

How digital applications can facilitate knowledge sharing in health care

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Abstract

Purpose – This paper focuses on knowledge sharing in health care. The aim of the paper is to further understand how digital applications can facilitate knowledge sharing between different care providers and health-care professionals.

Design/methodology/approach – The paper is based on a qualitative action case study, performed as a formative intervention study as a Change Laboratory, where a digital application concerning wound support was used. The Change Laboratory was used for knowledge sharing in the assessment and treatment process of wounds. The collected data was then thematically analyzed.

Findings – The findings show how digital applications can facilitate knowledge sharing, but also the need for complementary collaborative sessions. The main contribution is the rich description of how digital applications together with these sessions can facilitate knowledge sharing.

Originality/value – This paper shows that activities as collaborative sessions performed on the organizational level prove to support knowledge sharing and learning when a new digital application has been implemented in the work process. It also shows that these sessions contributed to identifying new knowledge that has potential for being included in the application and hence are important to keeping the application updated and relevant over time.

Keywords Knowledge sharing, Healthcare, Digital applications, Change laboratory

Paper type Case study

1. Introduction

“Knowledge is power” (Sir Francis Bacon, in *Religious Meditations, Of Heresies*, 1597). The quote is old, but nevertheless truer than ever. In a fast-changing world organizations must have the ability to meet the demands of both their internal and external environment (Yeo, 2005), i.e. to learn and change. In the digital age, critical assets have dematerialized, and the most valuable asset is knowledge (Marchegiani, 2021). Organizations must learn how to learn and how to manage their knowledge resources, i.e. performing knowledge management (KM) (Aggestam, 2006a; Aggestam, 2006b). Information Technologies (IT) is



a prerequisite for effective KM (e.g. Sandelands, 1999; Wong & Aspinwall, 2004; Holsapple, 2005; Marchegiani, 2021) and successful KM requires provision of appropriate knowledge to those who need it, when it is needed (Jennex & Zyngier, 2007). Here knowledge reuse is important because it concerns to adapt and recombine knowledge from different knowledge domains to learn and solve problems (Zhao, Wei, Yu, & Xi, 2023). Knowledge reuse requires knowledge sharing, which is in focus in this paper. To understand the extent to which information and knowledge modifies the drivers that determine the organization's performance and ability to meet demands in the digital age is extremely important (Marchegiani, 2021). The use of technology to enable employees to share knowledge online grew exponentially during the COVID-19 as well as the understanding how to use it (Nguyen, Rundle-Thiele, Malik, & Budhwar, 2022).

Health care is continuously changing driven by demographic changes with an increasing number of older people in society and where financial resources are limited (Kroezen, Van Hoegaerden, & Batenburg, 2018). People and their collaboration and knowledge are the main driving forces in this changing work to continuously meet internal and external demands. Accordingly, public health professionals regard KM as an approach to facilitate planning and decision-making (Sibbald & Kothari, 2015). To achieve the goals associated with collaboration knowledge sharing is needed (Ritala, Olander, Michailova, & Husted, 2015). Hence, knowledge sharing is an important issue in health care. For sharing and reusing knowledge in health care, IT means both an enabler and a driver. However, using IT must be regarded as a means, not an end (Carlsson & Kalling, 2006).

Due to the demographic changes in the Western world, where the population grows older, with more complex diseases digital transformation in health care is required (Lindberg *et al.*, 2017). The development of IT is challenging, both in general (e.g. Hevner, March, Park, & Ram, 2004; Alter, 2008; Saxena & McDonagh, 2020) and in health care specifically (e.g. Heeks, 2006; Dixon-Woods, Amalberti, Goodman, Bergman, & Glasziou, 2011; Aanestad, Vassilakopoulou, & Øvrelid, 2019). The underlying cause is the inherent complexity when technological, social and organizational factors interact (DeSanctis *et al.*, 1994; Alter, 2008). In health care there is a complexity emerging from the many interconnected and interdependent elements and their feedback structures, but also the relations with multiple independent elements in the surrounding environment (Linnéusson, Andersson, Kjellsdotter, & Holm, 2022):

Transdisciplinarity in health care involves transcending of disciplinary boundaries, a sharing of knowledge, skills and decision-making, a focus on real-world problems and the inclusion of multiple stakeholders including patients, their families and their communities (Van Bever, 2017, p. 339).

