UNIVERSITY OF GOTHENBURG
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Master Degree Project in Management

The “easy” digital documentation system

A study of the complexities of implementing technology

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Master Degree Project No. XXXX
Graduate School

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Abstract

This article investigates the effects of the implementation of a so called “easy” digital documentation system in a low-tech environment. The implementation took place in the Care and Welfare organization, a municipal health care organization in Sweden. A qualitative approach was used throughout the study to explore the implications of the implementation. By utilizing an affordance and constraint perspective as well as literature on resistance to technology this study identified how technology users and non-technology users have created different affordances or constraints and acted upon them to either use or resist the system. Our findings show that users that have created constraints team up with, or use certain aspects of technology to resist technology. Furthermore, a second path within the perception of constraint was revealed in which the level of interaction with the new technology plays an important role. With limited interaction it is likely that the perceiver will refrain from trying to use the technology rather than attempt to mitigate their constraint perspective. Our study contributes to the resistance to technology and affordances literature with new insights on the types of constraints that people with limited technological experience generate to resist when they engage with technology in a low-tech environment.

Key Words

Resistance, Affordances, Constraints, Technology, Materiality, Digital Documentation System, Municipality

Introduction

In today's society using technological devices and digital systems has become something common, both in work and in daily life. Technology and digital systems have been around for quite some time, however it is still not obvious to everyone. What one person perceives as easy can be perceived as difficult to another. For example the functions of a smartphone may be more obvious to younger generations than to their grandparents (Davis & Chouinard, 2016). During recent years, rising demands for healthcare and capacity constraints have been pressuring public health providers to use information and communications technology to improve existing services (Barlow et al., 2006). When facing these demands managers of these organizations might non-deliberately implement a software which is viewed as a solution to the problem (Swanson & Ramiller, 2004). The challenge however emerges once the people who attempt to practically implement the technology face an entirely different journey than what was expected by management. Implementing technology can result in the change of traditional organizational constellations (Nilsen et al., 2016). By increasing the use of technology, changes may occur to the work patterns, division of labor and interaction patterns. As new technologies transform the roles and work practices in an organization, employees will create different perceptions in the form of affordances or constraints based on their past routines and experiences with technology (Leonardi 2011). When developing an affordance perception individuals might experience a sense of opportunity and begin to use the new technology. However, when developing a constraint perception the individuals might experience a sense of frustration and be unable to envision any potential benefits the implementation might have (Leonardi, 2011). It can be can argued that within the space of frustration employees might be motivated to act through resisting the implementation of the new technology. This in turn can lead to resistance behaviours if the employees view the routines brought by the new technology as threatening their current state (Lapointe & Rivard, 2005). Hence, the implementation is more of an interactive and messy process rather than a straight line from A-B, where powerful interest groups might influence the implementation process (Spyridonidis & Calnan, 2010). Furthermore, top management is often more inclined to have a comprehensive view of the change process than middle management. However, top management is often less inclined to understand the impact the change process has on the practice, whereas middle management has a more extensive understanding of how complex the implementation process can be (Spyridonidis & Calnan, 2010).

Technology implementations within healthcare seek to provide efficient, low cost and transparent processes which facilitate the development and exchange of information within the government (El-Haddadeh et al., 2013). The implementation of information and communication technology is perceived to be a crucial factor in making the documentation more efficient and cost-effective (Currie & Guah, 2007; Van Der Lei, 2002). For the National Board of Health and Welfare in Sweden (NBHW), one of the greatest challenges given its reach and importance is to find ways to manage and coordinate the documentation and social

care in an efficient and cost-effective way across organizational boundaries (Socialstyrelsen.se, 2019). It can be expected that this work is not exempted from resistance, seeing as resistance is something inherent to organizational life (Mumby, 2005; Courpasson, Dany & Clegg, 2012; Nilsen et al., 2016). When it comes to healthcare information technologies, not enough attention has been given to understanding it (Samhan & Joshi, 2015). If failed implementation attempts are to be reduced, resistance towards health information systems must be understood. By bridging the literature on affordances and constraints with the literature on technology resistance the development of a deeper understanding for resistance towards health information systems as well as the relational perceptions between technology and its users will be enabled (Leonardi & Barley 2008; Faraj & Azad, 2012; Evans et al. 2017). More research is needed regarding the competences and skills of health information technology users and how their structure and work processes are affected by the implementations (Nilsen et al., 2016). Most of the existing research on technology and resistance within healthcare has been conducted in hospitals, focusing on physicians, and other high-status workers (Nilsen et al., 2016; Lapointe & Rivard, 2005; Bhattacherjee & Hikmet, 2007; Ovretveit et al., 2007). Most of the technology affordances and constraints literature has also focused on high-tech environments (Leonardi, 2011 & 2013, Naar & Clegg, 2018). These studies often include new technology being implemented in an environment where the knowledge about, and experience with technology is relatively high. Little attention has been paid to the implementation of technology in municipal health care organizations (Nilsen et al., 2016), such as care and welfare organizations (nursing homes and home care services). These organizations are not as high-tech and generally perceived to have a lower "status" than hospitals, bearing the stamp of manual labor. Physicians hold a certain power in hospitals, whereas nurses and other staff in different healthcare organizations might not be able to have the same impact in their resistance activities (Lapointe & Rivard, 2005).

Considering that existing research has predominantly been conducted within hospitals and high-tech environments, this study contributes to the research on resistance to technology and affordances and constraints by focusing on assistant nurses working in home care services and nursing homes within the Care and Welfare organization, a municipal health care organization in Sweden. This is a single case study of the Care and Welfare organization implementing a new digital documentation system which was introduced as an easy and user-friendly technology. We refer to the system as "CareDoc". The main objective of this new process was to move from documenting on paper to documenting digitally, fulfilling the purpose of "*creating a common language, advance documentation and enhance quality*" (NBHW 2016). By exploring the effects of implementing a new digital documentation system in a non-digital environment where the majority of the employees have minimal technological experience, this paper aims to add to previous studies and illustrate the complexities of the implementation of a so called "easy" digital documentation system. Therefore, we will answer the following question: *How is a new digital documentation*

system perceived in a low-tech environment, and what are the consequences of these perceptions?

Theoretical framework

Technology Affordances and Constraints

The concept of affordances was first conceived by Gibson (1979) in the field of ecological psychology to explain the possibilities of action that species perceive based on their environment (Evans et al. 2017). For example, a lake can be a place to fish for a person but to a dog it can be a place to drink some water. In this case the object (lake) acquires a meaning depending on the perspective and conduct of the actor that interacts with the object (Leonardi 2013).

The use of the affordance perspective in technology was popularized by Norman (1988, 2007) who used it to emphasize that the designed features of a technology will shape how the technology is used. Whereas Gibson (1979) conceptualized affordances as fixed perceptions between an actor and an object, Norman stressed that the technology's features influence users to utilize the technology in a specific way. Furthermore as the technology encourages a particular way to act, Norman's perspective suggested an implicit communication between the technology and the user (Faraj & Azad, 2012). However, later studies argue that different affordances can surface from the interaction with the materiality of technology (Leonardi 2011; Evans et al. 2017).

Although Leonardi and Barley (2008) recognize that the material properties of technology, *materiality,* can create multiple affordances, they argue that materiality has a more significant role in organizational change. In their paper, the authors explain that materiality creates real constraints or affordances for users. The way a technology is presented to users is already shaping the way the users will interact with it (Orlikowski 1995). Additionally, Leonardi and Barley (2008) highlight the importance of understanding materiality to develop a deeper understanding of organizing. In other words, the notion of affordances can help in understanding the relationships in which the materiality of technology and the context in which technology is used are all potentially changing (Evans et al., 2017). Leonardi and Barley suggest that giving materiality a leading role in theories of organizational change can help explain *"...why people do the things they do with technology and why organizations and practices acquire the forms they acquire"*(2008, p. 172). Faraj and Azad (2012) agree that affordances provide a practical approach to study technological change in organizations in the sense that, it allows for a deeper examination of the material and socials' actions. Furthermore, the usefulness of the affordance approach in organizational studies derives from the attempt to recognize the materiality of organizational life and the technology infrastructure needed to create those practices (Zammuto et al., 2007). In their study the

authors suggest that only by considering the IT and organizational features simultaneously the value of the organizational form and functions can be found.

Furthermore, it has been expressed that affordances can appear as a result of using technology (Gaver, 1991; Leonardi, 2011). This usage encourages new processes of adaptation and experimentation in the organization which in turn will have an effect on how the technology is used. Orlikowski (2000) agrees that although users can utilize the technology's features as they were designed, they also create new ways of using the technology. By using the features differently or ignoring certain parts of them, the users generate new ways that enhance or even refute the designed features of the technology. Furthermore, the possibilities of the users are not determined by the materiality of technology but influenced by it in a recursive way (Evans et al. 2017). This relational view is further developed as Leonardi (2011) seeks to explain how employees, that are unable to achieve their current goals with their current means, decide to change either their routines or the technologies they use. The author begins by explaining that human and material agencies create both organizational routines and technologies. Since both routines and technologies are necessary for organizing, these practices become intertwined as they are enacted. Drawing upon the meaning of imbricate, which is "*to arrange distinct elements in overlapping patterns so that they function interdependently"*, Leonardi (2011; p.150) developed the concept of *imbrication* in order to refer to these intertwined practices. To create new imbrications in the form of routines or technology, employees rely on previous imbrications to generate perceptions of affordances or constraints. To conclude, Leonardi (2011) theorizes that people will either choose to change their routines or the technology depending on how the human and material agencies were previously imbricated. The results of his study showed that when an existing technology is imbricated with a new routine employees are more prone to change the routine. However, when an existing routine is imbricated with a new technology employees will likely change the technology. In other words, both types of perceptions lead employees to change either the technology or their routines.

