



HAL
open science

Digital Inclusion Competences for Senior Citizens: The Survival Basics

Jeremy Rose, Jesper Holgersson, Eva Söderström

► **To cite this version:**

Jeremy Rose, Jesper Holgersson, Eva Söderström. Digital Inclusion Competences for Senior Citizens: The Survival Basics. 19th International Conference on Electronic Government (EGOV), Aug 2020, Linköping, Sweden. pp.151-163, 10.1007/978-3-030-57599-1_12 . hal-03282775

HAL Id: hal-03282775

<https://inria.hal.science/hal-03282775>

Submitted on 9 Jul 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Digital Inclusion Competences for Senior Citizens: the survival basics

Jeremy Rose¹, Jesper Holgersson¹, and Eva Söderström¹

¹University of Skövde, School of Informatics, SE-541 28 Skövde, Sweden
jeremy.rose|jesper.holgersson|eva.soderstrom@his.se

Abstract. The rapid pace of digitalisation provides many smarter and more efficient ways of interacting with the world, but may also lead to the exclusion of some groups. Senior citizens are one of these groups at risk. Taking the European Digital Competence Framework for Citizens as a starting point, we investigate digital survival skills for the elderly. Data was collected from digital education workshops for senior citizens organized jointly between Telia, Swedish municipalities, and the researchers. We use content analysis to understand seniors' perceptions of which competences they need to survive in an increasingly digital environment and provide a version of the Competence Framework targeted at senior citizen inclusion. Lessons for inclusion initiatives are drawn from the results.

Keywords: E-government, digital inclusion, digital competence, senior citizens

1 Introduction

Digital exclusion may refer to limited access to the internet and digital equipment [1], but in developed countries with extensive digital infrastructure digital inclusion commonly addresses citizens' abilities to use the internet and digital equipment in order to access digital information services provided by government authorities [2] or commercial actors. Senior citizens constitute a large demographic in many advanced countries, though their requirements for digital information and services may be different – for instance the need for health care information and service often increases with age [3]. However the elderly are not prolific users of digital services [4], even where they have access to both internet and digital equipment in their homes [5]. Seniors are often therefore at risk of digital exclusion. At the same time, government authorities struggle with poor uptake of digital services. Citizens often view digital information, service and communication as unattractive options compared with existing channels such as phone, mail or physical meetings, not at least by digitally excluded elderly people [3]. Research initiatives concerned with promoting digital inclusion for senior citizens often focus on education [see e.g. 6, 7]. Such initiatives rely on underlying assumptions about ways of improving the digital competences of seniors. Digital technology competences are increasingly understood as life skills comparable to literacy and numeracy - both a requirement and a right –

and further as a basic underpinning for citizens to function in society, as an essential requirement for life, or even as a survival skill [8]. Thus an understanding of which competences the elderly require to function well in an increasingly digitalised society is fundamental to targeted educational programmes. We investigate basic survival competences for the elderly as expressed by Swedish seniors participating in the Mer Digital (More Digital) program¹ run by the Nordic telecommunications company Telia Sonera AB, in collaboration with Swedish municipalities. We use the European Digital Competence Framework for Citizens [9] as a starting point, framing the research question ‘what competencies do Swedish seniors understand as necessary for digital inclusion?’ We collected qualitative data at a series of Mer Digital workshops conducted in 2019 in municipalities around Sweden, and employed content analysis with Dedoose as the primary analysis method. The theoretical result is a version of the digital competence framework specialised for basic inclusion necessities for the elderly.

The paper is structured as follows: the next section introduces the concept of inclusion, which is followed by a presentation of DigComp, the European Digital Competences Framework. Explanation of the data collection and analysis approach is followed by a report of the data analysis results - explaining how the seniors we interacted with understand inclusion, and the competences they require to address digitalisation. This leads to a revised version of the framework which is focused on inclusion skills for the elderly. Conclusions discuss the implications and limitations of the research.

