

Implementing digital assistive technology in healthcare: Which work-related knowledge matters?

Ann Svensson^{1[0000-0002-1421-868X]} and Susanne Durst^{1,2[0000-0001-8469-2427]}

¹ University West, 461 86 Trollhättan, Sweden

² Tallinn University of Technology, Ehitajate tee 5, 19086 Tallinn, Estonia
ann.svensson@hv.se, susanne.durst@taltech.ee

Abstract. Society is facing an increasing amount of frail older persons in need of home care services, as the population grows older. Digital assistive technology has the potential to relieve the home care service workers, still providing high-quality service for the frail older persons, as this technology can replace some of the services provided by human hands. This technology is designed to enable change, which implies that the employees need to learn how to use this technology. This paper aims at exploring the knowledge needed for realizing work-related learning in home care services in conjunction with the implementation of digital assistive technology. The data collected used come from an ongoing longitudinal study that started in 2017 which includes municipalities located in a cross-border area of Sweden and Norway. This geographical area is a sparsely populated region comprising municipalities where about a third of the population is over 65 years. The results show the need for different knowledge types namely situational, conceptual, procedural, and dispositional knowledge to realize the ongoing transformation of the work practices in the home care service. The study shows the reshaping of the staff's work identity, where previous ways of performing home care services are changing to a work that requires the use of digital assistive technologies, and where the staff has to teach frail older persons the use of these technologies.

Keywords: Digital Assistive Technologies, Municipal Healthcare, Home Care Service, Knowledge Types, Work-related Learning.

1 Introduction

Society is facing an increasing amount of frail older persons in need of home care services, as the population grows older. It is also a fact that people get complex diseases as they become older (WHO, 2018). In all the Nordic countries, the municipalities are responsible for providing home care services to the population. Home care workers in municipalities are a rather scarce resource, especially in small municipalities in the

countryside, and the demographics for the future predict there will not be enough personnel to take care of all people that need support in their homes (Woll & Bratteteig, 2019). One solution to this challenge may be the introduction of digital assistive technology (Frey & Osborne, 2013). It has been argued that digital assistive technology has the potential to relieve the home care service workers, still providing high-quality service for the frail older persons, as this technology can replace some of the services provided by human hands (Svensson, 2020). This technology is designed to enable change, which implies that the employees need to learn how to use this technology. Additionally, the adoption of the new technology will require changes in the work practice (Anderson & Robey, 2017) which, in turn, will also require an unlearning of old practices and routines from the employees (Durst et al., 2020). In this process of transformation, the municipalities are facing a great need for providing work-related learning for the home care services workers (Gjellebæk, Svensson & Bjørkquist, 2018; Svensson, 2020). However, the high turnover rates among staff can be detrimental as they are linked to lower job satisfaction and lower motivation for learning, and thus a successful implementation is at stake. Too high staff turnover also challenges the standard of care, as the workers suffer from a decreased availability of relevant knowledge needed to do their jobs properly (Chu et al., 2014).

The situation outlined above has the potential to erode the municipality's capacity to act (i.e., to provide its goods and services). This is worrisome for the citizens (the society) and puts the municipality in a vulnerable position because the knowledge currently available is no longer able to meet the increasing demands of the citizens (Riege & Lindsay, 2006, Durst et al., 2018). Additionally, considering that the public sector consists of hierarchical and bureaucratic organizations that tend to hoard knowledge, resist change and focus more on people-based approaches compared to private organizations (Durst et al., 2018), there is an urgent need for more rigorous research aimed at studying how municipalities prepare for the future. There is also a need for more studies related to municipal organizations and their impact on society related to knowledge management research (Massaro, Dumay & Garlatti, 2015). Different types of knowledge have a bearing on what and how the staff in home care services need to learn. Staff in such work practice has expressed a lack of knowledge in using innovative digital assistive technologies (Gjellebæk, Svensson & Bjørkquist, 2020). It is important to understand and appraise workplaces as learning environments to better understand what types of knowledge can support learning for the future work setting. The learning needs to be based on the work practice, i.e., the work domain needs to be considered a learning environment with its contextual conditions (Nicolini, 2010), to not undervalue the types of knowledge that are produced, kept and changed in the professional work practice (Gherardi & Rodeschini, 2016). This will help home care services in municipal organizations focus on the most important knowledge for the learning needs in the transformation process of the work practice (Billett, 2019). Better insights into how organizational members in health organizations prepare for changes are also needed (Krogh, 2018). Against this background, this paper aims to explore the knowledge needed for realizing work-related learning in home care services when implementing digital assistive technology.