Further practical information can be drawn from the artifact-subject relationship as the technology itself can afford particular meanings depending on conditions that enable or constrain the possibilities of action. Davis and Chouinard (2016) propose a relational model of how affordances work by building on a set of mechanisms and conditions. Mechanisms express ways in which the artifact affords or constrains, and conditions show different situations which shape the mechanisms. For example, an artifact can *request* when it proposes a particular direction for the subject but leaves room for another option. When an artifact *demands,* a certain line of action seems unavoidable to the subject. A technological artifact can also *encourage, discourage, allow* or *refuse.* These mechanisms are the artifact's responses to what the subject may want to do. *Encouraging* invites a specific action while *discouraging* inhibits a certain path. An artifact *refuses* when a line of action is declined and *allows* when several actions are available. Since affordances rely on artifacts, actors, and situations, the second part of Davis and Chouinard's framework suggests three conditions

which shape each of these mechanisms. The first condition is *perception,* which alludes to how the artifact is understood by the subject. The second is *Dexterity,* this is what can be done with the artifact. Finally, *cultural and institutional legitimacy* is the social and structural context in which the subject-artifact relationship happens. Evans et al., (2017) created a similar framework to further develop the affordance perspective. In their paper they constructed a systematized approach to define the criteria that an affordance should meet to facilitate a clearer approach to the application of the concept. These criteria can be used to assess the proposed affordances, ensuring that they are in fact affordances and not something else. The criterias are as follows: (1) the affordance is not a feature of the object or the object itself. (2) The affordance is not an outcome. (3) The affordance has variability.

By assessing affordances before the term is used and utilizing definitions which refer to the concept's relationality, materiality, and dynamism, the understanding of "*how artifacts afford, for whom and under what circumstances"* is enhanced (Davis & Chouinard 2016; p. 241). Taking circumstances into consideration is vital in the sense that, an artifact can *allow* one user what it *refuses* another depending on the context in which the affordance or constraint take place. In other words, the condition has a major role in affording or constraining the actions of the subject and creating possible resistance when using the artifact. When key constraints discourage employees from engaging with the new technology, a space in which individuals might experience a sense of frustration is created (Leonardi, 2011). It can be argued that within this space of frustration an employee might be motivated to act through resisting the implementation of the new technology. Therefore, exploring the possible connections between resistance and constraints might prove to be a fruitful way of expanding the affordance and constraint literature.

Technology and resistance

While the affordance perspective focuses on how technology affords and constrains (Leonardi & Barley 2008; Leonardi 2011, 2013; Evans et al. 2017; Faraj & Azad 2012), technology resistance literature focuses more on how the humans resist technology. Both approaches focus on the dynamic relation between humans and technology (Lapointe & Rivard, 2005; Leonardi 2011, 2013).

Resistance is no stranger to organizations, it is deeply rooted within organizational life (Mumby, 2005; Courpasson et al., 2012; Nilsen et al., 2016). Resisting change has been viewed as an attempt to preserve the status quo (Courpasson et al., 2012). Traditionally, the concept has been viewed as something that must be overcome, a negative force restraining and leading workers away from supporting the changes proposed by management. Nilsen et al. (2016) define resistance as interfering or obstructing the process of organizational change through behaviours, such as exclusion, actions and attitudes. This definition will be adhered to throughout the paper.

Resistance emerges when the interaction between the initial conditions and object of resistance leads to perceived threats (Lapointe & Rivard, 2005). In other words, the implementation of a new digital system (object of resistance) that threatens to change the established routines or the original power distribution (initial conditions) will most likely be met with resistance. In their bottom-up resistance model Lapointe and Rivard (2005) theorize that resistance might begin with a lack of interest, complaints or passive resistance behaviors. In the later stages this can evolve in to coalitions being formed. As the intensity of the resistance behavior increases, the notion of the perceived threats also changes. In the early stages of resistance perceived threats are expressed individually by each of the people involved (compilation process). In the later stages the perceived threats are manifested at a "unit level" or by a group of people that collectively perceive a threat (composition process). According to Lapointe and Rivard (2005) resistance behaviors will have a greater impact on the implementation when they stem from group level rather than individual level. These perceived threats are also viewed as expected consequences in events of resistance. The object of resistance or initial conditions can be changed by triggers, such as outcomes of system use, system supporters' reactions to resistance, or implementation related events. Since the model is dynamic the process will repeat itself continuously as triggers activate latent initial conditions which in turn change the object of resistance along the process.

The nature and intensity of the resistance towards technology also depends on a person's previous experience with technology (Nilsen et al., 2016). Based on these experiences users are again likely to make changes to either the initial conditions or the subject of resistance, as the implementation process progresses. This means that the nature of the resistance changes with the process of implementation and that it can be both functional as well as dysfunctional (Lapointe & Rivard, 2005). The former occurs when the implementation of a system that would generate negative effects is prevented through resistance. This has also been referred to as productive resistance by Courpasson et al. (2012), which is when protests unfold through resistance by the actors involved or non-institutional channels such as unions. The authors explain that resistance tends to be productive when it challenges the regular power relations and is based on certain established and legitimate relations of knowledge and power (Courpasson et al., 2012). In other words, the resisters show that in some situations the workers know more about what would benefit the organization than the managers as these protests bring forth interests which are usually not considered in management decisions. The goal of productive resistance is to promote different management practices likely to be in the interest of the organization as a whole. Hence, resisting activities can affect top management leading to the achievement of notable organizational change. Likewise, Nilsen et al. (2016) conclude that resistance does not solely need to be a negative phenomenon. Through a co-creation process resistance can appear to be playing a productive role. The character of the resistance changes over time and contributes to innovation and development through the disharmony that was created.

However, from a managerialist perspective resistance can be viewed as dysfunctional and is found when the implementation requires too much time, attention, and generates conflict (Lapointe & Rivard, 2005). Technology implementation can become complicated when there is a lack of interest from the workers as well as a lack of training (Lluch, 2011; Nilsen et al., 2016). Other main barriers to the implementation of new technology are lack of time and absence of computer skills (Lluch, 2011). These barriers can be mitigated by focusing on developing skills, changing the workflow, training the employees and appointing a system champion. Most importantly support and a shared vision on different levels (management, colleagues, IT support and policy level) in the organization is needed. Typically, a user-friendly system requires less training, however training can be viewed as a method to engage users and promote user involvement (Lluch, 2011).

Method

Introducing The Care and Welfare Organization

The study was conducted within a Swedish municipality. A swedish municipality is the local government organization responsible for the administration and execution of local matters, such as education, health and planning of the region (Regeringskansliet, 2019). The case organization for this paper was the Care and Welfare organization within the Social Service Center. This organization aids senior citizens who need help to perform their daily activities. The structure of the organization is illustrated below in Figure 1. There are two divisions: nursing homes and home care services. The organizational structure consists of an operations manager, two development managers (one responsible for home care and the other for the nursing homes). Each home care unit and nursing home has its own unit manager and employees. The units consist of three to five subdivisions, each with one group leader and four assistant nurses. In each group there are one to two assistant nurses or group leaders who have the role of being documentation agents. Being a documentation agent means being responsible for ensuring that the documentation is done in an appropriate and accurate manner.

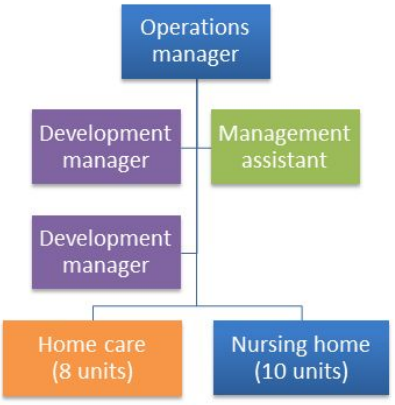

Figure 1. Showing the organizational structure of the Care and Welfare organization.

Previously, when the assistant nurses only documented on paper the documentation agents used to summarize all notes and document them in a system called ProDoc. In other words, what the assistant nurses and group leaders used to document on paper was always examined and rewritten when documented in the medical journal. When using CareDoc, all documentation and notes go straight to the medical journal once they have been signed by the writer. Meaning that the assistant nurses and group leaders are now required to write directly into the medical journal, previously something only the documentation agents had done.

Since the documentation agents have worked with digital systems before and have more experience in documenting digitally, they have been selected to become extra responsible for implementing CareDoc. Their role now includes going to additional education and information-meets with updates about CareDoc and passing on the information to their colleagues (assistant nurses and group leaders). Moreover, the documentation agents are responsible for teaching and supporting their colleagues in CareDoc. The assistant nurses have previously not been forced to work with digital systems, they do however have email accounts and some are responsible for ordering food and supplies online. The group leaders as well as unit managers work with digital systems which have to do with staff-administration and are quite used to working with computers.

