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DIGITAL INCLUSION OF ELDERLY CITIZENS FOR A SUSTAINABLE SOCIETY

Research in Progress

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Abstract

In an increasingly digitalised society, participation becomes dependent on digital skills – the ability to understand and use the everyday Internet technologies that surround us. People who have difficulty acquiring these skills risk being digitally excluded. One such group is the elderly; all research studies show that they are disadvantaged. The project focuses on digital inclusion for elderly citizens, addressing goal 10 of the United Nations global sustainability goals: reduced inequality within and among countries. It brings together researchers, industry and government in a collaborative practice (action research) program designed to increase theoretical knowledge of digital inclusion in Sweden, and to provide useful guidelines and tools for improving societal involvement of elderly citizens. The collaborative practice approach incorporates survey and interview techniques to ensure scientific rigor. A feature of the project is the use of a cross-generational teaching and learning approach – young people (digital natives) interacting with elderly - which has not previously been researched. Our initial results show that the benefits for the elderly include reduced isolation, more autonomy and independence, and better health.

Keywords: Digitalisation, The Digital Divide, Digital exclusion, E-government. Digital service, Elderly citizens.

1 Introduction

Sweden is in a transition period between the old industrial society and the new digital era, not at least regarding how governments' service to citizens is offered. The Internet (enabled by satellite telecoms and optical fibre networks) together with widely available digital services increasingly dominates our communication patterns, blurring the borders of time and space. Access to computers, mobile phones and the Internet is increasing. The Internet foundation in Sweden (2018) reports that 98% of the Swedes have a mobile phone, and 93% have a computer at home. Digital transformation, driven by the twin engines of information technology and digitalization is changing society, and digital citizens are characterized by constant connectivity and a high degree of technology literacy. However exposed groups in society risk being excluded from this development, leading to digital exclusion, unless targeted measures are developed to increase digital inclusion. Digital exclusion disadvantages vulnerable groups - such as the elderly, here defined as people aged 65 and over. Close to 430.000 elderly Swedes are not using the Internet (The Internet foundation in Sweden, 2017), which means that they miss out on digital opportunities, and risk being left behind as society changes. The Swedish Local Fiber Alliance (2016) identified five barriers that need to be managed to avoid digital exclusion for Swedish elderly citizens: 1) lack of knowledge of digital technologies and services; 2) lack of digital competence; 3) lack of motivation; 4) lack of access to the internet; and 5) lack of access to hardware needed to use digital services. There is therefore a pressing need to develop measures to support digital inclusion of the elderly.

1.1 Related work

The digital divide (also referred to as digital exclusion) refers to “*the gap between those who do and those who do not have access to new forms of information technology*” (van Dijk, 2006, pp. 221-222). The technology component of the divide concerns access to the Internet and availability of digital equipment (Bélanger and Carter, 2008). However, in developed countries with extensive digital infrastructure, the digital divide is more likely to focus on skills inequality - access to knowledge and skills for how to use the internet and digital devices. Sourbati (2009) argues that skills inequalities for the elderly is problematic since: 1) the need for service increases with age, not at least for government and health care services, and 2) elderly citizens are seldom engaged and interested in digital technologies. The elderly may have access to the Internet in their homes, but choose not to use for it personal reasons, and lack of engagement can be a result of either involuntary exclusion or personal choice (Eynon and Helsper, 2011). Existing research focuses on the nature of the digital divide, its extent in different countries and its causes. Complementary research concerns social inequalities, e-service provision (Sourbati, 2009), and the uptake of specific technologies like tablets and smartphones. There is, however, less research focusing on the inclusion of the elderly (Silva and Correia, 2013).

