"Autonomy and Automation in an Information Society for all"

The government white paper *"An information society for all"*[1] requires that the digitizing of public services should not hamper citizens' access. This call for equal access has been the basis for the research project *"Autonomy and Automation in an Information Society for all" (A3)*, in which we looked closer at the politics of digitizing public services, the real life experiences of citizens using the services, and activities and interests of the service providers. The *A3* project has studied how digital automation of public services or parts of those services affect citizen users. On this basis the project proposes alternative technical designs specifically aimed at supporting the autonomy of citizen users.

The primary objectives of the *A3* project were as follows:

1) *to contribute to new understandings of how digital automation processes in the public service sector interact with the autonomy needs of the users of these services and the effects of these interactions on the inclusive information society*
2) *to develop new designs for public sector services that support flexible configurations of digital automation and human autonomy.*

The secondary objectives of the project were:

3) *the development and application of innovative methods and tools to visualise the multiple and complex interaction of digital automation and human autonomy*
4) *to deepen the understanding of the role of age, gender, diversity, and digital skill levels in the different configuration of digital automation and human autonomy*
5) *to deepen the understanding of how different design approaches may effect different conceptualisations of the citizen in the information society.*

The *A3* project was organized as a study of the relations between human autonomy and digital automation in three different areas for public services: tax, patients and privacy, and the moving of health care to the home.

Digital automation, like automation in general, is the delegation of tasks to a machine: the digital computer performs tasks such as information processes and decision-making in an automatic way. There can be different levels of automation: the higher the level, the lower the level of human involvement in terms of how much a person is informed and involved in the decision-making of the automated process. It is important to mention that there is no systematic link between the level of automation and the experience of autonomy: a fully automated process with no human interference (e.g., a pacemaker) can increase human autonomy and space for action enormously.

Human autonomy is normally viewed as individual freedom of choice; autonomy is seen as the individual's capacity to make informed choices is something an individual has. In the *A3* project we have chosen to conceptualize human autonomy differently, namely as the experience of having a space for action, very often with the help of technologies and/or other human beings: a relational perspective of human autonomy. The *A3* project emphasizes a citizen perspective in the study of the interaction between autonomy and automation. However, our relational perspective on human autonomy makes us include a much wider sociotechnical network of people and things in our analysis, e.g., service providers, relatives, friends, public services and their technologies, and laws. We need to emphasize here that many public services become particularly

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[1] Stortingsmelding 17, "*Eit informasjonssamfunn for alle*" (2006-2007)

relevant for citizens when they find themselves in a vulnerable situation (e.g., sick, unemployed).

We studied digital automation and human autonomy in three very different cases. This enabled us to understand the different configurations of autonomy and automation in different contexts. We also found some common aspects and challenges in the ways in which public services are digitized and automated. We will first introduce the cases and then present some of the main findings from the **A3** project.

The three cases

Fitting life into tax categories: Tax as a public service and a civic duty

The first case is the Norwegian tax services. For many Norwegian citizens, collecting personal data and submitting the tax return form is fully automated[2]. Providing data and paying tax is a civic duty, hence it is a public service you cannot choose to not use. In the **A3** project we have studied how problems arise for the citizens when tax is automated. We listened to calls to the Tax authorities' call centre[3], which answered 2.2 million telephone calls in 2012. We have found that most of the tax questions to the call centre are simple related to the rules and regulations, and that the tax-related problems are caused by changes in the life situation of the caller. The call advisors disentangle the callers' problems and give advice about what the callers can do to improve the situation. In this way the call advisors support the taxpayers' space for action and choice. The autonomy of the call advisors contributes to autonomy of the callers.

Many of the callers have little or no knowledge about tax or the tax system. The caller's digital competence does not seem to play any role, on the contrary: young people who have no prior experience from filling out the paper-based tax return form, call more often than other age groups. The invisibility of the tax system, which is a result of the automation, provides few opportunities for citizens to learn and develop knowledge about tax. The remaining non-automated tasks that are left to the citizens are difficult to foresee and to understand. In order to avoid this deskilling of citizens we suggest a different design starting with a coherent set of tasks for the citizen supported by transparent, automated tasks. A digital support for tax should teach people enough about tax to be able to understand their own tax – and question it. Instead of exploiting the possibilities for full automation, our alternative approach emphasizes to design for increased human understanding and autonomy e.g., support for understanding how the tax changes on the basis of a change in wages, or understanding the annual tax process. The design suggestions and prototypes developed in this case demonstrate ways to make tax more relevant and understandable for specific groups of taxpayers. It is a challenge for a democracy if a large part of the population does not understand public services like tax and cannot control or question it.