The remainder of the paper is organized as follows. Next, we introduce the theoretical background of different types of knowledge. Then we describe our research context and the methodology. Based on the collected data we analyze and discuss the different types of knowledge found, and highlight the specific knowledge that is required in the home care service for implementing digital assistive technology. Finally, we conclude the paper by providing implications and suggestions for future research.

2 Theoretical Background

2.1 Knowledge and Learning at Work

Municipalities need to use their scarce financial resources efficiently for the benefit of citizens but also for meeting increasing demands from the citizens to provide more transparency in government operations (Richards & Duxbury, 2015). Hence, it is required from them that proper planning and coordination is carried through (Stentoft Arlbjörn et al., 2015). These organizations are also under pressure to work more effectively referring to both administrative processes and the services towards their citizens (Lönn & Uppström, 2013). Digital assistive technology is used to transform public services, structures, and processes to increase both efficiency and effectiveness. According to Cabaleiro et al. (2013), factors affecting the volume and the quality of the services provided in municipalities together with the opportunities to develop their services are closely linked with the potential of learning at work. Gherardi (2010) states that technology in practice (Orlikowski, 2000) reflects the way professionals learn the interaction between humans and technology.

According to Dahlborg Lyckhage and Pennbrant (2014), learning is situated as it is embedded within the professional activity, context, and culture. Employees within different professions and with different roles can bring their experiences, knowledge, and creative ideas together and a successful transformation may promote innovation in the performance of municipal care services (Agger & Sørensen, 2018). Thus, knowledge is based on individual employees but is distributed by people working together (Brown & Duguid, 2001). However, the difficulty of getting new knowledge into practice in the healthcare sector is well acknowledged, also when ICT innovations are implemented (Nicolini, 2008).

Learning at the workplace depends on different factors. Billett (2004), for example, highlighted the mutuality between the affordances offered by the workplace (the employer) and the preparedness and willingness of the employees to assume them and contribute to their further development. Nicolini (2008) points out that there is a need for collaboration across organizational and professional knowledge boundaries. Previous research has also identified additional factors that can either hamper or support learning and creation of new knowledge, such as 1) trust between people (Hislop, 2009), 2) common language – as without, individuals “*will neither understand nor trust one another*” (Davenport & Prusak, 1998, p. 98), 3) culture, as it is considered central when it comes to implementing knowledge management activities (Alavi et al., 2006), 4) management, as it makes resources and time available (Van Zolingen et al., 2001;

Fong & Lee, 2009), and 5) motivation to take on new knowledge (Szulanski, 2000; von Krogh et al., 2001).

Despite the need for learning, what needs to be acknowledged as well is that the home care service organizations need to know what types of knowledge are required to conduct their work properly at present and in the future when introducing digital assistive technologies into the work practice. Extant research has suggested four different domains of work knowledge that can be associated with the types of knowledge in the home care service work; namely 1) situational knowledge, 2) conceptual knowledge, 3) procedural knowledge, and 4) dispositional knowledge (Billett, 2019; de Jong & Ferguson-Hessler, 1996). These types of knowledge have a bearing on both what and how the staff needs to learn in implementing digital assistive technologies.

2.2 Four Different Knowledge Types

Knowledge is manifested in the accomplishment of organizational practices. Thus, knowledge is a tool that is used in daily work. The site of knowledge, the workplace, is where the inherent nature of knowledge in practice is manifested. People need to be involved in the practice to know how to work together in practice (Nicolini, 2011). Generally, it can be stated that situational knowledge is specifically related to the requirements of particular situations at workplaces or in a work domain. The conceptual, procedural, and dispositional knowledge are, on the other hand, types of knowledge that would be expected from all individuals who practice an occupation or a profession, which Billett (2019) called canonical knowledge. This canonical knowledge is expected from all practicing professionals or individuals in an occupation, and is subject to content in education, whereas situational knowledge has to be learned within the work practice, on the job.

Situational knowledge

Situational knowledge is associated with a particular work domain. This type of knowledge appears in problem situations in the domain of work at the workplace (de Jong & Ferguson-Hessler, 1996). The professional needs to perceive relevant aspects within a problematic situation, and to search for more information if needed, to be enabled to solve the situation. The professional must make clear what the problem consists of, to state representation of the problem. From this situation, the professional can also value using other types of knowledge to solve the problematic situation. Thus, situational knowledge enables professionals to identify, classify and analyze everyday problems in their work practice, and to recognize concepts that underlie the problems, as well as to decide what needs to be performed as a solution to the problem (Kolloffel, Eysink & de Jong, 2011). This type of knowledge is also located within the relationships between the professionals in a specific practice (Nicolini, 2011). In an IS implementation project described by Blegind Jensen, Kjærgaard, and Svejvig (2009) the accomplishment of the clinical tasks in the professional work practice was changed, and this had an impact on the situated practice.