Nevertheless, the potential benefits of increased digital inclusion may be extensive, including reduction of social isolation, IT-supported communication with friends and family, active participation in an increasingly computerized healthcare system, prolonged independence and improved cognitive abilities (Niehaves and Plattfaut, 2014). Increased digital inclusion for elderly citizen may also contribute to increased sustainability in governments' provision of service when other service channels are used less frequently (Srivastava and Shainesh, 2015). The most commonly proposed actions for increasing digital inclusion for elderly citizens are education and training. Fortes et al. (2015) conclude that different forms of training increase motivation as well as making the elderly more receptive towards mobile technologies. Lourero and Barbas (2014) run a set of workshops with the purpose of providing skills needed for elderly to take part in a networked society. Tsai et al. (2015) show that working with other seniors with similar life situations enhance motivation for experimenting with new technology. Though there are a number of research initiatives highlighting the importance of training and education, the “Digital inclusion evidence report” by Green and Rossall (2013), highlights the need for consistent and robust evaluations of interventions. There are currently no integrated strategies involving

government, industry, academia and voluntary organisations for promoting digital skills education for elderly citizens.

1.2 Aim and objectives

The overall aim of the ongoing research project is consequently to *increase digital inclusion for elderly citizens, by identifying, characterizing and evaluating measures for enabling their participation in digital society.*

The main objectives for the ongoing research project are:

1. To identify requirements for digital inclusion, which is addressed by the research questions:
 - a. What needs do the elderly see for digital inclusion?
 - b. How can public organisations promote digital inclusion?
 - c. What is the role of the telecom industry and Big-Tech in digital inclusion?
2. To identify influence and importance of cross-generational contributions for digital inclusion, which is addressed by the research questions:
 - a. How can cross-generational collaboration contribute to digital inclusion for the elderly?
 - b. What incentives motivate young people (digital natives) to support the elderly?
3. To measure how initiatives for increased digital inclusion for elderly citizens will affect public e-service usage. The research questions are:
 - a. How will attitudes towards and usage of public e-services be affected by education initiatives aiming for increased digital inclusion among elderly citizens?
 - b. To what extent does initiatives aiming for increased digital inclusion among elderly citizens affect usage degrees of public e-services?
4. To design and test actions for enabling digital inclusion based on the identified requirements and success factors. The research questions are:
 - a. What different measures are there for increasing digital inclusion of the elderly?
 - b. What characteristics, responsibilities, resources and roles should be assigned to each action to maximize mutual benefits?

Each objective is connected to a work package in the ongoing research project.

2 Research approach

The project outlines a collaborative practice study into digital inclusion for the elderly. A three cornered consortium including collaborators from academia, the telecom industry and the public sector will develop guidelines and educational tools.

2.1 Theory

The theoretical foundation for the project is adapted from Sæbø et al. (2008), (figure 1). All activities in the research project will use this model and the accompanying theory base as a theoretical foundation. The model (figure 1) indicates that actors conduct digital inclusion activities (eInclusion, defined as a social practice supported by an online technology), which are affected by important contextual factors. The activities result in digital inclusion effects, which can be monitored through evaluation.

The principal actors include the elderly citizens themselves, government bodies promoting inclusion programs and organising digital services, various voluntary organisations such as Help the Aged, and the telecom and tech firms providing the Internet infrastructure and digital services. Researchers investigate many digital inclusion activities including: social media communication, tablet and smartphone use (Barnard et al., 2013), community involvement (Park, 2017), the elderly citizen's use of e-

commerce and online entertainment (Llorente-Barroso et al., 2015) and of eGovernment services (e-services) (Sourbati, 2009).