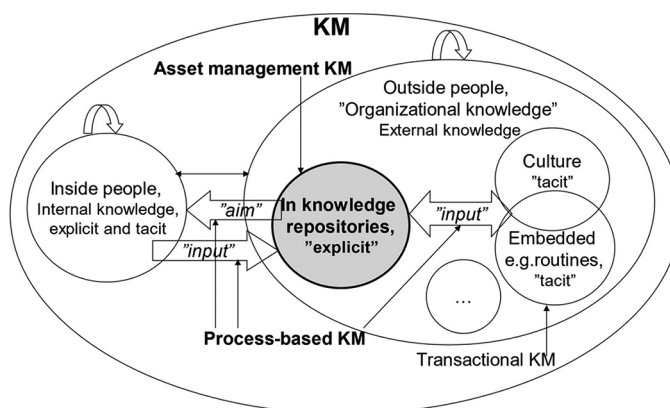
In the KM context, IT has two generic capabilities: storing knowledge and creating networks (Hansen, Ireland, & Hoskisson, 1999). Digital applications use both because they can create some sort of network for the purpose of disseminating information codified and stored in the application. However, there still exists a lack of understanding of how sharing can be accomplished in the context of health care organizations (Wu, Wang, & Hsieh, 2022). *The aim of this paper is to further understand how digital applications can facilitate knowledge sharing between different care providers and healthcare professionals.* To achieve this aim, we have performed a qualitative action case study in a Change Laboratory where a digital application concerning wound support was used. There is also a lack of workplace learning models on learning through processes where organizations develop new knowledge and appropriate such knowledge in practice (Ley *et al.*, 2020). We believe that this study also will play an important contribution to filling this knowledge gap.

The paper is structured as follows: Section 2 describes digital applications in the context of KM and Section 3 then summarizes the method. Section 4 includes our findings and describes carefully how digital applications can facilitate knowledge sharing. This is the main contribution of the paper. In Section 5 we discuss our findings and then finally, in Section 6, some conclusions and thoughts concerning future work are shared.

60 2. Digital applications in a knowledge management context

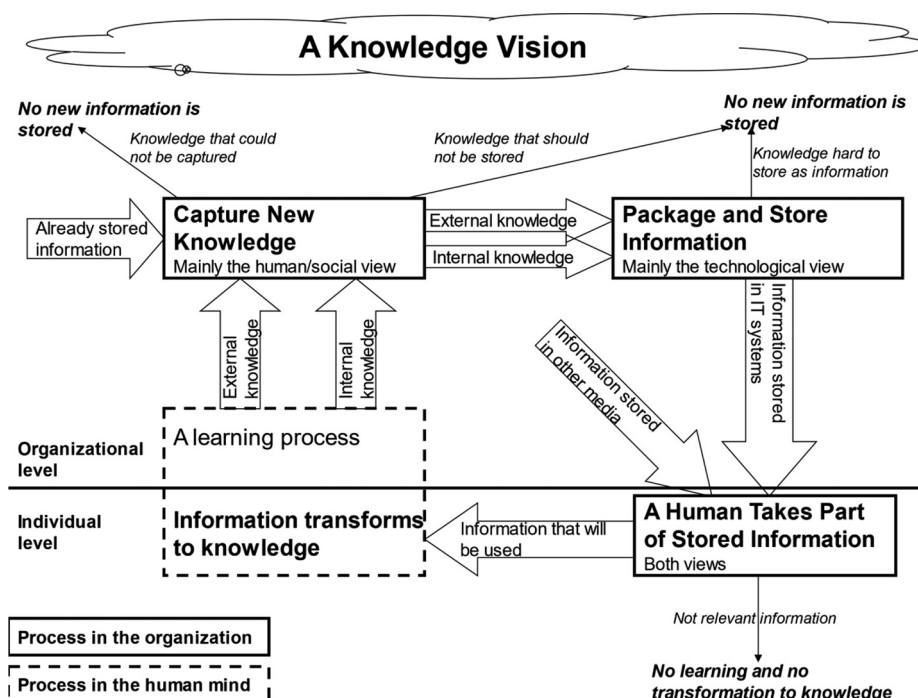
Knowledge sharing can be regarded as a fundamental tool to assimilate and apply knowledge (Castaneda & Cuellar, 2020), i.e. to learn. There are different types of knowledge and different ways of describing and categorizing types of knowledge (Wiig, 1993; Nonaka & Takeuchi, 1995; Svensson & Durst, 2021; Wang & Jacobson, 2023). IT's two generic capabilities, to codify knowledge and to create networks (Hansen et al., 1999), can in the KM context be used for different types of knowledge in different ways. Furthermore, different types of knowledge and their implications for KM activities are frequently discussed in literature (e.g. Nonaka & Takeuchi, 1995; Blodgood & Salisbury, 2001; Loermans, 2002). Knowledge derives from information (Wiig, 1993; Davenport & Prusak, 1998), and knowledge also has a function to produce new information (Schreiber et al., 1999). Activities aiming to create knowledge take place within or between people (Davenport & Prusak, 1998), but the real transformation process, when information changes to knowledge, is an individual one. Thus, it is impossible to store "knowledge"; it is information that supports knowledge transformation that is stored. However, we have experienced that people regard stored information as knowledge, because this is the way it is used. Thus, we can also refer to such stored information as external knowledge. There is also a difference between organizational knowledge and individual knowledge, where organizational knowledge is knowledge that stays in the organization even if an employee quits (Aggestam, Backlund, & Persson, 2010). A digital application, which is in focus in this paper, is a type of knowledge repository that includes organizational knowledge, and can be used for individual performance (Iyengar, Sweeney, & Montealegre, 2021). Knowledge can be mediated, as it could be adapted and recombined from different knowledge domains for individuals to learn and solve problems in organizations (Aggestam, 2008). Knowledge can also be integrated, where knowledge flows between individuals or groups when processes are performed in organizations. This is about collaboration in work practices, where individuals' specific knowledge is synthesized in different situations (Svensson, 2012). Figure 1 summarizes our conceptualization of KM and place digital applications as a form of knowledge repository in its context (Aggestam et al., 2010).