2 Digital inclusion

The digital divide (also referred to as digital inclusion/exclusion) refers to ‘*the gap between those who do and those who do not have access to new forms of information technology*’ [10, p. 221-222]. The original use of the term concerned access to the Internet and availability of digital equipment [1]; however recent commentators tend to understand digital inclusion as a ladder of participation, a continuum of different gradations of access and use rather than a binary divide between haves and have-nots [11]. Concerns about citizens ability to keep up with the changing nature of society are also condensed in the ‘digital natives/digital immigrants’ discussion [12] and in the various literacy research streams. Research focusing on computer literacy has in recent times been supplemented by ICT literacy studies (the ability to use computer hardware and software and related technologies effectively), Internet literacy (adding the ability to understand information, media, and to communicate through the Internet) and media literacy (the ability to analyse media messages and the media environment and the consumption and creation of digital media products) [13]. In developed countries like Sweden with extensive digital infrastructure and a relatively high standard of living, the digital divide is more likely to focus on skills inequality – competence and knowledge for how to use the internet and digital devices – rather

¹ <https://www.telia.se/foretag/bransch/kommun/mer-digital>

than access. Sourbati [3] argues that skills inequalities for elderly citizens is problematic since: 1) the need for service increases with age (not least true for health care services), and 2) elderly citizens are rarely engaged and interested in digital technologies. They may have access to the Internet in their homes, but choose not to use for it personal reasons. Lack of engagement can be a result of either involuntary exclusion or personal choice [14]. 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 [3], and the uptake of specific technologies like tablets and smartphones. There is, however, little research focusing on the inclusion of the elderly [15], though there is some agreement that ‘the learning curve for many older digital entrants is very demanding and difficult’ [16, p. 2]. Nevertheless, the potential benefits of including the elderly in digital society may be extensive, including reduction of social isolation, IT-supported communication with friends and family, active participation in an increasingly computerized healthcare system [17], prolonged independence, and improved cognitive abilities. Given demographic changes in Western societies, elderly are expected to be one of the largest groups of information and service consumers. They are nevertheless the group that exploits new digital capabilities the least - exhibiting both a general disinterest in digitalisation and a general discomfort with it [18]. The most commonly proposed actions for increasing digital inclusion are education and training. Fortes, Martins and Castro [6] conclude that different forms of training increase motivation as well as making the elderly more receptive towards mobile technologies. Loureiro and Barbas [19] run a set of workshops with the purpose of providing skills needed to take part in a networked society. Tsai, Shillair, Cotten, Winstead and Yost [7] show that working with other seniors with similar life situations enhances motivation for experimenting with new technology.

3 Digital competence framework

Digital competence can be understood as ‘the set of knowledge, skills, attitudes, abilities, strategies and awareness that is required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; behave in an ethical and responsible way; collaborate; create and share content and knowledge for work, leisure, participation, learning, socialising, empowerment and consumerism’ [8, 9]. Table 1 shows The European Digital Competence Framework for Citizens [9], developed for the European Commission’s Directorate-General for Employment, Social Affairs and Inclusion. The framework is based upon an overview literature study and analysis of 15 existing competence frameworks [8] and an online expert consultation exercise with 95 experts using the Delphi method [20]. The framework consists of five competence areas broken down into 21 competences. There are in addition eight proficiency levels, from foundational to highly specialised, (which are not shown here or used in our analysis) and examples of uses from different contexts.

Table 1. DigComp 2.1: The digital competence framework for citizens [9]

Competence area	Description	Competence
Information and data literacy	Identify, locate, retrieve, store, organise and analyse digital information, judging its relevance and purpose	Browsing, searching, filtering data, information and digital content
		Evaluating data, information and digital content
		Managing data, information and digital content
Communication and collaboration	Communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness	Interacting through digital technologies
		Sharing through digital technologies
		Engaging in citizenship through digital technologies
		Collaborating through digital technologies
		Netiquette
Digital content creation	Create and edit new content (from word processing to images and video); integrate and re-elaborate previous knowledge and content; produce creative expressions, media outputs and programming; deal with and apply intellectual property rights and licences	Managing digital identity
		Developing digital content
		Integrating and re-elaborating digital content
		Copyright and licences
Safety	Personal protection, data protection, digital identity protection, security measures, safe and sustainable use	Programming
		Protecting devices
		Protecting personal data and privacy
		Protecting health and well-being
Problem solving	Identify digital needs and resources, make informed decisions on most appropriate digital tools according to the purpose or need, solve conceptual problems through digital means, creatively use technologies, solve technical problems, update own and other's competence	Protecting the environment
		Identifying needs and technological responses
		Solving technical problems
		Creatively using digital technologies
		Identifying digital competence gaps

The European Joint Research Council maintains a gallery of implementations² recording the framework's use in fifteen European countries for purposes including the professional development of teachers, content and student assessment for technology education, employability assessment and policy support [21]. The framework represents a picture of digital competences for European citizens in general, and is not targeted at elderly people.