Conceptual knowledge

Conceptual knowledge consists of facts, concepts, and principles that are more or less static, applied within a specific occupation or profession. This is a type of knowledge that individuals can declare on examination (Brown & Duguid, 2001). Billett (2019) refer the conceptual knowledge to «knowing that», as what we know. This consists of explicit knowledge that may be shared by several professionals, and easily be shared (Brown & Duguid, 1998). Conceptual knowledge includes the mastery of vocabulary, as suggested by Nicolini (2011), in his study of the field of telemedicine. It can be part of the information about a problematic situation. This type of knowledge can then be used to perform a solution. Moreover, conceptual knowledge goes beyond just knowing facts and concepts, as it also encompasses how facts are organized (Watson et al., 2016). That implies that professionals have interrelations between concepts and that the understanding needs to be deep. Watson et al. (2016, p. 119) emphasize that: «conceptual knowledge is thus factual, structured, and interrelated». The conceptual knowledge often increases over time, which could be exemplified with Nicolini's (2011) case where the evidence pointed out the necessity to intensify close monitoring of chronic heart failure crises.

Procedural knowledge

«Knowing how» is a term used by Billett (2019) to denote procedural knowledge, as what we can do. Procedural knowledge is involved in actions within the professional or occupational domain. It is a particular ability to use «knowing that» in practice, and it refers to the ability to respond to actual situations and get things done. This is a type of knowledge that can be used in a more general or a more specific way. It supports the professional to make transitions from one problematic situation to another, where the knowledge has some degree of similarities and gives the ability to act appropriately in certain circumstances in practice. This knowledge is relatively difficult to share, coordinate, or change and it is relatively easy to protect (Brown & Duguid, 1998). Procedural knowledge is learned by doing things, thus, by practicing. However, when implementing technology established routines can be challenged, and old ways of working can be reinforced or changed, as in the healthcare context studied by Blegind Jensen, Kjærgaard, and Svejvig (2009).

Dispositional knowledge

Dispositional knowledge is referred to values and attitudes by the individuals related to occupational or professional instances of practice. Billett (2019) state this type of knowledge as «knowing for», as what and how we value. It is about sharing and coordinating knowledge more reflectively, and is to a great extent created in the context of practice and shared within a collective (Brown & Duguid, 1998). For example, dispositional knowledge can be about how the professionals develop understanding, how they share knowledge and sensemaking, and how they contribute to the collective practice. To share understanding, insights, information, and knowledge is also about forming and sharing an identity in the collective practice. The understanding of identity can enable us to understand the flow of knowledge (Brown & Duguid, 2001). Technology implementation often initiates a sensemaking process, as ambiguity and uncertainty can be prevalent at least at the beginning of an implementation. Different professionals can

also have conflicting logics, as their work responsibilities can be questioned and challenged (Blegind Jensen, Kjærgaard & Svejvig, 2009). Resistance to change is also a well-known concept within healthcare practices, which is a struggle to unlearn (Gupta, Boland & Aron, 2017).

2.3 Knowledge Creation and Learning in Organizations

As mentioned above to apply digital assistive technology properly, the home care workers need to develop new knowledge which leads to the practice of knowledge creation which is about the ways used by organizations to develop new knowledge. This practice should follow a continuous process (Von Krogh, Nonaka, and Rechsteiner, 2012) and is closely related to learning (Allameh et al., 2017; Billett, 2019). According to Kandampully (2002), a permanent search and up-date of knowledge is the only possibility for employees and the organization behind to make sure that knowledge can be viewed as an asset. This will imply the unlearning of some old knowledge, to create new knowledge. Grisold, Kaiser, and Hafner (2017) in this way suggest a non-judging stance towards the work practice, where to prevent previous experiences to be projected on current situations, to improve creative thinking. Nevertheless, unlearning is suggested to be a pre-stage or prerequisite for learning or relearning, as this is a requirement in the transformation process when implementing digital assistive technologies (Klammer & Gueldenberg, 2018).

