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Aged People's Experiences of Gerontechnology Used at Home

A narrative literature review

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The life expectancy lengthens everywhere around the world and the number of aged people is steadily increasing. In Finland, the home care services are busy with ever growing amount of new aged clients. Solutions are needed to meet aged people's varying needs, help them live at home independently and control the costs of the care and support for this large quantity of people. Gerontechnology can help to manage the care needs of the aged people.

The purpose of this thesis is to describe aged people's experiences of gerontechnology used at home. This thesis, a narrative literature review, was made to benefit an undertaking called RIKASte-project which aims to promote aged people's coping at home by developing existing technology. The literature review includes ten articles (N = 10) that were analysed with inductive content analysis method. Based on the analysis aged people's experiences of gerontechnology consisted of five groups: technology is convenient, technology as an enabler, monitoring technology evokes feelings, others' impact on experience of technology use and dislike toward technology.

Health care professionals should value aged people's experiences and provide them support with technology. Future research should be carried out to discover how and which ways new gerontechnology should be presented and taught to aged user.

Keywords	aged, experiences, technology, gerontechnology

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Eliniänodote kasvaa ympäri maailmaa ja ikääntyneiden määrä lisääntyy tasaisesti. Suomessa kotihoito on kiireinen jatkuvasti kasvavasta asiakkaiden määrästä. Tarvitaan ratkaisuja, jotta vanhusten erilaiset tarpeet voidaan täyttää, heidän kotona asumistaan tukea ja hillitä hoidon sekä tuen aiheuttamia kustannuksia. Geronteknologia voi auttaa hallitsemaan ikääntyneiden hoidontarvetta.

Tämän opinnäytetyön tarkoitus on kuvailla kotona asuvien ikääntyneiden kokemuksia geronteknologiasta. Tämä opinnäytetyö, kuvaileva kirjallisuuskatsaus, toteutettiin hyödyttämään RIKASte-hanketta, joka pyrkii edistämään ikääntyneiden kotona selviämistä kehittämällä olemassa olevaa teknologiaa.

Kirjallisuuskatsaus sisältää kymmenen artikkelia (N = 10), jotka analysoitiin induktiivisen sisällönanalyysin keinoin. Analyysin perusteella, ikääntyneiden kokemukset geronteknologiasta voidaan jakaa viiteen luokkaan: teknologia on miellyttävää, teknologia mahdollistajana, seurantateknologia herättää tunteita, muiden vaikutus teknologian käytön kokemukseen ja teknologia on epämukavaa.

Hoitoalan ammattilaisten tulisi arvostaa ikääntyneiden kokemuksia ja tarjota heille tukea teknologian kanssa. Jatkotutkimusten tulisi selvittää, kuinka ja millä tavoin uutta geronteknologiaa pitäisi esitellä ja opettaa vanhuksille.

| Avainsanat | ikääntyneet, kokemukset, teknologia, geronteknologia |

Contents

1   Introduction

The population all over the world is aging and while the number of old people is getting higher, the number of young people is getting lower. This decreases the number of informal carers which causes more responsibilities to health care services. Elderly people want to actively take part in the society and have an influence on their own lives. Gerontechnology can help elderly to maintain activities they have in their every-day life hence they could live independent life at home longer. It could also help them to recognize changes that occur when aging and those changes could be decelerated and this way independency could be maintained longer. (Micera – Bonato – Tamura 2008: 10.)

In Finland, the structure of economy as it is will not be able to financially secure public services and social welfare. The government is reforming social welfare and health care services to make them more cost-effective, client-oriented and preventative. The use of electronic services and health technology will help in achieving this goal. These systems develop services that are more useful in supporting health and functional capacity. One of the main goals in the reform is to hear clients' opinions and create services that make it possible for clients to maintain their own health by themselves. (Prime Minister's Office 2015: 8, 19.)

This thesis was made to benefit an undertaking called RIKASte-project. The project's purpose is to promote aged people's coping at home without home care, by developing the existing technology. The aim of this thesis is, by doing a narrative literature review, to find out the aged peoples' experiences about gerontechnology used by themselves in their home. By studying aged people's experiences, we can increase the knowledge needed to promote better services for aged and elderly people in the future.

This final thesis took place from September 2016 till April 2017. Information retrieval was carried out in January 2017. Authors used inductive content analysis as data analysing method.

2   Aged people and gerontechnology

This section of the paper introduces the reader to the main concepts used in the thesis. Here, concepts are defined and theoretical background information provided regarding the topic.

2.1   Aged people

Ageing, when discussed from the biological point of view, is the outcome of multiple cellular and molecular level damage happening in the human body in the course of time. These occurring changes have an influence on person's mental and physical capacity and increase the chance to develop sickness. These biological modifications do not occur consistently and similarly amongst people, but rather, ageing is individual. Other changes in life during the aged years such as retiring, moving to more applicable habitation and death of loved ones are part of the ageing process. (WHO 2015.)

The National Institute for Health and Welfare, in Finnish Terveyden ja hyvinvoinnin laitos (THL 2015), explains that functional capacity is composed of different aspects which in most cases are social capacity, physical capacity, and psychological capacity. Cognitive capacity is often included to psychological capacity but can also be discussed on its own. An aged person is considered as one whose functional capacity is deteriorated because of the aging. Aged society refers to citizens 63 years or older. Aged people should not be considered as a homogeneous group but as different kind of persons living their life their own way. Therefore, their needs vary and supporting one's functional capacity is very individual. (Sosiaali- ja terveysministeriö – Suomen Kuntaliitto 2013: 10, 15.)

In Finland people who have reached sixty-five years of age are eligible to receive the old-age pension (The Social Insurance Institution of Finland) and as seen in law (Laki ikääntyneen väestön toimintakyvyn tukemisesta sekä iäkkäiden sosiaali- ja terveyspalveluista 980/2012 § 3) people in this age group are defined as aged. Thus, it has been decided that in this thesis the term *aged people* stands for people aged 65 and over.

2.2   The aging society and the future

The number of people over 65 years old has increased in Finland and is estimated to increase even more over the coming years. During the past forty-five years, the life expectancy has risen from 65,9 years in 1970 to estimated 78,5 years in 2015 in male, and from 73,7 years to 84,1 years in female citizens in Finland. In year 2015, every 5th person (20,5 %) of the whole population in Finland was aged 65 and over. It is estimated that in year 2030, already every 4th person will be aged. (Tilastokeskus 2016a.) In EU countries, people aged 65 and over totalled 18,9 % of the whole population in year 2015 and the percentage is estimated to be as high as 28,1 by 2050 (Eurostat 2016).

Home care, which in the Finnish context means the cohesion of home services and home nursing, is offered for people who have difficulties to manage their daily life without help from others. Home care is greatly occupied by old citizens in Finland and the number of aged receiving home care is growing. In November 2015, there were 73 278 clients receiving regular home care in Finland. Alone in Uusimaa area, 14 106 people received regular home care. (Väyrynen – Kuronen 2016: 1–2, 5.) Nearly forty percent (37,9 %) of the year's 2014 social security expenses went for the care of aged people. This statistic has increased by 2 percentage points from 2011. (Tilastokeskus 2016b.) It is understandable that the progressive number of elderly people will lead to even bigger expenses unless changes are made in the service structures of the social and health care field. To enable the care for the increasing number of aged citizens, meet their needs and manage the growing costs it is important to react and find solutions for these concerns.

