

Identifying Motives for Implementing eHealth by using Activity Theory

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Abstract: eHealth interventions are utilized as a solution to address the current demographic challenges in society, as the number of old people increases. Thus, working life, work practice, and professional requirements needed for providing healthcare services will be transformed. The aim of this paper is to explore contradictive motives regarding the professionals' work practice when introducing innovative eHealth technologies in Scandinavian healthcare services at a municipal level. The study is based on two qualitative group interviews where nurses, assistant nurses, occupational and physiotherapists, as well as project managers participated. Two persons from an IT department were also interviewed. The interviews were analyzed by thematic analysis. The activity theory is used to explore the individuals' different contradictive motives in this work practice. The work practice consists of a collaborative activity, where expansive learning is important in this transformation of work to obtain a sustainable society. The motives identified in this study are to 1) improve quality of life for the patients, 2) create attractive and interesting work for the employees, 3) save money for the municipality, 4) learn about new technology, and 5) use the municipality's resources effectively.

Keywords: eHealth; Collaboration; Implementation; Contradictions; Sustainable Society; Activity Theory

1. Introduction

Society is facing vast challenges associated with the imbalance between people in need of healthcare and resources available to meet those needs [1–3]. Representatives from the governments as well as from the public and private health sectors have proposed that eHealth interventions are a possible solution to the current challenges [4–6]. eHealth is here understood as applications such as alarms and remote monitoring of care needs using information and communication technologies [7].

The implementation of eHealth technology is affected by contextual factors such as organizational issues, technological infrastructure and human actions [8–10]. Working life, work practice, and the professional requirements needed for providing healthcare services will be transformed due to an increasing demand for healthcare, and new ways of providing healthcare services based on eHealth will be required [11]. Thus, eHealth technologies create new ways of mediating human activities and engaging with organizations [12]. Even if the implementation of technology is on the agenda, the use of eHealth is not very well developed and the potential is far from exploited. Experiences from the use of eHealth so far show low success rates [13], and the interaction between technology and actors poses a major challenge [12].

Barakat et al. [14] point at the absence of knowledge and skills among healthcare professionals regarding the use of the technology as a barrier to adopting eHealth technology. Further research is needed to examine the experiences of healthcare professionals in order to shed light on the characteristics of these barriers [15]. In knowledge management (KM) research, there is a need for more performative and interventionist studies related to regional-local public organizations and their

impact on society [16]. Further studies should try to increase the understanding of the practice inside public sector organizations, as key public services, where knowledge is a key factor for taking care of citizens. There is also limited knowledge about how knowledge is translated into practice in healthcare organizations [17].

Many studies use the Technology Acceptance Model (TAM) to analyze the implementation of information technology (IT) and the acceptance of technology among personnel, e.g., [18–23]. In the study of Shubber et al. [22], the TAM perspective provides a point of departure for further implementation studies within eHealth. In order to go into more detail about the challenges associated with implementing eHealth technologies, the activity theory is used as a systematic approach.

The existing challenges associated with implementing eHealth technology include both technology and actors in organizations. It is obviously difficult to conduct innovative development in organizations, using technology to force these changes. New insights that could better guide the practical field of work are needed. Activity theory has been used in organization studies and in the field of information systems (IS), among other disciplines [12,24]. One benefit of activity theory is that it provides a conceptual framework where the social context and use of technology are one and the same, as it accounts for the interaction between technology and actors [12]. Activity theory provides a lens for understanding contradictory motives. It also provides an understanding of how actors in organizations with different perspectives can work together and develop new knowledge through interaction.

The aim of this paper is to explore contradictory motives regarding the professionals' work practice when introducing innovative eHealth technologies in Scandinavian healthcare services at a municipal level. Thus, the contribution of this paper is additional knowledge of contextual factors in implementing eHealth in public organizations, and of contradictions and congruencies in the professionals' work practice in the implementation of eHealth technologies.

