APPENDIX B - WELFARE TECHNOLOGY

"Handle with care"

Conceptualising the complexity of welfare technology

NordRoad
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Annette Pedersen – Denmark, Aud Obstfelder – Norway, Lotta Kauhanen – Finland, Marlene Sandlund – Sweden, Ole Faaborg - Denmark
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NordRoad activities

One aim of the NordRoad project was to develop a model for evaluation of welfare technology from a Nordic user- and relational perspective. The model was to support the analysis of the scenarios produced in the project and facilitate drafting of the roadmap. However, in our discussions on the model several questions were raised, and the development of a new model appeared to be more difficult than first thought. We experienced the complexity of welfare technology. Before we could develop the model further we had to establish a common ground of knowledge and understanding of the phenomenon.

This report is a description of our initial thoughts on the model and of some aspects of the common ground of knowledge and understanding of welfare technology. We will also suggest areas of future research and education.

The structure of the report will be as follows: first we describe the questions raised in our discussions on the model. Then we present some aspects of current Nordic welfare policy and the functions of welfare technology within this. Thereafter we present some dimensions we believe would be of importance in a model for evaluating welfare technology from a Nordic user- and relational perspective. In the last chapter we describe areas of future research.

Three questions on welfare technology

What is the difference between welfare technology, telemedicine, telecare and e-health? Is welfare technology a new phenomenon or a particular version of e-health?

This was the first question we encountered in our discussions on the model. We found no principal differences in the political justification of these technologies. Governments in the Nordic countries are facing rising demands and pressures for cost containment (Nordic Centre for Welfare and Social Issues 2010). Low cost and routine ICTs promise more efficient use of resources and improved quality of services (Halford et al. 2010). These technologies may be used to develop ‘telemedicine’ services offering remote access to specialist services (May & Ellis 2001); information systems enabling faster communication, independent of location, and large, flexible databases (Hartswood et al. 2003); ‘telecare’ where monitoring devices allow remote supervision of vulnerable people in their own ‘smart’ homes (Barlow et al. 2007) and/or welfare technologies that supports individuals to master their own lives and health better, based on their own terms (Nordic Centre for Welfare and Social Issues 2010). In short, the term welfare technology is relatively new, but it joins the ranks of other terms with slightly different orientations such as telemedicine, telecare and e-health. They all describe technological solutions that individuals can use in order to increase self-management, social participation and quality of life. A “next of kind” perspective and a service dimension are included in the descriptions (The Norwegian Directory of Health 2012).

The second question we asked was what the model of evaluation should be used for. Should it be used to guide implementation of new welfare technologies or to measure the effects of those already implemented?

Experiences from telemedicine, telecare and e-health suggest that both implementation and measurement have proven difficult. The technologies have considerable policy appeal, but delivering the promise has not been easy (Aanestad and Olaussen 2010; Pesola 2013) and the history of healthcare information systems reveals far more failures than successes (Greenhalgh et al. 2009). Various explanations are put forward, but it is widely accepted that particular outcomes depend on the interplay between technologies and users and are made in the everyday conduct of healthcare work and organization (Halford et al. 2010). Introducing ICT initiatives into health care may “disrupt” established organizational arrangements, professional work and patterns of work organization which may create resistances toward the technologies in the field. However, lessons are learned from experience. In policy documents on welfare technology, it is emphasized that organizational issues need to be taken into considerations in implementation processes: “Implementation of welfare technology assumes a corresponding focus on service innovation” (The Norwegian Directory of Health 2012; 11). In the research literature there has been a growing interest for assessment of ICT in healthcare (Petter et al. 2008). Models have been developed for understanding the workability and integration of complex interventions in healthcare such as The Normalization Process Theory.
(May and Finch, 2009) and for more narrow evaluations of the clinical or economic effectiveness of the new services (Tunis & Turkelson 2012).

The third question discussed was who are the users of welfare technology?