Knowledge sharing and knowledge creation are positively influenced by motivational factors (Azizi et al., 2023), but digital applications can support and enable knowledge sharing, reuse and learning. Digital applications involve people contributing knowledge to the application as well as people reusing knowledge from the repository (Kankanhalli, Tan, & Wei, 2005). The application requires capturing, packaging and storing of relevant knowledge, both when it is developed and then systematically and continuously over time for keeping it updated and relevant. These processes are visualized in Figure 2. For an application to be used, the users must perceive that its usage will greatly enhance their work performance and the quality in the knowledge repository, for example reliability and relevance, must be high (Sharma & Bock, 2005; Cheuk, Baškarada, & Koronios, 2017). Thus, it is critical that the processes of capturing, packaging and storing take place every time new knowledge is generated, that has potential relevance for incorporation in an existing application, if keeping it updated and relevant over time (Aggestam et al., 2010).



Source: Aggestam *et al.* (2010)

Figure 1. A conceptualization of KM



Source: Aggestam *et al.* (2010)

Figure 2. KM work using digital applications

The aim of this paper is to further understand how digital applications can facilitate knowledge sharing between different care providers and health-care professionals. Knowledge sharing in health care is a complex process, influenced by both social and cultural norms and by the social roles of actors within health care interactions (Brand & Timmons, 2021). This means that the focus is at the intersection between application and people (see Figure 1) and between organizational and individual levels (see Figure 2). The latter one is explicitly important in being able to contribute to the knowledge gap concerning workplace learning models on learning through processes (Ley et al., 2020).

3. Method

The paper is based on a qualitative action case study, performed as a formative intervention study as a Change Laboratory. This is a method used to involve practitioners in research together with researchers (Sannino & Engeström, 2017). In the study a digital application for health-care professionals concerning wound support was used. The formative intervention was aimed at generating and implementing new working methods using a mobile application that provides support with wound assessment and choosing the right treatment for a specific wound, to improve efficiency in patient assessment and treatment. As all health-care professionals working with wound healing in the geographical area where the study was conducted, an intervention using Change Laboratory was chosen.

The mobile application consists of two parts, a knowledge library with information about wounds, and a structured wound assessment and wound treatments tool, including recommendations of bandages for dressing.

As a start of the intervention, two introducing meetings were held:

- (1) The first meeting focuses on introducing the application to the health-care professionals.
- (2) The second meeting was dedicated to informing about the scientific study, and informed consent was given by the professionals.

The intervention included eight regular digital Change Laboratory sessions (Engeström, 2018), described as collaborative sessions. The health-care professionals were provided with a digital application for wound assessment and treatment. In between the sessions, the health-care professionals were asked to use the new digital application in practice. The eight collaborative Change Laboratory sessions were held every second week during a period in the autumn of 2021. Each collaborative meeting lasts for about one hour. In total 10 health-care professionals, together with four persons from the staff at the company developing the digital wound support application and three researchers, participated in the study. The 10 health-care professionals correspond to the entire workforce that is working with wound healing within a catchment area of a primary health care center in the western part of Sweden. Within this catchment area about 6,000 inhabitants are listed as potential patients at the primary health care center in this study. Twenty-seven percent of the inhabitants in this catchment area are 65 years or older. Two of the health-care professionals work at the primary health care center organization and eight work at the municipality health-care organization, as primary care in Sweden is divided between those two organizations. This enabled collaborative development beyond authoritative organizational constraints (Sannino & Engeström, 2017). Eight of the participating health-care professionals were nurses from the municipality health care of which one was a manager, and two were nurses from the primary health care center. Thus, the health-care professionals belonged to two different communities of practice. From the company one project manager, one business manager, one IT director and one global marketing manager participated. One of the researchers led each meeting.

