

# Challenges in Understanding Interaction – A Design Exploration Concerning Digitisation and Older Adults

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## ABSTRACT

A digitisation of the communication between citizens in Denmark and the Danish public authorities causes challenges for a wide range of senior citizens. Through practice based research, consisting of an explorative interactive installation tried out by a number of participants, mixed with both philosophical theories, design related theories and cognitive theories, this paper tests the hypothesis that different generations have different ways of understanding interaction with technology. Rather than finding a solution to a particular problem, this paper examines how design situations can be improved through reflecting on ways of understanding interaction. Combined with theories on epistemology, the installation offered a way to reflect on how the participants reacted when confronted with an unexpected way of interacting. The findings gave insight into the way interaction is learned, which made it possible to discuss the effect that surrounding technologies, and our interacting with these, has on the way we understand interaction. The discussions lead to reflections on how to incorporate these findings in future design situations, in order to make user friendly solutions that do not exclude sections of a population. However, it is also stated, that incorporation of these findings may be problematic.

## General Terms

Design

## Keywords

Digitisation, older adults, technology, interaction design, digital design, epistemology.

## 1. INTRODUCTION

The Danish Agency for Digitisation is in the time period of 2011-2015 pushing through the eGovernment strategy in order to digitise the communication between citizens and the public sector. This means that Danish citizens are obliged to use digital self-service solutions via the internet and that all mail from the public sector, by the end of year 2014, is going to be received online. According to the Danish Agency for Digitisation this, among other initiatives, is a way to save resources in the government and make access to public services easier for citizens [2].

As nice as this may sound, there seem to be some issues with this strategy. According to Statistics Denmark, in 2013 2% of the Danish population in the age range 40-59 have never used the internet while in the age range 60-74 it is 13% [11]. With a

population in Denmark of 5.623.501 in the fourth quarter of 2013 [12], 843.525 Danish citizens have never used the internet. With a valid reason, such as mental and physical disabilities, it is possible to be exempted from using the digital solutions. This exemption requires a process of assessment and permission in the particular municipality, though [3]. If a person is not granted the permission to be exempted, there is no way around either getting help from a relative to receive mail and other functions or simply learning to use a computer. The eGovernment strategy has thus been met with protests from senior citizens, who often find it hard to learn and use the kind of technology that will now be necessary. The reluctance may be based on more than just stubbornness, which leads to the hypothesis of this paper. Instead of designing a concrete solution to the problem, as this paper also makes it clear that the solution is not an easy one, I explore and discuss the hypothesis that different generations can have a difference in ways of understanding interaction, and that these reflections are both valuable and necessary when designing for the non-digital literate population.

Based on an insight into the challenges experienced by senior citizens when interacting with computers, this paper presents a case of practice based research consisting of an explorative interactive installation. The findings from the installation being tried by a number of participants is mixed with theoretical reflections in order to discuss the hypothesis.

## 2. BACKGROUND/RELATED WORK

Many people I know have experienced this; a senior relative asking questions about how to deal with computers – whether it is about browsing the internet or simply turning on the computer. Research mentioned in Sara Czaja and Chin Lee's work on the internet and older adults, points to older adults having difficulties acquiring computer skills and this being more time consuming than it is the case with younger adults [1]. To investigate these challenges further, I went to do an interview and some observations, this from two different perspectives; a website designer from the company Klean working on a self-service website mostly targeted for senior citizens, and the DaneAge Association offering a class in how to use the self-service internet solutions. The interview and observations provided some very interesting examples of how older generations seem to have different views on how to interact with computers and websites than the younger generations who usually develop the websites. Here I will mention two; reading websites and the concept of scrolling. The focus group of senior citizens that the designer, Jensen, worked with in order to create a user friendly design, showed an interesting tendency of reading everything on the website as if it was a book or a magazine. When being asked why, the focus group argued that if the text was there, it had to be essential to further actions. As an experienced user of the internet, Jensen found this approach very different from her

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own, since she would usually just cut straight to the information she needed.