4 Research approach

The research is conducted in Sweden - one of the world's most heavily digitalized countries. 98% of Swedish citizens have access to a mobile phone and internet, and

² <https://ec.europa.eu/jrc/en/digcomp/implementation>

93% have a computer at home [22]. However, a large group of 430 000 citizens, mostly elderly, do not use the internet at all [22], indicating that Sweden, in common with other countries has a problem with digital exclusion of elderly citizens. Data was collected as part of a series of workshops organised by Telia Sonera in collaboration with Sweden's local authorities as part of the Mer Digital (More Digital) program. In short, each workshop was lasting for three hours, and had approximately 60-100 elderly participants. All the locality's elderly (65+) were invited without pre-conditions, and invited to formulate their own questions and problems, and bring their own devices. Participants were seated around tables with internet-connected computers, and help was offered by high school students recruited from local schools, who received a small financial compensation. The intention, as a follow up to an earlier successful pre-study was to enable the younger generation to teach the elderly about digitalization. The workshops were user-directed, in response to the elderly's request for help, without a specific programme of instruction that should be followed. Interactions between the generations both supports the learning curve of the elderly, and enables a sense of contribution for the high school students. It means overcoming existing prejudices about each other's generations. Typical enquiries ranged from how to use Google to specific needs such as starting an e-mail account, getting access to social media, or selling a rug on consumer-to-consumer sites. The high school students and the elderly did not know each other beforehand.

Data collection aimed at exploring the participants' attitudes and behaviour towards digitalization, their current digital knowledge base, and how their knowledge and attitudes were affected by the training session. Data was collected using qualitative inquiry [23], based on free text questions handed out as a short open-question questionnaire, and collected on site. In total, 633 inquiries were analysed, collected from workshops distributed over four regionally distributed municipalities.

Data analysis was conducted using content analysis [24-26]. Content analysis yields 'a relatively systematic and comprehensive summary or overview of the data set as a whole' [26, p. 182], by observing repeating themes and categorizing them using a coding system. Dedoose was used as the coding tool. Inter-coder reliability was achieved by using a total of three coders. A hierarchical coding scheme was developed using the competence areas and individual competences given in table 2. Two coders spent an afternoon working together to synchronise their understandings of the codes, before coding the rest of the text independently. Additional codes were developed to represent competences not covered by the original framework, with further discussion between coders. A third coder sampled the coding retrospectively to ensure coding consistency and inter-coder reliability.

5 Seniors' understanding of digital inclusion and necessary digital competences

Figure 1 shows the frequency of coding for the major competence areas of the European digital competence framework. The information and data literacy, communication and collaboration, and safety areas of the framework, were well

represented in the responses of the elderly, whereas the digital content creation and problem solving areas hardly figured.

