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VIRTUAL HOME CARE IN EASTERN FINLAND

The current state of virtual meetings by the view of information systems and perceptions of employees

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THESIS
Abstract

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ABSTRACT

The aim of this thesis was to study and describe the current state of virtual client meetings in virtual home care unit in Eastern Finland. The aim was to describe how the virtual meeting process is formed in terms of different electronic social and health care information systems and the use of them. The aim was to find out what working phases and tasks were involved in virtual meetings, how much working time was spent in the different phases of virtual meetings and how the process was experienced by the employees.

The research data was collected and formed using both quantitative and qualitative methods. Quantitative data was collected by observing the use and usability of information systems by an external observer during real-time virtual meetings. Qualitative data was gathered by interviewing the virtual home care's employees to describe subjective views and experiences regarding the use and usability of systems.

The key results of the thesis were the challenges and inefficiencies in the use of the highlighted information systems experienced by the employees in their daily work. These findings were also supported by the numerical research results from the observational study. This indicates that the multiple working phases of virtual meetings that do not directly belong to the customer contact, take up a large part of the employees' total working time. Based on the results, clear process development opportunities were identified, which could be used to reduce the number of systems in use or unnecessary working phases. The results of the thesis enable to critically examine the current process and the possibilities for its development now and in the future.

Keywords
ageing, digitalisation, information technology, home care, home health care, virtual home care, virtual meeting process

CONTENTS

1 INTRODUCTION

Ageing and longer lifetime is a global phenomenon. The number of people needing care and living longer at home their homes has increased significantly. (WHO 2022a.) Significant reasons can be attributed to the improvement of living conditions and the development of medicine and health care (Duodecim Terveyskirjasto 2021; OECD 2023). However, the shortage of health care professionals is a common problem worldwide (WHO 2023a). In Finland, it is estimated that more than 200 000 new health care professionals would be needed to cover the resulting labor shortage from 2020 to 2035 (TEM 2021). Concurrently, health care costs have increased globally throughout this millenium (WHO 2020). Finland is no exception, and annual expenditure has grown by over EUR 8 billion since the beginning of the 2000s (THL 2021b). Healthcare costs per person increase with ageing up to tenfold between the ages of 50 and 85 (OECD 2016; THL 2021b). From the economy point of view, the growing deficit in public administration forces a situation in which the increasing need for services must be met by smaller resources. More productivity, effectiveness and cost-effectiveness are required. As technology advances, the ways of working change. Publicly funded services like healthcare must be well justified and produced as efficiently as possible. (STM 2016a.)

Partly due to more comprehensive and better data connections and the increased number of mobile devices, the use of Internet has grown quite steadily from the beginning of the 2000s until 2022, when up to 70 % of the world's people used the Internet. For example, the corresponding number in 2017 was 46 %. (ITU 2023.) According to the World Health Organization WHO strategy on digital health, digitalisation must be used as an integral part of healthcare worldwide, regardless of people's country of origin, age, ethnicity or income level. Digital health is intended to strengthen and harmonise healthcare systems and services. The aim is to provide safe, efficient, and accessible healthcare services that reduce inequalities. The services are meant to be provided just when needed, utilising new technology. (WHO 2021, 8, 11, 32-34.) The digitalisation of healthcare is a widespread phenomenon that does not only mean replacing people with new smart devices or artificial intelligence. A nurse or a doctor can use digital tools to support decision-making in their work or, for example, provide a virtual consultation or meeting. The individual's participation in decision-making concerning their own affairs, and access to their own patient data are major reforms brought about by digitalisation in social and health care. (Metsäniemi 2018.)

Global trends are reflected in healthcare. Ageing is one of the big reasons why it is topical and important to find new and innovative solutions to support independent living. (Van Eenoo, Declercq, Onder, Finne-Soveri, Garms-Homolova, Johnsson, Dix, Smit, van Hout & van der Roest 2015; WHO 2022a.). An important part of caring for the elderly now and in the future is to provide high-quality care to people in their own homes. Home care can be a very cost-effective solution compared to traditional institutional care. (Van Eenoo, et al. 2015.) Home care is a service that meets the individual's needs and that can enable living at home for as long as possible (Valvira 2022a, 7). Virtual home care utilizes technical solutions to provide certain home care services without the need for a physical home visit by a care-giver. Compared to physical home visits, virtual home care can save time and costs, but still provide home care services regardless of time and place. (Josefsson & Hammar 2022.) In Finland, Quality recommendation to guarantee a good quality of life and

improved services for older persons 2020–2023 aligns that technology solutions are one part of elderly care. The recommendation says that new technological solutions are needed for reducing costs and developing effective services. Technological solutions, for example video meetings are meant to support home care resources. (STM 2020, 30; Nikula 2021.) However, the usability of electronic health care systems has sometimes been found to be poor, so digital services do not always serve their users or customers as well as would be desirable (Vainiomäki, Aalto, Lääveri, Sinervo, Elovainio, Mäntyselkä & Hyppönen 2017; Vehko, Hyppönen, Ryhänen-Tompuri & Heponiemi 2019, 6; Snoen Glomsås, Ruud Knutsen, Fossum & Halvorsen 2020; Rytkönen, Kinnunen & Martikainen 2022). The wishes and experiences of the users of the systems must be utilised more and more when developing and deploying new systems (Vehko et al. 2019, 6; Snoen Glomsås et al. 2020).

The examined target organisation of this thesis is virtual home care unit in Eastern Finland. Virtual home care has been a part of target organisation's social care services since May 2017. At the beginning there were twenty customers, today virtual home care has almost 200 customers. The number of customers is increasing. Practical nurses make video calls more than 200 every day. The long-term goal is to grow virtual home care because it is a lighter service to customers, and everyone does not need physical care. Home care is carried out primarily with different technological solutions and with virtual customer meetings. Virtual home care's main point is to support elderly everyday life and independence. (Target organisation 2020, 5; Target organisation 2021, 2.)

The purpose of the thesis is to get numeral and experimental data of the current state of virtual meetings. The data is collected with an observational study and a group interview. As an outcome, there is an ambition to create a more detailed picture of the virtual meeting process, and a novel opportunity to get development proposals for virtual home care's everyday work. Now that social and healthcare is reforming in Finland, it is important to evaluate virtual home care's virtual meeting process and its possible weaknesses, and if there are some, try to find solutions to remove those and make the processes better. One perspective for evaluation is to analyse virtual home care work from technical point of view. On the other hand, the employees of virtual home care are probably the best experts when speaking of their everyday work and the tools in use. Today multiple different softwares and electronic systems are needed and used to arrange virtual meetings; there is patient information system, enterprise resource planning system and a system for the video conferencing (Target organisation 2021, 17-18).

2 TRENDS, FACTORS AND REFORMS AFFECTING SOCIAL AND HEALTH CARE SERVICES

The coverage and availability of health care services around the world is not uniform. It causes clear inequalities. The citizens of many countries enjoy better or necessary health care thanks to their wealth, education or place of residence, and the use of health care services threatens to plunge many into poverty. Although healthcare coverage has improved since the early 2000s, up to 2 billion people in the world suffer from its inadequacy. The global shortage of health care workers also causes challenges arranging and deploying health care services. (WHO 2022b.) The WHO's Universal Health Coverage (UHC) means that the world's people and communities has the right to receive the health services they need. The access and use of the services should not drive anyone into poverty. As the world's population ages, according to the UHC principle, the organisation of health services must take special account of services aimed at older people. The differences between the elderly in terms of physical and mental health must be considered. Services must be structured in such a way that they are economically reasonable and achievable. (WHO 2023b.) In Finland, healthcare is generally considered to be of high quality. The availability, coverage and functionality of health care have been a kind of indicator and part of Finland's success as a welfare state. However, public healthcare means significant costs to the Finnish economy in euros every year. Health care costs will increase, and poor economic development may cause problems for the organisation of services, which could be reflected in the lack of access to services. (Reijula, Ruohomäki, Lahtinen, Aalto, Reijula & Reijula 2017.)

In Finland, from the beginning of 2023, the responsibility for organising healthcare and social welfare lies with the wellbeing services counties, of which there are 21. The wellbeing services counties are largely formed geographically. The reform of healthcare, social welfare and rescue services is a significant administrative reform in Finland. The aim of the reform is to equalise services, curb the growth of costs and reduce inequalities in wellbeing and health. Private operators, organisations and associations supplement social and health care services. (STM 2023a.) The tasks of the wellbeing services counties were previously the responsibility of municipalities (Valtiovarainministeriö 2023a). According to the vision of the Government Programme, everyone in Finland receives equal treatment, care and attention when they are needed. The services must therefore be implemented flexibly and cost-effectively. Attention will be paid to the diversity of service production and the accessibility of local services. Special attention is paid to the development of services for people who often need services. A topical example of this is the elderly. (Sote-uudistus 2023.)

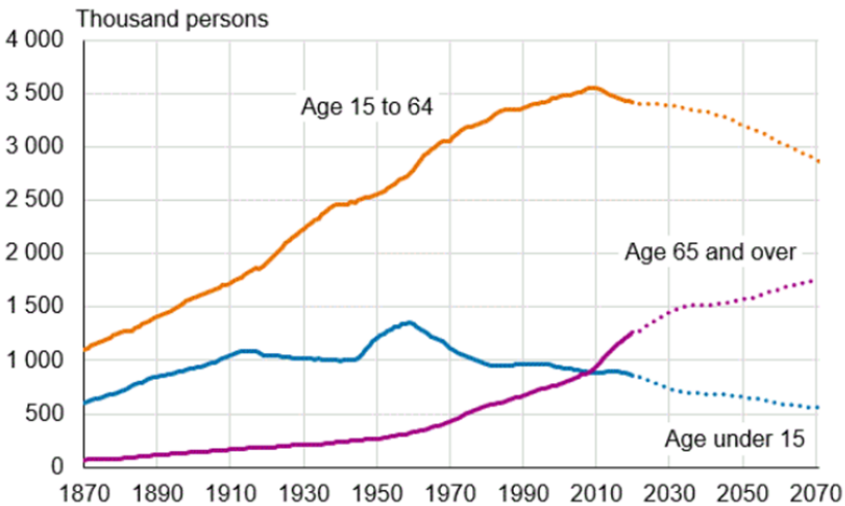
As wellbeing services counties start operating in 2023 in Finland, there are saving goals for 40 million euros every year in three years. This means 4 % cost reductions. Personnel expenses savings are targeted to be 60 million euros in three years. Services for the elderly is one third of the budget, the goal for elderly care is 10 %, in three years it means 34 million euros. It must be taken into account that the elderly services have grown 4 % every year. The main target is to streamline and unify the service structure. One goal is to increase virtual home care and technology solutions. (Tiihonen 2022.) While social and health care is and will continue to be affected by societal and global trends, the organisation of operations and services have to be done in a new way.

Demographic change, globalisation, digitalisation and technological development, as well as the participatory individual, are few of the important drivers affecting to social and health care. The changes can achieve social stability and sustainable growth, but also reduce inequalities. Improving the functional and working capacity of older people is one of the factors affecting the well-being of the population. This requires new kinds of solutions that can support well-being, housing and living. (STM 2018.)

Digitalisation has, for its part, created new kinds of functions alongside traditional operations, and digitalisation must continuously to be used to solve health care challenges. From the economy point of view, the growing deficit in public administration leads to a situation in which the increasing need for services must be met by smaller resources. More productivity, effectiveness and cost-effectiveness are required. As technology advances, the ways of working change. Publicly funded services must be well justified and produced as efficiently as possible. (STM 2016a.) Due to the resource constraints of older citizens and medical staff, it is very important to think about how a larger number of clients and patients can be treated and served by existing medical staff (Reijula et al. 2017).