2. Literature Review

2.1. Activity System

Activity theory has been developed since the 1920s, from the Russian psychologist Vygotsky. Other Russian psychologists were also involved in the development of activity theory, e.g., Luria Ilienkov and Leontiev [25]. The first generation of activity theory had its key component focused on the notion of mediated action. This means that the interaction between the human agent, the subject, and the world, the object, is mediated by tools and signs [12]. Today, activity theory has been expanded to its second and third generations [25,26]. The second generation is largely based on Leontiev's work. Leontiev proposed the notion of collective activity, rather than individual focus. Leontiev also made the distinction between activity, action, and operation [12]. Engeström [26] expanded the activity theory further and illustrated it using a triangular representation, with the introduction of community, rules and norms and division of labor as key elements of an activity system [12]. In the third generation of activity theory, Engeström [24] introduced the representation of two interacting activity systems connected by a shared object. The third generation of activity theory provides conceptual tools for understanding social action, change, and networks of interacting activity systems. Thus, activity theory brings together the tools, technology, and the organizational context into the activity, as the unit of analysis [12].

The most important element of the activity is the object, which the subject acts upon to achieve the desired outcome, the true carrier of the motive of the activity [27]. The object is the problem, situation or focus of the activity, and anchors the activity [12,28,29]. "The object determines the horizon of possible actions" [28, p. 455] Spinuzzi [28] also describes the object as the problem space for the activity. A subject is a person or collective, an agent that acts upon the object. Subjects transform the object, and in turn, the object influences the subject, as an interaction [30]. A subject, a person or a collective, is motivated to work toward an object [12]. An object can, for example, be a work situation where an IS solution will be implemented, and where the potential users are the

subject. An activity can be multifaceted and poly-motivated, with subjects acting on the object to satisfy multiple and sometimes conflicting motives [28,31,32].

Explicit and implicit rules and norms govern an activity and define which behaviors are appropriate. A community consists of individuals or groups with the very same object that they interact with [25]. In organizations, there are roles and hierarchies, structured through a division of labor that influence the activity [12,25]. An activity is constantly developing depending on the different parts of the activity system, i.e., the unit of analysis.

2.2. Collaborative Activity and Expansive Learning

As persons or a collective act upon an object in an activity system, there can be different motives, based on different desires and needs, interests and emotions of different persons in the activity system. Different actions are conducted in collaboration. As Nardi [32] states, the binding of one-object to one-motive is not problematic. However, when analyzing collaborative work in a collective activity system, there are many actors, many voices, and many interests involved. Moreover, actors in an activity system may also have radically different motives related to the same object [31,32]. Even if actors have completely different motives, they are not isolated from one another. The motives are related to each other through conflicts, power, resistance and compliance, thus difficult to align in relational processes. An individual may also have multiple motives in the activity system.

Learning and knowledge development is needed when an organization is implementing radically new types of tools, such as eHealth technology. This type of change can be characterized by a process that transforms the culture in the organization, as it also transforms explicit and implicit rules, roles and hierarchies, together with changes in the division of labor. These characteristics of learning in a transforming process of an activity can be put in the context of expansive learning [27]. Engeström and Sannino [27] mention double stimulation as a fundamental principle for formative interventions that lead to actions being reframed. This means that the subject has a demanding task (first stimulus) together with an external artifact (second stimulus) that the subject could fill with meaning, which could be mediated in his or her actions, thereby reframing the task. As Engeström and Sannino [27] claim: “in expansive learning, learners learn something that is not yet there”. Expansive learning refers to people in the activity system who change their collective activity in collaboration and implement these changes in their work practice. Thus, a new work practice emerges, a new type of agency. The activity system needs to redefine itself. Traditional modes of learning are not enough, and nobody knows exactly how and what to learn. This is also about the subject’s capacity to change his or her behavior [27].

Individuals have different capacities to change their behavior, and this is an important challenge in expansive learning, together with acting as a collective [27]. This can be associated with the concept of “double bind”, as “a social, societally essential dilemma which cannot be resolved through separate individual actions alone” [25, p. 165]. Collective actions are therefore needed to push a new form of activity into emergence. Moreover, according to Bakhtin, all the conflicting and complementary voices of the individuals in the activity system should be involved and utilized [27].