Ministry of Social Affairs and Health (2016: 6, 7, 9–10), together with the Government in one of their Key projects called Kärkihanke, states that the precaution to manage the aging society is to keep everyone's health and functional capacity as good as possible. This will be secured by multiprofessional services and rehabilitation that support living at home. Kärkihanke, a Key project for years 2016–2018, aims to get electronic services and technological solutions close and easy to use for clients, their relatives and professionals. This undertaking's principal is to hear the elderly people's voice and secure their participation by involving them in decision making, planning and implementation.

2.3 The concepts of aging in place and home

Municipalities are obliged to support elderly people's independent coping, health, well-being, and functional capacity. Only if there are either heavy medical reasoning or reasoning regarding patient/client safety will an elderly person be taken to institutional care. (Laki ikääntyneen väestön toimintakyvyn tukemisesta sekä iäkkäiden sosiaali- ja terveyspalveluista 980/2012 § 2, § 14a.) An interview study implemented in Finland discovered that most of the elderly wish to live at home and nearly a half is willing to pay for technology which would help them to live at home longer (Stenberg – Pesola – Vuoripuro 2012). As set in the law and said by the aged themselves, home is the place to be. Multiple different modifications can be done to help the aged cope in the residence of their choice despite the declining functional capacity. Aging in place, as described by the Centers for Disease Control and Prevention (2009), means that person can live in their chosen home and community safely and conveniently regardless of their age, earnings or ability to function.

This thesis studies the experiences of aged people who live at home and use or have used gerontechnology. The concept of *home* in this thesis stands for a residence where aged person can live independently or with some help. For example, a regular house or apartment, modified home or sheltered accommodation. This research does not include experiences of aged people who live in institutional care homes or reside in other long-term care facilities.

2.4 Gerontechnology

Gerontechnology is technology that achieves to study and develop equipment, services and surroundings that can support elderly and prevent deterioration of functional capacity which is caused by aging. Word 'gerontechnology' derives from words 'gerontology' and 'technology'. (Forsberg – Intosalmi – Nordlund – Suhonen 2014: 13.) Merriam–Webster dictionary (2016) describes the word 'gerontology' being *"the scientific study of old age and of the process of becoming old"*, and 'technology' *"the use of science in industry, engineering etc., to invent useful things or to solve problems"*.

Technology that meets the needs of the aging citizens for example in research, improvement and design in the engineering subjects and is based on scientific knowledge about the process of aging, can be called gerontechnology. It is technology in contact

with the aging process and the ageing people's needs' in their environment. Geron-technology is the study of technology and aging to secure independent living, good health and maximum social participation for as long as the life span may reach. (Har-rington – Harrington 2000: 2.)

Five aspects to gerontechnology can be named: enhancement, prevention, compensa-tion, care and research. Technology which provides the full use of one's own abilities and enriches in a new way of activity or stimulation is enhancing. For instance, solu-tions from information and communication technology, such as video phone call or e-mail, can bring enhancement to one's social life. Technical thing like an exercise ma-chine can prevent the deterioration of one's fitness level which prevents social exclu-sion due to a person being unable to walk to places because of mobility-related issues. Prevention gerontechnology can save large amounts of money. In case where preven-tion did not work, compensative measures in the environment or the self can be made use of. Different walking aids or a moped could compensate the declined fitness and thus aid moving. When in need of care, gerontechnology focuses on providing technol-ogy that helps those who deliver the care including self-care. Research together with development and design form a triad which underlines all the other four aspects of gerontechnology. (Harrington – Harrington 2000: 24–25.)

In this thesis, *gerontechnology* means devices and other technological solutions, meth-ods and aids that aged people can use to support their coping at home independently, promote their health and increase social participation.

3   Purpose, aim and research question

The purpose of this thesis is to describe aged people's experiences about gerontech-nology used in their home. The aim is to accomplish an appropriate literature review which could offer RIKASte-project beneficial information for development of the aged people's care in Finland. The research question is: what are aged people's experiences of gerontechnology used at home?

4   Execution of the thesis

This final thesis researched the aged people's experiences of gerontechnology used at home. The execution of the final thesis took place from September 2016 until April 2017 and was carried out by two Degree Programme of Nursing students in Helsinki Metropolia University of Applied Sciences.

The execution of the thesis proceeded as visualised in Figure 1. The theory base was built around the themes ageing, technology and home dwelling. A narrative literature review was the chosen method used to find answers to the research question. The selected data from information retrieval was analysed using inductive content analysis. Results of the analysis were compared with previous research and the conclusions are discussed in relation to nursing care. Proposals to development of the health care are given based on the results of the research.

Research question: what are aged people's experiences of gerontechnology used at home?

Article research: 10 articles to analyze

Inductive content analysis

Results, conclusions and utilization in health care

Figure 1. Process of the thesis

The research methodology which was used in this final thesis work is a narrative literature review. Literature review is a systematic process of searching and analysing literature to answer a certain research question (Aveyard 2010: 6). Characteristic to literature review methodology is that literature, searched from multiple databases, provides

the data and thus the sample comes from literature (Siu – Comerasamy 2013: 46). Literature search process starts with finding suitable research words and setting inclusion and exclusion criteria. The next step in the process is selecting the literature and getting familiar with the data. The last phase is the analysing of the data to answer the research questions.

4.1 A Narrative literature review as a research method

A literature review is done as a theory base in every research and it has a great meaning as a tool used in research. Literature review on its own can be identified as a systematic research methodology which is based on organized scientific working. A literature review, as any other research, must be repeatable. With a literature review, is possible to form a general view about a certain topic. This methodology can be used either by studying a specific scientific field's research literature, e.g. nursing, or combining many sciences, interdisciplinary. (Suhonen – Axelin – Stolt 2015: 7.)

Many different types of literature reviews exist but in general they can be divided into three different categories: 1) narrative literature reviews, 2) systematic reviews and 3) meta-analysis. Even though several different reviews are available and some of them differ only slightly, the differences can be found in how the typical phases of this method are implemented. These phases are: defining the research problem and the purpose for the study, the search and selection of the literature, evaluation of the data, data synthesis and analysis and finally, the reporting. (Suhonen – Axelin – Stolt 2015: 8, 33.)

Using a literature review as a research method has become more common in nursing and health sciences. Especially, a narrative literature review (other terms used: descriptive literature review, unsystematic narrative review and traditional literature review) is a method often used even though its reliability has been criticised. The precise following of the different steps in a narrative literature review promotes the reliability of this method. The steps to follow in a narrative research are i) discovering a research question, ii) searching for and choosing the data, iii) building a description, and iiii) examining the results. Characteristic to a narrative literature review is that despite it is following set phases, these phases also interlace and overlap. A narrative literature review can be applied in health research work in Universities and Universities of Applied sciences. (Kangasniemi et al. 2013: 292–294.)

4.1.1   Research phrases, used databases, inclusion and exclusion criteria

In a narrative literature review the answers to research questions arise from the searched literature. To systematically find all the information about the studied subject, various of databases, dissertations, final theses, internet websites and grey literature need to be searched. Inclusion and exclusion criteria also prevent the sample size from becoming overwhelming and help researchers to stick with data suitable to best answer the research questions. (Lehtiö – Johansson 2015: 37; Siu – Comerasamy 2013: 58.)