2.1 Ageing population, increasing healthcare costs and labor shortage

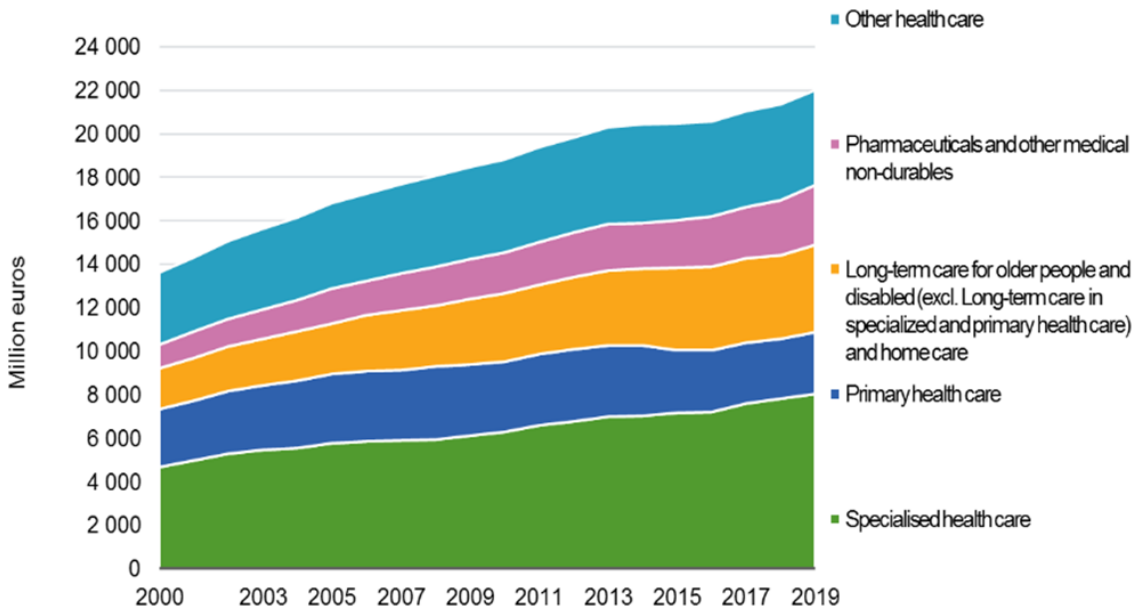
People living longer is a global trend. It is a fact that the number and proportion of older people is increasing worldwide and in every country. The number of people aged 60 and over will increase from one billion to 2,1 billion between 2020 and 2050. An increasing number of elderly people in need of care live in their homes. (WHO 2022a.) In Finland, working-age population is expected to decrease by over 50000 by 2030 from the current level and it is predicted that in 2050 the population of working-age people will be 200000 lower than at present (Hammar, Mielikäinen & Alastalo 2018, 2; Tilastokeskus 2018). In Finland over 22 % of residents are over the age of 65. From 2030 onwards, the number of elderly people will be more than one-third of the population of municipalities. As can be seen from Statistics Finland's age structure figure below (picture 1) the population of Finland is ageing and only the number of older people in Finland is increasing, as it has been since the beginning of statistics. The number of people aged under 15 decreases as the birth rate decreases. (Tilastokeskus 2022.)



PICTURE 1. Population and population projection by age group (Tilastokeskus 2022)

According to the current trend, ageing will continue as the population starts to decline. This leads to a slowdown in economic growth and undermines the maintenance of promised public services. If the situation does not change, the only way is to adapt to the prevailing demographic trends. Halting ageing by means of increasing the birth rate is not without problems in a country where family policy is at a good level. The increase in the number of baby boomers increases the need for services for the elderly. (Valtioneuvosto 2021.)

Healthcare costs have been rising for the past years and decades worldwide. The amount of money spent on health care around the world in 2020 broke nine trillion, which is a new record high. (WHO 2020.) It is a fact that ageing and healthcare expenditure are clearly causally linked. Healthcare costs per person increase with ageing up to tenfold between the ages of 50 and 85. (OECD 2016; THL 2021b.) In Finland, health care expenditure has grown throughout the 2000s. Finland's health care expenditure was about EUR 22 billion in 2019, as seen in picture 2. A relatively significant share of expenditure has been directed at long-term and home care for disabled and elderly people. From 2000 to 2019 expenditure in this area has increased by 113.6 %. It should be noted that over the same period total health expenditure increased by 61.2 %. (THL 2021b.)



PICTURE 2. Health expenditure by function in 2000–2019, in 2019 prices, million euros (THL 2021b)

As can be seen from picture 2, the largest percentage increase in costs has consisted of the provision of long-term and home care for disabled and elderly people. Based on the 2020 report of healthcare costs in large cities of the Association of Finnish Local and Regional Authorities, costs will start to rise clearly when the age of 65 is reached. The ageing of the population is reflected in the need for services and the increase in costs. Espoo, Helsinki, Kuopio, Lahti, Oulu, Pori, Tampere, Turku and Vantaa participated in the cost comparison of the report. The total cost of health care, home care and 24-hour care in the large cities participating in the cost comparison was approximately 5.4 billion euros. The amount includes the services of approximately 2.2 million Finns, which covers 38 % of the population of the whole country. Costs increased by 2.2 % compared to the previous comparison year. (Pernu & Nemlander 2021.)

TABLE 1. Health care costs (euros per citizen) in large cities by age group in 2020. (Adapted from Pernu & Nemlander 2021)

	0-6	7-14	15-49	50-64	65-74	75-84	85+
Espoo	1698	1146	1158	1720	3667	7422	21092
Helsinki	1326	1239	1164	1985	3800	8249	20681
Kuopio	2192	1488	1563	2218	3832	8525	20361
Lahti	1820	1418	1381	1897	3649	7346	18442
Oulu	1697	1329	1518	2255	4224	8729	21299
Pori	1785	1373	1482	2065	3344	7241	17655
Tampere	1551	1343	1325	2118	4196	8405	21484
Turku	1281	1149	1370	2118	4102	7663	21062
Vantaa	1749	1028	1191	1772	3745	7169	18424
All	1579	1239	1279	1987	3859	7942	20390
Median	1698	1329	1370	2065	3800	7663	20681
Min.	1281	1028	1158	1720	3344	7169	17655
Max.	2192	1488	1563	2255	4224	8729	21484

It is seen form Table 1, that the cost of healthcare for older people is significantly higher compared to younger people.

In general, as people get older, they need more care. The shortage of health workers is a global phenomenon. Health systems can only be used and exploited when health workers are involved in service provision, so the availability and territorial coverage of services largely depends on the workforce. The WHO estimates that the labor shortage will be in the order of 10 million by 2030, mainly in economically weaker countries. However, challenges exist will continue to exist with the workforce all over the world, regardless of socio-economic level. (WHO 2023a.)

Finland is suffering from a chronic shortage of nurses in public social and health care, which affects the availability of services. The Ministry of Finance estimates that the sector would need 200000 new employees by 2035. (TEM 2021.) In Finland, home care made 40 million client visits in 2021. Labor shortages are also causing problems in services for elderly. Monitoring carried out by the Finnish Institute for Health and Welfare in 2021 shows that up to a quarter of home care units work understaffed weekly. Almost half of the home care units work overtime at least weekly, and in one in ten even daily. It is estimated that by the beginning of April 2023, approximately 7500 more employees with social and health care training would be needed in the units of elderly care services. As the population ages, the number of clients in elderly care services is expected to grow rapidly in the coming years. From 2014 until May 2021, the number of home care staff has steadily increased, but in May the growth stopped. (Kehusmaa & Alatalo 2021.) The Ministry of Social Affairs and Health has launched a programme to ensure the sufficiency and availability of social and health care workers. The aim of the programme is to find sustainable solutions to meet labor needs in both the short and long term. The programme's points include the development of education, the development and utilisation of digitalisation, international recruitment, and the development of working places in such a way that people want to work there. (STM 2022.)

2.2 Utilising digitalisation and technology to meet the challenges and to improve healthcare services

The aim of the WHO's global digital health strategy is to support countries' needs and the deployment of digital technologies in healthcare, as well as to promote the overall sustainable development goals related to health. Health technologies should be interoperable with each other, and the aim is also to share health data between other countries. National legislation and political differences must be considered. The implementation of the strategy is influenced by the country's national priorities, as well as the country's digital infrastructure, workforce needs and country's capabilities. The strategy highlights the reliability of health data and the availability of systems, as well as data protection. (WHO 2021, 32-34.) The aim is to provide evidence on the availability, costs, quality, safety and sustainability of healthcare systems (WHO 2021, 10). The WHO's strategy aligns that digital health should be a self-evident part of health care and promote health of all people in an ethical, safe, reliable, equitable and sustainable way, among other things. Its development should follow the principles of openness, accessibility, scalability, reproducibility, interoperability, privacy, security and confidentiality. The strategy aims to develop and strengthen health systems by applying digital health technologies to all its users, those who work with them and those responsible for providing them to achieve a vision of health for all. (WHO 2021, 8, 11.)

Before the COVID-19 pandemic, there were large differences across Europe in the development of digital health by region and country. The Nordic countries are further advanced in promoting digital health policies and strategies than Europe in general. Before the pandemic, efforts had been made to support implementation across Europe for many years, but widespread adoption in practice had been difficult and slow. Factors slowing down the introduction of digital health systems have mainly been related to individual and administrative changes and actions influencing on service organisation. During and after the COVID-19 pandemic, many digital healthcare systems have been requisite and compulsory way to offer healthcare services, whereas earlier they often used to be seen only as opportunities. (Fahy & Williams 2021, 7, 13.)

The patients, customers, users and companies of the services are at the heart of the development of the services. For example, smart and remote care services for the elderly are one good example of this. Digitalisation is used to create more functional and reliable service chains for different life situations with the aim of achieving a good quality of life, well-being and success. E-services improve everyone's opportunities and prerequisites for using public services regardless of time and place. In this way, services will become more efficient and public funds will be saved. (Valtiovarainministeriö 2023b.) In the projects of the Ministry of Social Affairs and Health related to the development of home care for the elderly, the aim has been, for example, to develop and include technological solutions that support living at home, as well as a unified patient information system. (STM 2016b, 17-18.) The Ministry of Social Affairs and Health's quality recommendation for ensuring good ageing and improving services in 2020-2023 provides recommendations in which elderly people should be provided with information on technological solutions as early as possible. This is created by practices by which technological solutions would be normal operations in regular services. The goals for 2020-2023 also take into account the previous goals, and the goals have highlighted that technology can support the self-help, self-initiative and privacy of older people. The aim is also to increase safety and a sense of security through various solutions. (STM 2020, 33-35.)

3 INFORMATION SYSTEMS IN SOCIAL AND HEALTH CARE

Digitalisation has enabled global and extensive development of social and healthcare information systems over the past ten years. Paper forms have been replaced by electronic ones and local information management has expanded into regional and national. Good development work has been carried out in Finland with information system integrations. Finnish acute care hospital information systems are of high quality, for example, in external data network connections, digital image archives, the exchange of laboratory data with other organisations and in matters related to the use of clinical patient data. (Virtanen, Smedberg, Nykänen & Stenvall 2017.)

It was seen in Finland already in the 1990s, that information technology brings lots of opportunities to social and health care in the future. It was believed that it could improve the equality of different population groups, as the level of social security and technological know-how in Finland has been high in international comparison. As a result of the recession and the high unemployment rate, operating models and processes had to be developed and redesigned in order to secure services and improve cost-effectiveness. According to the memorandum "Strategy for utilising information technology in healthcare and social welfare" published by the Ministry of Social Affairs and Health in 1995, Finland was intended to be an information society based on networks from the beginning of the 2000s, and that Finland has been considered a forerunner in the development and implementation of the information society. (STM 1995.) More than three decades after the recession, Finland still has a strong identity as a trendsetter in the development of healthcare, social welfare and technology. According to studies, Finland's digital competence is among the best in the EU countries, in addition to which Finland is one of the top countries internationally in electronic information management for health and wellbeing, such as the national health archive OmaKanta and the digitalisation of occupational safety and health supervision. (STM 2016a.)

The Social Welfare and Health Care Information System is a software or system implemented for the electronic processing of customer and patient data. One of its essential purposes is to serve as a tool for recording and maintaining customer and patient data and documents. The Act on the Electronic Processing of Customer Data in Social Welfare and Health Care (784/2021) defines general requirements for information systems and their manufacturers, as well as for providers of social and health care services. (Valvira 2022b.) The purpose of the Act is to promote and enable the secure processing of customer data produced by social welfare and health care and the well-being data produced by the customer itself, as well as the customer's access to information on the processing of their own customer data. (Laki sosiaali- ja terveydenhuollon asiakastietojen sähköisestä käsittelystä 784/2021.)

The data management of social welfare and health care and the electronic processing of customer data are guided by THL's rules based on the Customer Information Act, which target the data structures of customer data and the transmission of data outside the organizations and services that use them. Social and health care actors are guided to adequate and consistent information security and data protection practices through information security plans. Essential requirements for information systems and welfare applications will be harmonized nationwide. Essential prerequisites for the use of information systems are interoperability, data security and data protection. The

manufacturer of the information system shall be responsible for these characteristics and their conformity. The regulations also guide the certification of systems and applications that process customer and well-being data. (THL 2022c.)

Health care information systems are often considered to be impractical, and greater attention should be given to their usability. Unsuccessful design has negative effects on work and well-being at work. Organizations should take along end-users more when developing information systems. Also, more attention should be paid to the compatibility of information systems. There are too many systems in use and their usability may be poor. When developing information systems and work processes, the current situation in which the same things have to be recorded in many different places should be taken into account. (Vehko et al. 2019, 6.) The problems related to poor usability and instability in healthcare information systems pose a significant threat to the well-being of doctors at work. This finding can be also compared to the work of nurses. So, it is important to hear end-users' opinions on how softwares work and serve the users (Vainiomäki et al. 2017.)

