ✦ Other |  |
| What other costs are not including? |  |
| How does the overall cost compare with alternative platform? |  |
| **Vendor relationship:** |  |
| What is the reputation of the vendor? |  |
| What ongoing relationship do they offer? |  |
| Are they willing to develop the platform and work with you as your needs and technology evolve? |  |
| Is the data in a standard format that can easily be moved to another platform/vendor? |  |

**Features issues**

For any given feature:

| Does the feature support the specific ways in which a community conducts its activities? |  |
| Does it add or reduce complexity? Can it be turned on or off to make the technology more useful or easy to use? |  |
| Does a feature inherently appeal to beginners or to more experienced users? What members’ skill levels make a feature valuable? |  |
| Is the absence of a feature problematic for the |  |
usefulness of a tool or a platform?
Will members expect a feature or recognize it because of previous experience?

<table>
<thead>
<tr>
<th>Configuration issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Completeness:</strong></td>
</tr>
<tr>
<td>Are some important functions missing in the overall configuration?</td>
</tr>
<tr>
<td>Do some tools duplicate each other, and if so, could subgroups evolve from using different, tools for the same purpose?</td>
</tr>
<tr>
<td><strong>Integration:</strong></td>
</tr>
<tr>
<td>What level of integration is required between existing tools and platforms in the configuration?</td>
</tr>
<tr>
<td>Where are there integration gaps and how are you going to address them?</td>
</tr>
<tr>
<td>How compatible is the configuration with other platforms or tools that members use?</td>
</tr>
<tr>
<td>Do features that support integration across tools or platforms have the quality and consistency that you need? Do security features, for example, conflict with tools such as RSS feeds?</td>
</tr>
<tr>
<td>Are there features that help make content portable across tools (e.g., content from conversation board to wiki)?</td>
</tr>
<tr>
<td>Can members import content from other tools into the configuration?</td>
</tr>
<tr>
<td><strong>Security:</strong></td>
</tr>
<tr>
<td>Is the overall configuration secure enough for your purpose?</td>
</tr>
<tr>
<td>Are some security features likely to get in the way of the community’s togetherness?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.4 Plan for change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timing:</strong> time your transition/implementation to fit your community schedule</td>
</tr>
<tr>
<td>Are you ready for the attention you will get when technology issues move to the foreground during a major transition?</td>
</tr>
<tr>
<td>Are there times when “messing with technology” will...</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>What external events or schedules do you need to take into consideration (budget cycles, holidays, availability</td>
</tr>
</tbody>
</table>
of support, for example)?

**Implementation: plan for the change process**

- What are your plans for the practical implementation of the new technology?
- Who are your main partners for the implementation process?
- Do you know enough about your community to know what to expect?
- If you have to make a lot of assumptions, how are you going to leave room to adjust as you move forward?

**Learning: plan for a learning curve**

- Will new tools affect their work and community focus in a significant way?
- How much beta testing can you do or do you want to do? Can you test software from a vendor or in other communities using it?
- How will you orient, train, and share good practices with your community?

**Integration across tools: help the community develop new practices**

- Are there integration issues in the new configuration?
- How do you plan to help the community develop new practices to achieve a productive level of integration?

---

**Step 3: stewarding technology in use**

**3.1 Everyday stewardship**

**New members: support new members in their use of the community’s technology**

- How many new members do you have per month?
- Does the community have a welcoming activity for them?
- How do you plan to onboard them on the community’s technologies?
- What is the minimum they need to know to be able to participate meaningfully?
- What resources do you have for this? Who can help you?

**Practice: identify and spread good technology practices**

- How are you going to identify the new practices that the community is developing to use technology, especially ones that might be going unnoticed?
- How are you going to share and spread them unobtrusively?