Knowledge can be created through various sources (Huggins et al., 2010). It can emerge from new ideas or be spurred by emergent internal or external needs (Mellor, 2015). More precisely, new ideas can come from suppliers, consultants, or literature. They may also originate from external forces such as needs and pressures from customers or legislation. Internally, new ideas can stem from creativity and inventions, in those cases new knowledge may arise from problems and opportunities identified by employees (Daft, 2007). In addition to individual learning, collaborative learning is thought to be a crucial factor for the success of knowledge creation measures because it can enhance critical thinking by questioning solutions and assumptions and based on that help discover better solutions (Jakubik, 2008)

3 Methodology

3.1 Data Collection

The present paper is based on an ongoing longitudinal study that has started in 2017 and includes municipalities located in Fyrbodalen (Sweden) and Östfold (Norway); a project that is financed by Interreg Sweden-Norway. This geographical area is characterized as a sparsely populated region with municipalities where about a third of the population is over 65 years. The ongoing project aims to support the implementation and use of assistive technology in municipalities in this south cross-border region of Norway and Sweden.

Data were collected in different ways. Twenty meetings with project managers or middle managers working with the implementation of digital assistive technology in the Swedish municipalities were conducted. Each meeting lasted between one and three hours. Moreover, six focus groups, three focus groups in parallel, with a few months to the next three focus groups, were conducted with participants from both Sweden and Norway lasting around one and a half hours each (Bryman, 2016; Wibeck, 2000). Each focus group consisted of six to eight participants from different municipalities both in Sweden and Norway. A few of the persons participated even in more than one focus group. The members included in the focus groups were project managers or middle managers who had either worked on issues related to healthcare development and/or had some past experience using digital assistive technology in their work practice. The focus group members had different professional backgrounds – representing nurses, assistant nurses, physiotherapists, occupational therapists, assistance officer, social educators, and IT workers. Also, two focus group interviews were conducted with front-line care workers to include employees using the technologies as part of their work. Moreover, one group interview was conducted with two nurses working in the municipality in the area of elderly care, lasting for one and a half hours. The participants in the meetings and the focus groups were mainly recruited through established contacts in the municipalities located on both sides of the southern border between Norway and Sweden. Thus, it has been a strategic selection of participants in this study. The selection of a qualitative research approach was motivated by the objective to explore peoples' views and experiences (Myers, 2013).

3.2 Data Analysis

Notes were taken in all the meetings. All focus group interviews and the group interview were recorded, transcribed, and analyzed (Braun & Clarke, 2006). The data were then analyzed by thematic analysis. The analysis was conducted in a theoretical or deductive way, as the analysis was driven by a theoretical interest, namely to identify the types of knowledge needed to realize the implementation of digital assistive technology. Once the transcripts were produced, the thematic analysis started with multiple readings of both the transcripts and the notes to become familiar with the depth and breadth of the data. The data set were then analyzed based on the four types of knowledge namely situational, conceptual, procedural, and dispositional knowledge.

4 Findings

This section presents the findings of the study, they are presented in accordance with the four knowledge types as outlined in the theoretical background section. The digital assistive technologies require changes of knowledge within the four types.

4.1 Situational Knowledge in the Municipalities' Social Care

Recent developments have clearly highlighted that the social care of the elderly has to change radically; and this required transformation process has only just begun, as the number of elderly people with complex illnesses or disabilities is increasing. The quality of social care is expected to not decrease in quality and the intention of municipalities is to implement digital assistive technologies to support that. However, some municipalities do not have any staff working with the development of new work practices according to new types of digital assistive technologies. Moreover, the staff and the managers at the lowest level have not any impact on the decision making according to tight budgets available for the implementation of digital assistive technologies.

«The decision on the budget for such aids that could not directly be prescribed goes up to the local council of the municipality» (a middle manager)

The older elderly people are starting to become more complex sick and disabled than in the past, and an increasing number of people live longer with more medications. Situations that never have been perceived before, are now occurring, where the frail elderly people need support in their daily life in whole new ways.

At the same time, the municipalities studied suffer from high levels of staff turnover in care, referring to both managers and ordinary staff. The staff in the home care services has low levels of education and some lacks language skills. Moreover, the staff is often not interested in using information technology. Finally, this is a low paid job, less popular, and with a quite high degree of sick leave.

4.2 Conceptual Knowledge in the Municipalities' Social Care

As both countries have national guidelines and focus areas described in policy documents, the professionals need to be updated with the development in this domain. Different digital assistive technology implementation projects are ongoing in different municipalities, and the professionals need to be familiar with those and their implications.