At each of the sessions one of the participants was asked to describe an example from work practice, where a hard-to-heal wound was challenging and where the digital application could be used to facilitate the work. It is a challenging task to assess wounds that are hard to heal and to decide on what dressing to choose in a specific situation, even for an experienced health-care professional. This problematic situation from the work practice, where the health-care professional was confronted with wounds hard to heal, composed the first stimulus, as this is the problem to be tackled. The digital application became the second stimulus, as the mediating artifact, in the double stimulation in this Change Laboratory (Sannino, Engeström, & Lemos, 2016). The digital application, as the second stimuli, was aimed to support the health-care professional to gain control of the problematic situation in practice. Thus, the digital application became a mediating and agentive artifact in work practice, and support in turning knowledge into transformative action. In the practical experimentation the ascending from the abstract to the concrete, contradictory explanations, practical applications and creative solutions and possibilities were discussed in the collaborative sessions. The examples of the use of the digital application in assessment of wounds were opening a new horizon of possibilities for the health-care professionals participating in the sessions (Sannino & Engeström, 2017). In between the collaborative sessions the professionals continued to familiarize themselves with the digital application and tried to implement the digital application in their work of assessing and treating, also inspired by the meeting sessions wounds. The meeting sessions gave the opportunity for the health-care professionals to learn about using the digital application to enhance healing wounds. The staff from the application developing company also got the opportunity to learn about the wound assessment process to further develop the digital application.

The collaborative sessions were recorded, and notes were taken. During the thematic analysis the recorded sessions were listened to, and codes were written down (Braun & Clarke, 2006). The codes were structured related to knowledge sharing when using the digital application, and knowledge sharing related to the collaborative sessions respectively, where assessments and treatments of wounds were characterized. Examples of the analysis process can be found in Table 1.

4. Findings

The aim of this paper is to further understand how digital applications can facilitate knowledge sharing between different care providers and health-care professionals. Our rich descriptions included in this section show how digital applications facilitate knowledge sharing, but also the importance of complementary collaborative sessions. To enhance readability, we have structured our findings in accordance with this overall finding (subsections 4.1 and 4.2). The section ends with a summary of the findings (subsection 4.3), which also includes a summary table (Table 2).

4.1 How the digital application can facilitate knowledge sharing

In the following we describe our findings in accordance with the process of assessing and treating wounds, based on the use of the digital application.

4.1.1 Assessment of wounds. The professionals were discussing different types of wounds at the collaborative sessions. Employing the application, a photograph is captured to visually depict the wound, facilitating a contextual understanding of its location on the body. The application systematizes the wound assessment process, enabling a stepwise evaluation of diverse parameters. Critical considerations, including knowledge of fixation, pain management and fluid management, are invariably integrated into the application, guiding health-care professionals in diagnosing the wound.

Table 1. Examples of the analysis process from meaning units to themes, via condensed meaning units, and sub-themes

Meaning unit	Condensed meaning unit	Sub-theme	Theme
I see a lot of potential there. Then I think exactly this, and I said that, mentioned last time as well. But just this, that you are forced, in a way then, to take a stand then, to these different steps, when you do the wound assessments. How much does it liquefy? Eh, now I don't remember, yes but, –how does the skin look around? and yes, these different things. It also means, I've noticed, that I start to reflect more on these things. So it kind of creates, that you think more, and above all when you have to fill in these, uh, what the wound bed looks like. Because I haven't looked at that much before, which you might think is strange. But, but now I pay much more attention to how the wound bed looks. Because I am forced, in some way, to make that assessment. So I think it's also very good with this app that, even if it's fast, you're still forced to look at these things	The application systematizes the wound assessment process, enabling a stepwise evaluation of diverse parameters	Assessment of wounds	Digital application facilitates knowledge sharing
I would like to raise something regarding, I haven't looked in the app what it says about allergies and such. But I know that when I worked at the skin clinic, we only got those difficult-to-heal wounds that never healed. And as if you had tried everything. At the health center, home health care, wherever he went. And then we always did one, an investigation on them. And it was very common for them to have allergies, to, for example, lanolin then or rosin. And inotvol ointment, that was taboo, you weren't allowed to use that. Because it contains lanolin It could make wounds difficult to heal, for example. And rosin then, that in 2021 you still use green soap when you wash your legs. It is also completely taboo, you must not do that. So it's a detergent, it's not a wound material. I think it's also important to think about weaving in. What do you have on the wounds? Is there anything irritating? Is it something that they react to?	Various conventional treatment practices are scrutinized in collaborative sessions, with a notable emphasis on discouraging the use of green soap for wound washing, a practice prevalent in some podiatry circles	Treatment of wounds	Complementary collaborative sessions facilitates knowledge sharing