The other example of a different view on interaction was seen by both Jensen in the focus group and by me in my observations at the class held by the DaneAge Association. A lack of understanding the scroll function lead to frustrations among the older adults, since some text pieces or buttons were not visible on a given position on the webpage. In the case of Jensen’s self-service website, a “to the top” button was added solely because of these challenges.

There seems to be something to the idea that the challenges can be a result of a different way of understanding the interaction with computers. This is what the following paragraphs addresses.

### 3. AN EXPLORATIVE INSTALLATION

As a way of studying the idea that there are different ways of understanding interaction among generations, I used an approach that Daniel Fallman and Erik Stolterman call design exploration. Design exploration aims to experiment, criticise and provoke through design, in order to bring new light to a subject [5]. With this in mind, I designed an interactive installation (or so it would seem in use) that sought to force the participants to interact in ways that were new and, to some, unthinkable ways of interacting with technology. It is important to empathise that the installation is not meant as a lab experiment with statistical data as a result, but rather as critical design. As Anthony Dunne describes it, a critical approach to design has the ability to create aesthetic experiences and reflection [4]. My installation was made in order to induce reflection on two levels; for the participants that tried the installation to reflect on how senior citizens may feel when introduced to interactions that are different than they are used to, and for reflections that support the discussion of the hypothesis.

#### 3.1 Setup and participant process

The installation was built using two computers connected via Teamviewer and included two rooms; one in which the participants would be (figure 2) and one in which the installation was controlled. This was necessary because the installation was executed as a Wizard of Oz (WoZ) simulation. The WoZ technique is based upon the story of the same title, where the wizard produced images of himself initially believed to be true by the observer, all the while hidden behind a curtain. This technique is thus a way of making a prototype at an early point in a design process, simulating the functions of a system [7]. In the case of my installation, the technique provided the possibility of making the computer respond to any kind of interaction.

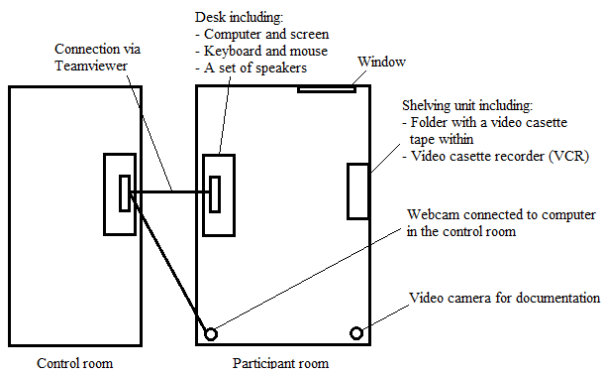


Figure 1. Installation setup

Several participants were invited to try the installation. The age range was varied, but most of the participants were in the age range 20-25. Since the goal of the installation was not to examine how older adults interact with technology, but rather to explore reactions to new and different ways of interacting, and the reflections mentioned above, the younger age range was interesting as participants.

Only one person at a time would be guided into the room and asked to carry out a task; play a video. What the participants did not know was that typical interaction with the computer was not an option, and the only one able to control the computer was the person in the control room. Since the keyboard and mouse were disabled, the participants would go to the computer and find that they could not interact with it this way. Just as they started expressing their frustration (some even tried to fix the keyboard and mouse) a hint, written by the person in the control room, would pop up on the screen saying “open window”.