The staff is aware of some types of digital assistive technologies, such as aids for medication, cognitive aids, alarms, and e-commerce. However, as there exist many different digital assistive technologies, and many new ones are constantly entering the market, it is difficult for the staff to keep up to date on what technologies are available.

«There are many different tools and you can see that if you go in and look at the digital assistive technology forum, it is a plethora, and more and more of digital assistive technology is entering the assortment. So as we work, we cannot keep up to date.» (an assistance officer)

In addition to knowing which digital assistive technologies are available, one needs to understand in which situations they can be used and also how to use them in these specific situations. There are not always instructions on how to operate and use different technologies.

There exist prescriptions on how to document the daily routines, and video films are available for some of the tasks the assistant nurses have to conduct in their work. Even though, it is not obvious that staff document what they should do, regarding what they have done and how the situation is with the elderly, because they are not used to using a computer.

4.3 Procedural Knowledge in the Municipalities' Social Care

The management level of the municipalities studied seems to lack a dedicated strategy as to how to best integrate the new technologies in the organization. Working in silos can be determined as a further challenge, people seeing the big picture appear absent and all activities related to the implementation of digital assistive technologies depend very much on the «enthusiasts».

The findings also suggested that there is a need for knowledge about project management in the municipalities studied. The Municipalities are now implementing digital assistive technologies in pilot projects, where only a few of the professionals are engaged. They need their managers' permission to dedicate a part of their time at work for the tasks in the implementation project. Thus, those professionals need support from their managers to successfully fulfill their goals with the implementation. As the digital assistive technologies would be implemented in breadth in all relevant departments, it is thus rather important that the department managers are engaged and that they can inspire staff to learn and change the work practice.

The staff has different roles. For example, assistant nurses provide the home care service to the frail elderly people, while occupational therapists decide on what digital assistive technologies will be provided to each person. However, both of the roles will need to understand the use of the digital assistive technologies implemented, but in different stages of the implementation process. The occupational therapist needs knowledge about the procedure to use the technology from the first time it is implemented in the frail elderly's home, and also needs to instruct both the frail elderly and its relatives to use it. The assistant nurses, on the other hand, need to know how to handle the technology when it is in use in frail elderly people's homes, which is a challenge considering the different digital assistive technologies used. Moreover, the new digital assistive technologies need new work practices, and the staff needs to learn new ways of working.

«If there is an alarm and the elderly person has a camera, then you can make a judgment from a distance, and then you find another way of working.» (an assistant nurse)

Thus, the work practices are in a process of transformation. Previously, the professionals have provided care by their hands, but now the professionals to a larger extent are forced to use technologies to serve the frail elderly in their home, and to learn the frail elderly to serve themselves with the support of these technologies.

4.4 Dispositional Knowledge in the Municipalities' Social Care

As municipalities have scarce resources for home care services, the staff often perceive they are not having enough time to do all the tasks as they should. In this situation the motivation to change is not very high. The staff is afraid that there will be duplication, that is, that new working methods are introduced while the old ones will be retained. Examples of documenting work have been provided showing that the duplication of work happened after the implementation of an app. On the other hand, the staff is quite positive about the implementation of digital assistive technology, provided that this could make their work more efficient and that the frail elderly people can benefit from it. When the staff begins to understand how to integrate the digital assistive technologies in the work practice, the persons realize the opportunities with the uptake of those technologies.

«when you start to understand a little better, it is not the threats, but it suddenly becomes opportunities» (a project manager)

Cultural differences can also lead to differences with regard to the dispositional knowledge of the professionals. Misunderstandings occur among the staff because of cultural differences, especially during staff changes after each work session, where the professionals need to report to the next team. Professionals from different cultures can have different views of how to make sense and how to do things. Also, difficulties for the professionals to understand each other can depend on different mother tongue languages.

Finally, there exist thoughts among the staff that there could be smart homes for frail elderly people, with a screen on the wall where they can connect everything, with support for activities, security, independence, and communication.

5 Discussion

Similar with their larger counterparts, small municipalities too, which often have a high proportion of elderly, have to meet the high demand for care in general and frail elderly care in particular.

