Creating a Boundary Practice by Co-Design

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Abstract
This paper explores the role of boundaries in a co-design process and how design work can be organized in order to manage the existing boundaries. The source of boundaries in design lies in the interface and dynamics between use practices, design practices and work practices. We will benefit from the boundary literature in order to contribute to practice-based design approaches in general, and to co-design approaches in particular. The research is based on empirical data from a 2-year co-design process within the home care sector; involving participants from several professional groups: caregivers and care recipients. This paper focuses primarily on the caregivers (practitioners), the care recipients (elderly) and the designers. We particularly take into account the diversity of the participants in the co-design initiative and how these participants (representing two user groups) influenced the design process over time, and how their participation enabled the crossing of boundaries and the creation of a new boundary practice. Finally, the role of the designer is discussed in terms of redirecting its function towards facilitation instead of negotiation.

Keywords: Co-design, boundaries, boundary practice, boundary object, practice-oriented research.

1 Introduction
This paper takes the point of departure from a practice-oriented research approach as described by Mathiasen (2002) and Goldkuhl (2012). Their approach aims for knowledge and theories developed through practical experiences and applications stemmed from real-world settings. Notable is that they do not consider as social structures that stipulate actions; rather as a mutual relationship in which patterns of actions and interactions contribute to the constitution of practice. Aligned with the approach of Mathiasen (2002) and Goldkuhl (2012); we consider such approach crucial when understanding design and in-use situations that require us to go beyond normative assumptions about how things “should be”. The paper will discuss a collaborative design (i.e. co-design) process and the role of boundaries in such a process. The paper reports from a co-design process and highlights the importance of engagement with practice where the involvement of relevant stakeholder groups is key. The co-design approach has gained popularity, in particular in Scandinavia and Europe, and most designers of today agree that participation of users in the design process is important.
However, opinions about who should participate in these collective actions, when, and to what extent varies considerably (Sanders and Stappers, 2008). Due to these unanswered questions, it not enough to bluntly state that stakeholders need to participate. This notion needs to be unpacked and these questions need to be addressed in order to be beneficial for the design process and the artifact to be designed. Hence, this demands a closer interaction and collaboration between researchers and practitioners related to the understanding and production of knowledge (Van de Ven, 2007).

Due to our focus on boundaries in design, the boundary literature is the analytical lens to contribute to practice-based design approaches in general, and to co-design approaches in particular. In Vashist, McKay and Marshall (2010) a boundary practice perspective is used to characterize the role and work of business analysts as the role is to play a liaison between the users and the IT specialists in business IS (information systems) projects. However, we want to take this further and investigate how a boundary practice might benefit several user groups in a design process aiming to support for interconnected groups and practices (Wenger, 1998; Vashist, McKay and Marshall, 2010). Since the main characteristic of co-design is that designers, researchers and users perform design activities together, situations frequently occur where people with different backgrounds, competences, experiences and expertise are to collaborate and conduct design work together as equal partners. In such situations, pre-existing boundaries are rooted in differences related to competence, professions, values, interests, age, social status, or power for example. This is an inevitable challenge that needs to be handled in co-design projects.

Therefore, the main purpose of this paper is to understand and investigate the role of boundaries in a co-design process. This is done by analyzing a co-design process with boundary theories as an analytical lens. The research question is: How can a design process be organized in order to facilitate a boundary practice to emerge?

The choice of the design problem is further based on the on-going trend of how new digital artifacts are becoming increasingly "appified" (i.e. in terms of mobile apps) and that such apps are often delivered via a mobile devices which is usually connected to a platform infrastructure. A consequence of this trend is that a vast majority of the population can build an app for any purpose, rather rapidly, and more often without any consideration of its actual user groups. This might challenge design approaches in general, as it nurtures the detachment of users and practices in a rapid development at an arm’s length relationship. This paper is both a serious consideration on these current design approaches to the rapid software development of mobile apps and, a suggestion to how the appropriation of such a mobile app, developed within a platform might be designed for an effective participative design process in terms of i) the importance of involvement of relevant stakeholder groups; ii) the engagement with practice.