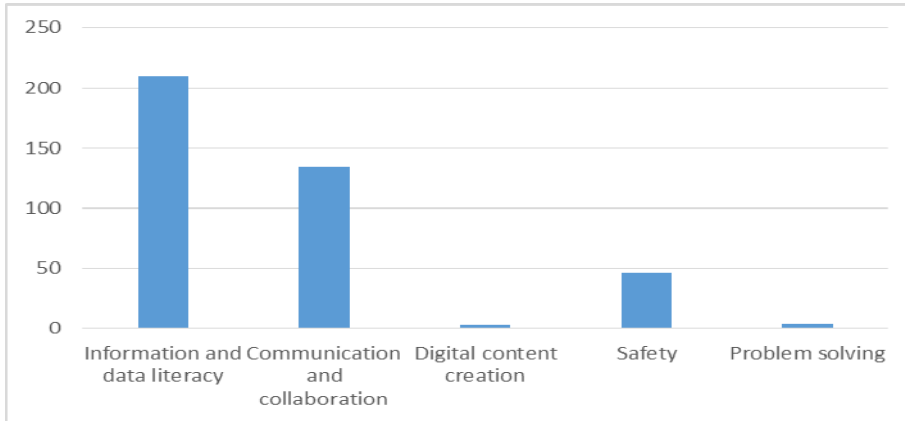


Figure 1. Frequency of coding for the major competence areas

Figure 2 shows the competence areas and individual competences from the analysis with 10 or more codings. This was chosen as an (arbitrary) threshold for significance, representing roughly five percent of the most coded categories. The competences are a mixture of competences from the original framework and competencies developed during the analysis. Competences related to digital content creation drop out of the picture, whereas new competences particularly represent service transactions (local government and financial services), and safety fears.

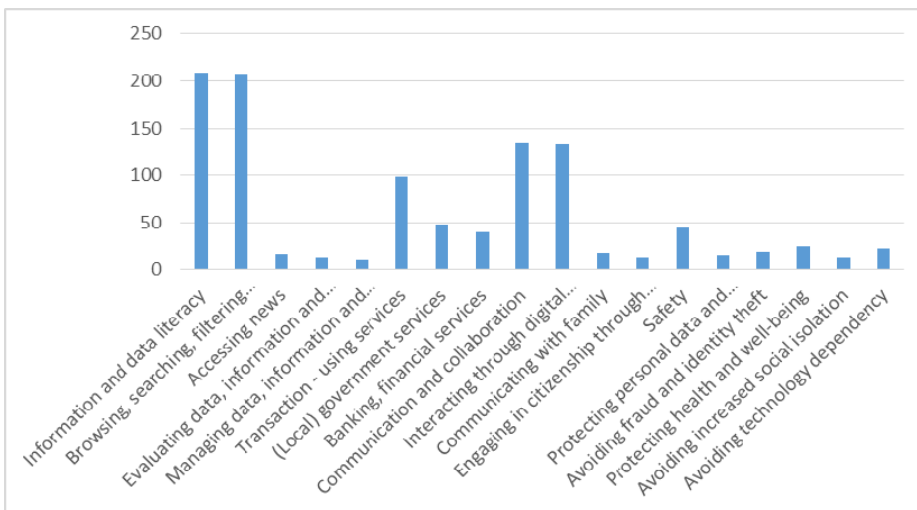


Figure 2. Competence areas and individual competences with at least 10 codings.

5.1 Senior citizens fear of exclusion

It is clear that the respondents realize that digitalisation is here to stay - *'most information and communication is digital today,' 'society takes it as given that everyone has a computer' 'That's the way today's society works'* and that it is essentially a step forward - *'the world gets closer', 'faster access to the channels of society.'* This means they have to get used to it, whether they like it or not: *'you're excluded from everything if you don't have a seat on the train,' 'if you know the new stuff you are less excluded from society'*. They often express that they don't have any choice in this matter - society forces them to go digital no matter what they think about it – *'the situation as it is today leaves you with no choice.'* However they feel that this is not a trivial task - its *'horror mixed with delight'* and *'something new when you are 80 years old.'* Seniors' view of digitalisation is characterized by a general sense of fear, of different kinds. Not being able to use digital equipment and services is commonly mentioned: *'I'm afraid that I cannot handle the digital society'* and *'I don't know when I do the right thing and when I don't'*. Various fears for their safety and personal development are described later. When asked to elaborate on how they thought digital inclusion could be increased, they often responded that knowledge and skill was the best way to reduce technology fear. This could be promoted in different ways for instance education and training (*'get the opportunity to dare to use these things,' 'wake up and open your eyes'*), reducing fear (*'we are afraid and believe that something will collapse,' 'many are afraid to make mistakes ... then you don't know what to do and that is scary'*), knowledge of better and newer technologies (*'it's not just to know what buttons to push but also to understand why you push that button'*), and assistance (*'I have my son here and I can use him whenever I can't do something by myself'*).