Research design

The choice of the case organization originated from the curiosity to study the implementation of new information technology systems in the public sector. A strong factor which encouraged us to consider the public sector was the transparency in their activities. It appeared that the study of an implementation within such an organization would allow us to reach vital participants and stakeholders involved in the process. As we began the study and became familiar with the IT-system and its main users, we realized that the particular context offered an opportunity to study IT in an environment where the exposure to it was relatively low. Consequently, our focus shifted to evaluating how the implementation of a digital documentation system unfolded in a low-tech environment, as well as studying what effects and consequences could result from such an implementation. To study these effects a qualitative methodology was employed. A qualitative method is a useful approach to analyze the relationships between behaviours and actions by using different data collection methods (Silverman 2011). Based on this we gathered information from interviews, documents and minor observations in order to develop a qualitative case that will enable a greater understanding of the situation (Flyvbjerg 2006). According to Kvale (2006) interviews offer a powerful tool to explore people's lives, which is why we decided to have interviews as our main method for gathering data. Documents and minor observations were used to complement the interviews.

The data was collected in the field since it enabled us to acquire a broader comprehension of the context in which the study unfolded (Flyvbjerg 2006). Therefore, all the interviews were

conducted within the facilities of the interviewees' workplaces, in order to get a hold on the different components which create their context. The data collection process consisted of four phases which lasted eight weeks. The first phase was meeting the contact person and conducting a preliminary interview in order to grasp the case and its setting. In this phase we received information about the organization both orally and in the form of internal documents. In phase two we began to conduct interviews at the different units as well as the municipality office. Once we acquired a better understanding of our case we were able to request who we would like to interview. These interviews included employees from each of the levels which we had requested. After conducting fourteen interviews we initiated phase three by reviewing the data and discussing which type of employees we would like to interview more. Finally, in phase four we conducted the remaining interviews with employees at different units and levels.

Data Collection

The initial approach to the case was through our contact person who works in the municipality. During our first meeting the contact person provided general information about the municipality, digital documentation system and the people involved in the implementation. Documents were collected from the municipality office and they consisted of powerpoint-slides, manuals from the first introduction to CareDoc, as well as other information about the system. These documents were analyzed at the beginning of our study in order to gain an overview of the case and organization. We requested interviews with employees in different levels of the organization in order to gain a comprehensive perspective of the implementation. The selection of interviews was done by our contact person sending out requests for interviews to the different units. Based on time and capacity, a total of 28 interviews were conducted at the municipality office, three nursing homes, and one home care unit within different positions shown in table 1.

Unit		No. of interviews
Nursing home (A)	Unit manager	1
	Assistant nurse	2
	Group leader & Documentation agent	1
	Documentation agent	1
Nursing home (B)	Unit manager	1
	Assistant nurse	3
	Group leader	2
	Group leader & Documentation agent	1
	Documentation agent	3
	Work pedagogue	1
Nursing home (C)	Unit manager	1
	Assistant nurse	3
	Group leader & Documentation agent	2
Home care unit (D)	Unit manager	1
	Assistant nurse	2
	Group leader	1
Municipality office (MO)	Development manager	1
	System administrator	1
Total:		**28**

Table 1. Showing the amount of interviewees interviewed within each division and position.

Seeing as we only conducted interviews at units which had time to set aside for us, we might have missed out on units struggling more with the implementation assuming that these wouldn't have time to meet us. Furthermore, because the different units knew we were conducting a study about the implementation of CareDoc, which is still an ongoing process, we acknowledge the limitation that interviewees might have answered something other than what we asked for, or that they simply said something they believed that we wanted to hear (Kvale, 2006).

The people interviewed were development managers, system administrators, unit managers, documentation agents, group leaders, assistant nurses, and work pedagogues. As we finished interviewing the first couple of respondents we gained increased knowledge about the case and were therefore able to request interviews with actors we deemed relevant to our study. This method has been referred to as the snowball sampling method and is used to ease the process of finding the next relevant respondent (Basiouka & Potsiou 2014). All the interviews were done individually and in person. Each interview lasted between 30-60 minutes. We chose to conduct semi-structured interviews, which allowed the further development of interesting topics rather than having to keep to a strict scheme of questions. Some of the general questions we asked everyone were "How has CareDoc affected your work?" and "How was CareDoc introduced to you?". We asked top management questions such as "Who is responsible for the implementation of CareDoc" and "How is CareDoc being implemented in the organization?" This method does not influence the interviewee and creates more of a dialogue, even though interviews aren't real dialogues (Kvale, 2006). The majority of the employees prefered to do the interviews in Swedish. Since it was important to us that they expressed themselves properly and comfortably we agreed to these terms and translated the interviews during the process of transcribing. No notes were taken during the interviews other than the recording. It was important to us that the interviewee felt comfortable so the conversation happened as natural as possible. Furthermore, by solely focusing on listening, and hearing what the interviewee said, posing relevant questions became easier and created a natural dialogue-like flow.

No large scale observations were conducted due to the confidentiality of the information in the digital documentation system. When the data was being collected, Bryman and Bell's (2005) four ethical principles were followed and presented to the interviewees in order to create a sense of security during the interviews. The principals are; Consent, Informing, Confidentiality and Usage. Before commencing the data collection, consent had been received from both the organization and each participant. Permission to record the interview, information about anonymizing names, the purpose of the study as well as information about not having to answer all questions was given to the interviewees prior to each session. Finally, it was explained that the collected data will only be used for research purposes.

Data analysis

When the data collection had been completed the documents were summarized and the interviews were transcribed within a week of conducting them. Silverman (2013) highlights the need to analyze the data as it is being collected in order to ensure that the preferred research method is suggesting interesting results. Based on this, we focused on making a detailed description of the phenomena in order to start with a preliminary comparative analysis of the field material (Glaser & Strauss, 1967). Consequently, as relationships began to surface from our data we decided to use a grounded theory approach in order to discover what the data was telling us (Martin & Turner, 1986). Grounded theory is a useful method when it comes to analyzing the type of data that was collected in this study: semi-structured interviews and case-study material (Silverman, 2013).

The first step in the grounded theory process was coding and it was done continuously throughout the eight week data collection period. Several general codes were created based on recurrent key words and our initial research interests (Bryman & Bell, 2011). Some of these codes were: experience, BankID, first implementation, and education. As the analysis progressed we developed more abstract codes which derived from more specific relationships found in the material. At this point we structured the current codes into categories, such as not having enough time, not having experience with technology, "easy" documentation system and outdated technological infrastructure. This new understanding encouraged us to reconsider our research aim and change several questions in our interview guide in order to receive more specific information about our new focus. This change was in line with Silverman (2013) as he suggests to make changes to the interview guide if needed since not changing the original research design after analyzing the data could mean a poor analysis in itself. According to Creswell & Miller (2000) a *triangulation* procedure can be used to validate if the data from interviews and documents converges and supports proposed categories. Therefore we chose to conduct a *triangulation* procedure which involved cross-checking the information in the documents and the interviewees' responses. The procedure between our two data sources further enabled us to validate our initial notion of the case and to support our interview questions.

After the first categorization mentioned above, we analyzed and recategorized the data one more time. During the second categorization, which involved all collected data, we found new categories: perception of inability, technology acting back, and teaming up with technology. The second half of the interviews included our new aim of illustrating the complexities of the implementation of a so called "easy" digital documentation system. The questions during these interviews were specifically aimed at obtaining accurate descriptions of how each of the interviewees interacted with and perceived the documentation system. The categorization during this phase resulted in the final codes and categories upon which we based our analysis. As Martin and Turner (1986) suggest, we completed the data analysis

before engaging in bridging our data with theoretical concepts. That being said, we proceeded to analyze our material using the affordance and constraint lens as well as literature on resistance to technology. This enabled us to answer our research question and contribute to the literature on resistance to technology as well as the affordances literature.

Empirical findings: Going digital

Introducing IBIC and CareDoc

In 2016 the National Board of Health and Welfare in Sweden (NBHW) presented a new work process called IBIC which stands for "Individens behov i centrum" and means "the individuals needs in focus". It is a systematic needs-focused work procedure for those working with adults of all ages and/or disabilities. Before IBIC the Care and Welfare organization had a not so different work process called ÄBIC which instead of focusing on the *individuals* needs, focused on the *elders* needs. ÄBIC was incorporated into IBIC by NBHW. It is not mandatory to implement however, it is recommended as it according to NBHW is better for the individual because it enables: comparability, clarity, participation, making needs visible and monitors development.

In implementing IBIC, the care and welfare organization faced one major change; going from documenting on paper to documenting digitally. Previously the organization's assistant nurses had not engaged in any digital documentation whatsoever. Documenting digitally is nothing new, however to the organization advancing documentation means going from documenting on paper to documenting digitally. There was a lot of pressure from top management to go digital as well as being one of the last municipalities to do so. Most municipalities made this transition several years ago.

When NBHW presented four different software systems for digital documentation the Care and Welfare organization chose CareDoc since they had worked with the company before. In CareDoc, the caregivers can make caregiving plans, see their care recipients' care history and document each individuals' caregiving in their medical journal. When getting started the caregivers were initially required to document deviating events and changes which might occur to the original caregiving plan. There were other things that could be documented as well, however the development managers and unit managers felt that documenting deviating events was a good place to start.