**Experimentation: support community experimentation**
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is your community changing? Is it curious about new tools?</td>
<td></td>
</tr>
<tr>
<td>How will you support technology experimentation without disrupting the whole community?</td>
<td></td>
</tr>
<tr>
<td><strong>Boundaries and access</strong>: attend to community boundaries created by technology</td>
<td></td>
</tr>
<tr>
<td>How will manage access as the community and people’s roles evolve?</td>
<td></td>
</tr>
<tr>
<td>What unexpected boundaries does technology create?</td>
<td></td>
</tr>
<tr>
<td>Do technology preferences or skill create boundaries?</td>
<td></td>
</tr>
<tr>
<td><strong>Technology integrity</strong>: assure continuity across technology disruptions</td>
<td></td>
</tr>
<tr>
<td>Who has administrative permissions so they can help you “keep the lights on” over time?</td>
<td></td>
</tr>
<tr>
<td>How do you make sure vendors get paid on time and domain registrations don’t lapse?</td>
<td></td>
</tr>
<tr>
<td>What are your practices for system backup?</td>
<td></td>
</tr>
<tr>
<td><strong>3.2 Community end-of-life closure</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Shutdown</strong>: attend to disposition of the community’s technology resources</td>
<td></td>
</tr>
<tr>
<td>Is the community ending or merely going dormant?</td>
<td></td>
</tr>
<tr>
<td>Who can decide?</td>
<td></td>
</tr>
<tr>
<td>When should online spaces be closed down?</td>
<td></td>
</tr>
<tr>
<td>Who will cancel contracts with technology services such as ASPs?</td>
<td></td>
</tr>
<tr>
<td>What to do about member profiles and account information?</td>
<td></td>
</tr>
<tr>
<td><strong>Community history</strong>: pay particular attention to the preservation of community artifacts</td>
<td></td>
</tr>
<tr>
<td>Does the community want to archive and preserve parts of its history?</td>
<td></td>
</tr>
<tr>
<td>How will you identify which artifacts should be preserved?</td>
<td></td>
</tr>
<tr>
<td>Do privacy agreements or concerns dictate that you erase sensitive materials?</td>
<td></td>
</tr>
<tr>
<td>Where and how will the material be archived? Should members receive a copy of the archive?</td>
<td></td>
</tr>
<tr>
<td>Who will have access to the archive?</td>
<td></td>
</tr>
<tr>
<td>Who will take care of it? Could other communities have an interest in being the caretakers of a legacy left by a defunct community?</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix C: Interview questions checklist

<table>
<thead>
<tr>
<th>Name:</th>
<th>Gender:</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The role of interviewee</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>What is your position in the U-Care community? So what is the main responsibility? Please list all the activities you have that support your responsibility.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>How much time will you spend on U-Care project per week (hours)?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>What are the other positions in the U-Care community? How geographically spread out is it?</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions between roles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>How do you usually interact with them (for example: meetings, open-ended conversation)? What are the existing communicative tools and sharing tools?</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>How to learn and share knowledge (expertise) from each other? What is the access to the expertise?</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>What is the barrier in the process of knowledge learning and sharing?</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions with outside world</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>How does U-Care community need to interact with other communities?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Do you need common tools for sharing and learning with them?</td>
<td></td>
</tr>
<tr>
<td><strong>Resources &amp; constraints</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>If you are psychologists or health staff, how could this kind of psychological treatment or mental care is offered normally to the patients without the U-Care platform?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>What do you think are the resources in the U-Care community from organizational view and technological view?</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>What do you think are the constraints in the U-Care community from organizational view and technological view?</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Is there any standard that must adhere to (firewalls and security standards? Databases or data standards?)?</td>
<td></td>
</tr>
<tr>
<td><strong>Activities and tools in U-Care platform</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>What do you think is the main goal of U-Care project?</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Please briefly list all the existing functions of U-Care project.</td>
<td></td>
</tr>
<tr>
<td><strong>Acceptance for change</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>What do you think is the stage of community development now? Is restless and ready for change, or settled and resistant to change?</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>How experienced and skillful are you with technologies? Are you willing to embrace new tools or new technologies that support your collective work?</td>
<td></td>
</tr>
<tr>
<td><strong>Acceptance for technology boundaries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>How many technological boundaries are you willing to cross-for example, learn to use new tools or use other open-source software?</td>
<td></td>
</tr>
<tr>
<td><strong>Current needs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Regarding the knowledge learning and sharing mechanism in the U-Care community, what are the existing problems (communicative problems? Knowledge sharing problems?) What causes these problems?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regarding the knowledge learning and sharing mechanism in the U-Care community, what functions do you want to add or what suggestion do you have?</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>More comments:</em></td>
<td></td>
</tr>
</tbody>
</table>