This thesis investigate what are aged people's experiences about gerontechnology used in their home. As Lehtiö and Johansson (2015: 38) suggest, the research question as it is rarely serves as a search phrase. Thus, the question was divided into smaller topics and vital concepts for successful literature search were defined. The authors came up with the following concepts: *aged people, experience*, *gerontechnology* and *home*.

Coming up with good research words, the authors familiarised themselves with the topic by reading material concerning aged people and technology. When thinking about relevant research words the differences in British and American English were taken into consideration. To supplement the search, the authors learnt about and used different *key words* specific for each database. (Lehtiö – Johansson 2015: 39–40, 45.) This thesis' data search included both English and Finnish literature. Thus, good search words and key words were produced in both languages. Table 1 displays a collection of words discovered by the authors from the four main concepts.

Table 1.   Research terms

ELDERLY PEOPLE	EXPERIENCE	(GERON)TECHNOLOGY	HOME
Aged	Perception	Gerotechnology	Home
Aged, 80 and over	Knowledge	Gerontechnology	Residence
Elderly	Opinion	Health technology	Place of resi-
Frail elderly	Information	Technology	dence
Old	Expertise	Engineering	Dwelling
Old age		Technical	House
Old person	Kokemus		Apartment
Old woman	Elämys	Tekniikka	
Old man	Harjaannus	Teknologia	Koti
Old people	Asiantuntemus	Gerontologia	Kotipaikka
Pensioner		Geronteknologia	Palvelukoti
Retired			Asunto
Senior			
Senior citizen			
Geriatric			
Over 60 years			
Vanhus			
Seniori			
Eläkeläinen			
Iäkäs			
Ikääntynyt			

Tools such as Boolean operators, parentheses, phrases and truncation were used in information retrieval to form a research phrase. Boolean operators AND, OR and NOT work in certain order as in addition and multiplication calculations. With parentheses, this order can be changed. Different databases have different rules for the tools used in information retrieval thus the authors had to learn to use three different databases. (Lehtiö – Johansson 2015: 40–43.) Examples of used research phrases and their results are found in Table 2. Appendix 1 presents more databases' search results.

Three different databases were selected to use for the information retrieval. It is advisable to use more than one to minimize the chance of leaving out relevant data. Bachelor's Thesis in the field of health care ideally includes the following databases, also used in this thesis: CINAHL, PubMed and Medic. (Lehtiö – Johansson 2015: 44; Valkeapää 2015: 63.) To supplement the electronic search, we used manual search by going through all the volumes of the official journal of the International Society for Gerontechnology from year 2007 onwards. The manual search unfortunately did not bring any articles to the final data.

Table 2.   Examples of research phrases, used limitations and the results of database searches. These information retrievals were carried out during second week of January 2017.

Database	Research phrase	Limitations	Hits/results
CINAHL	Technology AND (Aged AND Aged, 80 and over OR Elderly) AND Experience	Published 2007–2017	233
PubMed	Geriatric AND Experience AND Technology	None	98
Medic	"Aged" AND "Telemedicine"	Key word search (Asiasanahaku)	4

As discussed earlier, imposing inclusion and exclusion criteria help the researchers to keep the data collection on its tracks. Research question itself is not detailed enough to point out what literature is relevant for the research. Setting appropriate criteria helps in keeping the research focused and demonstrates the wideness of the literature search. (Aveyard 2010: 71–73.) Table 3 presents the inclusion and exclusion criteria for this thesis work which studied the aged people's experiences towards gerontechnology used at home.

Table 3. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
- Primary research relating to technology used by aged people at home - Published in an academic journal - Full text available for free - Published between 2007–2017 - English or Finnish language - The research studied aged people's experiences	- Research about aged people who reside in nursing homes or other institutional care places - Pre- 2007 - Unpublished research - Studied experiences of health care staff or relatives of aged people

Articles published in academic journals found either with electric search or manual search were included. The research article must had been published either in Finnish or English language between the years 2007–2017 and the full text version must had been available for free using the Metropolia University of Applied Sciences or Helsinki University libraries. The chosen articles had to answer the research question and their view point had to be in research of aged people's experiences. Unpublished articles, articles published before 2007 and articles which studied the aged people's experienc-

es of technology used in other than home setting (for instance an institutional care home) were excluded from the review.

4.2   The selected data

The information retrieval was carried out in January 2017. The authors worked independently using all three databases. Several searches were carried out and hundreds of article titles and abstracts read through as can be viewed in Figure 2 and more detailed in Appendix 1. The authors individually selected a total of 21 articles to be evaluated based on full text. These articles were again thoroughly read through by both authors and evaluation for the final selection was made together.
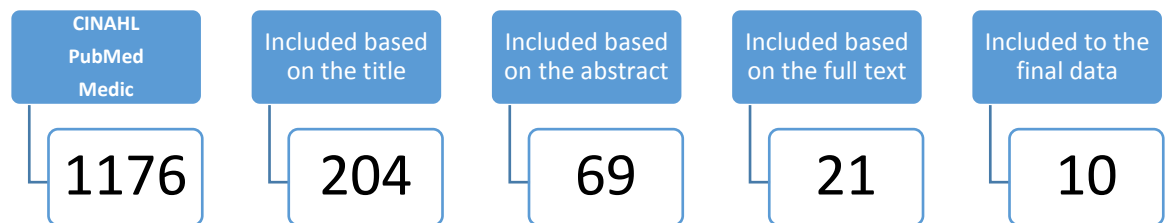
CINAHL PubMed Medic	Included based on the title	Included based on the abstract	Included based on the full text	Included to the final data
1176	204	69	21	10

Figure 2.   Data collection path

A total of N = 10 articles was included in the final data. Geographically two different continents and five different countries are represented: Finland N = 1, Sweden N = 3, The Netherlands N = 2, The United States of America N = 2 and United Kingdom N = 2. The articles researched aged people's experiences of sensor monitoring, fall detectors, remote monitoring and different forms of telehealth and care surveillance. The articles were published between years 2008 and 2016. All the studies had used qualitative research methods such as in-depth interviews, qualitative explorative field study, qualitative interpretative phenomenological (IPA) study design and semi-structured interviews. The number of participants in study ranged from N = 7 to N = 53. A total of N = 175 aged persons had been studied in the chosen research articles. In two (N = 2) of the chosen articles the set age limit of 65 years and older was not met by the youngest participants in research, but after a thorough discussion these articles were included as the other inclusion criteria was met and the authors agreed they will provide good data. As Kangasniemi et al. (2013: 296) explain, even though it is important for the reliability of a systematic literature review to carry out the data search in an organized

manner, in a narrative literature review the emphasis of the selection of the data will be on the content of the previously done research. That is, the reflection of the research question to the possibly chosen articles is ongoing throughout the data search process (Kangasniemi et al. 2013: 296). These ten chosen articles are presented in a closer detail in the Appendix 2.