3.1 Technology for supporting elderly

According to a overwiev of systematic reviews of 53 European countries, remote care implemented via telephone and video connection reduces, among other things, the time spent on accessing treatment, unnecessary repetition of examinations, the duration of hospital visits and emergency visits to patients. It allows to improve the quality of life of patients and improve the quality of the remaining years. Barriers to the use of telemedicine include for example a lack of technological skills (especially of elderly), lack of internet access or expensive implementations of new required technology and other organisational and infrastructural problems. The rewievs included in the overwievs are largely recent, from 2020-2021. (Saigí-Rubió, Borges do Nascimento, Robles, Ivanovska, Katz, Azzopardi-Muscat & Novillo Ortiz 2022.) Statistics Finland's survey from 2021 shows that only people of older age groups use internet more than previous years in Finland. 93 % of the population aged 16 to 89 used the internet, and over 80 % of them frequently during the day. 62 % of people aged 65-74 and 30 % of people aged 75-89 used the internet several times a day The use of social media and making internet and video calls became more common only among people aged 75 to 89. (Tilastokeskus 2021.)

Technology can be used to increase the safety of the elderly, including relatives, as well as a sense of security. In recent years, technological developments have brought new opportunities to support the independent performance of the elderly and to increase well-being, one of those solutions is virtual home care. Virtual home care can improve the availability of services, especially in countryside, where the distances to the services may be very long. Technology aims not only to guide workers' activities and to free up immediate working hours for home care clients, including to improve the efficiency of elderly people living at home opportunities. (Hammar et al. 2018, 3-5.) Virtual home care is flexible and easier to organize than traditional home care. There are results that real-time video contact or virtual contacts may reduce hospital admissions and postpone the transition to nursing at homes. Virtual home care is not for all, it should be based on the patient's medical and clinical condition and the extent of his or her treatment needs. The video-calls and -

visits design should be user-friendly flexible and reliable. (Demiris, Speedie, Finkelstein & Harris 2003.)

Funded by the Ministry of Social Affairs and Health and coordinated by the Finnish Institute for Health and Welfare, the programme "kotona asumisen teknologiat ikäihmisille" (KATI) promotes the use of new technologies in home care and home-based services. The programme started in September 2020 and will last until the end of June 2023. The objectives of the programme are to reform the services and operating models of living at home, for example, to maintain the well-being and functional capacity of elderly people living at home, to support independent and safe living, and to improve the occupational well-being of home care personnel. The aim is to develop the technologies together, which is believed to have positive effects on innovation and business nationally and internationally. At the same time, the costs of the social and health care sector will be curbed. (THL 2022b.) A major goal of the wellbeing services county of North Savo is to harmonise the services offered to its customers. Remote care and virtual home care offer good opportunities for this. Remote care can be used for more than just virtual meetings, such as rehabilitation and day activities. One of the strategic objectives of the wellbeing services county of North Savo is the development of digital services as well as human resources and increasing work productivity. (pshyvinvointialue 2023.)

There are multiple technology solutions in home care, but the use of those solutions is not involved or considered in everyday work. There is also work to do for the compatibility of softwares; use of technology is easy, but operational integration needs more development work. (Kivekäs, Kekäläinen, Kaija-Kortelainen, Kinnunen, Kämäräinen, Aallosvirta & Saranto 2020.) When technology works as expected and if the user has enough knowledge and competence to work with technology solutions, the user gets a better overview and access to the information. When the user has the appropriate understanding and skills to use those solutions, time will be saved also. (Snoen Glomsås et al. 2020.)

3.2 Integrations in information systems

The main function of information system integration is the transfer of data between different systems in such a way that it implements the desired service package. Although different information systems must communicate with each other, but they also operate separately as their individual systems. In information systems, unified and semantic information serves all those involved in the service system. The reform of information systems requires consistency, experimentation, the ability to observe opportunities and a comprehensive understanding of the possibilities for using customer-specific and patient-specific information. The fact that changes to information systems often affect the management of work and systems experienced by staff must be considered. When designing and deploying information systems, it is important for staff to be involved in the design. (Virtanen et al. 2017.)

It’s a common thought that better integration of health information systems is a way to get more effective systems and reduce costs at the same time. Successful integration is based on its goals and wanted benefits. An intention to get either better or more information, for example about

health services, is a crucial start when planning new integrations. The possibilities and opportunities for connection between different databases and the use of centralised system platforms are also important factors and enablers of well-functioning integrations. The integrations in social and healthcare systems are an important way to produce better, safer and more effective services. (Michelsen, Brand, Achterberg & Wilkinson 2015.)

Technically, the interfaces of information systems must be transparent and comply with standards. This has been a common idea in Finland for a long time. Interoperability in health care systems has already been achieved in Finland through HL7 standardization, for example. (Virtanen et al. 2017.) Through HL7, open interface specifications have been produced to implement integrations in health care. The aim is to make existing and new software open and interoperable in general. An example of this is the integration of necessary or optional software into the patient information system. (HL7 Finland 2022.)

An ERP system is a software or service that allows several core functions of an organization or unit to be managed from one place, so it utilizes information system integrations. An ERP system can be used to manage and view data from different processes and functions in an organization, so it can be used to integrate different functions of the organization. (Microsoft 2023.) The ERP system must provide the organization with value in accordance with its objectives, support the organization's operations and provide the necessary documentation of the organization's functions and processes (Espeter 2022). The rather poor usability and interoperability of healthcare information systems has contributed to the fact that digital systems have not been able to exploit their full potential. The ERP system can be used to connect many health care softwares together, such as patient information and workforce planning systems. (Mäkelä & Mäkijärvi 2017.) Reconciling individual and stand-alone systems used in healthcare is not always easy or even possible for example due to different software interfaces. The importance and potential of ERP systems and the benefits they may bring are understood, for example, through operational efficiencies, cost savings, effective data management and better availability of information. Their implementation often requires technical reforms, training and challenging implementation projects. (Kontio, Lundgrén-Laine, Kontio, Korvenranta & Salanterä 2014.)

4 HOME-BASED SERVICES

There are many elderly people in Europe, as there are in the whole world. To serve a large number of elderly in the future, it is crucial to find sustainable ways to deliver healthcare. One important solution is to provide high-quality care to people in their own homes. Home care can be a cost-effective solution compared to institutional care. In addition, the sustainability of health systems is high on the EU agenda. In all countries that were included in the study, the regulation of care and home care is decentralized. Finland seems to have the most decentralized regulation. The definition of nursing varies from country to country. Government expenditure should be particularly focused on home care. (Van Eenoo et al. 2015.)

In Finland, The Ministry of Social Affairs and Health is responsible for the preparation, general planning and guidance of legislation on home care and home health care. The Social Welfare law regulates home care. Especially elderly people are supported by home care. Home care is available regardless of the time of the day, when needed, and it can involve home health care. (STM 2023b.) Staying at home is supported with home care and it is complemented by support services and with help of home health care. In some areas home care and home health care is arranged by home care. (Valvira 2023.)

4.1 Home care and virtual home care

Home care and home health care is a service for supporting a person to cope with everyday life at home or living environment. Home care is arranged according to the client's individual needs. Need can be care and attention, it can be activities that promote and maintain functional capacity and interaction, or the care can be home health care referred to in section 25 of the Health Care Law. Home care is a social service. The service provider must create an action plan that describes whether the service will be implemented as its own service or as a subcontracted. Home care is individual, and can be taking care of nutrition, washing and other personal hygiene and dressing. It can involve health care treatment, for example medical care. Care must be involved in health maintenance as well as long-term illness guidelines care and monitoring. (Valvira 2022a, 7.)

Living at home can be supported with many digital solutions. One possibility is remote care, which allows to keep in touch with the caregiver by computers and mobile devices. Digital tools and new technology enable many ways to provide care services, for example chat, applications connected to measuring devices, ready-made guided classes or games. People living at home can also be supported with the help of automation or robotics, for example, with the help of pharmaceutical robotics. Security devices, an electric lock and fire safety equipment can also be installed in the home. (Lähteenmäki, Niemelä, Hammar, Alastalo, Noro, Pylsy, Arajärvi, Forsius, Pulli & Anttila 2020, 22.)

Virtual home care is a service which enables nurses and customers to communicate with each other by a mobile device and a computer. Usually, virtual home care does not completely replace home care. (STM 2020, 35.) Virtual home care is uncommon, but in the future the target is to cover up to a quarter of all home care visits (YLE 2019). Virtual home care has been generalized but there is variation between regions. Virtual home care is deployed everywhere in Finland. Proximately half of

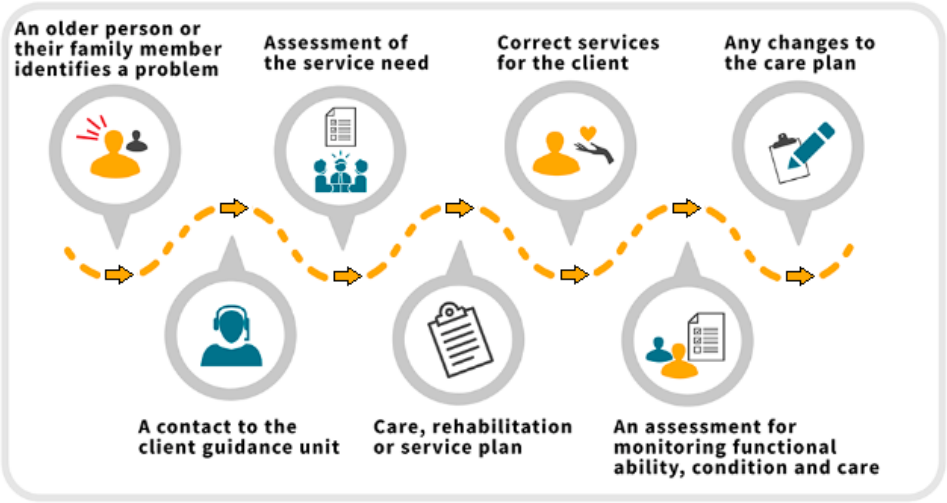
the home care units in 2020 implemented virtual home care. In North Savo 65 % of home care units use virtual home care. The coronavirus epidemic has increased the need for virtual services and accelerated their development. Virtual home care services have been able to improve the availability and accessibility of services, also in remote areas. The use of virtual home care must always be based on the customer's needs and responding to them. (Josefsson & Hammar 2022, 1, 3-6.)

In Finland virtual home care has been used to improve to equalize services especially in remote areas. With help from virtual home care, it is possible to save lots of time spent by nurses on traveling, and at the same make operations more efficient. Virtual home care can supplement or replace other home care services and free up nursing time for immediate care work. The use of technology and virtual home care should be an integral part of the customer service package. It should be assessed how technology could be used to meet the customer's needs. (Josefsson & Hammar 2022, 5.)

4.2 Customer process and service assessment

Home care is a social service specifically designed to support elderly people coping at home for as long as possible (STM 2023c). In Finland, these services are based on the following acts: the Social Welfare Act (1301/2014), the Act on Informal Care Support (937/2005), the Act on Social Assistance (1412/1997), the Act on Social Credit (1133/2002) and the Act on the Promotion of Integration (1386/2010). The implementation of services is regulated by the Act on the supporting functional capacity of the elderly population and social and health services for the elderly (980/2012). (THL 2017.)

Social care's customer process for elderly proceeds step by step, as described below in picture 3.



PICTURE 3. The customer process and assessment of service needs in Finland (Adapted from THL 2023a)

In the initiation of a case, the person's need for social welfare support will be taken up by a social welfare professional. Social welfare services can be contacted by the person himself or herself or, correspondingly, for example by a relative. In order to initiate a case, social welfare services can be contacted in several ways, for example, by e-mail, phone or by meeting with a social welfare professional. (THL 2023a.)

A person has the right to service needs assessment when the need for social welfare arises. If the person is over 75 years old, the assessment must be started no later than on the seventh working day. The assessment of service needs is a process in which the need for support, the prerequisites for customership and the appropriate social welfare service are assessed. The need for services is assessed together with the person and, if necessary, with their relatives or loved ones. The assessment of service needs is used to weigh up which services the customer will benefit from and how they will be supported in the future. (THL 2023b.)

Customers have the right to receive a written decision about the assessment. Assessment can also be denial of home care. To a written decision customers can appeal against the decision. Customer assessment is the basis for a customer plan. The assessment is made by the social welfare authority with customer and her / his nearby or legal representative, and it determines the nature of the service to be implemented. (STM 2023b.)

After determining the need for social services, the customer plan is created with the customer for the social services to be provided based on an assessment of the need for services. The plan is formed always unless it is only a matter of temporary guidance or unless it is completely unnecessary for some other reason. It includes the agreed goals and the measures needed to achieve those goals. The plan is reviewed at agreed intervals and substantially changed as needs or situations change. (THL 2023b.)

Arranging the service means that the services needed by the customer are decided and arranged according to the need and purpose. After the decision has been made, the necessary resources will be reserved for the provision of the agreed service. The service organiser is responsible for monitoring the implementation of the service, for the necessary further decisions related to the service and, if the need for the service ceases, for the decision to terminate the service. (THL 2023b.)

In the implementation phase of the service, the service granted to the customer is implemented as the service organiser's own service production or by a third party, for example, with a service voucher or a purchase order. The service provider is responsible to the service organiser for the implementation of the service as agreed. The implementation plan is created together with the customer. The implementation of the service is evaluated together with the customer from time to time. The service is terminated in a controlled manner either after the agreed deadline or by decision of the official when the need for the service has been determined to no longer exist. (THL 2023b.)

