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Doctoral thesis

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
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Norsk tittel: **Fremming av sosial interaksjon blant eldre i omsorgssentre ved hjelp av kommunikasjonsteknologi: Erfaringer, praksis og verdi**

Har du tenkt over hvor viktig videosamtaler og meldinger ble for besteforeldre og eldre mennesker under koronakrisen? Koronapandemien medførte begrensede muligheter for å møtes ansikt til ansikt, og mange eldre som bor i omsorgssentre tok i bruk nettbrett, smarttelefoner og andre nye kommunikasjonsteknologier, som for eksempel KOMP, for å holde kontakten med familie og venner. Gjennom denne studien får vi svar på hvordan slik teknologi har påvirket hverdagen til eldre, pårørende og helsepersonell. Avhandlingen utforsker erfaringene til eldre beboere, deres pårørende og helsepersonell og ser også på praksiser og tiltak som er brukt for å legge til rette for å fremme sosial kontakt mellom eldre som bor i omsorgssentre og deres pårørende under pandemien.

Artikkel 1 er en utforskende studie som undersøker hvordan og hvorfor helsepersonell la til rette for rask bruk av kommunikasjonsteknologi i langtidspleieinstitusjoner under pandemien. Funnene i artikkel 1 beskriver den ekstra innsatsen helsepersonell la ned for å sikre sosial kontakt mellom eldre beboere og deres pårørende ved hjelp av digital kommunikasjon i omsorgsinstitusjoner. Artikkel 2 er en casestudie som belyser de arbeidspraksisene som helsepersonell utviklet for å integrere kommunikasjonsteknologi i deres daglige rutiner under pandemien. Artikkel 3 er en fenomenologisk studie som utforsker eldre menneskers og deres pårørendes erfaringer med bruk av digital kommunikasjon i omsorgssentre og hjem for å opprettholde sosial kontakt under pandemien. Den tredje studien viser at digital kommunikasjon var av stor verdi for eldre og deres pårørende som et verktøy for å motvirke følelsen av isolasjon under pandemien.

Resultatene er basert på analyse av intervjuer med helsepersonell, beboere og pårørende, samt feltnotater fra observasjoner i omsorgssentret. Helsepersonell fra forskjellige omsorgssentre delte sine erfaringer gjennom tre fokusgruppeintervjuer og 11 individuelle intervjuer, mens beboere og deres pårørende delte sine opplevelser gjennom 16 individuelle intervjuer.

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List of included papers

Paper I

Badawy, A., Solberg, M., Obstfelder, A. U., & Alnes, R. E. (2022). Improvised use of a digital tool for social interaction in a Norwegian care facility during the COVID-19 pandemic: An exploratory study. *BMC Health Services Research, 22*(136). https://doi.org/10.1186/s12913-022-07526-0

Paper II

Badawy, A., Solberg, M., Obstfelder, A. U., & Alnes, R. E. (2022). Normalisation of technology for social contact in a Norwegian care facility during COVID-19. *BMC Health Services Research, 22*(1), 1. https://doi.org/10.1186/s12913-022-08618-7

Paper III

Badawy, A., Solberg, M., Obstfelder, A. U., & Alnes, R. E. (2023). Together, at a distance: Experiences with a novel technology for social contact among older people and their relatives in Norway during the COVID-19 pandemic. *BMC Geriatrics*, *23*(1), 218. https://doi.org/10.1186/s12877-023-03869-3

Abbreviations

COVID-19	Coronavirus Disease of 2019
LTC	Long-term care
NPT	Normalisation process theory
NSD	Norsk Senter for Forskningsdata (Norwegian Centre for Research Data)
PCC	Person-centred care
RQ	Research question
STS	Science and technology studies
TMC	Technology-mediated communication

Summary

Technology-mediated communication has played a crucial role in maintaining social contact between older adults and their friends and relatives, despite health-related disabilities. However, the COVID-19 pandemic has compelled individuals to limit face-to-face interaction due to social distancing measures by healthcare authorities worldwide. As a result, the lives of older people have been significantly affected, leading to increased feelings of loneliness and social isolation. Consequently, municipalities and informal caregivers have introduced digital communication technologies in long-term care settings and private homes. Despite the growing trend, there is still little knowledge about the experiences and practices of healthcare professionals, older people, and their relatives regarding digital communication technology, and how it has impacted their daily social lives during the pandemic's social distancing measures.