The caregiving plan is the basis of IBIC and the tool used to work in a systematic needs-focused way. When an individual is accepted into the nursing home the contact person (a member of the caregiving staff who is extra responsible for certain care recipients) sits down with them and discusses what the individual's needs are, what he or she needs help with and what he or she can do on her own. This caregiving plan is in written format and provides all information needed for taking care of the individual in the sense that a substitute

can read the caregiving plan and know exactly what the care recipient needs. In the home care units the caregiving plan has already been filled out by the care administrator who approves the care recipient.

The first implementation attempt

In the spring of 2016 the development managers at the care and welfare organization gathered the employees to an introductory education seminar about CareDoc. At the seminar the development managers went through IBIC, social documentation, how to write appropriately when documenting, a walkthrough of the new system CareDoc and provided manuals for working in the system. Previously, the documentation was conducted on paper and these papers were placed in each care recipient's individual binder.

When introducing CareDoc the development managers explained that BankID was going to be the way for the employees to log in to CareDoc. BankID is an electronic way of identifying oneself online using an app which can be downloaded to one's smartphone, computer or tablet. This function was chosen by top management because they viewed it as a safe way of logging into the system which contains confidential information about the care recipients. Furthermore, BankID was nothing new back then, the development managers were told by IT-people that it was a very common way to identify oneself online.

> *"BankID wasn't anything new back then. When we talked with competent IT-people they told us that BankID was a very normal and frequently used system for signing documents digitally. They told us that it was a safe way to identify oneself, so we listened to them. We chose it because it was a safe way to log in."* Development Manager (MO)

However most of the employees did not quite agree with using BankID. They felt that this new work process went against the rules and created problems at the workplace. Some felt that it was inappropriate for the employer to demand that the employees use their private mobile data and personal items to perform work-related tasks and that they should be provided with all they need at work. Also, using BankID at work on a private phone would entail the employees using their own mobile data since most units do not have Wi-Fi.

> *"I don't think we should have to use our personal items at work. We have rules, we are not allowed to use our phones during work hours but all of a sudden they made exceptions and changed a bunch of things just because it suited them. And it made me feel like the employer went against what they had decided from the beginning, and I was so against that, not towards the system itself and documenting digitally, but I didn't want to use my BankID."* Documentation agent (B)

The development manager who was also the presenter at the introductory education seminar, explained that the resistance towards using BankID was minor during the presentation. Some

asked questions, but there was no actual resistance at this point. However, the employees explained that as they went back to work and got to thinking and discussing what had been presented, the resistance grew. Not everyone had BankID, or a smartphone to download BankID on. Questions about who would have responsibility if the employees' BankID got hacked were raised. The top management replied that the organization would not be responsible in such an event. As the discussions grew, the union got involved as well, encouraging the employees not to use BankID while the employer was insisting they do.

> *"It became a huge thing for many I think. Some people accepted it and used their BankID, while others said 'hey, I don't wanna do this' partly because it can be viewed as something of value and personal. And some asked 'what happens if the computers get hacked? Who is responsible?' While the top management said that they're not responsible if something happens to our BankID and then employees said 'OK then we don't wanna use our BankID and so it was a stop in the implementation process. There was a time where it was like a feud. Our employer said we had to use BankID, the union said we shouldn't need to. Some employees had no problems with it, others had a lot of problems with it. So it was like divided in different opinions."* Documentation Agent (B)

Many suggestions were provided by top management to resolve the issue of logging in, for instance using BankID on the computers at work. However, one computer could only hold eight BankID accounts and the units did not have enough computers to provide this solution for their employees or the money to spend on buying computers for this purpose.

> *"There were a lot of suggestions, like you can have BankID on computers but you can only have eight accounts on one computer so then we would need more computers. And that costs money. And you've gotta consider the financials in all this too and how you go about implementing a new idea. It wasn't fully thought through."* Unit manager (A)

Not everyone resisted using BankID, some felt that it was a great solution and had a hard time understanding why other employees viewed it as a big problem. Other employees were just not bothered by using their BankID.

> *"...no one wanted to log in with their BankID, I guess I can understand that, but then again not really I mean everyone uses it when they shop online regardless of what website they use? And they didn't wanna use the municipality website? It's strange, but yeah you have a right to not want to. That's how it is."* Group leader and documentation agent (C)

The development managers were left with no choice but to search for an alternative way of logging in. The documentation agents got SIHTS-cards, which are electronic physical ID-cards that can be used to identify oneself online. This made it possible for the documentation agents to start working in the system right away since CareDoc was replacing

the system where they previously wrote documentation summaries called ProDoc. SIHTS-cards were only offered to documentation agents because they cost 800 SEK a piece and top management deemed it to be too expensive to provide all employees with them. The other employees had the options of either logging in with BankID, which some did, or not logging in at all. Most employees did not log in with BankID which according to top management made it hard to set the implementation in motion. Because of this, the development managers and unit managers decided to take a step back until they were able to provide a new way of logging in.

> *"In retrospect I would have wanted to know who logged in with BankID or if we could have started working with it but we and the managers kind of backed off until we got the second way to log in because it had become such a big event."* Development manager (MO)

A lot of employees were very critical to the first implementation attempt and felt that it was not thought through. Some also felt that the introductory education seminar was aimed at computer users more than non-computer users which are a big part of the organization. The assistant nurses had never been required to work in a digital documentation system or any other system at work before. Other employees wished that the development managers would have gathered more information before initiating CareDoc and leading the organization to the BankID chaos. The failed first implementation attempt set the tone for the attitude towards the implementation in general. There was a lot of frustration, not connected to digital documentation but to the way of implementing it.

> *"This new system was not presented well, they presented it as if everyone is super used to working with computers and that is not the case unfortunately. So that was my first thought; messy and not thought through. And it didn't start out good, and that set the bar and tone unfortunately."* Documentation agent (B)

A lot of employees felt like more employees should have been part of the process, not everyone but at least some. For example by being asked their opinions on certain aspects and having a discussion about what the system would be like, and whether or not BankID could be a good option for signing in.

> *"I think they should have thought about it more, find out opinions, maybe ask us what we want from it, what we expect, you know having a little discussion with us. Like about what we think, what our expectations are, what we think about using BankID. You know, have a discussion, a dialogue before they just decided."* Documentation agent (B)

The unit managers were not part of the process of designing the digital documentation system either. They didn't feel that they needed to have a big part, however they believe that it could have made a difference if they would have been able to give insights about the project. When

they found out that BankID was going to be used for logging in, they said "*well we wonder if this is going to work*". However, the development managers were not able to realize how big of a problem it could become, and the way to log in was already a done deal.

> *"We got to know that BankID was the only way to log in, and when they said that we said that well, we wonder if this is going to work. But we got this info when it was already a done deal. But we (unit managers) understood quite quickly that BankID would become a problem. Then again it is hard to be one hundred percent sure, but you can have a feel for it."* Unit Manager (B)

One unit manager mentioned that the flaw wasn't in choosing BankID, the problem was how BankID was presented at the introductory education seminar. Further she mentioned that if perhaps the development managers had explained BankID in a way that would allow the non-BankID users to understand its benefits, the resistance wouldn't have developed as much. She felt that by creating a management team they might have been able to capture more perspectives.

> *"We were not part of it and that is what is missing in a lot of processes: create a group, create a management team! The management team can take care of all the questions before you begin. And then maybe you could have caught some other perspectives..."* Unit manager (A)

CareDoc was to be implemented in both home care units and nursing home units. These units work differently and the same unit manager felt that it could have been valuable to get an input from managers working in different types of units.

> *"We have a home care perspective and a nursing home perspective. We work differently in the system, it would have been valuable to involve unit managers from both nursing homes and home care units to create a real management team."* Unit manager (A)

The development manager also felt that if they were to do it again, a risk and consequence analysis, as well as discussing with the unit managers and staff would be a good way to start. However, he had trouble with understanding the problem of logging in with BankID explaining that it is a known safe way to log in. He expressed that other nearby municipalities were already using BankID to log in, even organizations within the same municipality used BankID to log in to their systems at the time of the implementation.

> *"You think it's normal and safe, you have looked around how other municipalities have done it, a lot of other municipalities have BankID as well. But in retrospect I guess we would have needed a broader discussion. And maybe we should have developed a second way to log in beforehand as well since we did know that probably everyone did not have BankID. Then we could have introduced two ways to log in"* Development manager (MO)

Second implementation attempt

A two factor way of logging in was provided in the fall of 2018, approximately two and a half years after the introductory education seminar. The information was sent out by the development managers to the unit managers as well as posted online on the intranet. The information was further distributed from the unit managers to their employees at their monthly unit meeting. Top management did not initiate a new education seminar since they expected that the units had been sufficiently educated during the introductory education seminar. Now the top management expected the units to carry on with the implementation of CareDoc.