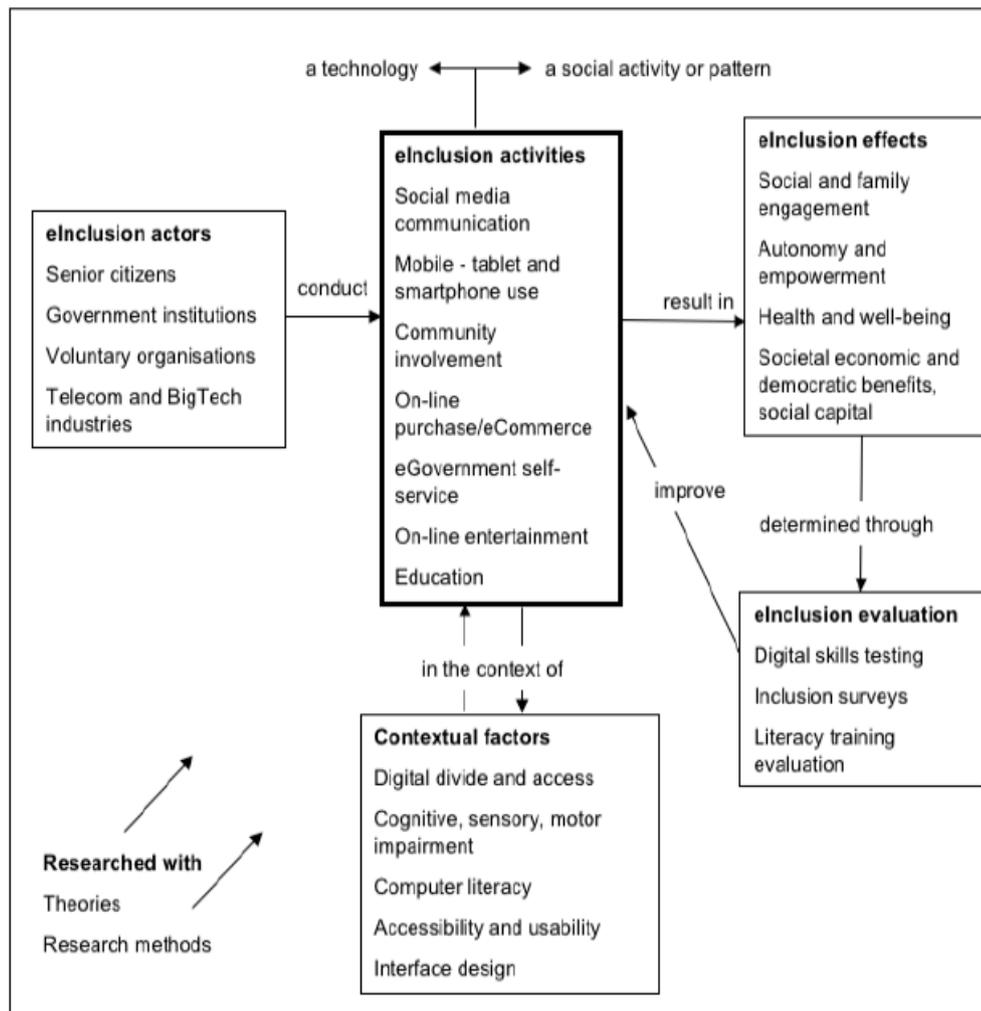


Figure 1. The eInclusion for the elderly model

A major activity for digital inclusion is education and training – as discussed in the background section. Contextual factors affecting these activities are described as the digital divide and reduced access to technology, impairment to the cognitive, sensory and motor functions of older people that may make IT use difficult, reduced computer literacy (skills), and, in relation to digital services, their accessibility for people with impairments and their usability (Castilla et al., 2016). Digital inclusion effects include, for the elderly citizens, improved social and family engagement (Gutierrez et al., 2015), autonomy and empowerment (Abad-Alcalá et al., 2017), and health and well-being including improved cognitive function (Colombo et al., 2015), for society there are economic and democratic benefits (Blažun et al., 2014), and improved social capital. Evaluation provides feedback for improving inclusion activities; relevant techniques include digital skills testing (van Deursen et al., 2016), various types of inclusion surveys (Silva et al., 2017) examining inclusion national populations and literacy training evaluation. The eInclusion model will be applied as an analysis tool against the questionnaire responses using a thematic content analysis approach.

2.2 Scientific method

The project's methodological foundation will be action research, which "*aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework*" (Rapoport, 1970, p. 499). Action research is characterized by multivariate social settings, interpretive assumptions about observations, intervention by the researcher, participatory observation, and the study of change in the social setting. Davison et al. (2004) offer five principles for action research: 1) there should be an agreement between researchers and practitioners, 2) a cyclical process model with iterative improvements should operate research conducted, 3) theory should be used to guide the project, 4) change should be effected through action, and 5) learning through reflection should be documented. The particular form of action research adopted is Collaborative Practice Research (Mathiassen, 2002), which is suitable for practice situations with complex goals and multiple actors. It adopts a pluralist approach by combining action research with experiments and conventional practice studies. Practice studies (such as case study and survey research) contribute by increasing understanding of the practice situation, and experiments help with designing good interventions. Berger and Rose (2015) specify challenges for public sector action researchers: addressing multiple interests and goals of multiple stakeholders building up the networks necessary to effect change integrating action research with existing initiatives developing decision-making capability effecting and managing change addressing fast-moving agendas and conflicting priorities as they develop communicating learning effectively addressing the end-user: the citizen, businesses, voluntary organisations.