5 VIRTUAL HOME CARE IN EASTERN FINLAND

Target organisation of this thesis in Eastern Finland has a virtual home visit as a part of home care service. Virtual home care has been a part of healthcare services since May 2017. The number of customers has increased from twenty to two hundred in six years. A virtual home visit is a contact where a practical nurse makes video call to a patient. Calls are made more than two hundred every day. (Target organisation 2021, 2.) The goal is to grow virtual home care because it is lighter service to customers, and everyone does not need physical care. The customer is given personal guidance and counselling via video. For communication purposes, customers have a tablet computer through which the nurse can get an image and audio connection to the customer and the customer to the nurse. The aim is to support the customer to cope with daily activities independently through audio and video, so that they can live in their own home for as long as possible. (Target organisation 2017.)

Before a patient can get home care, the service control evaluates customer service needs and functional capacity and there is also an assessment period. The virtual home care customers have filled criteria for granting home care. In the assessment period customer rehabilitation is supported and assessment of the customer's resources and service needs is done. In target organisation, home care is carried out primarily with technology-assisted services or virtual home visits. If the customer's service needs require the physical presence of the nurse at the customer's home, the visit is carried out as a traditional regular home care customer visit. In the virtual home care contact practical nurses can guide the patients and evaluate their health, for example supporting or guiding taking care of medicines and nutrition. (Target organisation 2020; Target organisation 2021, 2-3.)

Virtual home care takes care of the customers around North Savo. All the employees are practical nurses. Virtual home care employees give care every day from Monday to Sunday from seven am to nine pm in the evening. There are five employees in every shift. (Target organisation 2021, 2.). According to the target organisation’s software specialist, the busiest time in the mornings is from seven till eleven am and in the evening the busiest time is from four to nine pm. Working in virtual home care is independent. The employees work in the same office building but in separate rooms to do their virtual home care contacts. If some problems occur, employees can help each other. (Juntunen-Koivisto 2022.)

Usually, the busiest working hours in home care are mornings and evenings, lunch and dinner times (Perkiö-Mäkelä, Vauhkonen, Kupari, Saaranen, Honkalampi, Järvelin-Pasanen, Tarvainen, Räsänen & Oksanen 2021, 60). Often during this time period there are customers for whom it is critically important to get to the customer visit, in which case a home care visit should be made at a certain time. This means that the client’s need and the reason for the visit can be medical or functional. Medical refers to distribution and dosing of a medicine that must be given at a certain time, and the client needs support or guidance to do so. A functional reason may be, for example, taking the medicine with breakfast or taking medication should be scheduled for certain moments several times a day. (Groop 2012, 88–89.)

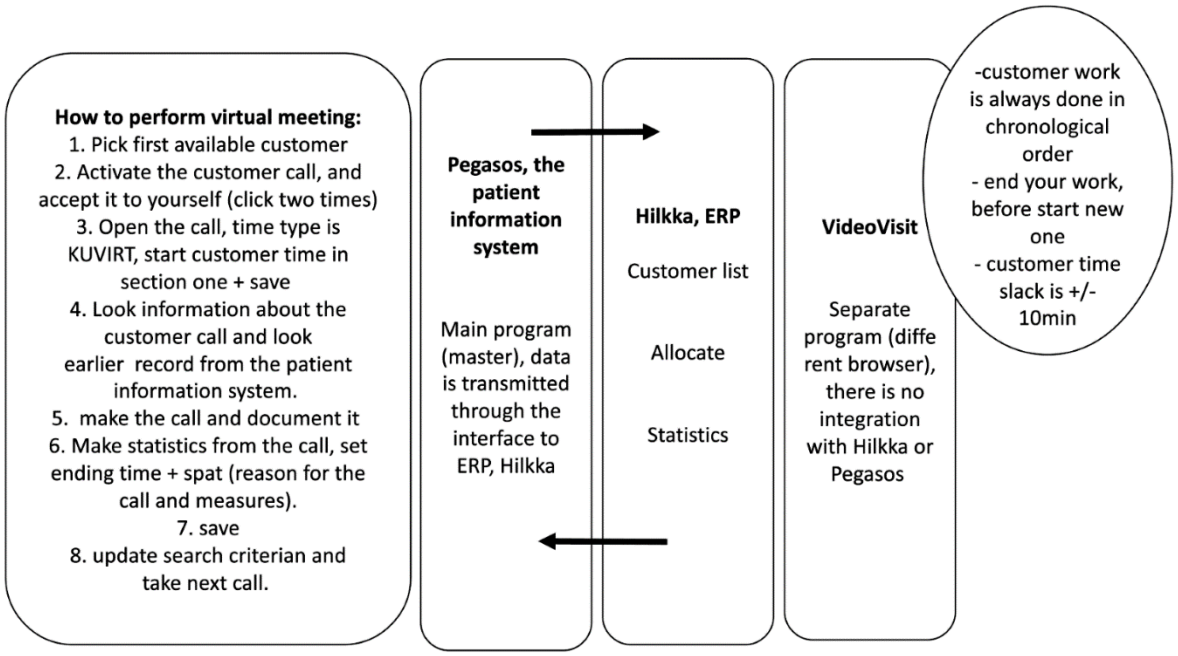
The technology used in virtual home care includes endpoints, data center services, necessary information systems and telecommunications with installations and support services. At the moment, three separate systems are needed to arrange virtual home care: a patient information system, an enterprise resource planning system and a video connection service to arrange remote access between the nursing staff and the patient. (Ikonen 2022.)

The patient information system used by the target organisation’s virtual home care is Pegasos. It is used to record and view patients' reports, management and financial information. The recorded data can be used for patient diagnosis support, treatment planning and administrative tasks. Pegasos includes, among other things, the following software sections: health report, medication information, appointment, home care, informal care, nursing, requests and answers for laboratory and X-ray examinations, statistics, population data, invoicing and e-services. (Istekki Oy 2018.)

Hilkka is an enterprise resource planning and customer information system for home care, home delivery services and housing services for private service providers and municipalities. The client list for virtual home care is in Hilkka. The system is used in more than 1000 private and public sector locations in Finland and is used daily by more than 35000 care professionals. The real-time cloud service enables managing services, home visits, customer data and invoicing. Hilkka's functionalities also include statistics and the possibility of informal communication. With Hilkka's help, treatment-related recording in accordance with the regulations can also be done mobility, and Hilkka's interfaces enable the system to be expanded according to customer needs. (Fastroi Oy 2022.)

VideoVisit is a Finnish company founded in 2010 that offers its customers digital healthcare solutions that help healthcare providers provide remote services. According to the company, the implementation of the service remotely is 85 % more efficient than traditional home care. VideoVisit offers solutions for virtual home care, video and chat distance reception, remote consultation between professionals and remote diagnostics, among other things. The platform that enables the service includes servers and software. Virtual home care uses the VideoVisit remote care service, which includes user interfaces for professionals, patients and patients' relatives. Patient’s communication is arranged by mobile device (tablet computer) with mobile network connection. While conducting the research, VideoVisit will bring into production the 2nd generation service platform, which will be in target organisation´s virtual home care use from February 2022. (VideoVisit Oy 2022.)

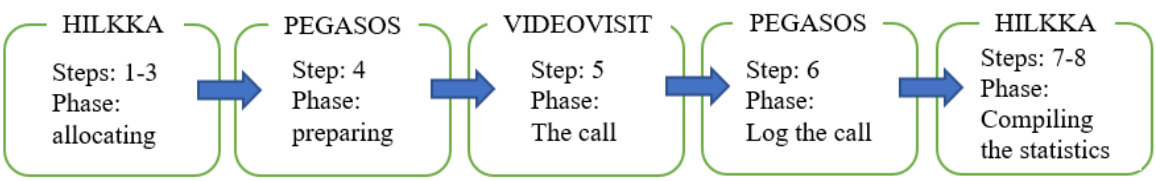
Picture 4 describes the virtual meeting process and the different steps in different information systems during virtual meetings.



PICTURE 4. The actions in electronic systems during virtual meetings (Juntunen-Koivisto 2022)

The Virtual meeting is a process that consists of audio-video connection between a nurse and a customer, and documentation and other actions related to it. The process includes seven different steps to be carried out. Those steps consist of several actions in and between three different electronic systems; VideoVisit, AluePegasos and Fastroi Hilkka, which practical nurses are using from their workstations to perform the whole process. The different steps of the process are divided into five logical working phases according to the use of each electronic system. One working phase includes one to three steps. VideoVisit is for video calls. It does not record the calls. The connection leaves log data, which can be requested from service provider if necessary. The processing of customer data is carried out in AluePegasos patient information system and the ERP system Fastroi Hilkka. Documents and client records are drawn up flawlessly, clearly and extensively enough to guarantee the customers safe treatment and service. (Juntunen-Koivisto 2022.)

Picture 5 describes the steps and working phases of target organisation's virtual meeting process. Hilkka ERP system plays a key role in virtual meeting process. The seven different steps are divided into five working phases to describe the virtual meeting process.



PICTURE 5. Steps and working phases in virtual meetings

A tabular description of the relationship between different information systems, the chronological order of their use and the different working phases are described in Table 2. A tabular process description can be used as a basis and platform for measuring virtual meetings.

TABLE 2. Virtual meeting process in tabular form

Steps / working phase		Customer 1	Customer 2	Customer 3	Customer 4	Customer 5	Customer n
1-3. Allocating (Hilkka)	start						
	finish						
system exchange							
4. Preparing for the call (Pegasos)	start						
	finish						
system exchange							
5. the call (VideoVisit)	start						
	finish						
system exchange							
6. Log the call (Pegasos)	start						
	finish						
ssytem exchange							
7-8. Compiling the statistics	start						
	finish						

Steps one to three are performed in Hilkka. This is the first working phase. When preparing a video connection between the client and the nurse, the first available client is allocated to the nurse from Hilkka's customer list, and the correct statistical service is set in place. In phase four / step four, the customer's background information / health information is checked from the patient information system Pegasos, if necessary. The patient information system displays previous entries related to the customer and, for example, a list of medicines that may affect the customer's treatment. Next, in step five, the call with video connection to the client is made through the VideoVisit system. During the call, the employee can record in the patient information system necessary information affecting treatment, such as the results of a blood glucose measurement. After the call, entries related to the appointment and the customer's information can still be made in the patient information system. In step six, the call is recorded in the Hilkka ERP system. The statistics show the start and end time of the call. In addition, the statistics include, for example, classifications of procedures and follow-up treatment codes. (Juntunen-Koivisto 2022.) The action classifications describe the content of the actual visit, and the follow-up action code is used to record all agreed follow-up measures (THL 2022a). The call made is recorded in its entirety in the seventh step. After completing steps from one to seven, Hilkka's search criteria are updated, and the process starts all over again. The steps are always performed in chronological order. The customer has been promised that the call will take place within +/- 10 minutes within the time specified in the service agreement. (Juntunen-Koivisto 2022.)

As emerging technology and digitalisation create new opportunities for work, attention must be paid to its organisation and implementation of processes. Smooth, clear and efficient work processes and efficient organisation of work are the starting point for productive operations as well as for employee satisfaction and well-being. Participation in the development of one's own work and the opportunity to influence often affect commitment and motivation. Continuous joint evaluation and development of activities is of particular importance. Participatory development is an excellent way to clarify the job description and goals of the personnel, to engage the personnel and, for example, to improve the opportunities to influence. (Ala-Laurinaho, Asikainen, Puro & Teperi 2022.)

Information systems for healthcare and social welfare in all dimensions of the technical model must be considered in the development. They are not independent or hierarchical, but interdependent

and mutually influential. Co-operation between developers and end users can be influenced to the usability challenges, and it also helps to support the work process and make customers and patients work smoother. Software developers think that there must be more end users for developing health care systems, especially definition and planning. Software developers believe that users should be involved in development work from the earliest possible stage to production use. Usually, the end users are involved in testing the software and giving feedback about that. End users want to give feedback personally to the developers and how the work process is related to their own work. (Rytkönen et al. 2022.)

6 THE MEANING AND PURPOSE OF THE THESIS

The aim of the thesis is to describe the current state of target organisation´s virtual meeting process – what working phases and tasks are involved in it and how it works by the view of used time in numbers and the perceptions of the employees. The aim is also to describe how the virtual meeting process is formed in terms of different healthcare information systems and the use of them. It is important and relevant to evaluate the process and to define if there is something that maybe could be done better and more effectively in the future. Within this thesis, virtual home care work will be observed from a technical point of view, by investigating the use of information systems. In addition, virtual home care's employees will be interviewed to get and hear their experiences and thoughts of the process.

Target organisation´s virtual meetings have not been analysed this way before. The goal is to understand how the virtual meeting process is formed in terms of different electronic healthcare systems and the use of them. The results of this thesis can be used to later process development.