Visibility by Design: Patients negotiating privacy and system-based transitions

The second case concerns patients and privacy on the Internet. Information about a person's health, illness, and treatment is owned by the patient, but is stored and managed by the health care provider. More and more, citizens expect to be able to see the information that a health provider has collected about them and they may want to share part of that information with others, such as their family and friends or other health care providers. They also want control over who in the health care system has access to that information. Until recently, Norwegian legislation did not allow any electronic communication between health care providers and citizens.

The ways in which patient information is treated in the health care system is in stark contrast with the willingness of citizens to share their personal health information online. Patients use blogs, online patient communities, and social networking sites to

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[2] Exceptions are self-employed and independent business owners

[3] Listening in to approx. 500 calls, in addition to observations and 15 interviews

share their experiences and to discuss treatments.[4] They do this often in a careful manner; they discuss their diagnosis and treatments on some sites, but not on others. On the other hand, we have studied teenage patients with chronic diagnoses who were mainly interested in being visible on social media as "regular" teens. Many consider making one's illness visible online as "uncool" or as "attention seeking".

On the basis of our study of how patients negotiate their privacy online, we organized several design activities with and for patients. We carried out design workshops at The Children's Hospital of Eastern Ontario (Ottawa, Canada) and the Children and Youth Clinic of Akershus University Hospital (Norway). More than 50 young patients between the age of 13 and 21 participated in design activities.

Using a Participatory Design (PD) methodology, in which the future users become the co-designers of the technologies under design, we designed tools that visualise privacy, a closed social networking site for young patients in support of patient-to-patient and patient-health care provider communication, and a mobile application that supports young people with chronic health challenges in the transition from paediatrics to adult health care.[5]

Citizen participation in the design of health care services resulted in prototypes that can be adapted to people's changing life conditions and system-based transitions. The flexibility and options for personalisation in a system forms the basis for what we call *"Visibility by Design"*: citizens use spaces and tools to design their own digital visibility.

A service is somebody's work: Living independently at home with welfare technology

The third case concerns the moving of health care services to the home, specifically elderly people living independently at home with the help of "welfare technology". Our study involves a residential *"Care+"* home for elderly people with 91 apartments. Each apartment was fitted with a *welfare technology package* consisting of a set of safety alarms[6] and a tablet. The Care+ apartment building has a 24/7 reception desk as well as a café, an activity centre, and a gym. There are no in-house health care services or health care personnel.

The *A3* project has studied the use of welfare technology by residents and employees in practice[7]. Our studies included both qualitative (observations and interviews) and quantitative (usability tests) methods in addition to Participatory Design, experiments, and design anthropology. We have identified a number of problems with the *welfare technology package*, and some of these problems have given rise to new requirements for the next tender. In other cases we were able to design improvements, alternatives, as well as new solutions for and with the residents and the Care+ staff. Many residents actively participated in the PD processes and experiments and contributed to the design of prototypes (technical solutions) that better fit their needs and competencies. Furthermore, we have collaborated with the local home care provider in trying out and experimenting with new ways of utilizing welfare technology (mainly the tablet) and the TV as means for extending the communication between the home care personnel and their clients. Several of the elderly residents have also been involved in this PD process. We have identified a number of infrastructural, organizational, and practical challenges that need to be addressed before such solutions can be introduced into people's homes – even to modern Care+ homes.

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[4] We conducted online research into a variety of online sites, such as *PatientsLikeMe*, *Facebook*, *Upopolis* (a closed social network for young patients in Canada), and individual patient blogs.

[5] See kulu.no for more information on the design activities.

[6] The safety "package" includes night light (movement sensor), stove alarm, flood alarm, power saving, a wearable safety alarm notifying the host (mobile sms), in addition to a tablet pc with internet access giving info about the café menu, activities, the TV program, a calendar and with the possibility to call.

[7] Systematic studies include fieldwork for more than 300 days, attending more than 70 meetings, organizing more than 50 weekly meetings offering computer help (approx. 80 hours) helping approx. 25 residents. The 38 student projects and 26 Master theses add to this, see *a3.ifi.uio.no* for details.

Living longer independently at home often implies being dependent of technology, e.g., a pacemaker or a wheel chair. But this is a kind of dependency that makes independent living possible hence it makes sense to see independence as a non-linear and relational process concerned with maintaining or expanding a space for action. The study of welfare technology practices has given us a basis for suggesting how technology can become part of the health care work in people's homes.

Towards an Information Society for All: Main findings

As a first finding, we can conclude that the three cases illustrate that *the interactions between digital automation and human autonomy can take many different forms and that these forms are not stable*: they change with time and adapt or rearrange themselves to changes in a citizen's life.