We know that there is a difference between knowing what and knowing how – as those concepts relate to theory and practice, respectively (Billett, 2019; Brown & Duguid, 2001; de Jong & Ferguson-Hessler, 1996). Yet in the setting investigated both the theory and practice of the work setting is transforming; and the situational knowledge is in a transforming process too. The staff is meeting a new situation; however, it is difficult to learn about and find opportunities for digital assistive technologies and also apply these technologies to solve emergent problems identified in their work practice when they are not aware of what technologies are available (Daft, 2007; Nicolini, 2008). Comparing to, for example, repair technicians at Xerox, they worked together, shared ideas and insights, to learn and share their procedural and dispositional knowledge, when they met, and they collaborated to solve difficult problems (Orr, 1996). But in this work setting, some technicians had to solve different technical, even

though complex and difficult, but they were working within the same technical domain without having to deal with the transformation in the work practice as well. In the social care context, the characteristics of the work practice are changing, what is emerging is a work with new content (know that) which also has to be conducted differently (know-how). Even though the professionals in social care are traditionally working with humans, as with frail elderly in need of care, now their work is transforming in a way where they need to use digital assistive technologies. Moreover, there are no stipulated instructions on how to give social care to frail elderly, and the ways to that can be shaped in many different ways, also in using different working methods in parallel, and can be varied from time to time also for the same frail elderly person. Yet, this new situation has the very same goal as the traditional work practice, that is, to provide social care for frail elderly so they can have a quality of life as long as possible. The professionals' work practice is thus drifting from a work practice that was more or less in charge of taking care of frail elderly to a work practice in charge of learning to support the frail elderly by using different digital assistive technologies and even teach the frail elderly to learn to use the digital assistive technologies by themselves. Thus, the work practice has become one that requires completely new skills from the staff.

The potential to learn at work is rather limited, as the volume of services should be provided to the frail elderly at the same time the actual transformation is going on, this can limit the opportunity of developing knowledge (Cabaleiro et al., 2013). Additionally, this work domain is under pressure due to limited financial resources (Lönn & Uppström, 2013).

The work practice is in a transformation process requiring from the staff to become knowledge workers and deal with cognitively different tasks in their daily work. They are asked to manage new digital assistive technologies instead of providing support to the frail elderly persons by their hands. This situation also implies that the staff's identity is at stake (Brown & Duguid, 2001). Their future work will to a greater extent consist of managing technical artifacts, and the staff is starting to lose their identity. Thus their identity is in the state of reshaping. And findings indicate that they have difficulties in relating to the ongoing changes. Also, their knowledge gaps are shared, it is difficult to develop a shared understanding, to coordinate the relevant knowledge reflectively, and to make a collective sense of the new work practice, as no one in the staff knows what the new work practice should be shaped to as a result of the transformation. Therefore, the opportunities for situated learning are limited, as the activities and culture in the work practices are changing (Dahlborg Lyckhage & Pennbrant (2014).

The staff is also challenged by the quite high staff turnover, and some of the new staff comes from different cultures and have different mother tongues which bring about additional challenges. These changes are related to dispositional knowledge because it makes it difficult in the sharing of knowledge and sense-making (Billett, 2019). This also complicates the current situation, where the work practice is in a transformation process in more than one way. It is rather difficult to put knowledge management activities into action if the culture in the work practice cannot be established (Alavi et al., 2006). This, in turn, can hamper the trust among the staff (Hislop, 2009),

and reduce the motivation to take on new knowledge (Szulanski, 2000; von Krogh et al., 2001).

6 Conclusions

This paper aimed at exploring the knowledge needed for realizing necessary work-related learning in home care services in conjunction with the implementation of digital assistive technology. Based on the findings presented in the paper, we can conclude that there are challenges in this work practice related to the following types of knowledge; situational, conceptual, procedural, and dispositional knowledge. There is a need for knowledge in these types related to the ongoing transformation of the work practice in home care services. The work environment is changing as new digital assistive technologies are provided, however without having taught the staff of the home care services about them. The policy documents and instructions at hand are often not directly applicable in the use situation. The potential to learn and to collectively create and share knowledge are limited within the given work practice due to practical and financial reasons. The identity of the staff is reshaping and they have to be prepared to execute a job they have not applied for originally.