5.2 Information and data literacy

The elderly very frequently express the need to keep up with the world, expressed in Swedish as *'att hånga med'*, which also carries implications of some difficulty in the task and a disadvantage if it is not accomplished - in English *'to hang on': 'to keep up with the digital world,' 'its necessary to keep up, find information since it's getting hard to make contact by telephone, or get to some places to collect tickets, etc.'* As society is progressively digitalised, old forms of information seeking (finding out by making a telephone call) disappear, physical distribution points become further apart – and older people have more difficulties with mobility, so its easier to stay home. Keeping up is usually accomplished through the competence browsing and searching in the DigComp model. Some have more practical purposes in mind (*'compare prices at different businesses'*), others are driven by curiosity (*'to gather as much knowledge as possible'*). Keeping up includes both keeping up with digitalisation, and keeping up with events in the world (accessing news), since seniors recognised that much of the news media has relocated online: *'look at what's happening in the world', 'information on FaceBook on what's happening in our country – follow SVT's (Swedish Television) site a lot amongst others.'* Keeping up implies the need to sort

and evaluate data (*'drowning in information – can be too much that is irrelevant'*) but also the need to evaluate the truth content of digital news (*'all the rubbish that gets spread' 'too much fake news'*). Some requirement for managing digital data is also recognised, with organising photos mentioned several times.

5.3 Communication and collaboration

Communication competences are much valued by seniors, in which a frequent phrasing is 'to be connected' (Swedish: uppkopplad) – *'with my surroundings'*, *'with the world'*, coupled with the recognition that much of communication had moved online: *'get in touch with what I cannot get in touch with otherwise.'* They need to communicate digitally with friends (*'quick communication with Facebook friends'*), but particularly to keep in touch with distant family members and friends - children, grandchildren, and relatives, who don't always live close by, as they once tended to. Grandchildren are digital natives, and seniors feel disconnected if they cannot communicate with them with their own technologies. Some have noticed that there can be an economic advantage (*'the possibility of a simple conversation which is free of cost'*), whereas many have noticed that the various authorities (health, pension) expect them to be able to communicate through digital media. Several felt a sense of civic engagement (*'to participate in society'*) which could also be carried out online. However they show little sense of having a specialised digital identity (which might not coincide with their physical identity) which needs to be managed, except in the sense that they are worried that their digital identity could be stolen (see below).

5.4 Transaction – using services

A form of competence not much recognised or prioritised by the European DigComp framework is transactional competence. This was understood as a necessary survival skill by the elderly in our survey. They needed to *'be able to use the existing digital services'* and recognised that *'many services will be digitalised'* in the future. Therefore they need to take advantage of *'everything that can be done digitally where you don't have to go into town'*. Seniors repeatedly mentioned paying their bills online; the Swedish monetary system is increasingly digital, with many shops refusing to accept cash any longer. Payment through mobile phone services is increasingly common, with the most common service (Swish) often mentioned. Sweden contains remote, sparsely populated and inaccessible areas, in which banks increasingly rationalise their physical presence, so that *'being able to manage your economy'* is increasingly an online competence. Seniors need to be able to use digital services provided by government authorities, for example booking appointments to the healthcare, filling in a tax form. They are also increasingly aware of online retail *'buying things on the net, for example eBay'*.

5.5 Digital content creation and problem solving

DigComp has a competence area called digital content creation, but this was scarcely recognised by the elderly. They understood of course that they should write emails and take photos on their phones – these were understood as extensions of pre-digital competences like writing a letter. They showed no general inclination to write their own web-sites, shoot videos on their phones and post them, blog or vlog, become extensive Facebook posters or Tweeters, let alone develop careers as internet influencers, as far as we could discern from analysing their data.

DigComp includes a problem-solving competence, described as identifying digital needs and resources, making informed decisions on the most appropriate digital tools according to purpose or need, solving conceptual problems through digital means, creatively using technologies, solving technical problems, updating one's own and other's competence. Beyond a general irritation/despair at the number of low-level technical problems (*'how to change my password,' 'the printer suddenly stops working'*) sometimes at a rather extreme level (*'mental illness due to malfunctioning computer'*), our sample of the elderly showed little awareness of, or interest in higher-order problem-solving skills.