Figure 2. Participant room

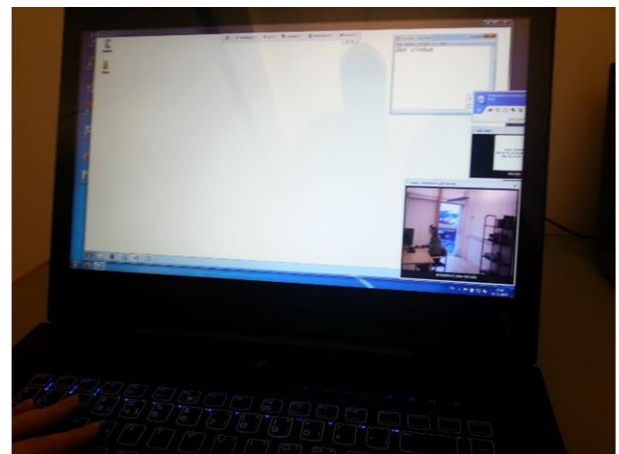


Figure 3. View from the control room computer

In most cases the participants would try to click on the box or write back to the messenger until given another hint – “think literally”. At this point a various amount of hints had to be given before the participants opened the actual window in the room. When this happened, the person in the control room would play a feedback sound and a window would open on the screen. The next hint was “find the folder called video”. Several participants again tried to interact using the mouse or keyboard in order to open the folder, thus needing another hint or more, before finding the folder placed on the shelving unit. Participants would now typically have caught on, not needing

as many hints to complete the task. The next steps, “open the folder” and “play the video” would often be done with few or no hints, with the participant taking the video cassette tape out from the folder and placing it in the VCR (figure 4). With these steps completed, a video was played on the computer screen, explaining to the participants the idea of the installation.



**Figure 4. A participant trying the installation**

### 3.2 Epistemology and Interaction

By making the design exploration, I wanted to test the idea that the way we understand interaction is connected to preceding interactions and thus the surrounding technologies we already know. Already in 1748, the philosopher David Hume claimed that thoughts and sensed impressions are interconnected. Even though thoughts may seem unlimited, one will eventually find that they are strictly limited to impressions already made [8]. Donald Norman uses the term cultural constraints to explain the conventions that helps a user understand a given object. If these conventions are unknown to a user or simply does not exist, it leads to a breakdown. Thus, the user does not know how to interact with the object since there is no knowledge about which actions are the correct ones. As Norman argues; “cultural issues are at the root of of [*sic.*] many of the problems we have with new machines: there are as yet no accepted conventions or customs for dealing with them” [10]. Hume and Norman’s theories offer an interesting view on users’ way of learning how to deal with new and unknown ways of interacting. In the case of non-experienced computer users, it is no surprise that the skills do not come naturally since there are no preceding sensed impressions. But some elements in the computer are already known. According to Gilles Fauconnier and Mark Turner a conceptual blending of two viewpoints is made when “structure from two input mental spaces is projected to a third space” [6]. This means that the blend is not the same as either of the inputs, but a mix of these. Fauconnier and Turner use an example of this that is rather perfect in the context of this paper, namely the desktop. Here, the user is presented with some representations of elements that are in most cases already known such as folders, and actions that do not relate to the typical interaction with folders such as using the pointer for dragging an object into the folder [6]. Until the conventions for the actions necessary are learned, one of the inputs in this example is missing, thus making the blend difficult to make.

### 3.3 Results

The installation plays with the representations in the computer, such as folders, by returning them to their physical form. In this way the participants, being used to ignoring the fact that the folders do not exist other than as representations [6], are confronted the fact that these representations and the accompanying actions are actually the key to interacting with the computer. Even though most of the actions required in the installation, such as opening a window, are quite well-known by the participants, the blend between the computer and these actions is not easily made, since there is no existing experience

with this blend. Overall, the problems, confusions and frustrations of being introduced to a new way of interacting become highly visible in the installation. The participants would typically go straight to the computer when given the task, wishing to play the video in the way that they had done and sensed before, and that included the known conventions. When confronted with the fact that the typical way of interaction was not an option, a breakdown occurred. The participants would typically hold on to the known way of interacting, either by moving around the mouse and pressing keys on the keyboard or by trying to fix the mouse and keyboard, until given the hints. There was simply no experience on which to base thoughts about another kind of interaction with the computer. After having received the hints and tried the initial interaction (opening the window), the participants had different ways of understanding the situation and the following interactions. Some simply went back to the computer, waiting for the next hint to show, assuming that the hints were an obligatory part of the interaction process. A few quickly learned that they had to look around the room for the next thing with which to interact. Most interesting, though, are the cases where the participants mentioned before, who went back to the computer, once more trying to interact with it as they usually would. These cases show that it can be very hard letting go of the known conventions for interaction.