This thesis explores the experiences of older residents, their relatives, and healthcare professionals regarding the use of digital communication technology. It also examines practices employed to facilitate and promote social contact between older people residing in long-term care homes and their relatives in western Norway during the pandemic. The thesis consists of three qualitative studies. The first study is an exploratory one that examines how and why healthcare professionals facilitated the rapid adoption of communication technology in long-term care facilities during the pandemic. The second study is a case study that discusses the normalisation of technology-related practices to maintain social contact between older residents and their relatives, and whether these practices are likely to persist beyond the pandemic. The third study is a phenomenological study that explores the lived experiences of older people and their relatives experienced when utilising digital communication in care facilities and homes to maintain social contact during the COVID-19 crisis.

The data were collected between September and November 2020, involving 39 participants. Among them, 22 were healthcare professionals working in various care facilities within the same county in western Norway. Due to the pandemic restrictions, a combination of in-person and digital meetings was used to gather data. The data collection process included three focus group interviews, 27 individual interviews, and six days of systematic participant observation, which were conducted in November 2020. Data analysis for the three papers involved three strategies: inductive content analysis, inductive thematic analysis, and meaning condensation of phenomenology as an applied qualitative method. These inductive approaches allowed for

the identification of categories and themes from raw data, which were linked to the research objectives.

The findings of Paper I highlight the effort and additional tasks undertaken by healthcare professionals to facilitate social contact between older residents and their relatives by employing digital communication in care facilities. The paper also explores how healthcare professionals perceive digital communication as a valuable tool in their work. To examine and discuss qualitative data related to new technology routines in care facilities, a script concept was employed in Paper I. This approach allowed for an understanding of how healthcare professionals modified and adapted their work routines to facilitate technology use for social communication among older residents and their families.

Paper II shows the working practices developed by healthcare professionals to integrate communication technology into their daily tasks in care facilities during the COVID-19 crisis. The paper used normalisation process theory, which helps account for how the technology-associated practices were embedded and integrated into daily routines. Additionally, the paper explores the possibility of using this technology beyond the pandemic.

Paper III describes the lived experiences of older people and their relatives who adopted and used digital communication to alleviate social distancing during the pandemic. The paper draws on the framework of person-centred care to interpret and discuss these lived experiences, focusing on four forms of 'being' and seeing the person as they are: being in relation, being in a social world, being in place, and being with self. By using these 'being' forms of person-centredness, the paper gains insight into how digital communication was meaningful and valuable for older people and their families during the crisis.

In this thesis, I utilised several person-centredness attributes, including communication, individualised focus, engagement, care environment, relationships, and respect, to interpret the practices of healthcare professionals and the role of organisations in supporting technology adoption and usage. By drawing on these attributes, I aimed to understand healthcare professionals' orientation to person-centredness and the advantage of using technology to enable them to work in a person-oriented manner.

This thesis provides new insights into the additional work done by healthcare professionals to facilitate and accommodate the use of technology-mediated communication in long-term care homes during the COVID-19 pandemic. Healthcare professionals adapted their work practices to support residents in digitally communicating with their relatives. These new practices

incorporated essential elements of person-centredness. Both healthcare professionals and relatives demonstrated social communication, engagement, mutual relationships, and respect towards older adults through creative adaptations of technology use. Healthcare professionals adjusted the use of digital communication and modified their work practices based on older residents' skills and capabilities, indicating an individualised focus of care and working in a person-oriented way.

To facilitate the use of technology-mediated communication, it is essential for healthcare organisations to foster a supportive care environment that encourages individuals' engagement. However, in practice, these organisations may encounter various barriers to technology adoption. These barriers can include hectic schedules, ethical dilemmas, engagement challenges, and a lack of organisational support. These obstacles can hinder the facilitation of technology use.

1. Introduction

Technology-mediated communication (TMC) has revolutionised social interaction for older adults by providing numerous opportunities for social communication and engagement in meaningful activities, both prior to and during the COVID-19 pandemic. This has enabled them to maintain social connections with relatives and friends, despite the challenges posed by health-related disabilities (Burholt et al., 2023; Hajek & König, 2021; Nedeljko et al., 2022; Veloso et al., 2020). TMC encompasses a wide range of methods for interpersonal communication facilitated by technology tools and applications. It includes traditional forms such as phone calls, as well as modern alternatives like text messages, emails, and video calls (Burholt et al., 2023).

Computers, tablets, and cellular phones have opened up new avenues for communication among older people, enabling them to connect digitally and engage in social media, regardless of their age and health limitations (Díaz-López et al., 2016; Hajek & König, 2021; Thangavel et al., 2022; Veloso et al., 2020). However, integrating these digital innovations into regular care practices, particularly in long-term care (LTC) homes, presents its own set of challenges (Procter et al., 2016). In LTC homes, various obstacles hinder the seamless incorporation of digital innovations into the daily lives of their residents. These challenges often include a scarcity of skilled personnel, insufficient technical infrastructure and support, resistance to change among staff members, a perceived lack of technology's usefulness, and the associated costs of implementation (Kruse et al., 2015; Zander et al., 2021).