4.3   Data analysis

Finally, after information retrieval and data selection it is time to analyse and synthesize the data. The decision must be made about which data analysis method to use and how to present the results. Tables and figures can be used to illustrate the synthesis. It is advisable to write the summary of the articles into a table, where important content of the studies involved are explained. (Kangasniemi – Pölkki 2015: 83; Niela-Vielén – Kauhanen 2015: 31–32.) The chosen data analysis method in this research is inductive content analysis. The articles are presented in a table explaining their author(s), publication details, used research method and results. This table can be viewed in Appendix 2. The data analysis process and the results are presented in writing, in figures and in tables.

This research looked for an answer for the question what are aged people's experiences of gerontechnology used at home. Table 5 shows the results of the analysis. In table 5, names for the different sub-groups, groups and the theme emerged from the data are presented. Table 4 presents an example of the analysing process of how the group *Technology is convenient* was formed. In the Appendix 3 the whole analysing process of the group *Dislike toward technology* is presented.

Table 4. An example of the analysing process

Original phrase	Reduced phrase	Sub group	Group	Theme
"It gets you more freedom of doing things."	More freedom	Technology gives freedom	Technology is convenient	Aged people's experiences of gerontechnology used at home
"...believed that the system provided freedom…"	Freedom			
"Two seniors, 78- and 75-year-old ladies, expressed a growing interest in learning more: one of these two had registered for ICT training for senior citizens."	Wanting to learn more about technology	Technology is interesting		
"Monitoring your activity with the wristband is interesting."	Monitoring own activity is interesting			
"Several patients expressed how easy the system was to use."	Easy to use	Technology and its use is pleasant		
"Oh boy! In my own case, I couldn't think of any reason why you would not use it."	Satisfaction			
"Most of the participants explained that they did not have any technical knowledge and expressed their relief that the sensors did not require any action of them."	Relief that sensors did not require technical knowledge			
"It *(the digital pen)* is a… security."	Security	Technology promotes the feeling of security		
"It makes me more secure. I feel that it will know when I had a fall. From my past experience from that point of view, it was nice to know that you have something to fall back on."	Secure			
"I feel safer now"	Feeling safer	Technology promotes the feeling of safety		
"I feel safe with this because without noticing it, somebody is keeping an eye on me."	Being monitored brings a feeling of safety			

The data analysis started with re-reading the chosen articles. The authors marked words and sentences from the articles which answered the research question. These words and sentences, *original phrases*, were written to a document. The original phrases were then *reduced* to a meaning that arose from the phrase. Similar reduced phrases were then combined into *sub-groups*. Sub groups with similarities were combined to form *groups*. All the groups, five in total, form a *theme* Aged people's experiences of gerontechnology used at home.

5   Results

This final thesis investigated what are aged people's experiences of gerontechnology used at home. The research was undertaken using a narrative literature review method and collected data was analysed using inductive content analysis. Under the theme *Aged people's experiences of gerontechnology used at home* five groups can be identified. Table 5 shows the different sub-groups, groups and the theme formed after the inductive content analysis.

Table 5.   Sub-groups, groups and the theme

Aged people's experiences of gerontechnology used at home				
Technology is convenient	**Technology as an enabler**	**Monitoring technology evokes feelings**	**Others' impact on the experience of technology use**	**Dislike toward technology**
• Technology gives freedom • Technology is interesting • Technology and its use is pleasant • Technology promotes the feeling of security • Technology promotes the feeling of safety	• Technology brings closer to health care provider • Technology lessens the need for face-to-face health care • Technology increases health • Technology enables living at home • Technology promotes self-care	• Monitoring technology is intrusive • Monitoring technology is a positive thing • Monitoring technology causes worry about false alarms • Monitoring technology made aged feel not in control	• Relatives have an impact on the use of technology • Using technology requires help	• This specific technology is not for me • Technology is not interesting or useful • Technology and its use is inconvenient • Human contact is important • Technology is intimidating

Next, the different groups and sub-groups are discussed in closer detail.

5.1   Technology is convenient

One finding is that the aged people think gerontechnology is convenient. Aged people find technology positive and enjoyable (Seelye et al. 2012). Technology is experienced to increase the feeling of safety and security (Essén 2008; Lind – Karlsson 2014; Ottenberg – Swetz – Mueller – Gerhardson – Mueller 2013) and aged are both enthusiastic and interested about technology (Kinni – Raatikainen – Johansson – Skön 2016). Some aged experience that gerontechnology provides them with more freedom (Ottenberg et al 2013). A participant in the research about remote monitoring system by Ot-

tenberg et al. (2013) explains *"It gets you more freedom of doing things, to where you don't really have to almost watch everything you do. They are watching you in a way"*.

5.2   Technology as an enabler

Aged feel that technology can make things possible. Technology was seen to bring the health care services more available and closer to the users (Gorst – Coates – Aritage 2016; Lind – Karlsson 2014). Thus, aged people feel that there is less need for face-to-face visits with health care professional (Gorst et al. 2016; Essén 2008; Ottenberg et al. 2013). As said by a participant in research by Gorts et al. (2016) *"…telehealth has enhanced her engagement in health care over the past year, as she is always able to speak to a health professional if she needs to."* Another interviewee in the same study feels *"…that her access to health care has increased dramatically."* Technology and technological devices, according to aged people, are promoting activity and increasing both physical and social health and well-being (Kinni et al. 2016; Lind – Karlsson 2018; Ottenberg et al. 2013; Pol et al. 2014; Seelye et al. 2012). Gerontechnology supports aged people's independent living and thus enables to live at home longer (Essén 2008; Horton 2008; Pol et al. 2014). A participant in the research by Pol et al. (2014) explained that *"it may be useful for the future, I think. People can stay at home longer with the help of sensors because there is more supervision."* Technology makes aged people more aware of their condition, increase their own participation in health-related matters and promote self-care. (Lind – Karlsson 2014; Pol et al. 2014; Seelye et al. 2012). In study by Lind and Karlsson (2014) participants explained that they better followed the health care professional's orders and they were more on top of their symptoms and signs, thanks to the use of the tested digital pen.

5.3   Monitoring technology evokes feelings

Analysed data included research made about aged people's experiences of different monitoring technology. Aged people feel monitoring technology is intrusive (Essén 2008; Holmström – Nokkoudenmäki – Zukancic – Sundler 2016; Horton 2008; Peek et al. 2016; Pol et al. 2016) and the falls alarms from the devices cause worry (Horton 2008). Monitoring technology makes some aged people feel they are not in control (Horton 2008; Holmström et al. 2016). A participant in Horton's (2008) research explained how he was not in control of when the tested sensor was activated and sent

signal for help without him wanting it to happen. On the other hand, aged people also feel that surveillance and monitoring is not disturbing, making the monitoring technology a positive thing (Essén 2008; Gorst et al. 2016; Ottenberg et al. 2013; Pol et al. 2016).