The paper is based on empirical material from a 2-year co-design process within the home care sector. The digital artifact was a tablet application (a mobile app) for grocery shopping for elderly people still living at home, but assisted by home care personnel (i.e. caregivers). The design problem concerns two types of stakeholders that are brought together in a joint task; a collaborative situation that is unusual and novel to both stakeholder groups. The case has the service providers; the caregivers and the service receivers; the elderly receiving home care. These groups can be seen as belonging to interconnected practices with their respective roles, concerns and needs. Alongside them, designers and researchers were involved in the process. Thus, the co-design process involved participants from three different stakeholder groups: from information system design practice (the researchers and designers), from home care practice (caregivers), and from daily life practice (the elderly). The paper takes into account the diversity of the participants in the co-design initiative and how these participants influenced the design process over time and how their participation enabled the crossing of boundaries and the creation of a new boundary practice. Finally, the role of the designer is discussed in terms of redirecting its function towards facilitation instead of negotiation.
2 Theoretical concepts

2.1 Co-design
Co-design has its origin in the field of participatory design. Overall, this design approach involves stakeholder groups actively in the design process to ensure that the result meets their respective needs. Participatory design has been around for nearly 40 years, mainly driven by Northern European researchers (Sanders and Stappers, 2008). In Scandinavian countries for example, the approach started as a political, democratic movement and was rooted in work with trade unions (Ehn & Kyng, 1987). In such participatory approach, the user is regarded as a partner actively contributing to the design process, in contrary to the user-centered approach originated in the US where the user takes on a more passive role as “the subject to be studied” by expert designers or researchers (Sanders and Stappers, 2008). Here the term co-design does not only refer to participation in general, but to the joint action of designers and stakeholders not trained in design, working together in the design process. Hence, co-design is about bridging the prevailing boundaries. The source of boundaries in co-design lie in the interface and dynamics between use practices, design practices and work practices. This perspective puts the design process into a social context, where relations and connections of several user groups and activities take place across various types of boundaries. For instance, the approach puts together the expertise of the designers and researchers with the situated expertise of the people whose situations are to be impacted by the intended change.

Another influence for co-design is derived from design theory, e.g., work by Nigel Cross and Keen Dorst (2001), in which creative design has been studied. In their work, creative design is not a matter of first fixing the problem and then searching for a satisfactory solution to the problem (ibid.). The process can better be modeled as an iterative co-evolution process, where problem and solution emerge together as a dualistic, mutually dependent problem-solution pair. The two spaces co-evolve together as information is interchanged between the two spaces. This view of the design process is consistent with a co-design approach, if stakeholders are fully engaged and invited to participate in all design activities.

2.2 Boundaries in Design
Doing design together with different actor groups that have different backgrounds and domain of interests raises boundary issues. Understanding co-design processes from this perspective means shedding light more specifically on the mechanisms that tie the groups together or separate them. Akkerman and Bakker (2011) discuss how boundaries are becoming more explicit because of the increasing specialization, and new ways of mapping and mobilizing across various cultural and social practices are emerging. Boundaries may include organizational, social, and/or cultural distances between different stakeholder groups or practices in a collaborative setting. Practitioners need to cross boundaries when collaborating with new and unfamiliar work territories and thereby have to learn how to work with other types of professionals or in new contexts (Suchman, 1994). Such boundary crossing collaboration is challenging since it requires learning and communicating with new and different cultures of practices.