> *"Having a second introductory education seminar hasn't been verbally demanded. Our organization is pretty small and we are close, we're easy to call and reach. We are always pretty open, and it's no problem from our side to have a second introduction but it hasn't been demanded. And I would like to assume that people speak up if they think something is a problem, and are capable and know. I can't assume that people have forgotten something after two years. Maybe it's obvious for some people but not to me."* Development manager (MO)

A clear majority of the employees felt that they had forgotten what was taught at the introductory seminar and would have wanted a new similar education when the new way of logging in was introduced. Only the documentation agents, who began working in CareDoc right away, felt like they had not forgotten.

> *"I don't know if the education costs money, I think it would be great to have the same education one more time now that the two factor login works. Cause now everyone has forgotten of course"* Assistant nurse (C)

Some units requested more education, these units also set deadlines for when the papers were to be torn out of the binders. Units A, B and D set clear deadlines within the near future, unit C however did not set as clear or near deadlines. The units with clear deadlines seem to have come further in the implementation process than the unit without. Some employees felt that they would need deadlines in order to get started with the implementation.

> *"If someone says 'you have to do this now' to me, then I will do it. But otherwise I won't do it"* - Assistant nurse (C)

Other employees were not as comfortable with removing the papers right away and explained that the older employees had troubles with it. However, the deadline was still perceived as being something good.

> *"Having a deadline is good I guess, the group leader tore all the papers out of the binder and said 'now you only write digitally'. I wish she kept the papers and that we*

could write on both paper and in CareDoc, but she tore them all away. The deadline was good, but a lot of other people panicked, the older people panicked. But a deadline was fine to me, you just have to deal with it" Documentation agent (B)

CareDoc in practice

Access

The group leaders and unit managers have their own computers to use when documenting and doing other administrative work. The assistant nurses and documentation agents in nursing homes (who are not group leaders) normally share one to two computers per division where normally two to four people are working at the same time. In the home care unit it is a bit different because all the employees are at the office at the same time: in the morning, around noon, and before going home. At first, the home care unit had a laptop and a very old computer available for documentation, however this did not work out as the employees were forced to que during their break time in order to get a chance to document on the computer. As a result the home care unit acquired four new computers and placed them in a computer room.

In the nursing homes there were some complaints about not having enough computers as well as not being able to document in the same places as before. None of the nursing home units had working Wi-Fi in the living areas, meaning that when the employees needed to document, they had to go to the office area where the computers were located. Although some of the computers were laptops, not having Wi-Fi disabled the employees from documenting in the living area where the care recipients usually are, or in the lunchroom. Previously they were able to document in these areas, or any area, and often did by simply bringing the binders with them.

The employees explained that once they were sitting by a computer and were ready to document, other than having to go to the office area, the employees needed to log in to the computer, go into the intranet, find the CareDoc login page and log in. When the employees had documented something, they needed to completely log out of the computer in order for the next person to be able to log in and document. This was because the CareDoc account is connected to the computer login. On top of that, the computers were old and very slow. Some of the employees described the computers as ancient and antique, making writing on paper the faster option. Many employees argued that the process of accessing CareDoc took too long, and that they sometimes forgot what they wanted to document because of the time it took to get to a computer, turn it on, log in, and document.

"To log in you have to first turn on the computer, and it's slow so that takes time, then you have to log in to the computer, go to the intranet, search for CareDoc, open it, to the right it says 'page to log in' click on that and then you have to write your account information to log in. When you have logged in you have to find the care recipient's file which you want to document in, document, sign and then log out

again. But before you could just grab the care recipients binder, sit where you want and write" Documentation agent (B)

Not having Wi-Fi and using CareDoc also meant that the place where the morning staff briefed the night staff (and vice versa) changed. The employees explained that they had to sit in a small room where the computers were located because not having Wi-Fi disabled the portability of the laptop. Together the employees read what had been documented in CareDoc and wrote what was being said during the briefing. These meetings were previously conducted in the living area or lunch room with the help of binders. Having to sit crammed into a small room made the staff feel like they were missing out on nice morning moments together with their colleagues and that the exchanges of pleasantries faded.

"Every morning we have briefings and sit and chat and have fun like colleagues should. It's a nice moment. But now we need to do it by the computer which is stationary, so we all have to go into a little room and sit there crammed together on small stools and read in the system to see if something has happened. So we are kind of missing out on these nice morning moments with our colleagues. It would have been better with a little tablet or something so we can sit where we used to sit. Now the result is that we stop chatting with the colleagues like 'how was the evening yesterday'. That disappears, we read it in the system instead. And i think it's so important to talk to your colleagues, I'm afraid this is gonna get worse in the future." Documentation agent (B)

To ease the location problems, make documentation more accessible and less time consuming, many employees suggested and requested different functions such as getting notifications for all the entries made in one's absence. For example, when the employee logs in after being free over the weekend CareDoc shows five notifications about new entries that were made since the last time the account was online. The employees also suggested different tools, such as tablets and recording devices. Some employees mentioned that by having tablets they would easily be able to document from different areas of the nursing home - having the tablet close by all the time. A documentation agent suggested having the tablet in the kitchen.

"The Wi-Fi is not really working here otherwise we could move the laptop to the room where we usually sit. But that doesn't really work. I would want to have a tablet in the kitchen. I think that would make everything super easy. Then we could just log in and write on that." Documentation agent (B)

However, some employees acknowledged that there are different levels of experience with technology within the organization and that adding tablets could become complicated. Other employees mentioned that they wished they could have a recording device or record a note on a phone and that the note would automatically be entered into the system. They felt that this would minimize the risk of forgetting what happened since the time between the event and

documentation would decrease. An assistant nurse mentioned that a recording device would speed up the documentation process.

> *"With our old computers here, our old technology, it takes time to log in. I wish that we just had a phone we could record into that would automatically document into the system. Then nothing would be forgotten because it is easy to do that."* Assistant nurse (A)

Another problem that was brought up concerned the many substitutes that worked within the organization. The employees didn't know if or when the substitutes would be able to log in to the system since they did not have any accounts. The assistant nurses on the other hand already had accounts because they used them to register their work hours. However, the substitutes never needed accounts because they were not employed at the Care and Welfare organization. This raised some concerns amongst the employees since they had a lot of substitutes working with them, especially during the summer. The employees expressed that the workload for the regular employees working with the substitutes would increase because they would have to document for them. This was also made a reason for not going completely digital with the documentation in certain units, thereby delaying the implementation because they believed that the substitutes would not be able to log in.

> *"By summer my staff probably will be working in CareDoc. But even if everyone works in the system we can't take away the papers until the unit manager says so. And if we have substitutes we need to have the papers."* Documentation agent (C)

In units that moved on to only working in CareDoc within certain aspects solved the substitute issue by either having the substitute tell the regular staff what happened and then document it, or write it down on a piece of paper that the regular staff would then document. This however still led to the regular staff having more work to do. The caregiving plans written in CareDoc were printed out and placed in the care recipients rooms so that the information was easily accessible for not just the substitutes, but for the staff, care recipient, and care recipients relatives as well.

Technological experience

The level of experience with computers and other technological devices varied in the organization. Some were very used to working with computers, smartphones, tablets, and other devices, while others were not as comfortable with this. Generally the documentation agents, group managers and unit managers were used to computers and software programs since these were part of their day-to-day work. However, as previously mentioned assistant nurses were not required to use any software system besides the one where they reported their work hours. Some were responsible for ordering food and appliances which was done online as well, but other than that they had no computer or technology related work tasks.

Those who were used to working with computers and other technological devices had a positive reaction to the implementation of CareDoc. Many explained it as something they had been waiting a long time for and were happy about it finally being implemented. Some positive aspects about CareDoc according to these employees were that it had a spell-check function, it enabled emailing confidential information, and that everything could be found in the same place.

> *"It's much smoother since everything is in the computer, it only takes ten minutes to go through everything, instead of looking through twelve binders."* Assistant nurse B

Previously the notes and caregiving plans were spread out in separate binders for each care recipient. Furthermore, using CareDoc meant having digital caregiving plans which enabled the employees to edit them without having to completely redo them as they had to with the paper versions. However, the employees explained that the caregiving plans in CareDoc looked quite different from the paper versions, and that it was difficult to know what to write where. They further explained that they hadn't received any directions about how to fill out the caregiving plans which had led to some differences between the subdivisions and units. In CareDoc the caregiving plan was filled out using different boxes with pre-decided headings, such as washing, eating or daily routine. In some nursing homes they wrote the whole caregiving plan in the daily routine-box, leaving the remaining boxes for allergies or other special instructions. In other units they only wrote which activities the care recipients had attended in the daily routine-box and the rest of the information was written in the remaining individual boxes.

Many employees described CareDoc as a super easy system to use and learn. They explained that it was easy to get a quick overview of the latest entries, for example if an employee had been free during the weekend, that employee could type those dates into CareDoc and receive all the notes made during his or her absence. The notes would be arranged in the order of dates with the latest notes first. Other than the system being smooth, employees also expressed that reading became easier as they no longer needed to attempt to read handwritten notes.