2.3. Contradictions and Congruencies

Organizations typically experience difficulties and conflicts associated with the development, use, and change of technology [33]. The introduction of eHealth technology in organizations is no exception. The advantage of activity theory is that it emphasizes contradictions that emerge within an activity [26]. Subjects conduct different actions with different motives with regard to the activity. Innovative actions can emerge and be recognized and adopted by others, changing the activity into new forms. Individuals in the collective can become aware of contradictions, which may cause the activity to start to develop [34].

Contradictions are tensions that evolve over time, and they can be detected and dealt with in the activity system [27]. Contradictions are often significant in organizational change [35]. By incorporating a logic of opposition, contradictions can be identified [29]. Contradictions reveal inefficiencies and opportunities for change as they shape an activity, providing an approach to shape

change and challenges. Contradictions can be described as a unity of opposites, opposite forces or tendencies within a moving activity system. Contradictions can manifest themselves as paradoxes, tensions, inconsistencies, disturbances, conflicts, dilemmas, critical conflicts, and double binds [35]. Contradictions are also a driving force for expansive learning [27]. Engeström and Sannino [35] claim that contradiction only can be identified through their manifestations, as they cannot be observed directly. Four manifestations are described in their framework, to analyze sequences of change efforts in organizations.

Activity theory also provides tools to identify congruencies, which shape success, normalization, and agreement in the activity system. Congruencies can be identified by an area where things work well, or where new technology has been efficient. Congruencies can also be used to identify opportunities for future development and change in an activity system [29].

3. Research Setting: Implementation of eHealth Technology

This paper is based on an ongoing longitudinal study conducted in healthcare services in municipalities located on both sides of the southern border between Norway and Sweden. This geographical area is characterized by rural municipalities with a high proportion of elderly citizens. The Scandinavian municipalities are responsible for primary healthcare services mainly funded by taxation. Local authorities and professionals currently experience an increasing workload and complexity of patients in-home nursing care. This is due to demographical changes and political pressure to transfer the patient stream from specialist health services towards community healthcare services according to the principle of lowest effective care level. As a result, many, and more advanced, healthcare services will be provided in the patients' homes. Facilitating changes in the activity system are challenging for politicians as well as officials. The exchange values, quality of healthcare, and quality of life for elderly and disabled people are on the agenda, next to the total cost of municipal healthcare.

There is a lack of research that focuses on municipal healthcare and home care. One of the few studies is Engeström and Sannino [35] who studied municipal home care for the elderly from a change laboratory intervention perspective. Another study is Gherardi and Rodeschini [36] who analyzed the work of long-term care of elderly and claim that "caring is an everyday accomplishment of a community of practitioners that develop a common orientation on the 'way of doing things together'". Care cannot be understood as a harmonious or shared set of values and behaviors, but should rather be seen as an activity where a plurality of meanings and logic meet and clash. Nilsen et al. [3] explored resistance to the implementation of welfare technologies in municipal healthcare services. Nielsen et al. [37] shed new light on how IT ideas within mobile Danish home care travel across a field and within individual organizations, how the ideas transform and become legitimate over time, and how they translate into different local arrangements. Mobile IT was first seen as a fashionable recipe for improvements but subsequently became a controversial subject. Dupret and Friborg [38] suggest from an Actor-Network Theory (ANT) perspective that the critical practice among healthcare professionals offers crucial insights into healthcare and creates possibilities for rearrangements through bottom-up processes and the systematic involvement of all stakeholders. Thus, healthcare professionals could be fully acknowledged as potential co-creators, rather than mere end-users, of technologies. The professionals working with healthcare technology must not be seen merely as implementers of pre-defined technologies, as it shapes their explicit actions and abilities as professionals. Rather, the professionals should be perceived as actively engaged in subjective processes of framing and using the technology in their specific context, in their interactions with each other and with the clients and their relatives [39]. Kujala et al. [40] suggest that eHealth competences fundamentally expand as new technologies gain ground in the field. eHealth will inevitably become an essential part of healthcare, and healthcare professionals will constantly have to adapt their capabilities to new technologies.

eHealth technology refers to various kinds of tools, divided into groups: 1) process-related eHealth technology, and 2) client-related eHealth technology. There are for example different personal alarm systems for people in their homes, attached to GSM phones, alternatively, alarm

systems attached to the GPS-satellite system, which inform the nurses where the clients in need of help are, as well as health monitoring systems [41–43]. Cameras installed in the clients' homes could be used by home care teams for digital night surveillance. Other tools are digital signing lists for medication, for nurses giving medication to the clients. Among many other artifacts, there could also be different reminders and planning systems. Implementing eHealth technology challenges the established working routines, and the professionals' knowledge and competence.