The work packages in the research project are divided in four different packages, each corresponding to one of the research objectives presented in section 1.2.

2.2.1 Identifying requirements for digital inclusion

In order to identify requirements for digital inclusion we will focus on identifying needs, obstacle, opportunities, and challenges for achieving digital inclusion. In order to do so, we will address the perspectives of 1) the elderly citizens, 2) the public organisations, and 3) the industry.

Empirical data will mainly be collected at the Telia Sonera initiated national educational effort More Digital. In short, More Digital is an initiative for educating elderly citizens in order to enable them to become "more digital", i.e. to promote digital inclusion. The initiative is based on a four hour workshop, organised by Telia in collaboration with a municipality. High school students are invited based on interest and ability to be teachers (digital natives), while all citizens aged 65 and over in the municipality are invited to be participants. Participation is assigned on a first come, first served basis. Each teenager is assigned two elderly persons, and the basic idea is that the elderly citizens will get concrete assistance of things they want to do or learn, e.g. register an e-mail account, try out how to communicate via social media etc. The workshops are hosted by municipalities who facilitate practical details surrounding the workshops, e.g. inviting the elderly citizens, recruiting the high school students, offering suitable facilities etc. The role of Telia Sonera is set up a working infrastructure of computer networks, laptops, and an information package for conducting the workshops in a standardised manner independently of which municipality hosting the workshop.

The elderly citizens' perspective will be analysed by combining a questionnaire survey of elderly citizens' attitudes towards digitalisation, and current digital behaviour with an interview study of digital inclusion needs and challenges for elderly citizens. The interviews follow the More Digital effort in a longitudinal perspective - interviews with participants will take place at different points in time through the educational events, to identify changes in attitudes and behaviours. The interviews are semi-structured, conducted via telephone, recorded and transcribed, before a thematic analysis.

In parallel, the public organisations' (the hosting municipalities) perspectives will be analysed by a two part questionnaire with free-text responses to public organisations on 1) what needs, obstacles, opportunities and challenges they see for achieving digital inclusion for the elderly; and 2) what measures, strategies, and educational efforts they promote or are planning. The study will also cover

digital inclusion issues in strategy documents and in the development and enhancement of digital services offered to elderly citizens.

In addition, we will identify needs, obstacles, opportunities and challenges for achieving digital inclusion from industry's perspectives, using a two part questionnaire with free-text responses to Swedish industry on 1) what needs, obstacles, opportunities and challenges they see for achieving digital inclusion for the elderly; and 2) what measures, strategies, educational efforts they undertake to increase digital inclusion for the elderly.

2.2.2 Identifying influence and importance of cross-generational contributions for digital inclusion

One important aspect of the More Digital concept is the cross-generational setting where young digital natives can help elderly citizens to become more digital. As described earlier, the idea is that young people help elderly citizens with on-line tasks. These interactions across generations will be observed by the researchers. Furthermore, we will interview elderly citizens on how they perceived these interactions. In addition, we will investigate how the teaching situation affected the younger generation via a questionnaire to younger people involved in teaching elderly about digitalisation.

2.2.3 Measuring how initiatives for increased digital inclusion for elderly citizens will affect usage of public e-service

One possible effect of elderly citizens getting more familiar with digital technology and digital service is that such service provided by e.g. the municipality hosting the workshop will be used to a higher extent after the workshop. We aim to collect qualitative empirical data from elderly citizens who has participated in education initiatives on increased digital inclusion regarding short and long term effects with respect to attitudes towards digitalisation. The methods used for this will be open inquiries and interviews. At the same time, we will collect quantitative data from public organisations acting as digital service providers in order to establish to what extent education initiatives result in a larger number of digital service users. This will be measured mainly via analysing user statistics in those municipalities where education workshops have been conducted.