The practice lens has been used by various IS researcher’s which apply it in different forms; Orlikowski (2000) applies Giddens’ structuration theory, Levina and Vaast (2005) apply Bourdieu’s theory of practice, Klein and Hirschheim (2008) apply Lave and Wenger’s lens to understand practice. Within the practice and learning theory by Wenger (1999) learning is described as an ability to negotiate new meanings and to create engagement in a certain practice. Carlile (2002, 2004) conceptualizes division in practice and the creation of knowledge boundaries between different collaborating expert groups. The interest in practice lens has therefore stands in previous IS research and this paper applies Wenger’s (1998) lens where the concept is based upon the notion that the organization can be seen as a “constellation of practices” that interconnect by boundary spanning and boundary objects (Wenger, 1998; Vashist, McKay and Marshall, 2010). Wenger (1998) argues for the concept of boundary spanning as activities that are performed by practitioners to connect whereas the
connections can, over time, be called boundary practice as the purpose of those practices is to sustain the connections between “several organizational practices” by “addressing conflicts, reconciling perspectives, and finding resolution” (Wenger 1998, p.114). During this process a boundary practice has the potential to be co-created by its members and groups taking part in it.

In order to have practices or different actor groups create common understanding, an object or a representation of a thought might be of vital support. Within the boundary research a boundary objects denote the concept when an artifact fulfills a specific function in bridging intersecting practices (Star, 1990; Star & Griesemer, 1989). Boundary objects allow groups to unite and form a working relationship and are instances that enable groups, that do not share consensus, boundaries or professions, to consolidate and work together (Star and Griesemer 1989; Wenger, 2000; Fischer, 2001; Kimble et al., 2010; Star, 2010). Boundary objects are the links in the communication processes where different perspectives are to be negotiated and discussed into a co-created meaning and consensus (Boland and Tenkasi, 1995; Brown and Duguid 1991; Cook and Brown 1999; Wenger 2000). However, boundary objects can only facilitate parts of the communication surrounding for instance a digital artifact and due to that, cannot replace communication and collaboration (Akkerman and Bakker, 2011). Boundary objects are often technological artifacts, but can be other artifacts that join professions or stakeholders such as drawings or prototypes. What Carlile (2004) shows is the importance of collaborative practices that have the ability to span boundaries between different communities and also puts emphasize on the capability of a well-structured boundary object as a representation of each groups effort in the design process.

While the term boundary object can be used for various types of artifacts it usually refers to somewhat stable artifacts. The boundary objects literature in general, addresses boundary objects as something that is negotiated and interpreted differently by the different communities of practice involved. The boundary object itself is generally not transformed during the process. In contrary to the common notion of boundary objects, emergent boundary objects begin in design concepts and change continuously and evolve throughout the design process (Dalsgaard, Halskov and Basballe, 2014). Emergent boundary objects are often associated with complex wicked problems, like this one.

3 Research approach

Mathiassen and Nielsen (2008) suggest engaged scholarship as a way to face the challenges that come with being in practice, conducting research. The researcher must, at the same time, be close to practice and be able to look up to see the bigger picture (and contribute to research). The method takes the strengths of both, trying to bridge the gap between scientific rigor and practical relevance (Mathiassen and Nielsen, 2008). Doing research in close collaboration with practice can therefore be seen as a strength, but in doing such research, it is important to constantly remind ourselves of being aware of our role as a researcher.

Another approach that goes beyond the notion that research can inform practice as theory can be created through practice is action research (AR), (Avison et al., 2001). It also puts emphasis on the collaboration between practitioners and researchers and it is essentially a change-oriented approach (Cole et al., 2005). AR is a democratic and participatory approach that aims to create practical knowledge in order to bring together action and reflection (Reason and Bradbury, 2001; Brydon-Miller, Greenwood and Maguire, 2003; McKay and Marshall, 2001). The overall research approach that this paper is based on was AR. The core activity was to study complex social processes (i.e., a co-design process) to the fullest (Baskerville, 1999; Avison et al., 1999).

AR is not without problems and the control structures in AR projects have been discussed as one of the main challenges (Avison et al., 2001). The control structures concern issues of authority warrant and initiation, which were carefully considered in this research initiative. First, by appointed internal members from the home care practice and municipality management (who already possess authority of action) in addition to the researchers in a
formal reference committee in order to have staged domination as authority warrant. This staged domination made the AR interventions more collaborative and legitimized (Avison et al., 2001). Second, the initiation of this study was genuinely collaborative. The welfare challenge as a whole was the original starting point and from that, we found the more concrete problem in home care practice, i.e., the grocery shopping process. This concrete problem was “discovered” by the researchers, and agreed upon by the practitioners (cf. Avison et al., 2001). Further, the development of the digital artifact, whose function was to probe the organization to change and learn, was also legitimized through the collaborative initiation. All research activities have thus focused on change through action, as well as learning through reflection (Davidson et al., 2004).