5.4   Others' impact on the experience of technology use

Those around the aged people have an impact over the experience an aged person has towards gerontechnology. The aged feel thankful for the social support but also feel like a burden to their closed ones when having to ask help with technology. It can be said that aged people's relatives have an impact on the use of technology. (Essén 2008; Kinni et al. 2016; Peek et al. 2016; Pol et al. 206; Seelye et al. 2012.) Sometimes aged people are happy with the amount of provided information and help regarding technology, but at times they experience they would need more help and guidance. In general, their experience is that using technology requires help. (Holmström et al. 2016; Horton 2008; Kinni et al. 2016; Ottenberg et al. 2013; Peek et al. 2016.) Kinni et al. (2016) examined senior's user experiences about health technology products and they discovered for example that *"These senior citizens were of the opinion that guidance in using these kinds of devices should be focused on, especially at the beginning of use. It should not be too quick and should be tailored according to the user's skills."* Also Peek et al. (2016) found that *"some of the participants stated that they were dissatisfied with the technical support which was included in the service…and that this played a role in their discontinued use of that particular technology."*

5.5   Dislike toward technology

Aged people experience a dislike toward technology for different reasons. Aged people experienced that certain technology is not for them (Horton 2008; Kinni et al. 2016; Pol et al. 206; Seelye et al. 2011). Aged feel that technology is not interesting or useful (Horton 2008; Kinni et al. 2016; Lind – Karlsson 2014; Peek et al. 2016; Pol et al 2016) or that technology is intimidating (Holmström et al. 2016; Lind – Karlsson 2014; Ottenberg et al. 2013; Peek et al. 2016; Seelye et al. 2012). Aged experience technology and its use to be inconvenient which was described in eight articles (Essén 2008; Holmström et al. 2016; Horton 2008; Kinni et al. 2016; Ottenberg et al. 2013; Peek et al. 2016; Pol et al. 2016; Seelye et al. 2012). Some aged people experience that hu-

man helper is better than technology and human contact is important (Holmström et al. 2016; Horton 2008; Ottenberg et al. 2013).

6   Discussion

This narrative literature review researched aged people's experiences of gerontechnology used at home and was the authors' first research paper. This section discusses the results of the research in relation to previous research. Ethics and credibility of the research are considered. Recommendations for future research are given and utilisation of the results are discussed in this section of the paper.

6.1   Conclusions and examination of the results

The main findings of this research suggest that aged people find gerontechnology to be convenient and enabling. It was also found that some aged express a dislike toward technology. Those around aged people have an impact on the experience of technology use and the monitoring technology evokes different feelings in the aged people. van Hoof, Kort, Rutten and Duijnstee (2011) studied the gerontechnology experiences of 18 community dwelling aged people who were aging-in-place. Ambient intelligence technology devices were installed in these aged people's homes and their experiences researched with interviews. The results indicate, that aged people found the technology to increase their sense of safety and security. Nonetheless, it was also interpreted that technology alone does not provide all-encompassing solution to aid aging-in-place: human help and additional environmental interventions are required also. These findings are like those found in this research: gerontechnology increases the feelings of safety and security and human help is important.

This research found that aged people experience a need for help and guidance for using technology. Melkas (2013: 77) studied how productivity of the elderly care could be increased with the use of technology. She found out that when aged people are presented with assistive technological devices, information regarding the benefits of such devices and their profit for the aged person's life should be explained to them. This help and support may change the customer's, possibly negative, attitudes towards technology, make the aged person use technology and thus enable the technology to

fulfil its purpose. (Melkas 2013: 83.) The same study found the aged people think devices have an impact on the safety and security and they make daily life easier. The aged also had hoped for more information regarding assistive devices.

The results of this research show that aged people have heterogeneous experiences of gerontechnology. Attitudes towards technology may be negative but aged are also eager to learn to use different devices and they are interested of technology.

6.2   Ethics and credibility of the final thesis

The discussion and reflection of ethics is an influential part of any research. Especially in a narrative literature review where the looseness of the methodology highlights the ethics in every step of the research project (Kangasniemi et al. 2013: 297). Many things can be named which promote the credibility of the thesis and show how the ethics have guided this project.

The authors have worked together in close contact throughout the thesis project and have good team working skills. The research has been done together step by step and in mutual understanding. If there is more than one person doing literature research the result will be less prejudiced hence more reliable (Bettany-Saltikov 2010: 52). The authors have asked for guidance and help from the mentor PhD Reetta Saarnio both in group tutorials and individually. The authors sought advice from Helsinki Metropolia University library's informatician to boost the information retrieval. It is important to get the whole picture of a topic when doing a literature review, in other words finding all relevant articles and not to leave out anything on purpose (Aveyard 2010: 10; Brettle – Gambling 2003: 229). The appendix 1 well explains the thorough article search the authors have undertaken to not leave out any relevant research articles from the final data. To accompany the electrical search, the authors also undertook a manual search. Inclusion and exclusion criteria was followed during the data selection process and care taken to select the articles which had studied aged people's experiences and best answer the research question.

All the chosen data are published journal articles. The data was carefully analysed with the best understanding and skills the authors have in this point as novice researchers. In the report, the referencing of the original sources and marking the references is done correctly. The final thesis has been running through Turn it in -program, a program to

detect plagiarism, and had no reportable similarities with previously written material. The report explains the research process in detail and provides examples of the data search and analysing phases. The authors had a genuine will to produce a presentable research of the topic they are both interested in.

As expected from first time researchers, there are also factors which affect the credibility of this research, the novice level being one. The information retrieval was done individually as the authors trust one another to work ethically, thoroughly and according to the plan. The duplicate studies found in information retrieval were deleted in the phase when articles were examined based on their abstract. This may have an impact on the real number of titles found in information retrieval. The results of the searches were discussed more thoroughly in the phase of selecting articles based on their full text. Though it must be pointed out that the authors kept in close contact during all parts of the execution of the final thesis and asked each other's opinion and help daily.

6.3   Final thesis as a learning process

The final thesis project has given new coping skills, strengthen the data searching skills and deepened the authors' understanding of research. During this project, the authors have learnt to search, process and absorb large quantities of information to produce a coherent whole. The thesis has required and strengthened time managing and team working skills. The authors have worked hard and thoroughly to the best of their knowledge and skills through each step of the thesis work.

This learning process has provided the authors with times of desperation and frustration but still the principal feeling has been and is the joy of learning. The main purpose and aim of the thesis process to the authors was to be an educational and teaching pair work. The thesis certainly has fulfilled this aim and given the authors a bunch of new knowledge and trust in themselves. The authors are proud of their ability to finish off in time and accordingly a large project. Looking back the project the authors can feel pride but are also aware of the things which could have been done differently and more efficiently. But at the end of the day, that is exactly what tells one that she has learnt new skills and developed into something better.

6.4   Utilisation of the results and recommendations for future research

This research studied the aged people's experiences of gerontechnology used at home. The research was made to benefit RIKASte-project which aims to improve the existing technology to help aged people age-in-place longer. As the RIKASte-project is a Finnish project, a poster is made for them in Finnish presenting the results and the research process of this final thesis. RIKASte-project hopefully can use this research's results as support when promoting the design and implementation of existing geron-technological solutions into lives of the aged people.

This research shows that aged people have heterogeneous experiences of gerontech-nology. They find it convenient and enabling. Different kind of monitoring technology evokes different feelings in elderly: some like to be monitored whereas others find it intrusive and feel to lose control with monitoring technology. It was found that relatives and others around aged people have an impact on the experiences of using geron-technology. Some aged people feel a dislike toward gerontechnology. Also, technology use was experienced not interesting or useful and even intimidating.