Research question:

What is the current state of the virtual meetings by the view of information systems and perceptions of employees?

7 RESEARCH METHODS

The data for this study were collected using both quantitative and qualitative data collection methods. The quantitative data was obtained with the help of an observational study, and the qualitative study was obtained through a group interview. As a quantitative part of the study, numbers describing the time demands of the electronic systems used by virtual home care personnel were observed. Qualitative material is gathered from group interview.

In observing research, the investigated target is monitored to get an overall picture of it (Puusa & Juuti 2020, 131). The aim of an observation was to get immediate and direct information of behavior or activities of an individual, group or organisation. Systematic detection was used. Systematic detection means when the observation is systematic and structured, and the observer is an outsider. The Observing must be done systematically and accurately with the help of a check list. Possible distractions must be considered, for example if the participating person's behavior changes during observation due to emotional commitment to the observer. (Hirsjärvi, Remes & Sajavaara 2013, 212-216.) Observing research is suitable for data collection purposes in cases where the investigated process is not known in some particular way. Data collected with observation offers the possibility to form a richer picture of the process. (Kankkunen & Vehviläinen-Julkunen 2013, 122, 195.) Data collecting has to be done systematically and reliably. This kind of procedure allows the analysis to be carried out systematically and believable. In addition to the originally planned research subjects, it is also important to record other factors that occurred during the study, factors that may affect the object observed. It may be useful to make a list like a diary. This diary will help in the analysis if there are things which affect the overall of the observed topic. (Puusa & Juuti 2020, 133-136.)

The qualitative approach highlights the subjective nature of reality and the information it provides. This means that subjective experiences arise from interviews, so that it could be understood how employees have experienced the functionality of the processes. Qualitative research is characterized by approaching the subject of research on the natural conditions. What is essential in people's perspective and the researcher's interaction with an individual observation. (Puusa & Juuti 2020, 76.) The aim of the group interview is to find out what the interviewees are thinking, feeling, experiencing, or believing about the investigated subject. It is recommendable to use interview to get the desired results. (Hirsjärvi et al. 2013, 185.) One priority for interview as a qualitative method is that voice and perspectives come to the fore. The group to be interviewed must selected carefully and appropriately. Qualitative cases are always unique, and they must be taken into account when processing the results. If the meaning is not to find average connections, a small group of interviewees is enough for an interview. (Hirsjärvi et al. 2013, 164, 181.) The purpose of a group interview and discussion within it is to get interaction between participants using different interaction techniques. The aim is to get participants to discuss the topic with each other. When the group consists for example of employees doing the same work, it ensures the homogeneity of the group. (Puusa & Juuti 2020, 120-121.)

The questions in the discussion are aimed at obtaining information about the topic of the research (Hirsjärvi & Hurme 2009, 66). During the discussion the participants can tell their experiences to

each other. This means that the participants have the responsibility to discuss, but also an opportunity to tell things which are important for them. (Puusa & Juuti 2020, 124.) The interview is preferred to start with an introductory speech to explain why the group has been gathered in general and what is the target. The group discussion rules are told at the beginning. After the introductory speech everyone should tell their own professional background because it is important to share joint expertise. This is also a message for debaters that all are equal. (Puusa & Juuti 2020, 122- 23.) Thematic interview usually lasts from one hour to two hours. The purpose of the interview is to deepen the result of the observation and to clarify the answers which are received. Group interview is an effective way to gather information, because information from several people is received at the same time. There are positive effects, and there might also be negative effects. The group can help with questions or can help correct misunderstandings. On the other hand, the group can prevent negative issues from coming up or the group might have a domineering person who leads the conversation. Those things must be considered when the results are studied, and conclusions are drawn. (Hirsjärvi et al. 2013, 205, 208, 210-211.)

When two different research methods are combined in the study, it is called multi-method approach. This kind of research may give more extensive respond for the research questions. The observation provides information, for example about people's behaviour - are they really acting the way they tell. Observation reveals the facts of what really is happening. The purpose of the group interview is to highlight what people are thinking, feeling or believing. Interview tells how the interviewers discover the matter. The purpose of combining research methods is to enrich the results. (Hirsjärvi & Hurme 2009, 39; Hirsjärvi et al. 2013, 212.)

Within this study, an inductive research approach is used. Inductive research starts from the data and is, by definition, more theory-free (Tietoarkisto 2023). Inductive reasoning is open and more supportive than deductive. Inductive reasoning begins with specific observations or real examples of events. The data is used to gain an understanding of the current situation. Then proceed analytically to broader generalizations and theories that help explain the observed cases. (Mogensen 2022, 20).

7.1 Implementation of the observation research

Observation research was implemented to collect numeral and quantitative data. The observed group consisted of three experienced virtual home care's practical nurses (n = 3), whose working was observed real-time during virtual meetings in virtual home care's premises. The observation was done by virtual home care's software specialist.

The observation was conducted in 13.09.2022, 19.09.2022 and 18.10.2022 during the morning working shifts, between 08:00-11:00 am. The first and the third day consisted of 13 virtual meetings, whereas on the second day 14 virtual meetings were observed. The different working phases of virtual meetings and the spent times on them were observed and recorded by the observer. The working phases include starting the reception, the actual meeting and various treatment-related documentation and use cases related to information systems. The observer used a stopwatch to measure the spent times and Microsoft Excel to record the observation data in real-time. The timer was started when one system started to be used and stopped before moving on to

the next system. The data from 40 virtual meetings (n = 40) were observed and recorded. All the gathered numeral data is in Excel-tables in appendix 3. Table 3 (the format introduced before) below is an example of one observed virtual meeting with different working phases. It contains observing data received from one virtual meeting. The other matters related to the use of the systems occurred during the contacts are also recorded in the table.

TABLE 3: Example record of the observation, one virtual meeting

Working steps and -phases		**Customer 1**
1-3. Allocating (Hilkka)	**total**	**56** seconds
system exchange		x
4. Preparing for the call (Pegasos)	**total**	
		does not read customer connection before call, reads when the connection is open
system exchange		x
5. The call (VideoVisit)	**total**	**250** seconds
system exchange		x
6. Log the call (Pegasos)	**total**	**130** seconds
		Measurements are logged when the client connection is open
system exchange		x
7-8. Compiling the statistics (Hilkka)	**total**	**35** seconds
Another log, for example Hilkka message	**total**	
Total	**sec**	**471** seconds
	min	**7,85**

7.2 Implementation of the group interview

Four participating virtual home care's practical nurses were selected for the interview based on their working shifts. The Interviewees have working experience in health care between 13 to 40 years and in virtual home care from six months to almost seven years. The duration of the interview was defined as one hour, because it fit well into the schedule of the employees. The interview was conducted at the time of the shift change, when the morning shift was about to end, and the evening shift was about to start its shift.

The interview was held in 25.11.2022 via Microsoft Teams. When starting the interview, there were slight technical challenges, especially with the audio connection. All interviewees sat at the same room, same table and at one computer at the virtual home care's premises. The cameras were kept open so that the interviewers and interviewees could see each other. All of the interviewees could not be seen properly from the video stream, because the camera's angle was limited. However, everyone's voices could be heard during their speeches, and they could be recognised.

The aim was to highlight the different experiences of the interviewees in order to obtain the most reliable picture of the whole. After that, the participants were told the objective duration for the interview, and that the reason for this interview is to get better understanding of the virtual meeting

process and its different working phases by the view of their perceptions. The employees were explained that it is important to find insights to smoothen and enhance their working environment, if it might be possible and reasonable.

A discussion frame was used (appendix 1). The frame of the discussion was based on backround theory and the research question - "what is the current state of virtual home virtual meeting process?" The main point was to discuss the experiences of the virtual meeting process. The themes were what is good in the process, what should be developed. The virtual meeting process –picture (Juntunen- Koivisto 2022) was used to help the participants to understand the process better. With the help of the picture the employees might find it easier to tell us what is good and what needs to be developed in the process.

First of all, the interviewees were asked about their backgrounds and working experience in health care and virtual home care. The questions were also meant to get information about their experience and competence in health care information systems. The virtual meeting process picture was shown to the interviewees, and they were asked what good things are seen in it. The conversation started from things which needed improvement, but in the little while, the good and working things of the process came up.

The conversation was interactive, and each interviewee spoke in turn. The shifts were evenly distributed. During the conversation, the interviewees also supplemented each other's answers. The order of the questions changed during the discussion, as the topics naturally came up in the discussion. The conversation during the interview was fluent, and everyone's opinions were introduced openly. The interviewees were asked what kind of impressions they have of the different working phases mapped with the observational study and what thoughts it raises. This gave an idea of what kind of vision the employees had for perceiving the process. The interviewees were then shown material and preliminary analysis from the observational study. Based on the answers given by the interviewees received before the material was shown, as well as the preliminary analysis, the results of the observation and the employees' perceptions of the different working phases were in the same direction. In total, the interview lasted a total of 47min 17 seconds. The discussions were recorded, and the conversation transcribed.

8 DATA ANALYSIS

What kind of answers thesis or research gives to the researcher, becomes clear in the analysis phase. Analysis is carried out all the time as the research progresses. When there is recorded material, it should be transcribed. The transcribed can be made from the entire material or selectively. There can be different ways to analyse the material, roughly is explaining and understanding. In the explaining is usually used statistical analysis and conclusions. In the understanding is used qualitative analysis and conclusions. (Hirsjärvi et al. 2013, 224-226.)

There is not just a one right way to do analysis. In inductive reasoning the data approach is the key. The basis of the analysis is the description of the material. It means trying to find out the characteristics or features of the subject under thesis. Usually there are some questions to answer, who, where, when, how much and how often. In the analysis phase, classification is one important element. Classifications means reasoning. The classification may be used for example research problem, research method or the material itself. After classification there must assess the success of the classification. For example, whether the issues can be separated or combined, are all the findings worth the same. (Hirsjärvi & Hurme 2009, 145-149.)

When analysing the observed data, the law for social welfare client documents 254/2015 must be considered. The law says that the employee is obligated to record necessary and sufficient information to the electronic systems as soon as possible. The Finnish Institute for Health and Welfare will issue more detailed regulations on the information to be entered in social welfare customer documents. (Laki sosiaalihuollon asiakasasiakirjoista 254/2015.)

The observed data is tabulated in appendix 3. The analysis was carried out on its basis and using all the observed values in it. Microsoft Excel was used to perform the analysis. The aim of the analysis was to get an accurate structural description of the virtual meeting process. In addition to the actual meeting with video call, the virtual meeting process includes many working phases and data retrievals from different information systems, as well as shifting between systems. Other working phases besides the process are allocating, preparing the call, logging the call and compiling the statistics. The outcome of the analysis was meant to describe the share of the different working phases of the whole virtual meeting process.

The times spent with each customer and during different working phases included in the process were tabulated and summed up. At the same time an overall picture was formed of the temporal significance of the different working phases as a whole. It was desirable to know how much time it takes within the video meeting with the customer. On the other hand, the time spent in other working phases was a partition to introduce. The time spent on different working phases for each customer is indicated in seconds. Calculations were made from all the observational material obtained. Based on them, tabulated summaries of the use of information systems related to virtual meetings were formed. The median is the middle value of the observation values set in order of magnitude of the distribution of numbers, i.e., a certain typical value of the distribution. Half of the values of the distribution are smaller than the median and half are larger than it. For this reason, for example, a tenfold increase in the maximum value of the data does not affect the median, so it also

excludes statistical individual deviations or error measurements. For the average, such a change could play a decisive role. Abnormal observations affect the median less than the average. The mode is the number that occurs most often in the distribution. (Tilastokeskus 2023.) In this analysis, the median and the mode values were used to present the share of the video calls. Their purpose is to reflect the role that video meetings have in the overall virtual meeting process, based on the observational material of this study.

The aim was to classify the answers to currently practical and positive things, as well as non-functional things potentially requiring general- and more detailed development what is functional in the process, according to the interviewees, and what should be developed in it. The transcription was done selectively, and thus the entire interview was not transcribed. From the material obtained from the interview, the aim was also to highlight positive things related to the use of the systems. The themes of the group interview were shaped by the questions in the interview. The questions produced answers to different categories; what is good, what need to be developed. Development divided into two different categories: general development and larger entities and smaller more detailed development.

The results of this study obtained with the help of two research methods, and the analyses carried out on them, can later be considered together. The themes raised in the interviews can be viewed on the basis of the numbers that came up in the observational study. In the analysis, looking at things in relation to each other is essential. Inductive analysis means that the thesis reflects on the work process and assessing reliability, highlighting the background to the research and what has happened in the research process (Tietoarkisto 2023). Themes related to the research problem can be raised from the data (Eskola & Suoranta 1998). An effort must be made to find and distinguish from the material the topics relevant to the research problem.