Source: Created by authors

Table 2. Summary of findings

Work activities	Knowledge sharing facilitated by the digital application itself	Knowledge sharing facilitated by complementary and collaborative sessions
Assessments of wounds	– Structured way of working – Enables knowledge sharing from earlier assessments, also from other care providers – Enables knowledge sharing with the patient – Enables professionals to discuss their different assessments – Notes can be documented – Enables support with different parameters for specific considerations – Enables professionals to recognize changes of the wound – Stimulate professionals' reflections – Enable reflections and analyses of wounds afterwards – Enables learning about wounds in combination with certain diseases – Stimulates learning for less experienced professionals – Awareness of situations where the application is not useful	– Difficult to define the type of wound – Certain types of wounds are not defined in the application – Professionals sometimes need to discuss with each other to define the type of wound – Nurses have been encouraged and strengthened to make diagnoses of wounds – New routines are created on how and when to assess wounds – Various factors about the patient are of vital importance for wound healing – Professionals think that more guidance in the application is needed – Professionals should learn to be more comfortable to make assessments – Checklists for different types of wounds are suggested – Suggestions on how to measure wound pockets are discussed – Suggestions of products to use when patients are allergic to certain products – Information about basic cleaning routines for wounds could be included in the library – To be cost-effective in healing wounds – not just use cheap dressings
Treatments of wounds	– Enables support with recommendations of treatments and dressing for certain wounds – Provides structured information about types of dressing to use for different types of wounds – Tendons and bones in wounds are difficult to treat using the application	– There should be routines on which professionals could do what – Training is needed for certain treatments – Redressing as rarely as possible – Need of redressing often means wrong dressing or bandage – Know what treatments to avoid for wound healing – Ambiguities on who should prescribe wrapping

Source: Created by authors

Upon utilization of the application, professionals capture a photograph, subsequently gaining access to visual representations of the wound, along with measurements of its dimensions. The application offers substantive assistance in evaluating wound fluid and surrounding skin, thereby providing a user-friendly and informative platform for wound assessment. This collective information is archived for subsequent assessments, enabling

nurses to draw upon previously registered data. Comparisons between current and prior measurements aid in discerning changes in the wound's size or structure, fostering an efficient assessment process. This functionality also serves as a valuable tool in patient communication, enabling the demonstration of healing progress and promoting patient motivation, a factor acknowledged for expediting recovery.

Acknowledging the imperative of expediency in patient interactions, nurses favor the application's efficiency during wound assessments, opting to forgo the extensive use of the knowledge library while directly engaging with patients. Challenges arise in assessing fibrin levels, compounded by variations observed before and after wound cleansing. Divergent assessments of fibrin percentage highlight the subjectivity inherent in such evaluations, emphasizing the need for standardized criteria to enhance inter-nurse consistency.

Encountering wounds with subcutaneous spread, nurses grapple with application limitations regarding comprehensive photographic documentation. In such instances, the note function within the application becomes instrumental, allowing for the documentation of pertinent information, such as the wound's subcutaneous extension.

Professionals receive contextual support, with considerations spanning pain management, maceration and fluid from the wound, when assessing the wound. The considerations section elucidates the impact of each aspect on wound healing, fostering a nuanced understanding of their relevance in the assessment process. Professionals contend with the complexity of comprehending the relationship between pain and wound healing, emphasizing the importance of safeguarding wound edges, a factor pivotal in the healing trajectory.

Considering the frequency of wound assessments, professionals advocate for a weekly evaluation using the digital application to discern favorable progress or significant deviations. In cases of hard-to-heal wounds persist over extended periods, for example if such a wound existed for several years, professionals can consider making assessments with the app every two weeks or so.

The reflective practice of a nurse has been notably heightened through the application's guided steps for wound assessment. Engaging with the application prompts a thoughtful examination of wounds, fostering a better awareness of their visual characteristics. The nurse has acquired proficiency in using the application as a tool for visual analysis, enabling subsequent scrutiny and validation of the assessment accuracy through the review of captured wound photographs.

The application serves as a comprehensive resource, offering support for the assessment and treatment of specific wounds, or for wounds in general, through its knowledge library. Information pertaining to wound infections and diagnostic considerations is readily available in the knowledge repository, providing valuable guidance. Noteworthy is the application's role in imparting awareness regarding the intricacies of detecting infections in diabetic wounds, as articulated by a nurse who used the knowledge library to gain insights into diabetic ulcers. For professionals seeking assistance in diagnostic matters, the knowledge library proves to be an accessible and navigable resource, featuring pragmatic tips avoiding theoretical texts, thereby enhancing its utility in daily practice.

The collaborative aspect of the application is evident in the utilization of other nurses' knowledge and competences when individual expertise proves insufficient. Despite its acknowledged utility, professionals acknowledge occasional lapses in recalling the application during clinical encounters, expressing retrospective realizations of missed opportunities for its use.

Professionals assert that the application significantly contributes to improved continuity and compliance in wound assessment. Nonetheless, challenges arise in instances where the wound cavity exceeds the entrance hole dimensions, rendering the application incapable of

accurately measuring the wound's size beneath the skin. Furthermore, complications arise when attempting to assess wounds displaying visible tendons, as the application fails to detect such wounds altogether. These limitations underscore the need for complementary assessment methods in specific clinical scenarios.