> *"We had to do this manually before, see the dates on the papers make sure they were in the right order and that takes time as well. But in CareDoc, the latest things appear first, and then it's easier to read digitally because on paper people have different handwriting styles."* Assistant nurse (A)

Many felt that it was a relief to not have to work with paper anymore, as well as it being good for the environment. Previously, when a care recipient got sent to the hospital the staff had to manually gather all the journal papers, copy them, and send them to the hospital via the internal postal service. With CareDoc the employees are able to mark the care recipient as being at the hospital by ticking a box in the system. This function also sends the care

recipient's journal to the hospital automatically, eliminating the excessive paperwork. The unit managers were especially content about not having to work with papers. Now they can easily review and sign caregiving plans in CareDoc without having to search for them in the binders. Furthermore, when a care recipient passed away, previously the unit manager or group leader would have had to collect all the papers in order to send them to the archives. With CareDoc everything is done digitally. The care recipient gets "terminated" in the system by the unit manager or group leader, and all files get archived automatically. However, the new issue according to one of the unit managers was that it became easier to make mistakes, for example by terminating the wrong care recipient or writing the wrong name.

Although many employees felt that CareDoc was something easy and anticipated, not all employees felt this way. Other than being inexperienced with technology many assistant nurses mentioned that they thought CareDoc was tough and that they were afraid of computers. Since the assistant nurses are not used to using computers, they were afraid of messing up in CareDoc and they generally prefered using paper and pen. Some of this fear seemed to stem from the documentation now being directly registered in the medical journal rather than being rewritten by the documentation agents. Even though according to top management; *what* to write and *how* to write were things the assistant nurses were required and expected to know when documenting on paper, these were the most frequently asked questions during the transition to CareDoc.

Based on the Social Services act (SoL) the documentation must be fact-based, include enough information, not include any personal opinions or abbreviations. This is especially important because the care recipient always has the right to read the notes. With the safety net of the documentation agent rewriting notes removed, there was a fear of making mistakes in the medical journal, as well as misformulating the documentation notes and risking misunderstandings. Some employees did not have Swedish as their native language and were especially worried about writing directly in the medical journal. Once a note is signed it will remain in the medical journal forever. The note can not be deleted, but it can be crossed out. These routines were the same on paper however, the employees explained that people seemed to have scribbled over the mistakenly written note more, making what it said less visible. In CareDoc the note is only crossed out with a thin line, allowing it to still be readable. This is why it is essential not to include any personal opinions or other inappropriate information. Many employees explained that in the case of any insecurity about the note one could ask a colleague to examine it before signing. Furthermore, when it comes to inappropriate words, CareDoc is equipped with the function of detecting such words. If something offensive is written in the note, the system will object by disrupting the writing and displaying a warning triangle.

The implementation of CareDoc was not going as fast as top management and unit managers expected. Some employees questioned why the transition to CareDoc was needed, why they couldn't continue working with something that had worked for so long (paper and pen). A lot

of assistant nurses had expressed that they would have wanted more information about why CareDoc was being implemented. Furthermore, all units described the average age at the Care and Welfare organization to be around 50 years old and used this as one of the explanations for not being able to implement CareDoc sooner. Some older employees said that they were not used to working with computers in the same way as the younger people were. According to them, the younger employees had worked with computers in school and were not afraid of testing the system out. However, not everyone viewed CareDoc as making things easier, for some the transition to working on the computer was a huge step.

> "*Younger people are basically born with technology, they know how it works. My generation is not like that, we have to keep up! When you are a bit older it is not obvious, it doesn't matter if it's about phones or computers.* Unit manager (D)

Those who perceived the system as being easy suggested that those who viewed CareDoc as something difficult did so because of incompetence and a lack of knowledge. A young assistant nurse insinuated that using CareDoc is easy and that one can't make that many mistakes when using it.

> *"Everyone doesn't want to sit down and work with it because they don't know how. But it's just to press the buttons a little, you can't mess up that much".* Assistant nurse (D)

Having time

Time was a recurrent topic in all units, some felt that documenting in CareDoc took less time, some felt that it took more time. Some felt that it took time away from being with care recipients since they had to go to the office area in order to document. Others felt that documenting in CareDoc simply took too much time because it took too long to log in or because the computers were old. When it came to these issues the units displayed some differences.

Unit A - Nursing Home

The manager in unit A prioritized making time for the employees to learn how to use CareDoc. She explained that not having time for documentation hadn't happened yet, and that it wouldn't happen as long as employees planned for it. During the implementation of CareDoc the group leader-documentation agent who was responsible for the schedule made sure that the amount of employees didn't stray too far from the regular amount. "*It's all about planning"* the group leader said. The staff was encouraged to document during the afternoons when the care recipients usually sleep, and to write down any notes during the morning on their notepad so they wouldn't forget. The assistant nurses were in agreement with the unit manager and group leader about having to make time for documentation. The staff felt that finding the latest notes in CareDoc took longer than going through the binders because

turning on the computer took long. However, they acknowledged that this might have been due to the old habit of looking through the binders.

Unit B - Nursing Home

In unit B there was a need for more time to document. A documentation agent mentioned that having scheduled documentation time would enable the staff to feel like they had time for documenting, rather than stressing about planning for it during the day. Generally the staff felt that documenting on paper was the faster option and gave them the most time with the care recipients. Furthermore the caregiving staff felt that they had other work tasks besides documentation that needed to be done. To them CareDoc became yet another task on their long list of things that needed to get done other than being with the care recipients. A documentation agent explained that if time wasn't made for documentation during the day one would need to spend an extra 10-15 minutes documenting after work.

> *"You have to make time for the documentation so you might work overtime or miss something because you have to sit and document. I don't think it's great because you also need to give the report to those working evening first, and sometimes there is only one who can do that, so most often you need to stay and work over time 10-15 minutes because there isn't really time.* Assistant nurse (B)

When it came to learning CareDoc, one group leader mentioned that she had made sure that everyone got the time they needed with the documentation agent and the opportunity to learn how to write caregiving plans in the system. She explained that she did this by making sure that there was enough staff in place so that a documentation agent and assistant nurse could leave the living area and go through CareDoc in peace.

Unit C - Nursing home

The staff at unit C felt that it was hard to find time for documentation and that they would rather be with the care recipients. The employees explained that it was hard to find time before the implementation of CareDoc as well. The documentation at the unit was done on paper and in the systems simultaneously. There were still quite a few who had not logged in to CareDoc and documented. Even though they had been encouraged to start working with the system, they turned to documenting on paper because it was the faster alternative. The unit manager felt that it was hard to get all employees to document because it takes time from giving care.

What was documented on paper needed to be documented in the system as well. This was done by the group leader on her administrative day or every other weekend when there was more time. Sometimes other employees working in CareDoc helped the group leader out by registering paper-notes in the system. The group leader wanted to have scheduled time for documentation to discourage the excuses of not having enough time to do it.

> *"I want to have scheduled time for documentation. Then no one can say that they don't have time because then I can say, now this time is meant to be for this. Or like if*

> *you put it on the schedule everyday, 15 minutes for documenting - everything that has happened today. I think that's a good idea. Then you know that you have do that for 15 minutes."* Group leader (C)

Unit D - Home care

As previously mentioned, the home care unit is a bit different from the nursing homes in the sense that the employees spend their work hours visiting the care recipients in different homes. This means that the only time the home care unit staff has for documenting is when they are at the office which is in the morning, before and after their lunch break, as well as before they go home. The employees felt that it was hard to find the time to document. According to the unit manager, the implementation of CareDoc was challenging due to the unit being understaffed. This resulted in the employees continuing to document in the way they knew best - on paper. One employee then typed all the paper-notes into CareDoc.

> *"We never get anywhere, we start and then there is no time for it. Then people do it the way they know and that continues. We only have one who enters information into the system. She fills in everything in CareDoc. But yeah, it's hard to find time.* Group leader (D)

Municipality office

According to the development manager, not having time has been a recurrent complaint for the past decades. Employees have felt stressed and under pressure, which the development manager explained as completely understandable. However, the employees work eight hour shifts and according to the development manager, the documentation should only take around 15 minutes. He further explained that in the nursing homes there are in general more opportunities to document since the staff and care recipients are at the same location. Whereas in the home care units, there is a sense of constant strain since the amount of care recipients continues to increase. There is no actual limit for the amount of care recipients in home care units, however nursing homes have a fixed amount.

> "*There have always been complaints about not having enough time. Many feel stressed and under pressure, and I fully understand that. I do however argue that there are opportunities and possibilities to write a caregiving plan as well as documentation notes. Sure, going to the computer and logging in takes a while but you often have eight hours to do this, and events that need to be documented don't even happen everyday. It's only when something deviating has happened.* Development manager (MO)

Discussion: The "easy" documentation system

In an organization where the majority of the employees lack computer experience, presenting a new digital documentation system as something "easy" can cause some friction. Since people are influenced by their previous understandings of technology their reactions will be affected by the way the new technology is presented to them (e.g. Orlikowski, 1995).

Resistance based on perceptions of constraints

In the case of CareDoc the first resistance occurred with the introduction of BankID, something that for many was an obvious tool for logging in but was unknown to others. The introduction of this new material agency threatened to develop new routines which is in line with what Leonardi (2008 & 2011) and Lapointe and Rivard (2005) have found. Although BankID and CareDoc are technologies that can function individually, BankID was essential to the initial implementation of CareDoc because it was the only way to log in to the system (apart from SITHS-cards).