The activity system is oriented towards completing some predefined routine tasks during the employees' visits to the clients in their homes. Clients typically struggle with their daily life, partly due to loss of physical mobility and the ability to live independently. Many clients feel lonely, and some also struggle with the loss of memory. However, the actual activity system in this paper regards the expansive learning of the service care providers as new tools are introduced in the activity system. Different roles traditionally exist in the municipal healthcare, such as managers at the social department, assistance assessors, operations developers, occupational therapists, nurses, assistant nurses and care assistants. When new tools are introduced it obviously creates a need for more positions with technology-related competence, such as IT coordinators, IT technicians, IT pedagogues, and project managers, among others.

The work has traditionally been organized hierarchically, with managers at different levels, and the assistant nurses and care assistants conducting the routine work in the clients' homes. Now when the activity is radically changing, new ways of organizing emerge, where much work will be horizontally organized.

4. Methodology

4.1. Methodological Approach

The study of professionals' work related to the transformation of healthcare services requires a qualitative approach with rich data collection [44], as the researcher has to understand the struggles of the different actors in the activity of caring for elderly and disabled people. It is, therefore, necessary to dig into the voices of the actors, as their voices should be involved and utilized [27]. The activity theory is used as a theoretical lens to account for the activity and its context [45].

The individuals in an activity system cannot be studied without the cultural context [34]. The idea of multi-voicedness needs to be included in the theory of expansive learning, as all conflicting and complementary voices of various groups should be involved [27]. The Scandinavian municipalities included in the study, eight in total, were selected on the basis that they are in the process of implementing technological innovations. With one exception, these are rural municipalities with more densely populated centers and a relatively old population. Scandinavian local healthcare services are public, organized by the municipalities and tax-funded.

4.2. Data Collection and Analysis

Group interviews were used as a method of data collection. Group interviews may cause the participants to feel pressure from the group to agree, which may prevent the participants from bringing up controversies [46]. On the other hand, it is a suitable method for revealing what the participants may agree upon and their common experiences, but different viewpoints and experiences may also emerge. Conducting group interviews facilitates the mobilization and activation of the participants in a way that is not possible in individual interviews. Using group interviews provided opportunities for joint reflection and discussion related to experiences with eHealth among health professionals. Interactions in the groups contributed to new insights that we would most probably not have had access to through other methods. Furthermore, it was important to study knowledge development and collaboration for learning primarily as a common organizational need and less as an individual need. The themes for the groups' interview were: (1) understanding of eHealth, (2) organization and decision-making, (3) financing of eHealth and health economy, (4) actual use and experience of eHealth, (5) competence and empowerment, and (6) eHealth in the future.

Four group interviews were conducted, two in Norway and two in Sweden. Each group consisted of five to seven participants. Two groups consisted of managers within healthcare services, and two groups consisted of employees, i.e., assistant nurses, nurses as well as occupational and physiotherapists, working close to the patients and users. The group interviews lasted for two hours each. The composition of the employee groups aimed at including different professions in order to identify different professional perspectives. Moreover, one interview was conducted with two participants from an IT department in Sweden, lasting for one hour. In order to access information on professionals' knowledge and experiences, the contact persons in the local municipalities selected the informants. The criterion was that they were already using eHealth, or the managers wanted to involve them in using eHealth later. They all signed an informed consent before the interviews were conducted.