3.1 The empirical case

The empirical case is critical as an instance of a global challenge that follows from an ageing society in which the life expectancy of elderly will continue to increase. There will be fewer children under the age of 5 then older adults over 60 by the year 2020 according to WHO (2014). This has never been the case in the world before. By 2050, WHO (2014) expect a population of 2 billion people over 60 years old, to be compared to approximately 840 million today. Even though this is mainly positive, the population growth most certainly also brings new societal challenges to the world. As a consequence of this, the health care system for example needs changes in order to cope with fewer healthcare professionals per care recipient. Creative solutions and new means to communicate between the healthcare system and the care recipients is called for, to meet to challenge of higher productivity and efficiency while simultaneously enhancing the quality of care.

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3.2 Data collection and analysis

The empirical material of this paper consists of semi-structured interviews, focus groups, home visits and field notes. The main stakeholder groups; the caregivers and the elderly participated during the entire design process. Their participation consisted of 15 single-group activities per group and 54 mixed group activities involving participants from both groups together. The single group activities consisted of 6 focus groups and 9 individual interviews per group. The mixed groups activities consisted of 6 focus group interviews and 48 design activities ranging from requirements elicitation to mock-up and prototype testing. The designer has been engaged in the data gathering (focus groups, semi-structured interviews, observations during the home visits) as well as being engaged in all design activities (design elicitations, personas, user stories development, user experience design, interaction design and other practical design work). Two of the authors (whereas one is the abovementioned designer) were heavily involved in the project as researchers and designers during the two years, while the other two authors are outsiders to the project and have taken part of the documentation and analysis of the insiders’ experiences.

The material was analyzed in an interpretative analysis inspired by the boundary literature. These boundary concepts were used as analytic tools to study the role of boundaries in the co-design process and whether participation and collaboration across a diversity of sites
and stakeholder groups can be facilitated despite existing boundaries. This way, the designer’s role in bringing the design process forward was explored. During the analysis, three activity types were identified as relevant to distinguish; 1) separate user group activities (the caregivers and the elderly met in separate groups and designed apart); 2) mixed user groups activities (the user groups designed partly together in a larger group setting); and 3) mixed user groups in authentic setting (the caregivers and elderly were co-designing together in their boundary setting). The analytical focus was on the formation of a boundary practice through the involvement in the co-design process.

3.3 The co-design context

3.3.1 The app

The app (which is regard as a boundary object herein) was designed in an iterative manner throughout the process, alongside the stakeholders. Due to the iterative manner, the artifact has taken different forms and changed during the design process. The artifact has evolved from being merely a paper prototype to mock-ups that were iterated as well. The software development was agile and the app was first developed as a stand alone application only for Android. The app was fully functional but to explore developments within platforms even further, the software development continued and the application was developed from scratch, into a full-scale application with complex integrations for tablets running on any operative system. The app was a part of a larger platform initiative (discussed further in Islind et al., 2016).

3.3.2 The stakeholders

The stakeholders involved in the co-design initiative were the elderly and the caregivers. The home care organization at the time consisted of 43 caregivers and 26 elderly. The elderly people consisted mostly of senior citizens but also of a few disabled individuals, who still live at home. Their age spans from 45 to 96 years. The elderly were frail older adults whereas most of them had a hard time leaving their homes. Some elderly lived in apartment buildings without an elevator, and being in need of mobility aid or sitting in a wheel chair, meant that their ability to go outside were highly limited. Others had age related memory loss or other age related issues that restricted their daily life activities. They did however, have plenty of time and most of them missed being a part of a social context.

The caregivers consist of people with various backgrounds whereas most of them have a diploma from upper secondary school as auxiliary nurses, but some have no education beyond compulsory school. They want to work with care and most of them dislike the task of grocery shopping on behalf of the elderly since the task can be cumbersome handling others’ money, and error prone in addition to time-consuming.