## 4. DISCUSSION

### 4.1 Challenges of Interacting

When seeing the problems connected to a new and unknown way of interacting, the challenges experienced by senior citizens when using computers might become understandable. Having been surrounded by other kinds of technology requiring other kinds of actions, the way to understand and think of interactions are to be influenced by these. Considering this, the older generation have acquired another way of understanding interaction than the younger generation that has been surrounded by computers a bigger part of their lives. This younger generation is now making the digitisation plan and the solutions that are to be used by all citizens – and they are making them, unconsciously thinking in the lines of the interactions they are used to.

Of course, there are other factors to consider in the matter. The obvious question is “did the senior citizens bring it on themselves when they did not learn to use the computers right away, like most of us did?” The older adults would maybe have had a better chance at understanding the new kinds of interaction, had they not waited to learn until now that it becomes obligatory to use the digitalised solutions. Remembering Czaja and Lee’s work stating that since “older adults typically have some difficulty acquiring new skills, learning to use the Internet [...] may be challenging” [1], it is also important to acknowledge that it may have been hard learning this, even when interaction with computers was new to most people.

All in all, as it is today, the problem seems to boil down to an older generation and a younger generation not understanding interaction the same way, leaving a gap.

### 4.2 Implications for Interaction Design

It is not a new thought in the field of interaction design to consider user-friendliness. Donald Norman, for instance, argues that the psychology of using artefacts is important to consider when designing the artefacts [10], while Ole Iversen, Kim Halskov and Tuck Leong, among others, write about participatory design, where the user’s ‘role’ is to let the designer know what the user needs [9]. This is only an extract

of the theories concerning ways to ensure a user-friendly design.

So how can we use the ideas presented in this paper in the field of interaction design? In the design process, considering and acknowledging the possibility of the different ways of understanding interaction between the designer and the user could be a first step towards doing this. Then there are multiple ways of including this in already existing approaches such as participatory design or ethnography, where focus could be on studying the technologies that have been used the most by the users in question and thus the learnt interactions. The possibilities for implication may be numerous, and so, further work based on the ideas of this paper would be an interesting next step.

There are several challenges to the implications of this idea in design situations, though. For instance, in the case of the digital self-service solutions, the target group is highly heterogeneous, since they are to be used by nearly all Danish citizens. It would be very hard to take into consideration every way of understanding interaction without leaving some groups out of the equation.

Another thing worth discussing is the relevance of even considering the differences in understanding among generations. Some would say that the challenges experienced by the older adults are irrelevant to the future of digitisation and interaction design. The ideas of this paper do point in another direction. It is worth considering the situation when the generation designing the digital solutions today, actually becomes the older generation. By then, the younger generation may have a whole different way of understanding interaction than we have. This suggests that the challenges may continue further than just a generation's time. Although this hypothetical situation surely can be discussed, the essential part is to consider that the thoughts on understanding interaction may provide an insight into designing for other generations.

## 5. CONCLUSION

Through the explorative installation combined with the theories on epistemology, design and cognitive science, it has been possible to analyse and discuss the way we understand interaction through impressions already made in previous interactions with the technologies surrounding us throughout life. This offers a view on the challenges experienced by senior citizens, that is very interesting in the field of interaction design, since this may not only be a problem connected to the current older generation. Acknowledging the differences in the way different generations understand interaction and integrating these ideas into the design process may contribute to a better solution when designing for other generations. Of course, the implication can also be problematic, especially when designing for a heterogeneous group consisting of several generations.

All in all it surely is a hope that this paper could become an inspiration in doing further work using these thoughts on different understandings of interaction, for instance in a design process developing a concrete solution.

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