Secondly, *the lack of transparency in an automated system prevents users from effective use of the system*. The *A3* project has studied automation from the viewpoint of the citizen user, focussing on the interaction between the user and the particular way that the service is designed (the technical solution). The level of automation often played a less important role than the information about the automated processes and the understanding of the logic of the automated process. In all three cases we found that a *lack of transparency* makes it impossible for the users to understand what the automated system does and what is left for them to do. We have also seen that the built-in assumptions and preconditions for using a service can make it difficult for the citizen to singlehandedly master the technical part of the service. All automatic processes are designed with a set of preconditions for use and certain assumptions about user behaviour; digital services are no exception to this. There is often need of a human facilitator to fill the gap between the user's competencies and resources and the skills and competencies required by the automated service.

A third finding is that many *services are presented to users as insignificant or simple, but many citizens experienced them as complex and difficult.* When a digitized service is built on unrealistic assumptions about user behaviours or capacities, it will affect human autonomy. An incomprehensible or insurmountable difficult digital service or system is experienced as a closed door, limiting the space for action and with no advice on how to change the situation. An *Information Society for All* requires public services that are accessible and comprehensible for all citizens. They have to understand the service in order to attend to their individual interests and civic rights and to fulfil their democratic duties. Hiding the complexities of public services makes it impossible for citizen users to understand the services and learn more over time.

The fourth finding is *the importance of involving future users in the design of their automated public services*. The *A3* project has mainly used a Participatory Design (PD) approach with in-depth studies of people's practices as a basis for design and with an emphasis on *involving future users in the design of solutions* that answer to their needs and wishes. The PD approach has shown effective in all cases, particularly within the health care cases. Involving vulnerable users has required us to adjust the methods for participation as well as the ways in which we organize the design process. Our revised methods for PD with vulnerable users have been tested in the project and new design ideas have come up in dialogue with our users. The resulting designs build forth on the capacities and skills of the citizens and are flexible enough to adapt to changes, thus contributing to citizens' space for action now and in the future.

Fifth, *autonomy is not the same as individual independence*; dependence can also be a basis for autonomy. We see different interpretations of autonomy in our cases, ranging from the "Do-It-Yourself" self-reliant autonomy encouraged by the policy documents to what we call "duke's autonomy", where everything is done for you. Most citizens will experience both kinds of autonomy, and the many levels of automation in between, during their lifetime. Hence, *digital public services should include solutions that can be configured to different life situations and needs*.

The digital services studied in the *A3* project are designed around the interests of the service providers, such as the Norwegian Tax Authorities, Facebook or the Municipal Care+ with its *welfare technology package*. These interests are strengthened by policy documents, case handling, data gathering, privacy regulations, legislation, and related institutions. They don't necessarily address the changing life conditions of citizens, for example as a result of a diagnosis or old age, which create the need to use these services. Our analyses suggest that there are no conflicts between the automation needs of service providers and design solutions that support citizens' changing needs and competences. The design suggestions and prototypes from the *A3* project demonstrate ways of achieving this.

Lastly, *digital competence is only one aspect that affects the skilled use of digital public services*. Also physical ability, education, age, gender, and ethnicity play a role in how a service is used. It is however a citizen's changing life situation that triggers the use of a public service and will influence a citizen's competence in using a service. Public services that are flexible enough to adapt to the individual citizens' needs and competencies contribute to an inclusive information society. The human side of public services – the call centres, case handlers and other personnel – also form an essential part of the citizens' service experience. Today, automated public services need human intervention in order to provide individualised and flexible services. The work of an accommodating public government hence enables digital automation to work.

For the record, four senior researchers and five PhD candidates have been involved in the *A3* project. Together they have produced 56 research papers, including 7 journal papers and two books (one PhD dissertation). A large number of non peer-reviewed presentations has been produced: 53 talks for research audiences as well as for governmental and stakeholder audiences interested in the project (including stakeholders and partners, 16 position papers, 2 special sessions at international conferences, one poster and two reports. One PhD is submitted and the four remaining PhD candidates plan to submit their dissertations in 2016 and 2017. In addition, 26 master students have carried out their thesis work in the project (5 more will submit their theses in 2016) and 38 student projects (bachelor and master levels) have so far contributed to the results as well. All in all, the project has produced 27 prototypes, such as web sites, apps and digital "things" to demonstrate alternative and new design solutions. In addition, we have developed an app for free download to be used by young patients for handling their transition from child to adult health care. The prototypes show how alternative interaction mechanisms and new ways of visualizing information can make public services more accessible to more users.

For more details about the research results, see *a3.ifi.uio.no*.