2.2.4 Designing and testing guidelines/tools for increased digital inclusion for elderly citizens

Finally, we aim to develop a first set of guidelines/tools in order to promote digital inclusion for elderly citizens. In order to do so, a thematic content analysis of questionnaire and interview material gathered during earlier phases will be conducted in order to identify and characterise suitable measures. Thereafter, we will develop a set of evidence-based guidelines and tools for increasing digital inclusion for elderly citizens. We will then test the guidelines and tools through incorporation in the 'More Digital' workshop concept via: 1) devise new workshop plan incorporating guidelines and tools, 2) carry out workshops, and 3) evaluate workshop results using instruments for previous WP's. In addition, we will continuously revise and improve the guidelines/tools via 1) an evaluation interview study with primary stakeholders, 2) a thematic content analysis of interview results and workshop evaluation, and 3) develop a revised set of guidelines/tools.

3 Expected outcome and preliminary results

As stated in the introduction, the overall aim for the research project is to increase digital inclusion for elderly citizens. In doing so, we will generate insights for both practitioners, e.g. public organisations and industry, as well as in research on digital inclusion.

3.1 Expected contributions to practice

The expected outcome for public organisations from the research is concrete and applicable guidance in how to promote digital inclusion, which in turn will increase the likelihood that elderly citizens choose to use digital service alternatives to a higher degree. In doing so, we aim to produce:

1. A guide and practical help in measures to increase digital inclusion for the elderly, which will enable an increased participation in democratic processes and a sustainable society.
2. Evidence determining how education can increase public e-service usage, not at least within municipalities performing various education and training initiatives.

Furthermore, our expected research outcome will generate important findings for the industry in terms of concrete knowledge and guidance on how to design and develop education initiatives as well as digital service that enhance digital inclusion for elderly citizens:

1. A guide how to design services and technology to enable increased usability for the elderly, which can result in increased use of digital services and digital presence for the elderly customers.
2. Evidence showing that initiatives may have concrete effects on newly signed broadband subscriptions and IT equipment in general.
3. Evidence showing how digital inclusion for elderly citizens may enhance e-service usage as well as making elderly citizens more able to act as participants in user-centred development/design efforts of digital service.

Benefits for the elderly include reduced isolation, more autonomy and independence, and better health. Keeping elderly citizens digitally active and engaged has been shown to lead to substantial economic and social capital gains for society.

3.2 Expected contributions to research

The expected contributions to research will provide improved theory of digital inclusion, including improvement and validation of the eInclusion for the elderly model (Figure 1). In addition, we expect to generate empirical data illustrating the short and long term effects from training and education of elderly citizens regarding digital inclusion. A feature of the project is the use of a cross-generational teaching and learning approach – young people (digital natives) interacting with seniors - which has not previously been researched. Moreover, we expect to improve existing theory on the value of training and education for digital inclusion of elderly citizens with respects to:

1. More grounded research from several case studies which will make improve the generalizability of results.
2. The Scandinavian context will be added to existing research on the value of education and training from other parts of the world.
3. New and extended theory in the e-government research area on training and education as a means to enhance usage of digital service for elderly provided by e.g. local government and health care providers.
4. The research will also add to the area of sustainable development in terms of more efficient usage of public assets in providing digital service in areas which today are very costly, e.g. doctors' visits by elderly citizens.

3.3 Results so far

Empirical data has been collected concerning attitudes and experiences of digital technology from a total of 25 training sessions, distributed over four workshop series held in four regionally distributed Swedish municipalities, using questionnaires and interviews. The total number of participants amounts to 2.000 elderly, and the usable responses from the questionnaires amount to 1.000. The follow-up

interviews are ongoing, but thus far amount to 50. The analysis thus far has only focused on identifying attitudes and experiences, and has not yet covered aspects such as gender.

The overall results from the workshops are unanimously positive. As an example, 8 out of 10 participants respondents who has participated in the workshops state that they have had changed their digital behaviour one month after the event took place (Söderström and Holgersson, 2018). Hence, we can conclude that the long term effects from participating in training and education are positive for elderly citizens. Moreover, we have found that most participants in general appreciate the workshops as a whole, as well as the initiative itself from the municipalities to organise training and education directed towards digital inclusion for elderly citizens. Also, we have found that the way the workshops were organised was well received by the participants and most of them experienced that their initial expectations of the workshops were met, i.e. the questions they had prior to as well as any additional questions that arose during the workshops were answered.