9 RESULTS

The data got from observational research describes the virtual meetings with exact time values. Table 4 below includes classified data from all the observation data (n = 40) of three different observing days. The data in the table is classified according to the working phase, customer and observation day. D1 is observation day one, D2 is observation day two and D3 is observation day 3. The bottom rows of the table show the total duration of the different working phases per day, and the total duration of each working phase for the entire observation material, i.e., the sum of three days. In addition, the bottom row describes the percentage of each working phase when they are proportional to the total time spent in all 40 meetings. The value in the lower right corner has been used to calculate the percentages of different working phases. For example, the daily specific durations of the allocation phase are added together, and the total spent time is thereby 2788 seconds. It is 10 % of the total time spent 27939 seconds (2788 / 27939 * 100 %). 27939 is the total time spent on all virtual meetings and all the working phases in them. On the right side of the table, the total time spent on different working phases by customer and day can be seen. The time spent on video calls, as well as its percentage of the total time spent with the client, is indicated in yellow. The purpose of this is to illustrate the proportion of the video call in the entire virtual meeting.

TABLE 4. Working phases of the virtual meetings in seconds and percentages / 40 cases

The working phases in seconds and percentages of total time spent / 40 virtual meetings

Cust.	Allocating			Preparing			The call						Logging data			Compiling stats			Total		
#	D1	D2	D3	D1	D2	D3	D1		D2		D3		D1	D2	D3	D1	D2	D3	D1	D2	D3
1	56	74	80			30	250	53 %	490	63 %	379	58 %	130	170	138	35	41	29	**471**	**775**	**656**
2	70	56	69	50		90	510	62 %	999	81 %	349	46 %	140	138	209	53	40	39	**823**	**1233**	**756**
3	58	64	57		39	15	429	71 %	75	24 %	195	49 %	87	99	88	30	33	43	**604**	**310**	**398**
4	65	114	55	53	79		308	45 %	333	48 %	264	57 %	214	141	119	48	30	22	**688**	**697**	**460**
5	65	84	50		47	75	390	65 %	138	34 %	410	63 %	113	99	97	36	36	23	**604**	**404**	**655**
6	73	49	28		15	31	445	64 %	453	68 %	859	89 %	122	105	28	50	48	21	**690**	**670**	**967**
7	90	100	53		30	115	478	63 %	190	42 %	594	69 %	138	99	75	47	31	25	**753**	**450**	**862**
8	61	96	58			138	371	56 %	401	63 %	873	78 %	191	97	30	40	43	22	**663**	**637**	**1121**
9	89	109	70			56	827	71 %	338	51 %	256	43 %	177	172	192	73	50	20	**1166**	**669**	**594**
10	82	96	64	20		45	386	59 %	150	35 %	386	57 %	144	144	157	26	33	22	**658**	**423**	**674**
11	76	58	68			21	631	68 %	741	78 %	325	61 %	169	107	96	58	44	26	**934**	**950**	**536**
12	78	87	44	27	27	62	399	51 %	281	47 %	397	62 %	232	185	106	52	23	30	**788**	**603**	**639**
13	45	83	62			44	366	61 %	715	77 %	412	63 %	144	101	117	44	33	22	**599**	**932**	**657**
14			52			50					533	69 %			119			16			**770**
Total	908	1070	810	150	237	772	Median: 61,5 %				Mode: 63 %		2001	1657	1571	592	485	360	**9441**	**8753**	**9745**
	2788 / 10 %			**1159 / 4 %**			**17326 / 62 %**						**5229 / 19 %**			**1437 / 5 %**			**27939 / 100 %**		

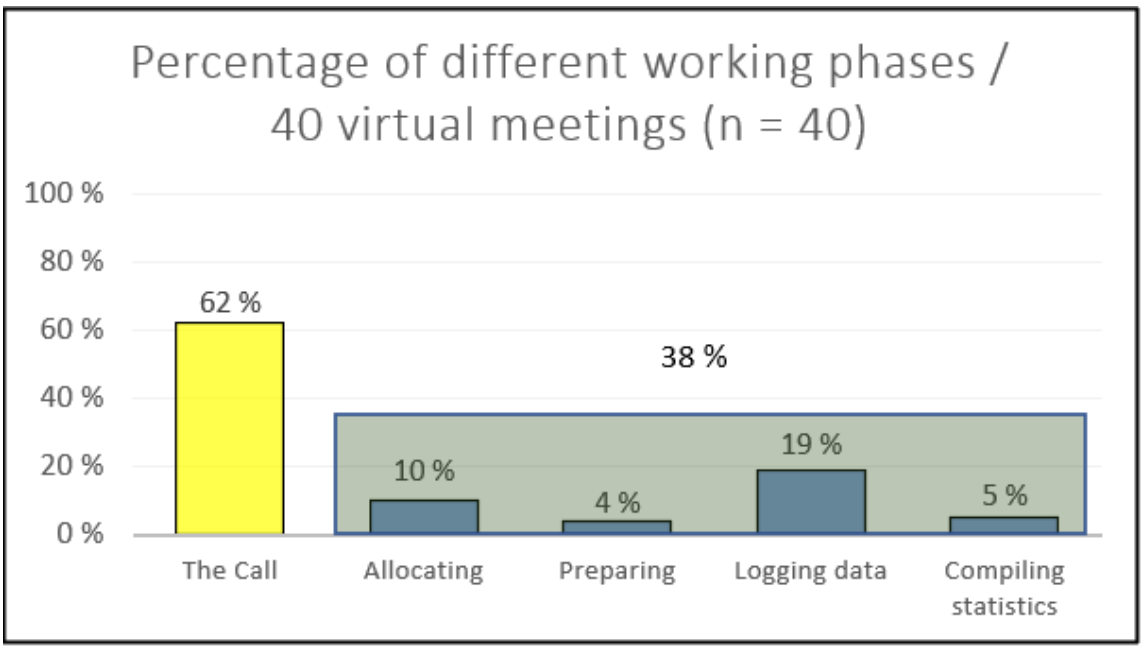
The results and coarse lines between different days are similar to each other, but the details are a bit different. This is natural and is largely based on an individual customer, and additionally on the details, goals and needs of the customer meeting. On the third day, less time is spent on allocating and compiling statistics. Also, on the third day, employees spent more time preparing the call compared to the other two days. Data logging had the smallest part on the third day.

When looking at the customer- and day-specific durations of different working phases, it can be seen that the percentage of the call event accounted for at least 24 % of the total time and a maximum of 89 %. However, when looking at the bottom rows of the table, it can be noted that the median and mode values closely correspond to the calculated proportion of the call, which is 62 %.

So, the typical percentage of a video call is about 60 % of the total virtual meeting, when examining the whole of the 40 virtual meetings.

It is seen from table 4, for example that allocating is 10 % and compiling the statistics 5 % from the whole virtual meeting process, when considering 40 virtual meetings all together. These are working phases performed in Hilkka. Assuming that there are 200 virtual contacts in a day, those percents means about 6 hours total working time in Hilkka. When describing the big picture, the results of the observational study's analysis mean that a little more than 24 working hours are spent on calls to customer meetings every day, and slightly less than 15 working hours on other working phases.

The overall picture of the proportions of the different working phases is described in picture 6. The diagram below illustrates the numerical values of the table as a graph. The diagram shows the percentages of the different working phases of the total time spent on all virtual meetings. The percentage of video meetings (the call) is 62 %, when all data obtained from the observational material is considered. Correspondingly, the share of working time spent on other working phases is 38 % in total. A more detailed definition of the proportions of the working phases is presented in the diagram.



PICTURE 6. Percentage of different working phases / 40 virtual meetings

Based on the observational material and sampling (n = 40), 15 % of the virtual meetings is spent in Hilkka and 23 % in Pegasos. The working phases carried out in Hilkka include allocating the work for oneself and compiling the statistics related to the visit. The virtual customer meeting is closed in Hilkka. Pegasos' share emphasises the recording and review of customer data. Finally, it seems quite evidently, that the virtual meeting comprises 62 % of the video call and 38 % of the other working phases.

The group interview and its questions aimed to get answers to how virtual home care workers experience the use of information systems in their work, during virtual meetings. The answers have been classified in table 5 as currently practical and positive things, as well as non-functional things

potentially requiring general- and more detailed development. The results of the responses and their significance will be discussed later in the reflection section.

TABLE 5. Classified results of the group interview

Currently practical and positive things	Hilkka-ERP is in real time. The program shows which employee is calling and which customer is being called. Hilkka also shows why the customer is called.	Hilkka-ERP
	the calls made and the remaining calls are visible in Hilkka	Hilkka-ERP
	updated VideoVisit has worked well. The picture and the voice are better than earlier in virtual meetings.	VideoVisit
	Search criteria for the search field in VideoVisit is easy to use if the writing style of the client's name is known.	VideoVisit
Development targets links to the process	Too many systems in use and exchanges during the virtual meeting.	VideoVisit, Hilkka-ERP, Pegasos
	it feels often to be slow, the use is slow in overall	Hilkka-ERP, Pegasos
	Patient-related data and records has to be updatet manually, possible wrong information in times	Pegasos
	challenges in the use of / lack of know-how in new VideoVisit	VideoVisit
Development targets do not link directly to the process	Hilkka message	Hilkka-ERP
	Education and training	VideoVisit, Hilkka-ERP, Pegasos
	two-way logging is not working: the information and data is not received form Pegasos	Hilkka-ERP, Pegasos

Hilkka's real-time operation and the image and sound quality of the new VideoVisit, as well as the ease of use of the search criteria, were considered to be positive things that have worked well. During virtual meetings, Hilkka presents clearly and in a timely manner which employee is calling and which customer is being called. Hilkka displays the contents of the calls at the same time, as well as the number of calls and the remaining calls. Said about Hilkka:

"siinä nähhään selkeästi, kenellekä soitetaan, mihin aikaan soitetaan, kuka soittaa ja miksi soitetaan asiakkaalle. Se me nähdään, paljonko on soittoja jäljellä, paljonko soittoja tehty, se me nähhään selkeesti, se on niin ku hyvä"

"It is clearly seen in the system, who is being called and when, who is calling and why. We can see how many calls there are left and how many calls have been made. That we see clearly and that is good. " (free translation)

The common and biggest problems requiring development were the use of several information systems and the occasional slowness of those systems. In addition, Pegasos' customer information is not always up to date. Information related to the customer's treatment requiring manual updating, such as medication lists, can be especially mentioned. Competence in the use of the new VideoVisit was still felt to be partially lacking.

"siinä on niin monta ohjelmaa päällekkäin, missä menee turhaa aikaa, ihan hirveesti aikaa"

"there are so many systems in use at the same time, unnecessary time is spent, an awful lot of time" (free translation)

"olisi vain yksi järjestelmä tai edes vain kaksi"

"There should be only one system or even just two" (free translation)

In addition, the interview was used to identify work-related challenges that require more detailed development, which are not directly related to the virtual meeting process. Two-way logging between systems was perceived as a risk. Another identified thing was Hilkka's message section, which was considered important, but it was hoped that it would be developed to make communication smoother. The interview also highlighted the competence of the systems and the need for training. Deeper knowledge of different information systems was considered an important part of understanding one's own work better.

10 DISCUSSION

The subject and need for this research arose at the request of the subscriber of the work. The study and the results obtained from it were seen to benefit the organisation's needs, goals and cooperation with its partner organisation. While working, there was a great opportunity to utilize the background theory, complementary knowledge of researchers and the contacts for the subscriber.

The organisation of virtual meetings is largely based on information technology. The success of the information technology implementation, which is the backbone of the service, is reflected in the efficiency of the service and operations that operate on top of it. It also determines the working of employees. With this study and its results, a description of how a virtual meeting is formed by the view of information systems is formed. To understand the big picture and possible development needs well enough, a sufficient level of the virtual meeting process and its technological base was described. The different working phases of the virtual meeting process are described, including in time use, by the results of the observation research. In addition, employees' experiences were heard through an interview. The results were classified as currently good and functional aspects of the process, as well as inefficient and those requiring development. With this definition, it was possible to get a comprehensive picture of technical activities in practice, which provides valuable information for the subscriber of this thesis. This section reflects and discusses the results obtained.

10.1 Reflection of the results of observation

Since no suitable research material was found for the theory section on the temporal distribution of the use of different systems in virtual home care, the reflection section examines the observational results by mirroring them into the knowledge and views of the experts, who are responsible for the technical implementation and maintenance of virtual home care in the target organisation. After the analysis of the observation material and the completion of the results, the current situation of the virtual meetings was reviewed with the software specialist of virtual home care and the expert of the in-house organisation responsible for the overall technical implementation.

The experts' view and feedback were clearly that in virtual meetings, in addition to a video call, the working phases in different systems take a lot of time. For 40 virtual meetings, 62 % of the total time was spent on the video call itself in VideoVisit. In addition, 38 % of the total time was spent in the Hilkka ERP system and the Pegasos patient information system. According to the observer, the use of Hilkka was slow at times, due to the allocating and compiling the statistics. The numerous clicks, retrieval and logging of patient or customer data, exchanges and transitions from the system to the system, as well as other ancillary activities carried out in Hilkka and Pegasos, take up a total of approximately 15 hours of employees' working time per day. This is based on the results of observation, as well as the assumption that there are 200 virtual meetings per day. In this case, two virtual home care workers would only have time to do data retrieval and logging in one working day, nothing else. The common view of the experts was that the results of the findings are good and important. With these results, it is justified and appropriate to consider possible options for streamlining the different working phases and reducing the working time spent on them.