Welfare technology may ensure that individuals in need of healthcare services can stay at home longer and thus postpone the time they should move to a nursing home for short or long term. The technologies may be used to improve quality of existing services, contribute to a better working environment or the creation for new ways of cooperation between healthcare sector, communities, families, voluntary, non-profit companies, academia and industry (The Norwegian Directory of Health 2012; 11). This makes the term “user” problematic. A user of welfare technology may be the client, clinician, a family member or a healthcare provider.

That the “user” should not only be associated with the end users - those who use the software to perform work tasks and other everyday practices – is recognized within current research on advanced information systems too. Information systems have matured and attention is directed toward continuous maintenance processes of the systems (Johannessen 2012); including, for instance, end users’ role in shaping patterns of use. This research makes two key points. First, while earlier research has suggested that the end users of the systems should be allowed to modify them to own local practices (see for example Berg 2001), seeing this as a precondition for successful integration of the systems, current research suggests that this may disrupt collaborative work practices, information flows across the organisations, planned organisational changes, and data security policies (Johannessen 2012). A consequence of this is that organisations that are dependent on their systems must introduce stricter controls with end user use of the system. It is this control aspect that makes managers, system tailors and other involved in the everyday maintenance of the systems to key uses of the systems.

The Nordic welfare models and the multiple functions of welfare technology

The Nordic countries are characterized by their small populations and a high degree of cultural homogeneity in terms of language and religion. The countries are recognized by their social and economic models that include support for comprehensive social security systems, institutionalized social rights, solidarity, and a competitive economy. The goals are to promote individual autonomy, social mobility and equality, flexible and adaptable markets through high level of taxation and labour force participation, gender equality, extensive benefit levels, and dialogue between labour market parties. The governments play a dominant role in formation of these social and economic models, and in the development of an extensive public sector for the implementation of the social and economic policies (Kautto et al 2001; Hole et al 2006).

However, the global economy, European integration, demographic change and international migration, change in class structure, ideological and political change put pressure on core values of the Nordic countries and welfare societies. In order to compete in the global economy and maintain social cohesion, the models have to be refined (Hole et al 2006; Alestalo et al 2010). A strategic action to meet the current economic, social and cultural conditions surrounding the Nordic countries is welfare technology (Nordic Centre of welfare and Social issues 2010). The expectation is that if the technology is well integrated into work practices and/or the everyday life of clients, the quality of public services will maintain or increase while the public expenditure is reduced. With support from welfare technology people will be able to manage on their own, human resources will be used more efficiently and the physical workload for health care professionals will be reduced. Despite the large demographic changes, care for elderly people will be guaranteed. In the near future the number of senior citizens will increase at the same time as the working generation decreases. Last, but not least, welfare technology may also open the way for major industrial development.

Nordic model for evaluating welfare technology

Welfare technology is one solution to current challenges which governments face in delivering public services. The challenges and the solutions are described in general terms. In order to measure its effects, make informed decisions on investment in welfare technology products, and motivate clients to install them in their houses, the
terms have to be operationalized. The model for evaluating welfare technology from a Nordic user and relational perspective is one way of doing this. The model represents a practical approach to evaluate welfare technology that is used in the Nordic region or when consider if it should be implemented.

The Nordic welfare model is characterised by universalism, emphasising a high degree of labour force participation, gender equality, egalitarian and extensive benefit levels and wealth redistribution, and liberal use of expansionary fiscal policy. The welfare model aims to enhance individual autonomy, promoting social mobility, and ensuring the universal provision of human rights, as well as for stabilising the economy (Esping-Andersen 1990). These characteristics mirror general cultural specifics of the Nordic culture (Hofstede 2001; 2010). Nordic people are generally individualistic combined with predominantly female value sets, thus generating a caring and welfare-oriented society. Power distance is relatively low in tune with the very flat structures in companies and organisations, and uncertainty avoidance is similarly at a low/medium level, meaning that populations like variation and do not try to control the future and have less anxiety.