The education seminar was the starting point for the shaping of perceptions in the sense that it was the employees' first encounter with the new material agency. The way the introduction was conducted and how both CareDoc and BankID were described as "easy" and user-friendly by the top management, influenced the employees' perceptions of the technology (eg. Orlikowski, 2000). The documentation agents were able to access the system in the same way as they used to with ProDoc. Viewing this through Lapointe and Rivard's (2005) resistance model, the interaction between the documentation agents' initial conditions and the object (BankID) did not produce any perceived threats. This allowed for the documentation agents to be more likely to accept and use the technology (CareDoc) rather than resist it.

Affordances and constraints work by the technology being perceived to *demand, request, encourage, discourage, allow* or *refuse* based on the individual's' *perception, dexterity* and *the cultural and institutional legitimacy* (Davis & Chouinard, 2016). When BankID *encouraged* the unit managers and top management to log in to CareDoc, they perceived this access tool as affording increased efficiency and security when logging in and therefore chose to do so. On the contrary, the employees with limited technological experience were *discouraged* by BankID based on their *dexterity* and the *cultural and institutional legitimacy.* They did not perceive the system to be as easy as explained, and the education seminar resulted in more confusion than clarity. Most of the assistant nurses and group leaders' past imbrications were different from the documentation agents, unit managers and top managements' in the sense that they had less technological experience. With the implementation of BankID the assistant nurses viewed their initial conditions (established routines) as threatened by the object of resistance (BankID). The perceived threats they described were having to use their own phones and mobile data to do their job. The resistance in the form of complaints emerged (eg. Lapointe & Rivard, 2005) as the assistant nurses perceived constraints in the form of 'lacking technological infrastructure'. Drawing upon Leonardi's (2011) argument that a new material agency is likely to change when it imbricates an existing human agency, the complaints can be viewed as attempts to change the technology which in turn would lead to a different way of logging in.

Discussions about the technology progressed, as the employees began to share their individual conceptions and complaints about using BankID they realized that they had shared perceived threats. This can be viewed as the composition process of emergence explained by Lapointe and Rivard (2005), since the resistance behavior became clear once the employees had talked to each other and collectively perceived threats. The union advising the employees not to use BankID can be viewed as the trigger stage in Lapointe and Rivard's (2005) resistance model, where the union's actions influenced the creation of new initial conditions and the change of the object of resistance. This in turn led to the employees' perception of constraint growing to a point where BankID had to be replaced with a two factor login for the employees to be able to access CareDoc. This decision to change part of the technological infrastructure was in accordance with Leonardi's (2011) argument, as an existing human agency (documenting on paper) was imbricated with the new material agency (having to use Bank ID to log in to CareDoc) which led to the new material agency changing (going from BankID to the two factor login). The employees who perceived BankID as a constraint based on their perception of 'lacking technological infrastructure' teamed up with the existing technological infrastructure to resist BankID. In other words, the technological infrastructure was used as motivation helping the resistors in reaching new initial conditions more similar to their previous conditions. In turn, the employees perceived this as benefitting the organisation as a whole, therefore the two factor login can be viewed as a product of productive resistance (eg. Courpasson et al., 2012). For top management however, the implementation created conflict which through a managerialist approach can be viewed as a factor contributing to dysfunctional freezing (Lapointe & Rivard, 2005). Hence, the implementation came to a halt.

The second path within constraints

After two years, the two factor login *encouraged* the employees to log in to CareDoc and begin documenting digitally. This created a change in the technological infrastructure which set aside the previously mentioned constraint of 'lacking technological infrastructure' leading to the new initial conditions of documenting digitally. As the units began to interact with CareDoc different outcomes emerged. Some units perceived CareDoc as being efficient and got inspired to begin the implementation by setting deadlines. In the process, CareDoc *demanded* that the employees know how to use the system. This led them to improve their *dexterity* by asking top management for additional education about the new technology and its features.

On the other hand, unit C perceived CareDoc as *demanding* changes to their existing routines and perceived the change in the technological infrastructure as a potential threat. At this point the object of resistance shifted from BankID to CareDoc. CareDoc *demanded* that these employees know how to use its features and that they follow a specific line of action in order to be able to document. However, the employees perceived a constraint in the form of 'inability to use the features' which led to a passive resistance behaviour. Instead of responding by asking for more education the employees expected top management to provide

a second education seminar. By not being able to use the system the employees were unable to see potential benefits with the system or experience that it generated any improvements from their previous routines. From a passive resistance perspective, the employees were not trying to use the system or voicing their inability to use it either (Lapointe & Rivard, 2005). Rather, they used their perception of constraint to refrain from attempting to use the system since they couldn't see the benefits of trying to mitigate the constraint and they were not pressured by deadlines to do so. Building upon Leonardi's (2011) conclusion that a material agency is likely to change when it imbricates an existing human agency, we found that when the perceiver has had limited interaction with that which is perceived to constrain, and is not under pressure to interact with it, no actions in the form of changing the new material agency will be taken. Rather the constraint perspective leads to the new material agency being perceived as a block of cement which can't be moved. Instead of attempting to move it, the perceiver walks away from it. However if the interaction with the block of cement is increased or forced through deadlines, the perceiver might begin to view it as something that can either be moved or used. In other words, the perceiver can continue to have a constraint perspective and begin to change the new material agency or, the increased interaction might help the perceiver to create an affordance for the new material agency and begin to use it. The figure below illustrates this second path found within the perception of constraint leading to the block of cement, and how we build upon Leonardi's (2011) conceptualization regarding the actions following the construction of affordances (usage) and constraints (changes to the new material agency).

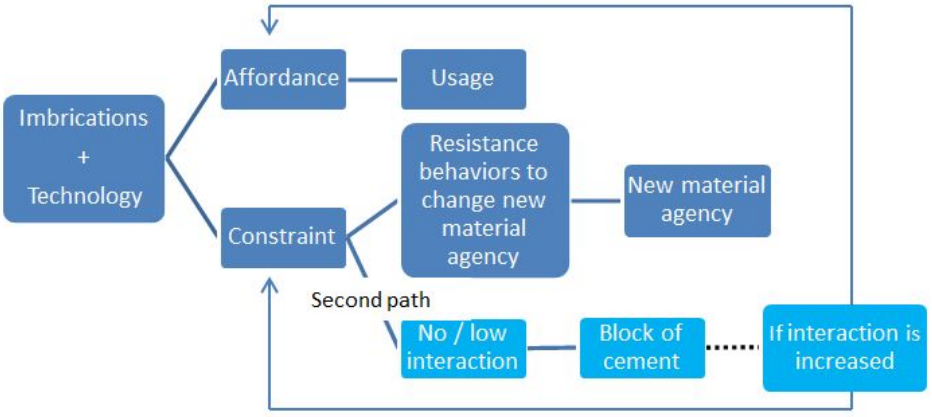

Figure 2. Illustrates the second path found within the perception of constraint leading to the block of cement and how increased interaction can lead back to the creation of an affordance or a constraint.

From a top management perspective, the employees not requesting more education slowed down the implementation since top management had assumed that the employees had already been sufficiently educated. CareDoc was an easy system requiring minimum education according to top management. Perhaps no more education was requested as a consequence of fearing being labeled as not remembering how to use the so called "easy" documentation system. In any case, in line with Lluch (2011) more education was needed, not only to educate but also to promote engagement and user involvement, especially with the employees lacking computer skills.

Using the technological infrastructure to resist

Accessing CareDoc was about more than just logging in, it was about having the technological infrastructure in place as well. CareDoc *demanded* that the employees change their routine of documenting anywhere at work. This because the materiality of the technology bounded the employees to the computers in the office area (e.g. Leonardi, 2008; Orlikowski, 2000). During the implementation of CareDoc the employees began to experience common consequences within health care as presented by Nilsen et al. (2016), such as not having enough time with the care recipients or having to work overtime. Resistance emerged through complaints and passive resistance behaviours, such as not using the digital system when the option of paper was still available. Furthermore, CareDoc *requested* that the employees have their briefings in the office area because that was where CareDoc functioned. The employees viewed this as a constraint in the form of 'lacking technological infrastructure' as the office area was too small and uncomfortable, and to document in more comfortable areas the units would need Wi-Fi. Resistance towards this emerged in the forms of complaints and passive resistance as well. Some subdivisions resisted this by conducting the briefings according to their previous routines which were without the technology. At this point, the resistance was no longer individual nor passive as the employees' actions were purposefully not involving CareDoc because according to them, the technological infrastructure would not allow it. This resistance was justified once again using the materiality of the technological infrastructure. By complaining about the technological infrastructure being insufficient for the usage of CareDoc, the employees used technology to their advantage when resisting technology being implemented.

The resistance towards documenting and having briefings in the office area can also be referred to as resistance towards working without Wi-Fi. This in turn can be viewed as a process of productive resistance since the top management didn't seem to have considered Wi-Fi before the implementation. In line with Courpasson et al. (2012) new information was brought to the attention of top management influencing them to reconsider their initial decisions. Top management recognized the need for Wi-Fi which led to most units initiating the process of purchasing it in order to ease the usage of CareDoc. Put differently, the technological infrastructure was being changed to become more like the employees' previous routines. In accordance with Leonardi (2011), the Wi-Fi was the change in the technological infrastructure that came from the new material agency (briefings using CareDoc) imbricating existing human agency (briefings using pen and paper). Wi-Fi was viewed as the solution, allowing the employees to recover some of their past routines. Furthermore, Leonardi and Barley (2008) suggest that new materiality can be perceived as mitigating a constraint. This is also found in this case since employees viewed purchasing Wi-Fi as preferable to working under the constraints of the present material agency, i.e slow old computers situated in the office area. The employees also suggested that they would prefer to introduce tablets and

recording devices to make documenting more accessible and efficient. However, CareDoc *refused* this as the system was not compatible with tablets or recording devices.