Although the results of the observational research cannot be compared with other applicable research evidence, the findings derived from it must be treated as an information package that presents the process of virtual meetings in virtual home care in a new and previously unexplored light. The results are a valuable and previously lacking informative part of the work and realisation of virtual home care. The value of the observation material is largely based on its usability to support decision-making, for example when designing and evaluating possible future technical solutions for virtual home care. The results of the observational material are sought to be used when considering the results of the group interview in this work. The aim is to consider and evaluate whether the functioning of the systems used in virtual meetings and the temporal use demonstrated in their results are to some extent consistent with the experiences of employees.

10.2 Reflection on the results of group interview

The interview highlighted issues that cannot be collected or studied through observation. Their purpose is to describe people's subjective experiences of the subject under study. The results of the study can be more diverse and comprehensive by utilising both research methods. The experiences and stories of the employees highlighted in the interview are supplemented and confirmed by the results of the observational study. Some of the interviewees have multidisciplinary backgrounds, which was found useful in their work. The interviewees felt mainly that their knowledge of the information systems is in a good level, so answers were not affected by the fact that someone was just a beginner as a user of the information systems or a new virtual home care worker.

According to the results of the interview, responses were classified as described earlier into positive and negative things. The information systems reported to have some good and positive things worth mentioning. Hilkka ERP system was considered good partly because it is real-time. The system shows which employee is calling and which customer is being called. Hilkka also shows why the customer is called. These things were felt necessary to know. It was also considered a clear and positive thing that the calls made and the remaining calls are visible in Hilkka. The second-generation VideoVisit, introduced in 2022, received praise from users. The system has mainly worked well with an improvement in the quality of the audio and video connection from the first version. For VideoVisit, the ease of the search function was also seen positive.

The following issues emerged as problem areas in the process. The use of several systems was seen frustrating and as a major negative impact on the smoothness of work, as the system has to be changed several times during virtual meetings. It was already known from the process description and from the observational material, which showed that during a virtual meeting, information system exchanges have to be done four times. The information systems were also seen to be slow from time to time, so in addition due to multiple exchanges, the operation is perceived as inefficient. Two-way logging is not working in Hilkka and Pegasos patient information system, this means that the information from the Pegasos does not transfer to the mobile Hilkka. Hilkka feels too slow in overall. The markings made in Pegasos were also highlighted as a factor hindering the smoothness of the work. Entries are made manually by employees, which may cause errors or delays, and therefore not all entries are real-time in the Pegasos, as exemplified by the drug lists. Therefore, Pegasos is not always in real time. There might be wrong information, for example about customers'

medicines. This always takes time to clarify. All this information requires someone to log in, so the data updating is not automated. This is a human dependent problem. Incorrect recorded information in Pegasos may stretch the duration of the customer visit, as the matter must be clarified, and incorrect information corrected during the visit. In addition, incorrect or incomplete information can have a detrimental effect on customer safety. The systems in general are slow at times or their use is slow. Because the two-way logging is not working between Hilkka and Pegasos, there are possible risks for customers' safety because other nurses cannot see the recordings at the mobile.

According to employees, the systems in general are slow at times or their use is slow. The subjective experience was that it takes a frustrating amount of time to load systems and visits. Two-way logging of Hilkka and Pegasos should be corrected to work. Another area of development concerned communication in Hilkka. The messaging in Hilkka was perceived as a good feature, but it is rather confusing. The employees' wish was that the message would appear, for example in a pop-up style, when the customer's information is opened for reading. One proposal from the employees was about the possibility of using the messages from Pegasos. For example, when the customer's information is opened, the message would appear in connection with the customer's data. The results of the observational study shown to employees surprised them all. They were clearly astonished to learn what the percentages of working phases mean, for example during one working day. This also prompted employees to think about the big picture in a new way. The answers of the employees indicated also that more training according to the use of the electronic is needed. Understanding of information systems, their working and capabilities in virtual home care should be deepened and improved to bring more certainty and understanding to the work. The employees hoped that there would be one or at most two electronic systems in use. The call entity and customer data management came to the fore in such a way that it was hoped that it would be simpler. For example, the possibility of reading customer background information directly from the task card or integrating the customer list directly into VideoVisit, so that the flow of the working day would be clearly visible from one place. The clear message from the employees is that it is topical and important to develop the system as a whole to be more agile in the future.

With results of the group interview, clear weaknesses in the current state of the process were identified, which maybe could be corrected and developed in the future. The virtual meeting process needs some improvement by the view of employees. It is clear that the employees are the group with the highest utilisation rate as an end user of service-related systems. The results of the interview are consistent with the results of previous researches (Vainiomäki et al. 2017; Vehko et al. 2019; Snoen Glomsås 2020; Rytkönen et al. 2022), which stated that information systems have often been found to be even poor in terms of usability and efficiency. There are often several types of health care systems in use, and this seems to be inefficient in terms of use and time management (Vehko et al. 2019; Kivekäs et al. 2020). A similar trend can also be observed in this study. In target organisation's virtual home care in Eastern Finland, a virtual meeting requires the use of three different information systems, and in addition, the systems must be changed several times during the meeting. According to this study, the consensus of the interviewed employees is that it would be good to combine or reduce the number of systems that would make their own work

easier. The involvement of employees in the development of services and systems is seen very important, but many times employees are not listened to early enough, or not at all about the development or implementation of systems (Snoen Glomsås et al. 2020; Rytkönen et al. 2022). The interview of this research ensured that the end users of the systems can share their own experiences of how the information system entity they use everyday works. As has been noted in previous studies (Kontio et al. 2014), the implementation and use of new systems and integrations is often challenging and requires, among other things, the development of users' technical skills. The results of the interview of this work revealed the same trend. The virtual meeting process considered in more detail in this study is only one part of the client process as a whole. However, the whole is the sum of its constituent elements, so everything affects everything, and the possible weakness of one part also has a debilitating effect on the overall. The research material collected in this work provides a comprehensive picture of the process of virtual meeting as a whole and its components. By understanding the components of the process, it is possible to better perceive the whole.

When looking at the results of this thesis, it can noticed that the material of observation alone does not provide complete answers about the current state of the virtual meeting process or about the things that need to be developed. The results of the group interview complement the results of the observational study. On the other hand, without the observational study, no comparative and verifiable data would have been obtained for the subjective experiences of the interviewees, so the material for observation was also an integral part of this whole. Thus, the results of the observation were felt to complement the results of the group interview. The observational study was good and necessary to do. The observation provided real and numerical information about the use and usability of the information systems and amplifies with numbers the picture of how employees subjectively perceive the functionality of the systems.

The results of this thesis can be utilised in the activities of its subscriber and in the development of services. Meanwhile doing this thesis, the responsibility for organising virtual home care shifted to the wellbeing services county of North Savo. The thesis and its results are nevertheless current and valid. A description of the operation and usability of the current information systems will certainly serve all parties involved in service provision. By understanding the virtual meeting process, the parties can better influence the service and its content. The subscriber of this thesis can use the material and the results to influence the customer's success and strengthen cooperation.

In early 2023, the Finnish Institute for Health and Welfare published a proposal for a national coordination model for age technology. Its aim is to develop, implement and evaluate the effectiveness of technology that supports living at home. The aim of the Finnish Institute for Health and Welfare as coordinator would be to ensure the flow of information and cooperation between the actors. In 2023, the utilisation of digitalisation is very fragmented nationally. This model of coordination is intended to be of a continuous nature. (THL 2023c.) Only the current state of target organisation’s virtual meetings in Eastern Finland is described in this thesis. The goal was to make the present model visible in this thesis and for its subscriber. For the future, THL's proposal for a

coordination model is a great opportunity to utilise national expertise in the field. The benefit for everyone would be big, and new things would not have to be reinvented.

10.3 Reliability and ethics

This thesis and the results describe the current state of target organisation's virtual meetings with the help of information obtained from an observational study and an interview study. Based on observational material collected from 40 virtual meetings, the results present the relative proportions of the different working phases of the total duration of virtual meetings. The figures accurately show how much working time is spent on different working phases of based on the entire observation material. The scope of the observation material in terms of customer contacts is 40 cases for practical reasons, and it was not possible to organize the observation of a larger number of customer contacts within the framework of this study on behalf of all the parties involved.

The reliability of research should always be assessed. One of the measures of reliability of quantitative research is reproducibility, which refers to the researcher's ability to repeat the research (Hirsjärvi et al. 2013, 231). It can be seen from the material collected by the observational study and the analysis carried out on it that the same things are repeated on the same three different measurement days. The method of observation and the conditions of observation are the same every time. The time of observation is in the mornings, so it is impossible to estimate the possible effect of the time of day on the results of the observations. It is possible that when working during days or evenings there are some differences when comparing working in the mornings. However, any differences between shifts do not reduce the number of different working phases, as each phase is an integral part of the current virtual meeting process. However, the research stage of the observational study is the same on three different days, and each time the study is reportedly repeated as originally intended.

The observation data was collected on weekdays during the mornings. Employees work daily from Monday to Sunday. The functionality of the systems, for example in the evenings or on weekends, has not been considered when conducting the analysis. The effect on the results of the timing of observation during the busiest working hours was also excluded from the analysis. The results of the observation may also be affected by the fact that there has been another person in the room to follow the work. It's only natural for people to get excited when someone is watching them work. The excitement may also affect the fact that one's own work is paid more attention to by the employee. This may affect the performance of customer work compared to a normal working situation. Any measurement errors related to measuring the duration of working phases are excluded from the examination. The reliability of the observation study would probably have been increased by larger sample of virtual meetings. On the other hand, the percentage of video calls/ actual customer contacts calculated from the observation material was consistent with the median and mode, so the result obtained based on the sample size of this work can be considered reliable.

The results of the observation are supported by the subjective experiences collected from the group interview of employees. Through a group interview, employees can be involved in research and contribute to the possible further development of the service. As the theory suggests, it is important

to bring out the voice of employees. To confirm the reliability of the observational study, the experiences and views expressed in the group interview should be mentioned. The questions in the group interview were based on a research question, and the questions were structured in such a way that they would not guide the participants to answer the interview questions in a certain way. The aim was to obtain material on functional entities and development targets, and both of these came up in the discussion. The conversation was supported by the image of the customer work process. The group interview was held through Microsoft Teams. There were some technical problems at the beginning of the interview, but after they were fixed, the discussion was open and interactive. The time of the group interview was good in length and all the questions were reviewed, and there was no sense of urgency or other distractions in the interview. The group interview does not take a position on specific times of the day and working shifts. The reports and experiences of employees working different shifts in relation to the interview questions were consistent, so the assumption is that the time of day or shift does not have a significant impact on the duration of the different working phases of the virtual meeting process or the operation of the information systems. When considering the whole study, individual interviews or two separate group interviews could have provided more or more extensive information about virtual meetings. It would then have been possible to obtain a broader overview of the range of experiences and views.

The deconstruction of the group interview was not done word for word, but selectively. The selection highlighted the formation of the themes of the interview; What is good, what would be important to develop in the process, as well as other areas that may require development that are not directly part of the process of virtual home care virtual meetings. Based on these findings, important points were highlighted. The group interview was listened to several times to ensure that important findings have been transcribed.

The reliability of research can be examined through credibility, transferability, certainty and strengthening. Credibility means whether the researcher's conceptualization and interpretation correspond to the views of the research subjects. Transferability refers to the transferability of research results under certain conditions. Certainty refers to preconditions that have an unpredictable effect. Amplification means that interpretations are confirmed by other similar phenomena. (Eskola & Suoranta 1998). The credibility of the research has been highlighted in this thesis, and the views of the researcher and the research subject in the process were made visible. Portability is also demonstrated by the fact that breaking down processes into smaller entities gives an understanding of the overall situation. The study sought to highlight the stages of the process and was successful. The study brought certainty to the fore in the perspective that the interviews highlighted views and areas for development that are not manifested in the process, for example the importance of communication or manual work. The confirmation is reflected in the fact that in the study, the results of the observation and the interview supported each other.

An essential part of research is its validity, which means that the research method measures exactly what it is intended to measure (Hirsjärvi et al. 2013, 231). Part of the purpose of this study was to find out how much time is spent on the different working phases of virtual customer meetings, and how that time is formed from a technological point of view. As for this thesis, that goal and

requirement can be considered successful. The reliability of this study was confirmed by the fact that the research methods and its nature have been told in advance. The implementation of the group interview and observational study is described accurately and transparently. Reliability is also enhanced by the fact that the results of the study are documented openly, and they are also visible and usable for the subscriber of the study. The aim was to describe the circumstances related to the collection of the data, the time spent on it and the time of the study as clearly and accurately as possible. Possible distractions and misinterpretations are also highlighted, not forgetting one's own self-assessment. Theory that is considered sufficient and necessary is introduced into the interpretations of materials. The consensus of the people participating in the thesis is that group interviewing and observation together strengthen each other's results.