The analysed articles represent five different countries and two continents as explained in chapter 4.2. Only one research (N = 1) was made in Finland. Thus, it is to be con-sidered that the results cannot be without concern utilised to Finnish society and aged people in Finland. Although, everywhere in the world aged people are individuals with different opinions and values. That is why the results can be to some extent utilised in Finland and Finnish concepts.

Based on the results it can be advised that aged people should be always viewed as individuals with different previous experience of technology and different expectations and needs towards it. Aged people are adults with valuable experience of life and they wish to be part of their own lives until where the life span may take them. Health care professionals should not carry prejudice toward aged people's opinions and experience about gerontechnology. Aged are able and willing to learn and deserve adequate sup-port to carry on living as respected human beings on this technology filled planet. Health care providers should be supportive and provide help for the aged in the fast-evolving technology filled world.

Gerontechnology can provide support to age-in-place longer, increase aged people's overall health and promote social participation. It seems to be inevitable also for the aged people to live without more complex and developed technology. Feelings of dislike and finding technology useless can decrease the use of technology. If gerontechnology is not used by the aged people it cannot bring about the profit and benefit it could have on the aged people's life. Thus, it would be beneficial to study aged people's wishes and hopes towards how the technological solutions should be presented and taught for them. Only this way may gerontechnology fulfil its purpose to enhance, prevent, compensate and care.

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Table of research results undertaken in specific databases

Database and keywords	All results	Included based on the title	Included based on the abstract	Included based on the full text by individual evaluation	Included to the final data by both authors evaluation
CINAHL 2007-2017					
Tele* AND (Aged AND Aged, 80 and over OR Elderly) AND Experience	263	32	14	10	5
Technology AND (Aged AND Aged, 80 and over OR Elderly) AND Experience	233	36	9	2	0
(Perceptions OR attitudes OR opinion OR experience) AND (Aged OR elderly OR senior OR older people) AND Gerontechnology	3	3	2	1	0
Health services for the aged AND (Tele* OR Technology) AND Experience	11	3	0	0	0
Aged 65 and over AND (Experience OR perspective OR view OR perception OR attitude) AND Technology	10	0	0	0	0
PubMed 2007-2017					
(Aged OR Aged, 80 and over OR Elderly) AND Tele* AND Experience	151	34	7	1	0
(Aged AND Aged, 80 and over OR Elderly) AND Technology AND Experience AND Home	202	21	8	2	2
Geriatric AND Experience AND Technology (no time limit)	98	9	2	1	1

Geriatrics AND Experience AND Technology NOT Hospital (no time limit)	22	1	1	0	0
Older adults AND Technology acceptance	165	59	23	2	1
Gerontechnology AND Elderly AND Experience (no time limit)	2	1	0	0	0
Medic 2007-2017					
"Aged" AND "Telemedicine"	4	1	1	0	0
Technology AND Aged	12	4	2	2	1
vanh* senior* eläk* AND kokem* AND tekn* (no time limit)	0	0	0	0	0
Vanhus AND kokemus AND koti (no time limit)	0	0	0	0	0
läkäs AND Teknologia AND Kokemus (no time limit)	0	0	0	0	0
TOTAL	1176	204	69	21	10

The information retrieval was carried out during weeks 2–4 in January 2017.

Included articles

Authors, Year, Title, Country	Aim/Purpose	Method, Sample, Used Technology	Main Findings
Essen, Anna 2008. *The two facets of electronic care surveillance: an exploration of the views of older people who live with monitoring devices.* Sweden.	To understand why seniors feel that electronic care surveillance (telemonitoring) does or does not violate their privacy.	In-depth interviews with 17 seniors who used monitoring device on the wrist.	1. Care surveillance as enabling – feeling cared for 2. Care surveillance as constraining – feeling as if under suspicion
Gorst, Sarah L. – Coates, Elizabeth - Armitage, Christopher J. 2016. *"It's Sort of a Lifeline": Chronic Obstructive Pulmonary Disease Patients' Experiences of Home Telehealth.* United Kingdom.	To explore the beliefs and perceptions of patients with chronic obstructive pulmonary disease currently using home telehealth and who are not enrolled in a trial.	Semistructured interviews with 8 patients. Home telehealth in this study is an equipment that can transfer health information from a patient at home to health professionals at another location.	(a) perceiving benefits of "being watched over" as providing peace of mind (b) learning about the health condition and the impacts on self-management behavior (c) active engagement in health service provision and better access to health care (d) valuing the importance of in-person care.
Holmström, Inger K. – Nokkoudenmäki, Mai-Britt – Zukancic, Selma – Sundler, Annelie J. 2016. *It is important that they care – older persons' experiences of telephone advice nursing.* Sweden.	To explore older persons' experiences of telephone advice nursing at primary healthcare centres.	Qualitative inductive approach. 10 participants using telephone advice nursing.	Some of the older persons found the telephone system difficult to handle. They were uncertain about the technology and doubted it was reliable and well-functioning.
Horton, Khim 2008. *Falls in older people: the place of telemonitoring in rehabilitation.* United Kingdom.	To explore older people's experiences with and expectations of the use of telemonitoring devices such as fall detectors and bed occupancy sensors	In-depth interviews. 35 participants. Those in the control group already had a standard pendant alarm. Those in the intervention group were allocated each a fall detector, a bed occupancy sensor, and a key safe.	The use of telemonitoring devices had benefits resulting in older people feeling more secure and able to live in their own homes. Disadvantages included the intrusive aspect of telemonitoring, because of which older people reported not being able to get along with their personal life without the fall detector triggering an alarm. They also had the feeling of not being in control, because the devices were

			recording any event that occurred as opposed to the older person having to activate the alarm.
Kinni, Riitta-Liisa – Raatikainen, Mika – Johansson, Markus – Skön, Jukka-Pekka 2016. *Senior citizens evaluating welfare technology: User experiences in SENER-project.* Finland.	To explore the potential of ICT to enhance active aging.	Semi-structured interview. 17 seniors participated. Material included a tablet computer, a sleep monitor, stove guard, activity wristband, medical dispenser, smart weighing scale, blood pressure monitor, wireless object locator, and a motion-activated voice reminder.	In general, the health technology products were felt to be activating. The activity wristband, blood pressure monitor, and smart weighing scale were used to strengthen an existing interest on health promotion. The tablet computer was used to ease everyday life and for fun.
Lind, Leili – Karlsson, Daniel 2014. *Telehealth for "the Digital Illiterate" – Elderly Heart Failure Patients' Experiences*. Sweden.	To explore and describe the patients' and spouses' experiences in using the system.	Seven patients were interviewed. Technology was a pen that is used as an ordinary ball-point pen, but the strokes made by the pen are recorded and transferred to a server.	1. Technology acceptance and new daily routines despite the indifference to technology in general. 2. Difficult seeing one's own gain in health insights and increased care participation. 3. A sense of increased security and closer contact with the care provider due to trust. 4. A sense of stability despite the multimorbidity.
Ottenberg, Abigale L. – Swetz, Keith M. – Mueller, Luke A. – Gerhardson, Samantha Paul S. Mueller 2013. *"We as Human Beings Get Farther and Farther Apart": The experiences of patients with remote monitoring systems*. USA.	To explore the experiences of patients living with an implantable cardioverter-defibrillator (ICD) who had received remote monitoring (RM).	Semi-structured interview with nine patients.	Some users thought it was easy to use and made them feel more secure. Other users did not know what to do with the system. There was a concern whether the system worked properly.
Peek, Sebastiaan T.M. – Luijkx, Katrien G. – Rijnaard, Maurice D. – Nieboer, Marianne E. – van der Voort, Claire S. – Aarts, Sil – van Hoof, Joost – Vrijhoef, Hubertus J.M – Wouters, Eveline J.M 2016. *Older*	To explore which factors influence the level of use of various types of technology by older adults who are aging in place and to describe these factors in a comprehensive model.	Qualitative explorative field study. 53 participated. Devices were included in the inventory if they (1) required electric power in order to function, (2) were intended to be used in or around the home,	According to these results, the participants' use of technology was to a large extent influenced by their pre-usage and post-usage technology-related attitudes and beliefs. Participants in this study regularly perceived technology as having both