A final technological infrastructure issue found in this case concerned the substitutes, CareDoc *refused* the substitutes access to the system since they did not have any accounts. Their lack of access would affect the regular employees' workload in the sense that they would have to document for the substitutes which are there to decrease the workload. This change of routines led to the regular employees not allowing the substitutes to document either, by resisting to increase their workload in order to document in their place. Perceiving this as a threat, the regular employees risked having a heavier workload during the summer which led to the regular employees resisting to implement CareDoc before summer. In a way, the employees were teaming up with CareDoc by together denying access to the substitutes by complaining about the added workload and being unwilling to document for them. This in turn led the unit manager to decide not to implement CareDoc until after the summer. Seen from a productive resistance perspective in line with Courpasson et al. (2012), to the employees the unit benefitted as a whole since the regular employees wouldn't have to increase their workload and the substitutes would be able to document as usual. The complaints affected the unit manager's decision to postpone the implementation until after the summer.

The importance of past imbrications

The unit managers, group leaders and documentation agents had previous work experience with technology which affected the nature of their potential resistance (Nilsen et al., 2016). The documentation agents' past imbrications in the form of previously working with ProDoc helped them in constructing an affordance for CareDoc. In accordance with Leonardi (2011) this allowed for the documentation agents to be more likely to accept and use the technology. The unit managers' past imbrications in the form of working with multiple computer systems as well as their responsibility to implement CareDoc helped them in perceiving an affordance of the system. The past imbrications of most the assistance nurses however did not include previously working with technology and the implementation of CareDoc meant a substantial change to their routines, therefore they perceived a constraint for CareDoc. Furthermore, this lack of technology experience led to the nature of the assistant nurses resistance to be more intense than those with technology experience.

Based on our empirical data, the employees can be divided into two categories: technology-users and non-technology users. The technology-users are those with previous technology experience both in the line of work and outside of work, typically younger or simply interested in technology. The non-technology users are those without computer experience in the line of work and minimal experience outside of work. Typically non-technology users are older or un-interested in technology.

The affordance or constraint that each category perceived shaped the interaction that they had with CareDoc. Technology-users found the new material agency as enabling them to do past

activities in new ways and continuously expressed that CareDoc was a "super easy" system and that it made everything "easier". Those who didn't understand how to use the system were viewed as incompetent by technology-users.

For non-technology users the new routines were perceived to threaten their initial conditions which led to the employees creating a constraint in the form of 'technological inability'. The technological infrastructure in which the documentation was to be conducted was frightening to the non-technology users. Furthermore, CareDoc *demanded* that the employees document directly in the medical journal which led them to question their *dexterity* of knowing how to document as they formed perceptions about possible mistakes remaining in the system forever. As the employees constructed a constraint they continued to document on paper since that was what they knew how to do and felt comfortable with. They did not try to mitigate this constraint by changing the new material agency because they did not see the point in using the system, or how the system would improve their existing routines. To them, documenting digitally meant doing the same thing in a more difficult and time consuming way. Hence, they resisted the usage of CareDoc as they refrained from using the technology until forced otherwise. This is another example of the second path within the perception of constraint and how the new material agency can be viewed as a block of cement. Without time pressure and interaction with the system, the employees retreat from the block of cement to continue with their previous routines rather than attempt to mitigate the constraint. The fact that CareDoc was referred to as "super easy" by technology-users can be a contributing factor to the resistance by the non-technology users who have expressed a fear of technology. By not using the system they shielded themselves from making mistakes in the so called "easy" digital documentation system. From the perspective of the technology, CareDoc attempted to help the non-technology users to document correctly by encouraging the right language. The system acted back when offensive words or sentences were written in the documentation. However since most non-technology users didn't get that far in the system CareDoc couldn't help them.

In other parts of the system CareDoc wasn't as helpful. The change of design in the caregiving plans caused confusion. According to Orlikowski (2000), technologies are sometimes used as they are intended to be used, other times users work around the inscribed ways of using a technology by ignoring or inventing new ways to use the technology. This can be found in the different units and subdivisions through their different ways of writing Caregiving plans. CareDoc *requested* the users to fill out all the boxes but left room for alternative options which enabled the users to do as they saw fit.

The social context

The perception of not having enough time has been another barrier to the implementation of CareDoc, this is a barrier defined by Lluch (2011) as well. As the employees interacted with the technology, affordances and constraints were constructed. The non-technology users created constraints since they perceived using CareDoc as taking more time than using pen and paper. Furthermore, perceiving CareDoc as time consuming was motivated through the

technological infrastructure being outdated. This in turn led the employees to question the whole implementation as they were not able to grasp the benefits of documenting digitally. In other words, the employees were not willing to change their routines and resisted by not making time for CareDoc. The technological infrastructure helped them by hindering them to document at a faster pace (e.g. slow old computers). On the other hand, the technology users and curious non-technology users perceived using CareDoc as saving time as well as improving their routines. Thereby they were willing to change their routines as they were able to perceive an affordance that would increase their efficiency. The benefits of digital documentation were clear to them which led them to prioritize its implementation.

Taking this into account, it is important to consider the environment in which these affordances and constraints were created. The social and structural context affects the interaction between the technology and the user (Davis & Chouinard, 2016). In unit A, having time was the cultural norm, allowing the employees to sit down and learn the system in their own pace was prioritized. Whereas in other units, where the cultural norm was not having time it was harder to construct an affordance for learning CareDoc. Here, the fastest alternative according to them (pen and paper) was prioritized over learning the new system.

Conclusions

The aim of this paper was to explore the effects of implementing a new digital documentation system in a non-digital environment where the majority of the employees have minimal technological experience. Further we aimed to illustrate the complexities of the implementation of a so called "easy" digital documentation system and answer the question: *How is a new digital documentation system perceived in a low-tech environment, and what are the consequences of these perceptions?* By studying this we found that a new system can be perceived in many different ways based on the perceivers' previous experiences with technology, organizational routines, and the ability to perceive potential benefits. Those with limited technological experience tend to perceive constraints and limitations whereas those with more technological experience tend to perceive affordances and benefits. The consequences of these perceptions are the way they are acted upon. This varies based on the interaction between the perceivers past imbrications and the new material agency. When the implementation of a new technology is perceived to *discourage, demand, refuse,* constrain or threaten the initial conditions, these perceptions are acted upon through passive, active, or productive resistance. Furthermore, the perceptions are sometimes acted upon by using technology to resist technology. Workers who oppose technology, or want to improve the implementation of the technology, team up with their existing technological infrastructure to resist the implementation of new technology. If the technological infrastructure is old and outdated it acts as justification for resisting the implementation of the new technology, or as justification for changing the existing technological infrastructure and improving the implementation through productive resistance.

The resistance towards the implementation of a new technology seems to stem from the attempt to preserve old routines to the utmost extent. From previous resistance research we know that perceived threats lead to resistance behaviors, and perceptions of constraint lead to the attempt to mitigate the constraint by changing the new material agency. When diving deeper into the constraints we have contributed by finding a second path building upon Leonardi (2011) which showed that a constraint perspective combined with no or low interaction with the new material agency leads to perceiving the new material agency as an immovable block of cement. In this stage the perceiver does not attempt to use nor change the block of cement, rather the perceiver retreats to old routines. As discussed, the level of interaction between the perceiver and the new material agency is an important factor leading to the block of cement. We argue that the way to dissolve the block of cement is through increased interaction, which in turn will lead the perceiver to three new potential paths (1) constructing an affordance perspective enabling the acceptance of the new material agency (2) constructing a constraint perspective and attempting to change the new material agency (3) constructing a constraint perspective and returning to the block of cement. Further studies should focus on the actions succeeding the development of a constraint perspective as well as the relationship between the level of interaction with the new technology and the creation of affordances and constraints. It would also be interesting to further study how technology itself is used to resist technology, even by those opposed to technology.

As for practical implications, the lack of technological experience in an organization might be viewed as a complication to an implementation. However, we argue that the complication most likely originates from an underestimation of the need for training and education by perceiving the system as "easy", as well as a significant gap between those experienced and inexperienced with technology. Introducing something as easy does not encourage participation amongst people struggling to understand what the "easy" is. It is important that all participants feel included and considered in the implementation of a new technology whether they are technology experts or beginners. For future technology implementations in low-tech environments we urge providing more opportunities for the employees to interact with the technology under educational circumstances. In this way, their experience will increase and enable them to perceive potential benefits of the implementation. Furthermore, by creating a management team involving key employees from different levels within the organization, more perspectives will be considered before the implementation attempt. We believe that this will decrease the risk of missing out on valuable insights which might improve the implementation process. Being able to provide insights will also create a sense of commitment and involvement in the implementation. Finally, it is important to communicate that a change is going to happen and inform the employees about the change and what it will entail before the implementation itself so that everyone has some knowledge about what is going to happen.

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