An important finding so far is a general demystification of digital technology and how to use digital service. It is evident that many participants have reduced their fear for using digital technology and digital service. Instead of being afraid of breaking a digital device by pushing the wrong button or sabotaging a digital service if entering the wrong values we see that the participants to a larger degree are eager to try out new functions and what possibilities there might be when using a digital device or a digital service. As a consequence, we have observed that many participants have advanced their digital borders and they exhibit have an increased courage and curiosity to try out new digital things after the education. Illustrating examples include the use of social media, e.g. Facebook and Skype, commercial digital service, e.g. internet banking and BankID¹, as well as digital service from governments, e.g. health service (1177²) and municipal web pages.

The cross-generational teaching and learning approach used in the workshops seem to be successful. The students (the elderly) and their teachers (the teenagers) did not know each other prior to the training sessions. In spite of this, many of the elderly express their gratitude to their young tutors and are amazed how much knowledge they may bring to the table. The teenagers on their part express amazement and pride in being able to teach and influence the lives of the elderly students.

4 The road ahead

The results obtained so far are unanimously positive: it seems that minor training has a positive effect on digital inclusion for elderly citizens' and that the effects seem more or less permanent also in a longer perspective. The research project will keep building on the results produced so far to enable cross-municipality analyses, along dimensions such as rural vs urban, small vs large cities, etc.

Furthermore, we will keep working to increase the current project consortium, including possible additional industry partners as well as a larger number of public organisations. Collaboration is under way with a public health research group, in order to deepen the analysis of how the educational workshops influence the well-being of both the elderly and the teenagers. This includes cross-generational collaboration effects, in terms of for example increased independence and health for the elderly, and improved self-esteem and a changed view of elderly citizens for the teenagers.

¹ BankID is a Swedish e-ID that enables companies, banks, organizations and agencies to identify and conclude agreements with individuals on the Internet.

² 1177 is a national Swedish e-health service who offers advice and information.

References

- Abad-Alcalá, L., Llorente-Barroso, C., Sánchez-Valle, M., Viñarás-Abad, M. and Pretel-Jiménez, M. (2017), "Electronic government and online tasks: Towards the autonomy and empowerment of senior citizens", *Inicio*, Vol. 26 (1), pp. 34-42.
- Barnard, Y., Bradley, M. D., Hodgson, F. and Lloyd, A. D. (2013), "Learning to use new technologies by older adults: Perceived difficulties, experimentation behaviour and usability", *Computers in Human Behavior*, Vol. 29 (4), pp. 1715-1724.
- Bélanger, F. and Carter, L. (2008), "Trust and risk in e-government adoption", *The Journal of Strategic Information Systems*, Vol. 17 (2), pp. 165-176.
- Berger, J. B. and Rose, J. (2015), "Nine Challenges for e-Government Action Researchers", *International Journal of Electronic Government Research (IJEGR)*, Vol. 11 (3), pp. 57-75.
- Blažun, H., Zeleznik, D. and Kokol, P. (2014), "Multiplier Based Blended Learning Paradigm for Elderly People's Efficient Adaptation to Information and Communication Technology", *6th International Conference on Education and New Learning Technologies*, Barcelona, Spain, pp. 7189-7198.
- Castilla, D., Garcia-Palacios, A., Miralles, I., Breton-Lopez, J., Parra, E., Rodriguez-Berges, S. and Botella, C. (2016), "Effect of Web navigation style in elderly users", *Computers in Human Behavior*, Vol. 55, pp. 909-920.
- Colombo, F., Aroidi, P. and Carlo, S. (2015), "New Elders, Old Divides: ICTs, Inequalities and Well-Being amongst Young Elderly Italians", *Comunicar*, Vol. 45, pp. 47-55.
- Davison, R. M., Martinsons, M. G. and Kock, N. (2004), "Principles of canonical action research", *Information Systems Journal*, Vol. 14 (1), pp. 65-86.
- Eynon, R. and Helsper, E. (2011), "Adults learning online: Digital choice and/or digital exclusion?", *New Media & Society*, Vol. 13 (4), pp. 534-551.
- Fortes, R. P. M., Martins, G. A. and Castro, P. C. (2015), "A Review of Senescent's Motivation in the Use of Tactile Devices", *Procedia Computer Science*, Vol. 67, pp. 376-387.
- Green, M. and Rossall, P. (2013), "Digital inclusion evidence report", in UK, A. (Ed., London.
- Gutierrez, F. J., Ochoa, S. F. and Vassileva, J. (2015), "Mediating Asymmetries in Family Communication: Supporting the eInclusion of Older Adults", in Cham, pp. 438-448.
- Llorente-Barroso, C., Vinaras-Abad, M. and Sanches-Valle, M. (2015), "Internet and the elderly: Enhancing active ageing.", *Comunicar*, Vol. 45, pp. 29-36.
- Lourero, A. and Barbas, M. (2014), "Active ageing - Enhancing digital literacies in elderly citizens", *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 8524 LNC S(PART 2)*, pp. 450-459.
- Mathiassen, L. (2002), "Collaborative practice research", *Information Technology & People*, Vol. 15 (4), pp. 321-345.
- Niehaves, B. and Plattfaut, R. (2014), "Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide", *European Journal of Information Systems*, Vol. 23 (6), pp. 708-726.
- Park, S. (2017), "Digital inequalities in rural Australia: A double jeopardy of remoteness and social exclusion", *Journal of Rural Studies*, Vol. 54, pp. 399-407.
- Rapoport, R. N. (1970), "Three Dilemmas in Action Research: With Special Reference to the Tavistock Experience", *Human Relations*, Vol. 23 (6), pp. 499-513.