4.1.2 Treatment of wounds. During the course of wound assessment, professionals are provided with guidance pertaining to suitable treatments and dressings for the specific wound under consideration. The application offers recommendations on the appropriate type of dressing and bandage upon the completion of the assessment, elucidating choices such as polyurethane dressing or odor-absorbing dressing. Additionally, the application's knowledge library encompasses information delineating the types of dressings suitable for diverse wound classifications. A specific clinical scenario engendered discussion among professionals concerning wounds featuring exposed tendons necessitating the application of a moist dressing. Regrettably, the application does not furnish extensive information or assistance regarding wounds characterized by exposed tendons and bones. Nevertheless, professionals contended that this particular category of wounds mandates a distinct form of wound dressing when compared to other wound types, thereby highlighting the exigency for specialized considerations in the treatment of such wounds.

4.2 How complementary collaborative sessions can facilitate knowledge sharing

In the following we describe our findings in accordance with the process of assessing and treating wounds, based on the collaborative sessions.

4.2.1 Assessments of wounds. In the collaborative discourse, health-care professionals deliberated on diverse wound types, acknowledging the inherent challenge of definitively categorizing certain wounds. The recourse to classifying wounds as an "other type" was deemed expedient in instances where the specific characterization posed difficulty. Despite the capability to designate a wound broadly, nuanced subcategories, such as a leg wound within the overarching classification of a skin wound, underscored the complexity of precise wound typification. Notably, the absence of the "traumatic wound" category within the application precludes its inclusion in the assessment, contributing to a potential oversight in the comprehensive evaluation of wounds.

The collaborative sessions revealed a recurrent pattern wherein different nurses undertook assessments of the same wound on disparate occasions. The application's capacity to facilitate knowledge sharing between nurses served as a valuable resource; however, challenges were identified in the complex process of wound assessment and diagnosis. Instances of inconclusive diagnoses and a perceived reluctance among nurses to assume a diagnostic role were underscored. The delineation of professional roles, particularly in diagnosis and pressure checks, created ambiguity, occasionally leading to a dearth of assessments.

The discourse further illuminated a paradigm shift in the perception of nurses' diagnostic capabilities. While prevailing norms emphasize physicians as the primary diagnosticians, some nurses contended that genuine competence permits nurses to make accurate diagnoses. This perception was reinforced by discussions during collaborative sessions, encouraging nurses to embrace a diagnostic role. A case study exemplified the impact of professional uncertainties, wherein a new routine stipulated that wounds persisting beyond four weeks be deemed difficult to heal, with nurses entrusted to conduct the assessment. However, a collective desire for enhanced guidance from the application in diagnostic endeavors emerged, particularly in navigating the intricacies of wound assessment.

The health-care professionals underscored the multifaceted nature of wound healing, emphasizing the imperative of considering underlying diseases, such as diabetes, diet,

swelling and other pertinent patient-specific factors. The application, in their view, necessitated an augmented role in providing guidance, especially concerning nuanced aspects like assessing fibrin percentage. The difficulty in assessing fibrin percentages prompted discussions, culminating in an agreement on the practicality of checklists for various wound types, informed by professionals' collective knowledge and experience.

The consideration of patient pain within wound assessment is an underemphasized aspect. Collaborative sessions have proven instrumental in integrating this dimension into the evaluative process. The application should delineate the qualitative attributes of pain, elucidating whether it is triggered by touch or remains constant. However, the subjective nature of pain, influenced by individual pain thresholds, complicates its systematic assessment.

In a meeting, a nurse engaged in an analytical discourse concerning wound assessment, exploring challenges associated with diabetic wounds, notably the absence of pain and the resultant difficulty in discerning potential infections. The nurse also highlighted the intricate nature of measuring wound pockets, revealing a reliance on an improvised technique. There was a shared desire among nursing professionals for a standardized method to measure such pockets. Subsequently, a nurse trained in wound care introduced the use of a "button probe," an instrument designed to be inserted into wound pockets, facilitating tactile exploration of underlying structures such as tendons and bones. The potential efficacy of such probes prompted consideration for their adoption in home health-care settings, emphasizing the significance of maintaining control over wound pockets due to their concealed dimensions.

Experiences shared by a nurse with a background in a skin clinic underscored common allergies to lanolin or colofonium among individuals with challenging wounds. The taboo associated with lanolin-containing inotyl ointment was discussed, necessitating alternatives like zinc-based products. The nurse's insights emphasized the importance of meticulous wound cleaning practices using soap and running water, discouraging the use of compresses and suggesting the inclusion of a section in the application's knowledge library addressing basic cleaning routines.