The interviews were transcribed and data were analyzed by the author using qualitative thematic analysis [47]. The thematic analysis was made manually, using the table function in MS Word. The conventional thematic analysis describes an approach whereby codes are developed through multiple readings of the interviews. Such an inductive approach helps discover meaningful underlying patterns [48]. The analysis emphasizes contradictions that emerge within the activity, resulting in five themes of contradictions [26]. The themes and their contents are presented in the results section. The themes are described within the context of activity theory, and concepts related to activity theory are used.

5. Results

In this empirical case of home care services, the object is the individuals that need home care services, as those individuals and their needs define the activity system. The activity is to provide home care service, and it is conducted cyclically by people working in the municipality. The subjects are the individuals working cyclically to take care of the object, the individuals in need of home care, in order to achieve the desired outcome: a better life for those in need of home care. To conduct the activity, both physical and psychological tools are used. There can be some variation of possible actions when the subjects conduct the activity, as all clients are different. What is happening in this activity is that the tools are now changing due to the introduction of a radically new type of technology, eHealth technology. Various types of eHealth technologies will support both those working in the activity and the object that defines the activity, i.e., the clients in need of home care service. The new tools also radically change the actions conducted in the activity, in the sense that the nature of work practice moves towards inter-professional teams with collaborating and boundary-crossing experts as subjects. The individual subjects have to learn new things, and expand their knowledge, also about others' work. The learning effort of the activity encompasses all individuals, as a collective, in the activity system.

The subjects consist of a collective community of individuals with different roles and professions. Individuals can have one or more motives with regard to their shared object, and the object can be said to be multifaceted and poly-motivated. The motives identified in the studied setting are: 1) improve quality of life for the patients, 2) create attractive and interesting work for the employees, 3) save money for the municipality, 4) learn about new technology, and 5) use the municipality's resources effectively.

5.1. Improve Quality of Life for the Patients

Generally, all stakeholders want the patients to have a better quality of life. Politicians, administrative personnel, all healthcare professionals as well as managers and IT personnel have this motive, as well as the patients themselves and their relatives. No explicit contradictions exist with regard to this motive. However, the resources in society are not enough to provide an endless quality of life for patients. It is even quite hard to define the quality of life, as it could mean different things to different people. However, this motive is an overall goal for using eHealth in municipal home care. Quality of life should be provided equally to all patients, regardless of gender, sexuality, age and ethnicity.

5.2. Create Attractive and Interesting Work for the Employees

The employees in the healthcare sector want to have attractive and interesting work, as well as support from the managers. This motive consists of some intrinsic characteristics. Different individuals find different parts of their work attractive and interesting. Some individuals appreciate the social contact with the patients, while others prefer to take care and provide healthcare for the betterment of the patients. Some individuals prefer to work with eHealth technologies, while others prefer not to. Many women now work in the healthcare sector, but the introduction of eHealth may contribute to a more equal workplace when it comes to gender, as men with more interest in technology will be attracted to working in the healthcare sector. Introducing eHealth also means that other technology-related professions will work together with healthcare professionals to a greater extent. Healthcare professionals sometimes say that they have chosen to work with people and not with technology and that they, therefore, do not like the implementation of eHealth. Managers also recognize this phenomenon. Hence, many contradictions emerge when eHealth technologies are tested and implemented. For some individuals working in the healthcare sector, the work becomes more attractive and interesting, but for others, the work changes in a negative way: it becomes more stressful and difficult, as they experience a lack of knowledge and skills to use the technologies. However, the professionals themselves seem to be more positive than the managers think they are.

5.3. Save Money for the Municipality

Municipalities generally implement eHealth with the intention of saving money. The demographical changes in the society imply that the working staff will not be enough for taking care of all the frail older persons and introducing eHealth is considered a solution. This is an overall intention in society. The municipalities do not have money to employ more people in the healthcare sector, and therefore they cannot increase their workforce. This also means that managers have very restricted budgets for transforming healthcare to include more technology. The use of eHealth technologies is considered to cost less than employees in the long term, but the transition and the required changes in work practice will add costs. Politicians generally expect that eHealth technologies will enable fewer employees to take care of more patients, or that the patients should need less help from the healthcare staff when eHealth technologies are used. However, the managers claim that the cost-benefit analyses do not yet show a clear picture of the savings from using eHealth technologies in the healthcare sector. In fact, healthcare services in municipalities in the forefront of implementing technology often cost more. The managers and their economists are struggling with the analyses, in order to find out what to count and not. The motive of saving money is also threatening for the employees in the healthcare sector, as they are afraid of losing their jobs.