3.3.3 The co-design process

There were three different phases in the design process: The activities in phase 1 consist of focus groups, that were conducted in separate groups of only caregivers or only elderly. The activities in phase 2 took place in the location of the caregivers, which meant that the elderly had to move to another place (or were gathered in a group at a retirement home nearby their
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The activities in phase 3 took place in the homes of the elderly, which is the natural context for the elderly and the location where meetings between caregivers and the elderly normally take place. The phases are illustrated in the upper part of Figure 2 below:

![Figure 2: The co-design initiative timeline](image)

One of the data gathering methods for this research initiative was home visits. The reason for this was partly of practical reasons since not all elderly could leave their homes, but also to meet them in their natural surrounding, at their own premises. Spending time in the older adult’s homes during the design of the artifact was highly informative for the design process and this involvement in the everyday practice gave insights to the work of the caregivers, the elderly in their authentic setting and their interactions with each other.

4 Findings

The findings will be structured according to the three distinguished design phases. Figure 3 illustrates the formation of the boundary practice through these three phases, visualized in the following conceptual development of an emergent boundary practice. We will provide our findings following these phases; Phase 1: Separate user groups; Phase 2: Mixed user groups; and Phase 3: Mixed user groups in authentic setting.

![Figure 3: The three phases in the design process and an illustration of how the boundary practice developed](image)

4.1 Phase 1: Separate user group design activities

The artifact to be designed is intended to enable elderly taking part of a home care service to shop groceries from their respective homes, via a tablet. Prior to the project, caregivers had to go grocery shopping for the elderly, which took up most of their designated time resulting in that the caregivers and the elderly spent very little time together. Besides being time-
consuming, the shopping solution also includes handling other people’s money with potential mistrust, mistakes and a lack of freedom for the elderly to choose groceries based on current supply.

In the early phases of this research initiative there was skepticism from the elderly and one of the older adults said: “well, I have been more or less opposed to the use of technology because you hear so much fuss about the use of it in the news.” Another agreed: “There are probably many people who are afraid because of the increased risk of fraud.” Others were more positive: “Using the internet changes our lives. I started using technology early and for a retiree it will be amazing to be able to order home groceries.”

As an attempt to find common ground for the elderly and the caregivers where the elderly would not feel a risk of being cheated or fooled because they would now be connected to the internet, the caregivers were interviewed in a group as well. A caregiver’s view in the early phases: "You often hear that the elderly feel that there are too many caregivers that come and go. And that is important to remember. It’s really the most severe criticism you hear. But this does not necessarily affect this. Rather, that an initiative like this could reduce the running amongst the staff.” Another caregiver says: “It has been hard to maintain the grocery shopping routine. Nowadays, there is a priority in the queue while shopping but it’s still a big project to go grocery shopping for five households.”

This illustrates the expectations and wants from the group of elderly as well as the group of caregivers. At this time, they were still working in separate groups, discussing the same vision but with such different views, worries and expectations.

### 4.2 Phase 2: Mixed user groups design activities

Designing the digital artifact, together, in joint sessions, generated further needs and desires. The elderly and the caregivers sat together, in focus groups where prototypes were elaborated on. For instance, some group activities during this phase were held in a nursing home where the elderly did not live (they were still living at home) but the setting was convenient because there it was possible to sit together a larger group of people at the same time. The elderly were picked up from their homes and driven there by bus, and hence the setting was not their most familiar setting. One such new need was that the caregivers took on a guidance role regarding nutrition as they had been asked to provide advice by the elderly. The elderly progressed in their interactions and design activities with the boundary object. For example, the elderly expressed curiosity towards what other groceries to buy, so a function that presents the most popular choices amongst all buyers was developed. The initiative was brought to the boundary practice and was formed while the caregiver and the elderly interacted with the function together. The caregivers were a little skeptical about the popular choice function because the older adults might not understand that they would never see specifically what their neighbor Agda was buying, only what most of the elderly were buying i.e. the most popular choices. However, this was not a problem. Taking this user-focused perspective generated new innovative user ideas continuously and thus made the digital artifact richer, more focused and more suitable for the targeted groups.