References

- Agger, A. & Sørensen, E. (2018). Managing collaborative innovation in public bureaucracies. *Planning Theory*, 17(1), 53-73.
- Allameh, S. M., Hosseini, S. H., Samadi, A. & Darikandeh, A. (2017). The relationship between intangible organisational capitals, knowledge management, and organisational learning. *International Journal of Knowledge-Based Development*, Vol. 8, No. 3, pp.249 - 270.
- Anderson, C. & Robey, D. (2017). Affordance potency: Explaining the actualization of technology affordances. *Information and Organization*, 27(2), 100-115.
- Billett, S. (2004). Workplace participatory practices: Conceptualising workplaces as learning environments. *Journal of Workplace Learning*, 16(6), p. 312-324.
- Billett, S. (2019). Workplace Experiences: Premises, Conceptions and Practices. *Work-based Learning as a Pathway to Competence-based Education*, 25.
- Blegind Jensen, T., Kjærgaard, A. & Svejvig, P. (2009). Using institutional theory with sense-making theory: a case study of information system implementation in healthcare, *Journal of Information Technology*, 24, 343-353.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3(2), 77-101.
- Brown, J. S. & Duguid, P. (2001). Structure and spontaneity: knowledge and organization. *Managing industrial knowledge: Creation, transfer and utilization*, 44-67.
- Bryman, A. (2016). *Social Research Methods*. 5th ed. Oxford: Oxford University Press.
- Cabaleiro, R., Buch, E. & Vaamonde, A. (2013). Developing a method to assessing the municipal financial health. *The American Review of Public Administration*, 43(6), 729-751.
- Chu, C. H., Wodchis, W. P. & McGilton, K. S. (2014). Turnover of regulated nurses in long-term care facilities. *Journal of Nursing Management*, 22(5), 553-562.
- Daft, R. F. (2007). *Understanding the theory and design of organizations*, Mason: Thomson South-Western.

- Dahlborg Lyckhage, E. & Pennbrant, S. (2014). Work-Integrated Learning. A Didactic Tool to Develop Praxis in Nurse Education, *Advances in Nursing Science*, 37(1), 61–69.
- Davenport, T. H. & Prusak, L. (1998) *Working knowledge. How organizations manage what they know*. Harvard Business School Press, Boston, Massachusetts.
- de Jong, T. & Ferguson-Hessler, M. G. M. (1996). Types and Qualities of Knowledge, *Educational Psychologist*, 31(2), 105-113.
- Durst, S., Lindvall, B. & Bruns, G. (2018). Knowledge risk management in the public sector: insights into a Swedish municipality. *Journal of Knowledge Management*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JKM-12-2017-0558>
- Durst, S., Heinze, I., Henschel, T. & Nawaz, N. (2020) ‘Unlearning: a systematic literature review’, *International Journal of Business and Globalisation*, 24(4), 472–495.
- Frey, C. B. & Osborne, M. (2013). *The future of employment*. Retrieved from <https://pdfs.semanticscholar.org/0822/f0b701e0b798c670d23c3e85b5f4ec31bd22.pdf>.
- Gherardi, S. (2010). Telemedicine: A practice-based approach to technology, *Human relations*, 63(4), 501-524).
- Gherardi, S. & Rodeschini, G. (2016). Caring as a collective knowledgeable doing: About concern and being concerned, *Management Learning*, 47(3), 266-284.
- Gjellebæk, C., Svensson, A. & Bjørkquist, C. (2018). Competence Development and the Implementation of Technology in Healthcare Services, In *Proceedings of the 11th annual International Conference of Education, Research and Innovation*, Seville, Spain. 12-14 November 2018. ISBN: 978-84-09-05948-5 / ISSN: 2340-1095.
- Gjellebæk, C., Svensson, A. & Bjørkquist, C. (2020). The Dark Sides of Technology – Barriers to Work-Integrated Learning, In Schmorrow, D. D. & Fidopiastis, C. M. (Eds.). *Augmented Cognition. Human Cognition and Behavior*, HCII 2020, (pp. 69-85), Springer Nature, Switzerland.
- Grisold, T., Kaiser, A. & Hafner, J. (2017). Unlearning before creating new knowledge: A cognitive process, In *Proceedings of the 50th Hawaii International Conference on Systems Sciences*.
- Gupta, D.M., Boland, R.J. & Aron, D.C. (2017). The physician’s experience of changing clinical practice, a struggle to unlearn, *Implementation Science*, 12(28).
- Hislop, D. (2005), *Knowledge Management in Organizations: A Critical Introduction*, Oxford University Press, Oxford.
- Huggins, R., Izushi, H., Clifton, N., Jenkins, S., Prokop, D. & Whitfield, C. (2010). *Sourcing knowledge for innovation: the international dimension*, NESTA, London.
- Jakubik, M. (2008). Experiencing collaborative knowledge creation processes. *The Learning Organization*, Vol. 15, No. 1, pp.5 - 25.
- Kandampully, J. (2002). Innovation as the core competency of a service organisation: the role of technology, knowledge and networks. *European Journal of Innovation Management*, 5 (1), pp. 18-26.
- Klammer, A. & Gueldenberg, S. (2018). Unlearning and forgetting in organizations: a systematic review of literature, *Journal of Knowledge Management*, 23(5), 860-888.
- Krogh, S. (2018). Anticipation of organizational change, *Journal of Organizational Change Management*, 31(6), 1271-1282.
- Lönn, C. M. & Uppström, E. (2013). Process management challenges in Swedish public sector: a bottom up initiative. In *Proceedings of International Conference on Electronic Government*, 212-223. Springer, Berlin, Heidelberg.
- Massaro, M., Dumay, J. & Garlatti, A. (2015). Public Sector Knowledge Management: A Structured Literature Review, *Journal of Knowledge Management*, 19(3), 530-558.