An illustrative example highlighted challenges encountered in selecting an appropriate wound dressing. The initial dressing's inability to retain fluid effectively led to its replacement with a more efficacious alternative, despite being costlier. The health-care center's commitment to cost-effectiveness was reflected in its decision-making process, ultimately favoring the adoption of a superior dressing, which, although pricier, proved more economically viable than the concurrent use of two dressings.

4.2.2 Treatment of wounds. The issue under consideration pertains to the distinction between formal competence and practical competence concerning debridement procedures. Many nurses express hesitancy toward debridement due to uncertainty about their authority and capability to perform such tasks. Proficiency in debridement appears lacking among professionals, primarily attributed to reluctance. Patients with extensive black necrosis have had to be referred to hospitals due to uncertainty about the necrotic tissue's nature. Consequently, patients returned with sizable wound cavities causing significant pain. The decision of whether to lift dry necrosis or wait until it becomes soft and spongy before removal is often misunderstood. There is an inconsistency regarding debridement responsibilities, with nurses occasionally instructed not to debride diabetic ulcers, leading to calls for clarification on the matter.

The distinction between mechanical and surgical debridement is a subject of discussion. A nurse perceives surgical debridement as a minor operation in a hospital involving a scalpel, while mechanical debridement entails using tools such as wound spoons or tweezers to address fibrin-coated areas or loose tissue. Company representatives, however, assert that surgical debridement necessitates scalpel use, requiring specialized training. Another nurse highlights

situations where cutting off skin may be necessary during debridement, particularly in cases involving skin flaps or scrapings, contingent on wound characteristics and skin fragility.

Collaborative sessions delve into the frequency of wound redressing, emphasizing the consensus to minimize redressing frequency, as frequent changes may signify inappropriate dressing choices. Discussions also encompass considerations for dressing and bandage selection when tendons are exposed in wounds.

Various conventional treatment practices are scrutinized in collaborative sessions, with a notable emphasis on discouraging the use of green soap for wound washing, a practice prevalent in some podiatry circles. The significance of disseminating information against such practices is underscored.

The type of wound is a pivotal factor determining whether wrapping is warranted and the pressure within the dressing. Treatment prescription responsibilities often lead to ambiguity between doctors and nurses, with the health center normatively requiring doctor-prescribed wrapping, albeit nurse suggestions are entertained.

4.3 Summary

A summary of our findings can be found in [Table 2](#). Our findings show how digital applications can facilitate knowledge sharing by, for example, standardized and structured ways of working, recommendations and individual reflections and learning. Our findings also emphasize the importance of complementary collaborative sessions where, for example, professionals can strengthen each other, discuss needed routines as well as new knowledge that would be appropriate to include in the application.

5. Discussion

The adoption of digital technologies has increased exponentially since the COVID-19 ([Nguyen et al., 2022](#)). Because the study was performed in autumn of 2021, we believe that the COVID-19 contributed to a positive attitude to use digital tools. Despite this, the complementary and collaborative Change Laboratory sessions, that were included in the study, reveal the importance of (complemented) knowledge sharing directly between professionals and actors. This knowledge sharing is influenced by both social and cultural norms ([Brand & Timmons, 2021](#)), which was also visible in the study.

The way the knowledge was stored in the application meant that using the digital application itself guided users to (new) structured ways of working with preliminary wound assessment and treatment, i.e. learning new ways of working. This increased the quality of the decisions and led to better wound care, where wounds that were hard to heal could be easily healed. The application also includes a function that makes it possible to take photos of the wound at each assessment time. This provided an opportunity to compare the development of the wound from time to time and professionals could learn how the treatment that was decided on has worked. Overall, the contribution to important organizational change is clear. The same conclusion was also drawn in another study within health-care context, where a digital application was used to make better diagnoses of patients' cognitive impairments ([Svensson, Gustavsson, Svenningsson, Karlsson, & Karlsson, 2023](#)).

The collaborative sessions meant that the application was used in cooperation with other care providers and health-care professionals. During these sessions the participants got the opportunity to take part in different cases that were presented. This knowledge sharing gave ideas for new ways of working in general, but also how the application can be used to support the treatment of wounds. This means that knowledge was integrated by the individuals collaborating in the meeting ([Svensson, 2012](#)). The findings reveal that arranging complementary collaborative sessions when using the application facilitates knowledge sharing,