5.4. Learn about New Technology

Opportunities for learning and competence development can be crucial for creating attractive and interesting work for the employees in the healthcare sector – the managers agree with that, but they are a bit concerned about healthcare professionals who do not want to learn and face challenges in their work. Many healthcare professionals perceive that they have limited knowledge of technology and its use, and they are aware that they need more knowledge and competence to conduct their work when implementing eHealth technologies. The professionals need to learn about the technologies and when they could be used, in order to find out in which situations and for which patients eHealth can be useful. Many healthcare professionals experience that they do not get enough time and opportunities to learn how to use new technologies, as they also need to discuss with their colleagues and learn together. Managers need to recognize the need for learning and competence development among the employees and design a work practice that enables learning. If there are opportunities to learn and develop competencies, the healthcare professionals' roles in the work practice will also change, and the work can widen its scope of activities.

5.5. Use the Municipality's Resources Effectively

Some professionals and managers highlight the effective use of resources in the municipality. This should be a motive for most professionals, but the managers responsible for the budgets are obviously most concerned about this. If some resources are used sparsely, there will be room for using other resources more generously. If it is difficult to find professionals to employ within healthcare, more resources can be spent on eHealth technologies. However, the healthcare professionals are of course afraid of losing their jobs. IT staff naturally find it positive that the municipalities invest in eHealth technologies, as they can be involved in the development. Many municipalities have economic problems nowadays, with budgets where the income is not matching the necessary expenses. Therefore, many municipalities are not in a situation where they can spend money on eHealth technologies.

6. Discussion and Conclusions

A municipality should ideally strive for economic, social and ecological sustainability. However, this striving has many dimensions. It is about the economic use of all kinds of resources, together with managers that need to create a sustainable workplace for the healthcare professional, by providing enough learning and competence development and an attractive and interesting work. By being aware of the different motives of individuals related to healthcare work in municipalities, a higher success rate of using eHealth technologies can hopefully be obtained [13].

The aim of the paper was to explore contradictions in motives for the professionals' work practice when introducing innovative eHealth technologies in Scandinavian healthcare services at a municipal level, and such contradictions are presented in the results section.

Certain rules, which are more or less known by those working in the activity, form the basis for the activity [10]. Labor has previously been clearly divided, but now, as the tools and content of the activity are changing, the division of labor also changes. In the municipal home care services, the professionals conducted very practical work in serving the elderly or disabled persons, the clients. The home care professionals have to be mobile, riding around in a car or by bicycle, visiting their clients in their home, or at an institutional retirement home. Now that eHealth technologies are implemented, healthcare professionals are expected to use them to a certain extent, instead of interacting with the patients.

The results show existing motives with regard to the professionals' knowledge and competence development when introducing eHealth technologies in municipal healthcare. The motives contain both contradictions and congruences, which sometimes overlap. The motives originate from changing needs in the work practice when innovative technologies are introduced. Small scale implementation projects are often conducted in order to try out different innovative technologies. The experiences from such projects are often varied. The situation is also characterized by many different existing technologies, and new and innovative products and services being introduced in the activity system all the time, which requires interaction between technology and actors [12].

Some municipal healthcare units, and their managers, are aware that work processes need to change in order to support the use of innovative technologies. Work processes and routines have to be developed, to keep up with new ways for the healthcare service professionals of providing healthcare services. Knowledge has to be developed, diffused and integrated collectively among the professionals in order to enhance the implementation of innovative technologies and new ways of providing services. Learning is, therefore, an inevitable part of the work [11]. The contribution of this paper is additional knowledge of contextual factors in implementing eHealth in public healthcare organizations in municipalities, and of contradictions and congruencies in the professionals' work practice in the implementation of eHealth technologies. To focus on both communication and mediation in the activity system could further improve the analysis of the case [49].

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