When using the artifact with a cognitively impaired participant that also belonged to the home care, he expressed content: “Good with different colors. Very good.” While this individual tested the prototype (that he had been contributing to the design process of) alongside the caregiver, he pressed the different icons and moved around in the digital artifact very quickly. He did not place any items in the shopping basket, he just navigated and looked around. He smiled and seemed very happy with the colors. After that home visit the caregiver said: “Those with mental disabilities as X and Y in the test group, they are unable to read, but were able to use clear icons and the pictures were very important. Besides that, if you do not read everyday anymore, we see that much of that ability disappears.” That last comment, regarding the reading skills is a general is a highly relevant issue within the home care and the care of frail older adults since their reading skills may deteriorate.
The mixed group activity was an attempt to bring the needs of the two user groups closer together, and the attempt was so successful that all future activities in the design process were arranged in mixed groups. As an example, in the mixed group activities the elderly and the caregivers started to appreciate each other needs and acknowledged that both perspectives could co-exist. The co-design process continued to evolve and when the mixed groups worked on the artifact design they simultaneously developed a new way of handling the shopping task together. Caregiver: "We want to encourage the dialog between us and the elderly. In the perfect world, the caregivers and the elderly can talk and that is what we want to accomplish, an easy discussion without it having to be to personal. Today we function more as assistants and we want to have a more caring role.” During this time, the caregivers and the elderly were sitting together but not sharing consensus on all levels. The caregivers had an image in mind regarding how the artifact would facilitate the different needs: “The elderly patients regain the control of their own decision making regarding choice of eatables as well as control over their payments. For the staff, it is the relief of not having to shop and being able to focus on care.”

4.3 Phase 3: Mixed user groups design activities in authentic setting

The desire to eat became a part of the design process. A caregiver: “What we need to remember is the desire to eat. The apatite is something that needs to be promoted. Writing words on a piece of paper, does not make one desire to eat. They should get the chance to desire chips on a Friday or a new tasty type of soup. Many older adults need to think of their food consumption because of their physical state so the importance of apatite is even higher for those who eat too seldom.” An elderly person: “I have not been to the store for eight years, I would like to see what the local grocery store has to offer. I always write the same products, week after week, year after year.” Being able to see the products and sorting through the assortment was an empowering factor in the design process, the elderly liked sorting through the products and looking for an item but were easily tired of scrolling.

The close collaboration and their spontaneous reaction to the way the digital artifact evolved throughout the design process led to a range of design decisions including the decision to prioritize images with high-resolution for the products presented in the digital artifact in order to expose the products as aesthetic as possible. To promote the apatite as well as enriching the experience for the elderly through images has been a great challenge. After some iterations and testing of the images they were finally sufficient both in size and clarity. Older adult: “The images are so clear! It is wonderful! It would be nice if the photos in the shopping cart on the right side would be bigger. Oh, it is so neat that the price is adjusted immediately when I select the bananas I want to buy. The text needs to be clearer though, I have such bad eyesight.” These particular comments led to the design decisions to make the photos of the products placed in the shopping cart bigger. The total price gets higher immediately when placing a product, an option tested with the functional prototype, as it was too difficult for the older adults to imagine the changes without a visual prototype. The text size was adjusted accordingly and the color changed to a completely black tone. The font was tested amongst the elderly patients and carefully selected according to their wishes.

In the early phases the elderly perceived their thoughts as invalid, as they felt they were too old and had too little experience with technology to make a difference. However, as the process progressed they felt differently since they realized and saw (during the rapid prototyping) the value of their contribution. Elderly person: “I have been scared of technology but this is not so terrible. Even we, the old people, can use this, probably because it is partly designed by old people.”