Before starting a study, it is self-evident to define what is being studied and why. Research used to monitor or research people raises questions and requirements related to the ethics of research. Although sensitive data is not intended or sought to be collected in research, the need for ethical review of human sciences research must be assessed. A diagram can be used to assess the need for an ex-ante assessment statement in the human sciences when the research subjects have reached the age of 15. The table contains questions that are answered yes or no. The first step is to assess whether the research is based only on public data, archival data or documentary and register data without the data security risks associated with combining the data. According to the yes answer, there is no need for a preliminary ethical review statement from the Human Sciences Ethics Committee. (Tenk 2019, 18.) In relation to this study, the answer to this is yes. The observation material was collected by an external observer, and no individual persons can be identified from the material obtained. Participants in the interview were told the details and details of the study. All interviewees received the information to read and signed their consent to the study. Thus, this study did not require an ex-ante evaluation report.

According to the guidelines of the Finnish National Board on Research Integrity and Design, a person participating in a study has the right to participate voluntarily but also to refuse the research. The research subject may also discontinue the research if he or she so wishes without negative consequences. The participants have the opportunity to stay anonymous, to withdraw their consent and receive information about the content of the study, practical implementation and its objectives. (Tenk 2019, 8-9.) This study was carried out in accordance with the instructions. The interviewed employees signed the consent form (appendix 2). The consent form defined that participants in the study are engaged in scientific research that does not process personal data. The consent form highlighted the fact that participation is voluntary and can be interrupted at any time at the stage of the study. The consent form also stated that the participant will receive sufficient information related to the study and that the participant cannot be identified from the collected material.

10.4 Further development

The study aimed to describe the current state of virtual meeting process. With the help of the study, it might be possible to identify and seek development targets related to target organisation’s virtual meeting process in Eastern Finland. During the study, the purpose was to look for service-related factors that would affect positively the experiences of virtual homecare employees in the future. It is

important for every employer to support the employees in performing their own work and make the service more efficient and better. The provision of the virtual care service is studied in practice. Situations related to the service are recorded and documented for further examination. Since the technical systems enabling the service and their platforms have evolved during the existence of the service, it is appropriate to examine the current operating process and the possibilities offered by the current technical system. In such a way, untapped new technical features and means of efficiency can be introduced in the future.

Optimising the use of technology and information systems would also be appropriate in target organisation´s virtual home care. The results of the interview and observation show clear areas for process development, e.g., in terms of the number of information systems. An essential part of customer work and virtual meetings is the recording of the customer's information and statutory documentation. It is certainly not possible to ignore or automate all the background and recording work involved in the meeting, but in the future, it would be appropriate to investigate how to streamline the different working phases.

The integration between Pegasos and VideoVisit would be one of the clearest and highly desirable innovations. Another improvement would be the possible personal customer lists of employees. However, the employees were of two minds about this because of the potential problems that might arise. (Juntunen-Koivisto 2022.) The new VideoVisit has been built in such a way that it is possible to make integrations to it using open software interfaces. The integration platform already exists. One possibility would be to build the integration in such a way that the call to the customer could be started directly from the Hilkka ERP system, so the VideoVisit browser would be left out of the process. This would reduce the need for transitions between systems. In addition, the development of individual systems could reduce the working time spent in them. One idea that seems promising is the integration between the Pegasos patient information system and VideoVisit. In this case, staff shifts and customers would be displayed in VideoVisit. At the time of the implementation of this study, VideoVisit does not have the customer's identification data, so identification with the patient information system would be required with a personal identity code. All the time that could be taken away from the different working phases without a decrease in the quality of service is likely to have a smoother effect on the work of employees and save the working time and costs required to maintain the services. In the end, successful development work could have a positive effect on the service received by the customer, as well as a lowering effect on the client fee. (Ikonen 2023.)

As authors of this thesis, we feel that the results can be used for the further development of virtual home care’s services and especially the virtual meeting process. The results of the thesis benefit both its subscriber and its partner organisation. The responsibility and goal of developing services and products lies with both parties. The efficiency and agility of virtual meetings might be developed, for example, through system integrations. Successful development work enables the reduction of unnecessary working phases and the streamlining of client work in virtual home care.

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APPENDIX 1: GROUP INTERVIEW

Introductory speech: Why we have the interview and where we need their professional help.

We have two hours for the interview. We hope that every participant uses web-camera because the meeting is held in Teams. Everyone has a turn to speak, we share the turns if necessary.

Everyone introduces themselves

- How long they have worked in Virtual home care and in health care sector?

- What is everyone's expertise in health care information systems?

We show the picture of virtual home care client work process.

What is good in the process? Why?

What should be developed? Why?

Is there something what is not working? Why?

How can we affect for your work to be smoother in the virtual home care process?

- what we need to keep in the process?

- Are there some details that should be redone or delete? Or is there any?

Do you have some wishes regarding the process of the information systems point of view?

APPENDIX 2: CONSENT FORM

SUOSTUMUS OSALLISTUA TIETEELLISEEN TUTKIMUKSEEN, JOSSA HENKILÖTIETOJANI EI KÄSITELLÄ

Opinnäytetyö, Savonia ammattikorkea koulu
YAMK-tutkinto, Master of Digital Health

Virtual Home Care in Eastern Finland – The current state of virtual meetings by the view of information systems and perceptions of employees

Ryhmähaastattelu 25.11.2022. Ryhmähaastattelu nauhoitettiin Microsoft Teams-ympäristössä. Ryhmähaastattelu on osa opinnäytetyötä. Allekirjoituksellaan puheentallennukseen ja haastatteluun osallistunut henkilö suostuu, että äänitettä ja sen litteroituja tietoja voidaan käyttää osana opinnäytetyötä. Haastattelun nauhoite hävitetään litteroinnin jälkeen.

Olen ymmärtänyt, että tutkimukseen osallistuminen on vapaaehtoista ja voin keskeyttää osallistumiseni milloin tahansa esimerkiksi jättämällä kyselyn kesken. Tutkimuksen keskeyttämisestä ei aiheudu minulle minkäänlaisia kielteisiä seuraamuksia.

Olen saanut tietoa tutkittavalle, jossa on riittävät tiedot tutkimuksesta ja minusta kerättyjen tietojen käsittelystä niin, että henkilötietojani ei kerätä, ei myöskään epäsuoria tunnisteita, joista minut voitaisiin tunnistaa. Allekirjoittamalla suostumuksen olen ymmärtänyt saamani tiedot ja haluan osallistua tutkimukseen.

Yhteystiedot:

Jesse Nissinen p.
Kati Puomilahti p.

Suostumus:

Paikka ja aika Allekirjoitus ja nimen selvennys.

APPENDIX 3: MEASURED TIMES OF DIFFERENT WORKING PHASES IN SECONDS

Steps		Customer 1	Customer 2	Customer 3	Customer 4	Customer 5	Customer 6	Customer 7
1-3. Allocate (Hilkka)	**total**	**56**	**70**	**58**	**65**	**65**	**73**	**90**
system exchange		x	x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**		**50**		**53**			
		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki
system exchange		x	x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**250**	**510**	**429**	**308**	**390**	**445**	**478**
system exchange		x	x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**130**	**140**	**87**	**214**	**113**	**122**	**138**
		mittaukset kirjataan asiakasyhteyden ollessa auki			mittaukset kirjataan asiakasyhteyden ollessa auki			
system exchange		x	x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**35**	**53**	**30**	**48**	**36**	**50**	**47**
Muu kirjaus esim. Hilkka viesti	**total**							
Total	**sec**	**471**	**823**	**604**	**688**	**604**	**690**	**753**
	min	**7,85**	**13,72**	**10,01**	**11,5**	**10,01**	**11,5**	**12,6**

Steps		Customer 8	Customer 9	Customer 10	Customer 11	Customer 12	Customer 13
1-3. Allocate (Hilkka)	**total**	**61**	**89**	**82**	**76**	**78**	**45**
system exchange		x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**			**20**		**27**	
		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki
system exchange		x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**371**	**827**	**386**	**631**	**399**	**366**
system exchange		x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**191**	**177**	**144**	**169**	**232**	**144**
			mittaukset kirjataan asiakasyhteyden ollessa auki	mittaukset kirjataan asiakasyhteyden ollessa auki			
system exchange		x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**40**	**73**	**26**	**58**	**52**	**44**
Muu kirjaus esim. Hilkka viesti	**total**					**124**	
Total	**sec**	**663**	**1166**	**658**	**934**	**912**	**599**
	min	**11,05**	**19,43**	**10,96**	**15,56**	**15,2**	**9,98**

Steps		Customer 14	Customer 15	Customer 16	Customer 17	Customer 18	Customer 19	Customer 20
1-3. Allocate (Hilkka)	**total**	**74**	**56**	**64**	**114**	**84**	**49**	**100**
system exchange		x	x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**			**39**	**79**	**47**	**15**	**30**
		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki					
system exchange		x	x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**490**	**999**	**75**	**333**	**138**	**453**	**190**
system exchange		x	x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**170**	**´138**	**99**	**141**	**99**	**105**	**99**
							mittaukset kirjataan asiakasyhteyden ollessa auki	mittaukset kirjataan asiakasyhteyden ollessa auki
system exchange		x	x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**41**	**40**	**33**	**30**	**36**	**48**	**31**
Muu kirjaus esim. Hilkka viesti	**total**							
Total	**sec**	**775**	**1233**	**310**	**697**	**404**	**670**	**450**
	min	**12,91**	**20,55**	**5,16**	**11,61**	**6,73**	**11,16**	**7,5**

Steps		Customer 21	Customer 22	Customer 23	Customer 24	Customer 25	Customer 26
1-3. Allocate (Hilkka)	**total**	**96**	**109**	**96**	**58**	**87**	**83**
system exchange		x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**					**27**	
		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki	ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki		ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki
system exchange		x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**401**	**338**	**150**	**741**	**281**	**715**
system exchange		x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**97**	**172**	**144**	**107**	**185**	**101**
						mittaukset kirjataan asiakasyhteyden ollessa auki	mittaukset kirjataan asiakasyhteyden ollessa auki
system exchange		x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**43**	**50**	**33**	**44**	**23**	**33**
Muu kirjaus esim. Hilkka viesti	**total**						
Total	**sec**	**637**	**669**	**423**	**950**	**603**	**932**
	min	**10,61**	**11,15**	**7,05**	**15,83**	**10,05**	**15,53**

Steps		Customer 27	Customer 28	Customer 29	Customer 30	Customer 31	Customer 32	Customer 33
1-3. Allocate (Hilkka)	**total**	**80**	**69**	**57**	**55**	**50**	**28**	**53**
system exchange		x	x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**	**30**	**90**	**15**		**75**	**31**	**115**
					ei lue ennen asiakasyhteyttä kirjauksia, lukee yhteyden ollessa auki			
system exchange		x	x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**379**	**349**	**195**	**264**	**410**	**859**	**594**
system exchange		x	x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**138**	**209**	**88**	**119**	**97**	**28**	**75**
							osan kirjaa asiakasyhteyden ollessa auki	
system exchange		x	x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**29**	**39**	**43**	**22**	**23**	**21**	**25**
Muu kirjaus esim. Hilkka viesti	**total**							
Total	**sec**	**656**	**756**	**398**	**460**	**655**	**967**	**862**
	min	**10,93**	**12,6**	**6,63**	**7,66**	**10,92**	**16,11**	**14,36**

Steps		Customer 34	Customer 35	Customer 36	Customer 37	Customer 38	Customer 39	Customer 40
1-3. Allocate (Hilkka)	**total**	**58**	**70**	**64**	**68**	**44**	**62**	**52**
system exchange		x	x	x	x	x	x	x
4. Prepare for the call (Pegasos)	**total**	**138**	**56**	**45**	**21**	**62**	**44**	**50**
system exchange		x	x	x	x	x	x	x
5. The call (VideoVisit)	**total**	**873**	**256**	**386**	**325**	**397**	**412**	**533**
system exchange		x	x	x	x	x	x	x
6. Log the call (Pegasos)	**total**	**30**	**192**	**157**	**96**	**106**	**117**	**119**
		osan kirjaa asiakasyhteyden ollessa auki	mittaukset kirjaa yhteyden ollessa auki	osan kirjaa asiakasyhteyden ollessa auki		osan kirjaa asiakasyhteyden ollessa auki	mittaukset ja osan kirjauksista kirjaa yhteyden ollessa auki	
system exchange		x	x	x	x	x	x	x
7.Statistics of the call (Hilkka)	**total**	**22**	**20**	**22**	**26**	**30**	**22**	**16**
Muu kirjaus esim. Hilkka viesti	**total**							
Total	**sec**	**1121**	**594**	**674**	**536**	**639**	**657**	**772**
	min	**18,68**	**9,9**	**11,23**	**8,93**	**10,65**	**10,95**	**12,86**