5.6 Safety

The participants exhibit a great concern regarding security and privacy issues, including having their personal information stolen (*'personal information can easily leak'*) and their computing devices infected by viruses. They fear fraud (*'being conned on the net,' 'you can conn a person on the net'*) and identity theft (*'danger of getting your ID hijacked'*), and feel (and may actually be) vulnerable to many new and difficult-to-understand digital fraud threats – *'there's a lot of fraud on that shitty net and intrusive selling ploys.'* They are generally nervous about their money and the net (*'worried about hackers in my internet bank and internet card payments,' 'don't want to pay on the net because it doesn't feel safe'*). Also commonly mentioned is an anxiety for spending too much time in the digital world. Seniors worry that moving online will increase their social isolation, since it takes time and reduces their face-to-face interaction with society around them – *'you lose human contact'*. There is a fear of being trapped behind a computer, or being dependent on it: *'it can be too much fun and take up a little bit too much time,' 'it can be an addiction'*, as well as a more general fear of the amount of time needed to keep up with advances in the digital world. Seniors worry about acquiring the screen addictions that they see in younger people.

6 Digital competences for senior citizen inclusion

Table 2 shows the Digital Competence model revised to focus on basic inclusion competences for senior citizens. The new digital competences identified are displayed in italics in table 2.

Table 2. The revised Digital Competence model

Competence area	Description	Competence	Senior citizens' particular needs
Information and data literacy	Identify, locate, retrieve, store, organise and analyse digital information, judging its relevance and purpose	Browsing, searching, filtering data, information and digital content	
		<i>Accessing news</i>	<i>Frequently expressed need to keep up with the external world where news sources are diverse and often on-line</i>
		Evaluating data, information and digital content	
		Managing data, information and digital content	
Communication and collaboration	Communicate in digital environments, share resources through online tools, link with others and collaborate through digital tools, interact with and participate in communities and networks, cross-cultural awareness	Interacting through digital technologies	
		<i>Communicating with family</i>	<i>Senior citizens' immediate families (children, grandchildren) are often geographically separated in contemporary society and grandchildren in particular are digital natives</i>
Transaction - using services	Perform transactions on-line with a range of important service providers	<i>(Local) government services</i>	<i>Service providers move on-line (often as a cost saving measure), and withdraw traditional service offers (over-the-counter, face-to-face, personal service)</i>
		<i>Banking, financial services</i>	<i>As above compounded by the gradual withdrawal of physical money and the development of secure on line payment services, especially mobile</i>
Safety	Personal protection, data protection, digital identity protection, security measures, safe and sustainable use	Protecting personal data and privacy	
		<i>Avoiding fraud and identity theft</i>	<i>The elderly feel (and may be) vulnerable to many new and difficult-to-understand digital fraud threats</i>
		Protecting health and well-being	
		<i>Avoiding increased social isolation</i>	<i>Seniors worry that moving online will increase their isolation, since it takes time and reduces their face-to-face interaction with society around them</i>
		<i>Avoiding technology dependency</i>	<i>Seniors worry about acquiring the screen addictions that they see in younger people</i>

7 Conclusions

In this article we focused on basic digital competences for the elderly, with a background in the European DigComp framework, using data collected from

participants at series of educational workshops in the Swedish Mer Digital programme. We focused the model to reflect the views of senior citizens, excluding elements not prioritised by them, and introducing new elements (particularly transactional skills) where they were sufficiently prioritised or focused in the original framework. Thus the primary contribution of the article is the Digital Competences for Senior Citizen Inclusion framework. We expect this to be particularly useful to educators in the field, who can arrange digital inclusion programmes to reflect the needs that the elderly themselves recognise as important. We, in the same way, continue to inform the Swedish Mer Digital programme as it develops. We recognise limitations with the research. It is not certain that elderly are necessarily the only authorities in specifying their own digital competence needs, since they (with some exceptions) may not focus on the trajectory of digital development, and therefore may miss important competences which may be needed in the near future. On the other hand, educators should expect more commitment to learning those competences which the elderly themselves recognise as essential. Nor is it certain that other countries follow the same digitalisation curve as Sweden – many western countries follow a similar trajectory, though they may be at different points in their development. Senior citizens from other regions of the world may have entirely different needs. Since digitalisation is a change process, it is clear that the framework will in any case need updating in only a few years.