To ensure that the basic values of the Nordic welfare state and culture is represented in the new services made possible by welfare technology, the evaluation model should be sensitive to these values. The model should disclose how elements of Nordic culture and welfare models interact with the welfare technologies in use or available on the marked. In our initial discussions we found four dimensions that connect with these values and that might be key measures in our model: Human Value Added, Cost Efficiency, Connectivity and Ease of Use.

**Human value added**

With human value added we mean the product's ability to increase user's life satisfaction. It could for example be how the product influences personal pride of the user and what effect the product has on individuality and independence. Human value added can also concern the influence of relationships and other aspects of more physical wellbeing.
Cost efficiency
Cost efficiency refers to the product’s ability to increase profitability over time and to reduce cost per user and/or service event. The product could for example affect labour saving procedures, institutional investment, energy consumption, maintenance costs or have consequences for contact and care hours.

Ease of Use
Ease of use is the product's level of usability to different end users. It could for example be how easy it is to handle for residents at a care centre as well as for care staff and relatives. Ease of use can also encompass others decision makers as for example local system tailors and how easy it is to replace the equipment when needed.

Connectivity
Connectivity refers to the products capability to produce an interactive and meaningful connection between the user and care personnel or other significant people. For example improvement of resident/staff communication, resident/family communication, resident/friends communication, resident/authority communication, or even resident/media communication.

Areas of future research

Conducting a literature review
Healthcare institutions are under pressure to optimize ICT investments for improving patient care (Arviansyah et al 2011) and the interest for literature on ICT evaluations in healthcare is growing. Since 2000 has there been a gradual progression of ICT evaluation methods from the conventional standard of random controlled trial (RCT) to mixed-methods and triangulation. The theoretical and methodological constructs utilized for ICT evaluations are diverse and operationalization techniques for measurement of effects have expanded. In consequence, there is a challenge to design robust and comprehensive evaluation designs that reveal diverse insight of welfare technology. The inclusion of multidisciplinary teams of evaluators in evaluation designs and processes are suggested (Arviansyah et al 2011).

Parallel to the development of a new model of evaluating welfare technology from a Nordic user and relational perspective, our suggestions for further research is to design and perform a literature review of existing models of evaluating ICT in healthcare. This will give an overview of the field and provide more elements to the design of a Nordic model, which will then be positioned within the theoretical and methodological discussions within the research field. A new model adjusted to characteristics of Nordic welfare state and culture will enable us to produce knowledge about the impact of welfare technology from a Nordic perspective and it will be a contribution to the current research.

Developing and testing the Nordic Model
Insights from the literature review will guide the work on further development and testing of a model for evaluating welfare technology from a Nordic user- and relational perspective.

Designing and conducting studies of welfare technologies in use
There is need for empirical studies that will provide new knowledge of what happen when the technologies are being integrated into work practices and everyday lives of clients. A literature study makes up an important building block for a common knowledge base on welfare technology. However, in order to develop our knowledge base further empirical studies of welfare technologies in use should be designed and performed. The theoretical and methodological approach should be interdisciplinary and the users’ perspective should be included in all stages of the study.
Suitable fields for the empirical studies of welfare technology are Living Labs. A Living Lab is a concept to support the processes of user-driven design of information systems which is a relatively strong tradition within the Nordic countries (Aanestad and Olaussen 2010). Living Lab activities are situated in real-world contexts and they support the innovation process for all involved stakeholders, from manufacturers to end-users, with the potential users in the centre in their real world context (Ståhlbröst and Holst, 2012). It is an answer to many contemporary trends in the society such as, for instance users changed roles from passive consumers to active participants, a shortened time to market for innovators, and a globalized market through internet and ICT’s entrance into peoples everyday activities.

A concrete example of a living lab that can be used as a field in the empirical studies is Lab X at University College Northjylland (UCN, Lab X). Lab X is a comprehensive living lab project that includes several enterprises and healthcare institutions in the municipality. The aims of Lab X are to support the vendors market position, enhance quality of life for those who use the technologies, more efficient use of public money, and accumulation of experience and knowledge about welfare technology. The institutions function as “real-time” test beds for welfare technologies. Developers, vendors, healthcare professionals and clients cooperate in the development of new technologies and adjustment of existing products for the needs of clients, delivery and organisation of the services.