The close collaboration and their spontaneous reaction to the way the digital artifact evolved throughout the design process led to a range of design decisions. For example, comments from the older adults regarding how the pictures triggered more active decision making for more varied grocery shopping habits resulted in prioritize images with high-resolution for the products presented in the digital artifact in order to expose the products as a...
aesthetic as possible to trigger the lack of appetite that the caregivers pointed out. Bigger pictures of the products were also decided upon since some of the elderly asked for those, due to bad eyesight.

5 Discussion

The study is relevant for our investigation of two reasons. First, the elderly population is not so often active participants in digital co-design processes, and as with all user groups they are various challenges connected with each type of user group. Secondly, we do not only consider the relationship and collaboration between designers and one user group, but also the collaboration between the two rather disparate user groups. There are many potential and subtle boundaries that may arise due to the particular situation with caregivers and elderly collaborating to achieve a design of a common artifact supporting both groups needs’ and desires. Boundaries may arise due differences related to roles (professional role versus private person), to power (caregiver versus care recipient, i.e. the provider vs the needy), to context (being in someone else’s versus own home), to age difference, to difference in technology experience and competence to mention some. Hence, during the design process, there were several apparent shifts with respect to boundaries. Most apparently, the task division of the shopping activity changed dramatically from a service provided completely by the caregivers to passive care recipients, to become a mutually engaging and negotiated activity by both parties enriched with nutrition discussions and advice. Moreover, the power relation changed to become much more equal since the elderly had the opportunity to scan the available grocery supply; to be aware and in control of the expenses during grocery selection; and take part of other popular choices by other people (a social dimension). The caregiver role changed from a sole service provider that evolved into a role as advisory co-shopper discussing nutrition aspects of health and care. The shopping activity hence developed into a new boundary practice: a caring nutrition conversation.

When analyzing the co-design process, interesting observations were revealed: almost all design activities that were significant (that is, design ideas that was actually realized in the digital artifact) arose and evolved during mixed group activities where the caregivers and the elderly directly discussed their respective perspectives and negotiated the different ideas with each other. In the separate group activities, only one group’s point of view was brought forward to the designers at the time, leaving the designer with the difficult task of negotiating often contradicting needs and desires on behalf of others into one holistic design vision.

This particular design process compared to traditional processes is illustrated in figure 4. The traditional process of co-designing a boundary object is illustrated in the upper part of figure 1 whereas the lower part of figure 4 illustrates our way of working that we refer to as co-designing a boundary object and practice together. Therein, we show how participation in the design process over time, lead to the crossing of boundaries and the successive creation of a new boundary practice, simultaneously as the emerging boundary objects developed. Thus, our understanding of the process is in accordance with the design theoretical ideas of (Dorst & Cross, 2001); that is as a mutually emerging co-evolution, where a boundary practice (the “problem”) is emerging already from start in the design process together with the boundary object (the “solution”). This way, the problem and the solution are mutually dependent on each other and co-evolve as a unit. Hence, there is no need for further adoption after the design process is completed.
The digital artifact challenged the practice-based design as it called for crossing of boundaries that the organizational practice before had no room for. By re-allocating the caregivers time from shopping, there was now opportunity for the caregivers and the elderly to sit down together, use the digital artifact while also spending time together. We argue that this design case illustrated how the co-design process triggered the boundary crossing and the creation of the boundary practice through boundary spanning mechanisms (such as boundary objects) (Carlile, 2002; Carlile, 2004; Wenger, 1998; Vashist, McKey and Marshall, 2010). The ambition was also to try grasping what boundaries are to be crossed and how the organization of participation in design activities affected significant design decisions. The process resulted in the co-creation of a new caregiving boundary practice, which evolved during the design process of the boundary object artifact.

The digital artifact that was being designed hence emerged as a boundary object between the two user groups already during the prototyping due to all the mixed group design activities. Moreover, the caregivers were crossing the boundaries of their professional practice, creating a new boundary practice together with the elderly with increased cohesion when they used the digital artifact together. The elderly were not previously a part of a professional practice but their needs and wants concerning the artifact evolved and they started to see the value of fulfilling the needs of both user groups. Other benefits of the new boundary practice included time for a caring conversation, which consisted of nutrition discussions, mutual decisions, knowledge transfer, more time for caring conversations and continued empowerment of the elderly. Hence, the artifact puts the two user groups in a novel situation; where the caregivers and the elderly handle the task together instead of the caregivers handling it alone.