Adults' Reasons for Using Technology while Aging in Place. The Netherlands.		and (3) could support activities of daily living, personal health or safety, mobility, communication, physical activity, personal development, and leisure activities.	favorable and unfavorable consequences simultaneously. This study also points to the important role of external influences.
Pol, Margriet – van Nes, Fenna – van Hartingsveldt, Margo – Buurman, Biana – de Rooij, Sophia – Kröse, Ben 2016. *Older People's Perspectives Regarding the Use of Sensor Monitoring in Their Home.* The Netherlands.	To determine the perspectives of older people regarding the use of sensor monitoring in their daily lives.	Qualitative interpretative phenomenological study design (IPA), 11 participants were interviewed. Technology used in this study was wireless monitoring system, including passive infrared motion sensors (to detect motion in a specific area), magnetic contact sensors on doors and cabinets (to measure whether doors are opened or closed) and a flush sensor in the toilet (to measure the toilet being flushed).	Participants indicated that the technology helped them to remain independently at home, contributed to their sense of safety and helped them to remain active. The increased sense of safety outweighed the privacy issues.
Seelye, Adriana M. – Wild, Katherine V. – Larimer, Nicole – Maxwell, Shoshana – Kearns, Peter – Kaye, Jeffrey A. 2012. *Reactions to a remote-controlled video-communication robot in seniors' homes: a pilot study of feasibility and acceptance.* United States of America.	To explore the attitudes and preferences of seniors and those of family or friends who communicated with them remotely via the device.	Participants were interviewed with help of questionnaires. 8 participants who used a remote telepresence robot, handheld local controller, 8-h battery, charging dock and power cord, and a remote driving controller.	In general, participants appreciated the potential of the telepresence robotic technology to enhance their physical health and well-being, social connectedness, and ability to live independently at home.

Data analysing process for group Dislike toward technology

Original phrase	Reduced phrase	Sub group	Group	Theme
"These senior citizens saw more nuisance than benefit in the *(piloting)* process."	Seeing more nuisance than benefit	Technology is not interesting or useful	Dislike toward technology	Aged people's experiences of gerontechnology used at home
"I am not interested."	Not interested			
"Passive users did not experience the benefits of the devices themselves but their family members did. Passive users or their family members reported that safety technology would promote independent living at home in the future when aging."	Do not see benefits of the devices			
"Senior citizens in this category *(Health information minded seniors)* were keen on monitoring their own health but not using the tablet computer for other purposes."	Not interest using tablet for more than monitoring health computer			
"These users thought that however good a tablet computer is, it is no use if they suffer memory loss when growing older."	Tablet computer is useless if in the future suffers memory loss			
"Technology in general, including computers and mobile phones, was regarded as "not interesting" and "a bit scaring"."	Technology is not interesting			
"They expressed that they did not have use for computers and the Internet – and did not want to learn how to use them…"	Not interested to learn to use computer			
"I thought 'what's the use of measuring?'"	Do not see the use in measuring			
"Often, participants stated that they did not have to make use of technology or any form of assistance, because they could handle things on their own."	Do not see need for technology			
"Yes, I can order groceries, and they can deliver them to my house... I can also call my son and he will bring them…"	Do not see need for new technology			
"I do not need my computer... When something is really important my daughter will use her computer."	Do not see need for own computer			
"I find my landline phone convenient... I don't want two... A mobile phone and a landline phone, that's too much for me'."	Old technology is enough			
"These electrical things don't interest me. Like these mobile phones, I always call them children's toys'."	No interest towards electrical things			
"Then I have to make an effort and use my brain... I am too... I think I have so much to do already" *(to invest effort in technology)*	Not ready to invest effort in technology			
"Participants mentioned that they were reluctant to buy technology which took up a lot of space or forced them to make adjustments to their home."	Unwilling to have technology if it takes lot of space or needs adjustments to home			
"Some of the participants did not express	No interest to see or			

the desire to view or have control over their personal sensor data of daily functioning."	control own data			
"I am happy with my pendant here, and I have it on all the time apart from bedtime."	Happy with existing telemonitoring			
(What about yourself, would you benefit from them) I don't know. I am not that bad really. I mean I do have falls every now and then but I haven't had a bad one."	Does not see the need for telemonitoring			
"It would appeal to someone who falls a lot. I'm quite lucky really, only had 2 small falls, and if I can get up myself I don't bother about asking for help. Just get up and try to get on with life. There's no need to alarm anyone."	Does not see the need for telemonitoring			
"I am happy with my button thing [pendant alarm] here."	Happy with current device			
"Would I recommend it? No."	Would not recommend			
"Oh no, I certainly wouldn't recommend it to my friends. They (manufacturers) have to finetune it first before I would dare say yes."	Would not recommend			
"I won't recommend it to anybody."	Would not recommend			
"They can see if I wear the new alarm, and that's good, because I tended to forget to wear the old alarm."	Forgetting to use the alarm	Technology and its use is inconvenient		
"I want my old alarm back…"	Do not like the new device			
"How could one get wiser to be able to use (the devices)."	Difficulties using the device			
"I could have learnt something though I am stupid."	Feeling too stupid to learn/feeling unable to learn			
"Two active users said that they had "got lazier" due to illness or because the devices did not work."	Got lazier due to illness or inoperative devices			
"Generally, if a device did not work participants gave up trying to use it as the piloting process proceeded."	Gave up trying when device did not work			
"Anxious by the use or thought of using the piloted devices."	Anxious about piloted devices			
"She was made anxious by the devices and did not learn to use them."	Anxiousness Did not learn to use the device			
"One felt she was totally incapable of using the technology."	Feeling incapable to use technology			
"Monitoring your activity with the wristband is interesting. And the weighing scale – if it worked."	Dissatisfaction with inoperative devices			
"It is nice to check them when they work."	Nice to use if they work			