Curriculum and teaching modules
Welfare technology is a complex phenomenon. The technology should not be seen as “things” that will have certain effects when they are integrated into practice, but as heterogeneous relations (Aanestad and Olaussen 2010; Oudshoorn 2011). Welfare technology products are used as elements in dynamic and flexible healthcare services, but alone they cannot contribute to better and more efficient healthcare. Furthermore, the electronic products do “something” in the situations they are included in; they shape what people can do and know about clinical work and clients, social relations, ethical and sensual impressions (Hasse 2012a).

Politicians, administrators and leaders, clinicians, and also end users tend to consider welfare technologies as problem solvers that will make health care more efficient and affordable (Oudshoorn 2011). Healthcare professionals are likely to be either passive users of technology or active opponents (Hasse 2012a). Many are doubtful to their own ability to utilize the technology in daily work and to understand how it affects their own profession (Hasse 2012b). By taking an instrumental view of welfare technology - perceiving it as a tool that has positive or negative effects in the clinic or the everyday life of clients - the complexity is overseen. However, as healthcare professionals are - and will be - involved in design, investment, implementation, and use of the welfare technologies in clinical practice, they must develop a more broad and critical perspective on technology, learn how to operate products, apply their capacities in the creation of new healthcare services, and make them function smooth in everyday practices of healthcare professionals and their clients. Including knowledge about how innovation processes should be initiated and managed, how public investments are regulated, how issues related to scalability, standardization (open and proprietary) and interoperability of technical products should be handled.

The organizations involved in NordRoad project have the ambition to collaborate in developing curriculum and teaching modules in welfare technologies for students at Bachelor, Master’s and PhD program in the Nordic countries. Assessment and mapping of what courses already exist involving welfare technology in our universities will also be done and shared through benchmarking. The review study and the development of the model and the design of empirical studies of welfare technology “practices” will give an overview of the research literature, successes and failures of welfare technologies in the Nordic countries. This overview and knowledge will possibly form the basis for the curriculum and teaching modules.

Welfare technology –“handle with care”
Design, implementation and use of welfare technology are comprehensive tasks. Components of the complex processes involving welfare technology are illustrated by the figure:

Annette Pedersen, Aud Obstfelder, Lotta Kauhanen, Marlene Sandlund, Ole Faaborg
The term welfare technology joins the ranks of several others that have been promoted by governments in the Nordic countries to solve challenges related to efficiency and quality in delivering public services. Much has been written about earlier initiatives, and a Nordic Model of evaluation should be positioned within this. In order to get an overview of the existing research literature we suggest a literature review to be conducted of existing models of ICT evaluations. We also suggest empirical studies of welfare technologies in use to be carried out. The literature review and the empirical studies will be building blocks in a common knowledge base in welfare technology. Further development of a model must run parallel with development of a knowledge base that also will be valuable for developing curriculum and teaching modules in welfare technologies for students at Bachelor, Master’s and PhD programs in the Nordic countries.

The Nordic Centre for Welfare and Social Issues recommends collaboration between the Nordic countries on welfare technology (The Nordic Centre for Welfare and social issues 2010; 4). According to the Centre the Nordic countries are at different levels as regards both attitudes to technology and the will to provide funding to test it out. The Centre sees potential for learning from each other and setting up stronger Nordic cooperation in this area than currently exists. Knowledge and competence are needed to exploit the technology that already exists. Knowledge and experience sharing are areas that would be useful and suitable for Nordic cooperation. Our described suggestions for future collaboration and research fit well into the Centre recommendations in setting up networks in these areas. Our suggestions for future collaboration in research and education will possibly support positive development and use of welfare technology in the Nordic region. Discussions of the role of the NordRoad project in acting towards the above suggestions and how the future work should be organized and financed are ongoing.
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