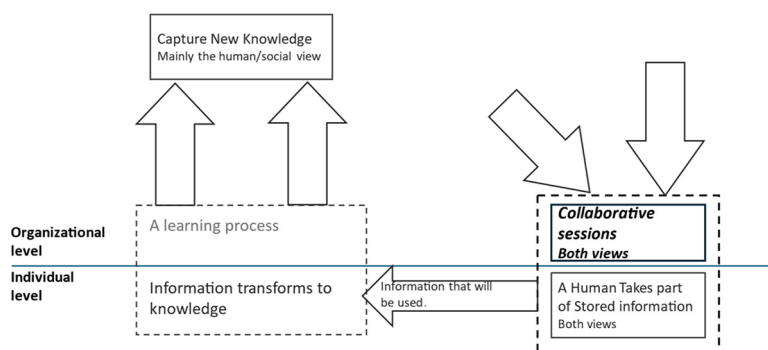
and learning. Knowledge could thus be mediated when individuals from different knowledge domains in practice collaborated in the Change Laboratory. This contributed to learning and to ideas for extending the knowledge library in the digital application. The health-care professionals described how they during these sessions through shared knowledge and gained new, and sometimes completely different, insights into wound assessment and treatment, both by using the application and by the discussions and knowledge sharing. Arranging the collaborative sessions is performed on an organizational level. Hence, we believe that the study also can play a role when developing workplace learning models on learning through processes where organizations develop new knowledge and appropriate such knowledge in practice, as described as a lack by [Ley et al. \(2020\)](#). Such activities as collaborative sessions are performed on the organizational level and have proven to support in the learning at work when a new digital application has been implemented in the work process. In such processes the management role is important to initiate and create opportunities for learning in and between organizations ([Gjellebæk, Svensson, Fladeby, Bjørkquist, & Grundén, 2020](#)).

We can contend that these collaborative sessions, organized on the organizational level, were important complements to facilitate knowledge sharing by using digital applications, and to learn in collaboration. They also contributed to identifying new knowledge that has potential for being included in the application as well as existing knowledge that probably needs to be updated or taken away. This means, from a KM perspective, that supporting activities on the organizational level is critical when organizations want to use digital applications to facilitate knowledge sharing, not at least from the perspective of keeping it updated and relevant over time. For an application to be used, it is critical to keeping it relevant and updated ([Sharma & Bock, 2005](#); [Cheuk et al., 2017](#)). The analysis also reveals what type of knowledge that was shared differed between using the digital application itself and the complementary collaborative sessions. Knowledge sharing through the digital application concerned explicit knowledge, but the collaborative sessions also include tacit knowledge. This strengthens the need to organize knowledge sharing activities on the organizational level, and the opportunity for the professionals to learn. To visualize these findings, we have in [Figure 3](#) developed this part from [Figure 2](#).

6. Conclusions

The aim of this paper is to further understand how a digital application can facilitate knowledge sharing between different care providers and health-care professionals. From the findings we can conclude that a digital application can facilitate knowledge sharing and contribute to learning. Our findings include rich descriptions of how this can be done. The findings reveal the importance of collaborative supporting sessions arranged on an organizational level. From the findings we can also conclude that the type of knowledge that was shared differs between the use of the digital application and the collaborative sessions.

As revealed in [Figure 3](#), there is a need to explicitly include collaborative sessions in the KM context. Not at least, this is needed to share tacit knowledge as well as to support the capture process. The collaborative sessions were also an important issue in driving learning in collaboration and to develop new ways of working, i.e. organizational change. From this we believe that arranging similar collaborative sessions in a regular and systematic way, even after the application has been implemented, is an important aspect. The findings also reveal that these sessions constituted an important input to organizational knowledge and work-related learning. Moreover, they contributed to keeping the digital application updated and relevant because they enable to identify new knowledge that has potential to be stored in digital applications as well as already existing knowledge that may need to be updated or taken away. Potential roles of complementary



Source: Aggestam *et al.* (2010)

Figure 3. Collaborative sessions in its KM context

collaborative supporting sessions are a contribution to KM literature and an important research implication for future KM research.

To examine this further and how it can be integrated into the daily work practice is an important part of future work. The findings are based on a single case study carried out in a public health-care environment, to get deep insight into the phenomenon of knowledge sharing and learning in collaboration. In future research it would be interesting to further investigate how digital applications can facilitate knowledge sharing, both in health-care and in other types of organizations, but also to understand different types of challenges and how they need to be managed.

Finally, it is well known that the development of IT in health care is challenging (e.g. Heeks, 2006; Dixon-Woods *et al.*, 2011; Aanestad *et al.*, 2019; Saxena & McDonagh, 2020). To use champions, as described by Van Laere and Aggestam (2016), is therefore an important perspective to add in studies concerning how to introduce and develop digital applications to facilitate knowledge sharing.

In research there is an interest in what works and what does not work in a practical context, i.e. have a pragmatic stance (Goldkuhl, 2012). A practical implication from the study is the critical importance of developing and systematically arranging regular and continuous collaborative supporting sessions. It takes time to establish new ways of working. Health care is a knowledge intensive organization and used to share knowledge. However, there is a challenge to collaborate, share knowledge and learn across organizational and professional boundaries. To encourage this in a systematic and sustainable way and developing incentives as well as removing obstacles is critical.

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Further reading

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