"According to the user experiences of this project, if there are a lot of technical problems with the devices the interest in using them will cease soon after the first enthusiasm."	Technical problems cease the interest toward devices			
"Well, at first when they mentioned [the remote monitoring system], I thought it sounded like something I didn't think I wanted to get involved in because I thought maybe I wouldn't know what I was doing."	Skeptical towards monitoring system at first/thinks he/she is unable to use monitoring system			
"Transportability and placement of the RM system in the home appeared to be challenging for some patients in the user group."	Challenges in transporting and placing the system in the home			
"…not understanding the function of the technology tended to overtly impact their experience."	Not understanding the system had an impact on the experience			
"Participants also talked about how the use of technology would make them feel frustrated, happy, entertained, useful, tired, stressed, or relaxed."	Frustration Tiredness Stress			
"Technology could also make them feel old, and a number of participants acknowledged that this feeling prevented them from starting to use assistive technology, such as a personal alarm button."	Not wanting to use technology because assistive technology makes one feel old			
"It's giving me a stomach ache already... What am I supposed to do with it? I don't know if I can do this'"	Unsure what to do with technology			
"Look, it's been explained to me... But I keep forgetting how to use it whenever I've not used it for several weeks'."	Do not remember how to use technology			
"Others stated that they could not use technology due to physical limitations."	Physical limitations prevent the use of technology			
"Other problems included a lack of proper parking facilities and low accessibility of buildings. Weather conditions were frequently mentioned as a factor which influenced the use of means of transport."	Not using transportation technology due to safety, weather and parking concerns			
(burning LED light) This made her feel uncomfortable. When the sensor base unit was placed out of her sight, this problem was solved."	Little light disturbed when seen			
"Some participants stated that they did not have sufficient technological knowledge to understand the sensor data from the computer"	Not enough technological knowledge to understand			
"On the other hand, this system contributes for them to a certain dependency, which can be considered as an unattended side effect of sensor monitoring."	Dependency on the system			
"Participants reported slight confusion about how to use the handheld remote."	Difficulties to use the handheld remote			

"In addition, transitions from solid flooring to carpeting were problematic. "	Difficulties move robot from floor to carpet
"Not sure what the purpose is supposed to be."	Not understanding the purpose of a robot
"It was too complicated… overwhelming."	(The robot was) too complicated
"One participant had a negative experience with the robot. She was confused by its purpose and function and requested that it be removed from her home."	Not understanding purpose and function (of a robot)
"Taking my trousers off was a nuisance with them thing [fall detector] round my waist. I don't like it round my waist, it kept moving round to my front."	Device physically uncomfortable
"…it kept giving these false alarms and they became quite a nuisance that I'd never bothered to wear it after a while."	Stopped using the device because encountered problems
"Straight away [after false alarm], I rang up the first thing in the morning and said to them "you'd better take it away.""	Stopped using the device because of a bad experience
"I do appreciate what the council is trying to do. But it's no good to me if it gives the signal too often."	Not happy to use the device because of encountered difficulties/false alarms
"(Why aren't you wearing it now) To be honest, I just don't remember. I was good for the first few months, then I went away for a few days, and I couldn't have it with me because it wouldn't work in my daughter's house. Then I came home and I suppose it's like most things, you try it for a while and then you forget it."	Forget to wear the device
"I shouldn't say this, but I don't think I'll keep them on. I have trouble remembering to wear my pendant as it is…"	Trouble remembering to wear the device
"Some of the older persons found the telephone system difficult to handle. They were uncertain about the technology and doubted it was reliable and well-functioning."	Difficult to handle the technology Unsure if technology works
"Old age was given as a reason for difficulties to grasp new techniques, as the older persons were brought up in a different era: "Younger people easier catch up than I do … if you look at them and their cell phones, they fumble with them constantly. That's something we cannot do, you see…""	Difficult to learn
"The older persons were uncertain if the information they entered by pressing different buttons went through."	Unsure if technology works
"I don't know how much they've heard and what's gone through, and that it really works and they know what I want…"	Unsure if technology works
"Difficulty making choices by pressing different buttons was sometimes an issue."	Difficult to handle the technology

"The system could be perceived as to be too complicated."	Difficult to learn				
"The perception was that it is more difficult to discuss health matters over the tele-phone."	Difficult to discuss on the phone				
"In their opinion, human helper would be better than technology"	Human helper is better than technology	Human contact is important			
"I think hands on is important too. Talking with people and knowing that the device is working properly, I think that is important… the remote monitoring doesn't always answer all your questions…"	Device is not alone enough, also need to talk with people				
"I guess it is a pro being you don't have to go down to the clinic, to that floor, have somebody working with you. The pro is more for [the clinic] than it is for me."	System benefits the clinic more than the participant				
"The usefulness of RM systems from the perspectives of nonusers was tempered by some distrust of the technology but, mostly, by the patients' own preference for clinic visits."	Clinic visits more pre-ferred that remote moni-toring				
"Face-to-face interactions with their health care professionals were important to patients in the nonuser group despite their attitude toward the RM system."	Face-to-face interactions with health care profes-sionals are important too				
"Increased use of technology like the RM systems was thought to have a negative impact on a patient's relationship with his or her health care professional."	Negative impact on relationship with health care professional with increased use of tech-nology				
"They felt a lack of control and though it would be much easier to get to talk to a real person instead of a machine."	Prefer to talk to a real person				
"Personal visits were also sometimes preferred…"	Personal visits preferred over telehealth				
"Technology in general, including comput-ers and mobile phones, was regarded as "not interesting" and "a bit scaring"."	Technology scares	Technology is intimidating			
"And then one is afraid of pushing the buttons"	Being scared to push the buttons				
"Some patients expressed initial concern as to whether the data transmissions could be trusted."	Distrust toward data transmission				
"Several patients remarked they were "intimidated" by the system set up pro-cess"	Intimidated by setting up process				
"Users appeared to be in awe – as sup-posed to in fear – of the RM system's capabilities."	Ffear of the system's capabilities				
"New technology seemed to threaten the essence of health care"	Threat to essence of health care				
"The usefulness of RM systems from the perspectives of nonusers was tempered by some distrust of the technology…"	Distrust of the technolo-gy				

"Both users and nonusers mentioned being "intimidated" to some degree by the RM system."	Being intimidated			
"Patients in the nonuser group had a pervasive fear that RM systems represented an inexorable momentum toward technologizing or depersonalizing all of health care."	fear that systems technologize or depersonalize the whole health care			
"They also felt technology could impact their digital safety, and many participants had concerns regarding their privacy and computer crime."	Could impact their digital safety Concerns about privacy and computer crime			
"Many participants did express a fear of becoming too dependent on technology or being 'addicted' to technology."	fear of becoming too dependent or addicted to technology			
"These participants *(who had never owned a ICT device)* feared a steep learning curve…"	Fear of needing to learn quickly			
"…and one person unplugged the robot because she was worried about a fire."	Being worried the robot may caught up a fire			
"One disadvantage was experienced when older persons needed help and felt uncertain with the use of technology."	Insecure to use technology			
"Difficulties in trusting the telephone system was described."	Distrust of technology			
"However interesting the project, it was more for those who comprehend computers better."	For those who know more about computers	This specific technology is not for me		
"It may be useful for the future, I think."	May be helpful in the future			
"It would be good for checking sedentary person."	Beneficial for inactive people			
"I think it would certainly be helpful to those who are frailer and fall about."	Not feeling frail enough for new telemonitoring			
"Among those in the control group, only frailer older people with a history of severe falls were perceived to benefit from an extended alarm service."	Thought that service benefits only frailer people			
"But to have to wear one of those things *(fall detector)*, well, that would be for those who need it… Now she would benefit from it. But it's not for me. I shouldn't think so."	Would be beneficial for someone in weaker condition			