- Sæbø, Ø., Rose, J. and Skiftenes Flak, L. (2008), "The shape of eParticipation: Characterizing an emerging research area", *Government Information Quarterly*, Vol. 25 (3), pp. 400-428.
- Silva, M. and Correia, S. (2013), "ActiveBrain: Online social platform for active and healthy ageing", *Procedia Computer Science*, Vol. 27 (Dsai 2013), pp. 38-45.
- Silva, P., Matos, A. D. and Martinez-Pecino, R. (2017), "E-inclusion: Beyond individual socio-demographic characteristics", *PLOS ONE*, Vol. 12 (9), p. e0184545.
- Sourbati, M. (2009), "'It could be useful, but not for me at the moment': older people, internet access and e-public service provision", *New Media & Society*, Vol. 11 (7), pp. 1083-1100.
- Srivastava, S. C. and Shainesh, G. (2015), "Bridging the service divide through digitally enabled service innovations: evidence from Indian healthcare service providers", *MIS Quarterly*, Vol. 39 (1), pp. 245-A19.
- Söderström, E. and Holgersson, J. (2018), "Ökat digitalt innanförskap för äldre", *IIT Technical Reports*, Skövde, pp. 1-18.
- The Internet foundation in Sweden (2017) *Svenskarna och internet*, <https://2017.svenskarnaochinternet.se/> (visited on 2019-03-13).
- The Internet foundation in Sweden (2018) *Svenskarna och internet*, <https://2018.svenskarnaochinternet.se/> (visited on 2019-03-13).
- The Swedish Local Fiber Alliance (2016) *En studie om digitalt utanförskap*, <https://www.ssnf.org/sveriges-stadsnat/statistik/rapporter/ny-studieen-miljon-svenskar-i-digitalt-utanforskap/> (visited on 2019-03-13).
- Tsai, H.-y. S., Shillair, R., Cotten, S. R., Winstead, V. and Yost, E. (2015), "Getting Grandma Online: Are Tablets the Answer for Increasing Digital Inclusion for Older Adults in the U.S.?", *Educational Gerontology*, Vol. 41 (10), pp. 695-709.
- van Deursen, A., Helsper, E. J. and Eynon, R. (2016), "Development and validation of the Internet Skills Scale (ISS)", *Information, Communication & Society*, Vol. 19 (6), pp. 804-823.
- van Dijk, J. (2006), "Digital divide research, achievements and shortcomings.", *Poetics*, Vol. 34 (4), pp. 221-235.