References

1. Bélanger, F., Carter, L.: Trust and risk in e-government adoption. *The Journal of Strategic Information Systems* 17, 165-176 (2008)
2. Ebbers, W.E., Jansen, M.G.M., van Deursen, A.J.A.M.: Impact of the digital divide on e-government: Expanding from channel choice to channel usage. *Government Information Quarterly* 33, 685-692 (2016)
3. Sourbati, M.: 'It could be useful, but not for me at the moment': older people, internet access and e-public service provision. *New Media & Society* 11, 1083-1100 (2009)
4. Nishijima, M., Ivanauskas, T.M., Sarti, F.M.: Evolution and determinants of digital divide in Brazil (2005–2013). *Telecommunications Policy* 41, 12-24 (2017)
5. Hill, R., Beynon-Davies, P., Williams, M.: Older people and internet engagement: Acknowledging social moderators of internet adoption, access and use. *Information Technology & People* 21, 244-266 (2008)
6. Fortes, R.P.M., Martins, G.A., Castro, P.C.: A Review of Senescent's Motivation in the Use of Tactile Devices. *Procedia Computer Science* 67, 376-387 (2015)
7. Tsai, H.-y.S., Shillair, R., Cotten, S.R., Winstead, V., Yost, E.: Getting Grandma Online: Are Tablets the Answer for Increasing Digital Inclusion for Older Adults in the U.S.? *Educational Gerontology* 41, 695-709 (2015)
8. Ferrari, A., Punie, Y., Redecker, C.: Understanding Digital Competence in the 21st Century: An Analysis of Current Frameworks. pp. 79-92. Springer Berlin Heidelberg, Berlin, Heidelberg (2012)

9. Carretero, S., Vuorikari, R., Punie, Y.: DigComp 2.1: The Digital Competence Framework for Citizens. With eight proficiency levels and examples of use. In: Publications Office of the European Union, B. (ed.), (2017)
10. van Dijk, J.: Digital divide research, achievements and shortcomings. *Poetics* 34, 221-235 (2006)
11. Livingstone, S., Helsper, E.: Gradations in digital inclusion: children, young people and the digital divide. *New Media & Society* 9, 671-696 (2007)
12. Prensky, M.: Digital Natives, Digital Immigrants Part 1. *On the Horizon* 9, 1-6 (2001)
13. Christ, W., Potter, W.: Media literacy, media education, and the academy. *Journal of Communication* 48, 5-15 (1998)
14. Eynon, R., Helsper, E.J.: Adults learning online: Digital choice and/or digital exclusion? *New Media and Society* 13, 534-551 (2011)
15. Silva, M., Correia, S.: ActiveBrain: Online social platform for active and healthy ageing. *Procedia Computer Science* 27, 38-45 (2013)
16. Damodaran, L., Olphert, W.: Sustaining digital engagement: some emerging issues. *Digital Futures'*, Nottingham (2010)
17. Niehaves, B., Plattfaut, R.: Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems* 23, 708-726 (2014)
18. Kurniawan, S.: Older people and mobile phones: A multi-method investigation. *International Journal of Human Computer Studies* 66, 889-901 (2008)
19. Loureiro, A., Barbas, M.: 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) 450-459 (2014)
20. Janssen, J., Stoyanov, S., Ferrari, A., Punie, Y., Pannekeet, K., Sloep, P.: Experts' views on digital competence: Commonalities and differences. *Computers & Education* 68, 473-481 (2013)
21. Kluzer, S., Rissola, G.: Guidelines on the adoption of DigComp (Technical report). (2015)
22. Davidsson, P., Thoresson, A.: *Svenskarna och internet 2017: undersökning om svenskarnas internetvanor.* (2017)
23. Patton, M.Q.: *Qualitative research & evaluation methods.* Sage, London (2002)
24. Berelson, B.: *Content analysis in communication research.* Free Press, New York, NY, US (1952)
25. Krippendorff, K.: Reliability in Content Analysis: Some Common Misconceptions and Recommendations. *Human Communication Research* 30, 411-433 (2006)
26. Silverman, D.: *Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction.* Sage, London (2001)