- Mellor, R. B. (2015). Modelling the value of external networks for knowledge realisation, innovation, organisational development and efficiency in SMEs. *International Journal of Knowledge-Based Development*, Vol. 6, No. 1, pp.3 - 14.
- Myers, M. D. (2013). *Qualitative Research in Business & Management*, Vol. 2, Sage Publications.
- Nicolini, D. (2008). Managing knowledge in the healthcare sector. A review. *International Journal of Management Reviews*, 10(3), 245-263.
- Nicolini, D. (2010). Medical innovation as a process of translation: A case study from the field of telemedicine, *British Journal of Management*, 21, 1011-1026.
- Nicolini, D. (2011). Practice as the site of knowing: Insights from the field of telemedicine, *Organization Science*, 22(3), 602-620.
- Orlikowski, W.J. (2000). Using technologies and constituting structures: A practice-lens for studying technology in organizations. *Organization Science*, 11, 404-428.
- Orr, J. (1996) *Talking about machines: An ethnography of a modern job*. Ithaca, NY, IRL Press.
- Richards, G.S. & Duxbury, L. (2015), "Work-Group Knowledge Acquisition in Knowledge Intensive Public-Sector Organizations: An Exploratory Study", *Journal of Public Administration Research and Theory*, 25, 1247-1277.
- Riege, A. & Lindsay, N. (2006), "Knowledge management in the public sector: stakeholder partnerships in the public policy development", *Journal of Knowledge Management*, 10(3), 24-39.
- Shubber, M., Östlind, T., Svensson, A. & Larsson, L. G. (2018). Acceptance of Video Conferencing in Healthcare Planning in Hospitals, in *Proceedings of 24th Americas Conference on Information Systems*, New Orleans, Louisiana, US, Aug 16-19.
- Stentoft Arlbjörn, J., Freytag, P. V. & Thoms, L. (2015). Portfolio management of development projects in Danish municipalities. *International Journal of Public Sector Management*, 28(1), 11-28.
- Svensson, A. (2020). Identifying Motives for Implementing eHealth by using Activity Theory, *Sustainability*, 12(4), No. 1298.
- Szulanski, G. (2000) The Process of Knowledge Transfer: A Diachronic Analysis of Stickiness. *Organizational Behavior and Human Decision Processes*, Vol. 82, No. 1, pp. 9-27.
- Van Zolingen, S. J., Streumer, J. N. & Stooker, M. (2001) Problems in knowledge management: a case study of a knowledge-intensive company. *International Journal of Training and Development*, Vol. 5, No. 3, pp. 168-184.
- Watson, M. K., Pelkey, J., Noyes, C. R., & Rodgers, M. O. (2016). Assessing conceptual knowledge using three concept map scoring methods. *Journal of engineering education*, 105(1), 118-146.
- WHO (World Health Organization) (2018), *Ageing and health*, available at: <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health> (accessed 12 February 2019).
- Wibeck, V. (2000). *Fokusgrupper. Om fokuserade gruppintervjuer som undersökningsmetod*. Lund: Studentlitteratur.
- Woll, A. & Bratteteig, T. (2019). A trajectory for technology-supported elderly care work. *Computer Supported Cooperative Work (CSCW)*, 28(1-2), 127-168.
- von Krogh, G., Nonaka, I. & Aben, M. (2001) Making the Most of Your Company's Knowledge: A Strategic Framework, *Long Range Planning*, Vol. 34, pp. 421-439.
- Von Krogh, G., Nonaka, I. & Rechsteiner, L. (2012). Leadership in organizational knowledge creation: A review and framework. *Journal of Management Studies*, Vol. 49, No. 1, pp.240 - 277.