Furthermore, there was an increased focus on user empowerment and democracy as both groups started taking each other arguments into account to a larger extent when they were brought together and were in the same room. Having the two groups together, negotiating their own desires between them both had influences on the quality of the digital artifact as well as on triggering organizational development early on in the process. Having this complex situation might have slowed down the design process but it speeded up the in-use process later on (that we choose to call in-use instead of implementation, as no real implementation was needed). The new evolving boundary practice was therefore formed already during co-design process (Wenger, 1998), where both parties were involved as equal partners that empowered the elderly in particular, while also supporting the caregivers in their professional development.

By considering the different user groups common activities as a boundary practice in co-design sessions meant bridging preconceived understandings and taking the point of
departure from the different user groups together and simultaneously. This facilitated both negotiation and sense-making to take place and encouraged the creation of their own boundary practice (Wenger, 1998). Our findings indicate that a co-design approach lead to the formation of a boundary practice, that in turn advanced the design process into an in-use process without any significant implementation effort. Bridging boundaries through the facilitation of a boundary practice means at the same time, that the boundary practice situation is designed to resemble the in-use situation as much as possible.

The results indicated numerous beneficial aspects associated with the co-design as a boundary perspective. In contrast to the traditional design approach, one of the main findings from our study was that the different user groups (the caregivers and the elderly) negotiated and created a boundary practice, i.e. during the co-design sessions. Bringing the groups together early on lead to the shift in focus towards designing their own boundary practice, where they developed the practice to overcome these boundaries, where the new practice shared a common understanding and shared language. Such boundary practice was found as closely linked to developing a shared boundary object together and allowed for the different groups to represent own expertise and merge that expertise within the joint practice (Carlile, 2002, 2004). The creation of the boundary object can by that help in bridging the pre-existing knowledge boundaries between the two practices (Boland and Tenkasi, 1995; Brown and Duguid 1991; Cook and Brown 1999; Wenger 2000).

Having the users collaborate early on in the co-design process, even though their needs and requirements differentiated much, supported the designer’s elicitation process a lot. In traditional design processes negotiation between groups is left to the designer. Making participation happen over the boundaries in the design process requires coordination and negotiation. Consequently, the designers got the main responsibility to interpret, negotiate and combine conflicting ideas into one whole design vision. The designer’s role shifted from being a form of a negotiator role towards becoming more of a facilitator role in the formation of the boundary practice.

6 Conclusions

The purpose of this paper to understand boundaries in a co-design process. Our contribution is a practice-based design approach combining co-design processes with boundary theories. We have shown how the creation of a boundary practice can evolve alongside with the emerging boundary object during the co-design process, provided that the design work is organized so that the different user groups take active part in designing the artifact together on equal grounds, in ways so that their respective perspective and needs are discussed and negotiated already from start and results in a common, emerging design vision. The designed artifact (i.e. the boundary object) evolves simultaneously as the boundary practice evolves. The co-design process not only engaged the user groups but also allowed them to form and contribute to the design process while forming their new practice. Thus they gained an important role by connecting their practices and at the same time connecting the designer’s view with their own views on how the artifact should be designed. The designer’s role suddenly dispersed into facilitating how flows of information from the involved user groups intervene in the process, informing the final design. The emergent boundary object, i.e. the different development stages of the artifact, then becomes a temporary representation of the digital artifact connecting the designer, users and their practices.

The role of the designer becomes more of a facilitator rather than a negotiator. The negotiation is delegated over to the user groups’ discussions and their "togetherness" in their boundary practice. This results in a design process that empowered both user groups since the co-design activities allowed the two user groups to take responsibility for developing their new common practice as well as the artifact supporting the newly developed practice. Hence, when the artifact was developed, the boundaries of the participants were already crossed and their new way of acting formed.
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References


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