Furthermore, LTC residents encounter specific obstacles that impede their ability to effectively utilise communication technology, unlike home-dwelling older individuals (Seifert & Cotton, 2020). These barriers may include an inability to use the internet, lack of internet access, inadequate support from both internal and external sources within their care facilities, as well as physical and cognitive disabilities (Francis et al., 2019; Seifert et al., 2017).

While LTC settings strive to provide ongoing complex care and frequent assistance with daily living activities, personal support, and safety monitoring to older residents (Zhang et al., 2019), it is important to acknowledge the vulnerability of frail older residents to social isolation and loneliness, which can be attributed to various factors (Prieto-Flores et al., 2011; Victor, 2012). These factors include diminished social networks, limited interactions with close relatives, the loss of family members or friends, mobility constraints, and underlying health conditions (O'Rourke et al., 2018; Prieto-Flores et al., 2011; Victor, 2012).

Previous research has addressed the importance of maintaining family ties for older people to enhance their sense of belonging (O'Rourke & Sidani, 2017; Prieto-Flores et al., 2011; Smith, 2012). Contact with family members serves as a vital source of social support for older adults residing in LTC and can also foster positive relationships between healthcare professionals and families (Smith, 2012). Social contact and a feeling of belonging are basic human needs that should be a major focus of LTC services and require considerable attention in nursing practice (Rostad & Stokke, 2021). Improving social well-being is crucial for older adults as it helps alleviate feelings of loneliness and social isolation, while also considering the principles of person-centredness. According to Eklund et al. (2019), maintaining social communication, relationships, and social engagement is integral to person-centred care (PCC) and holds significant importance for older adults.

During the author's observational fieldwork at a care facility in November 2020, a field note was written to illustrate the need for social contact among the residents:

> 'There was a map hanging centrally on the wall in the living room through which everyone at the care facility was passing by all the time. The date on the map was 9th June, 2020. The map had a drawing of large tree leaves. Each tree leaf had one or more phrases written on it about what was important for an older resident in the care facility. Among their written words, I found these repetitive phrases: someone to talk with, birthdays of children and grandchildren, good companions, family, and having contact with children and grandchildren. There were other words and phrases; however, the aforementioned ones about the need for social life were the most recurrent ones'.

The field note was written during the pandemic when physical visits to the care facility were restricted. It reminds formal and informal caregivers about the importance of social communication for older residents and the need to be actively involved in their family's lives. This can be achieved through sharing of different activities, such as daily conversations, birthdays, and other family celebrations. During my observational period, various nurses showed me the same map, suggesting that healthcare professionals were well-aware of the social needs and desires of these older residents. Recognising the crucial role of social connections in maintaining mental health and overall well-being, it was imperative for LTC homes to quickly establish opportunities for residents to engage in social interactions during the pandemic.

The COVID-19 pandemic has had significant consequences on the health and well-being of older adults (Armitage & Nellums, 2020). This population has encountered numerous

challenges, including disrupted social events and separation from family and friends (Schrack et al., 2020). Public health restrictions implemented worldwide to minimise close contacts and mitigate the spread of the virus (Brown et al., 2021; Giebel et al., 2021) have greatly limited face-to-face communication. These restrictions have had a particular impact on LTC home residents, who were unable to receive visits from their family members or loved ones, go outdoors, or even leave their rooms during the pandemic (Seifert et al., 2021). As a result, they endured months of confinement and isolation, being restricted to their rooms (Chu et al., 2021).

Consequently, these preventive measures and restrictions, including social distancing, enforced lockdown, and self-isolation, have led to increased social isolation and loneliness. These factors pose a greater risk to their physical and mental health, whether they reside in LTC facilities, or their own homes (Armitage & Nellums, 2020; Brooke & Clark, 2020; Goethals et al., 2020).

Furthermore, the pandemic has imposed changes in the care, services, and engagement provided to LTC home residents, leading to a notable increase in excess deaths and a decline in residents' health due to the lack of social contact (Alzheimer's Society, 2020; Morciano et al., 2021). The sudden disruption of vital physical and social connections between residents and their relatives not only has adverse effects but also contradicts the fundamental principles of PCC (Chu et al., 2020).

To mitigate the negative outcomes of social isolation and loneliness globally, caregivers in LTC homes have taken steps to ensure the safety and social engagement of older people during the pandemic (Berg-Weger & Morley, 2020; Edelman et al., 2020). The pandemic has compelled organisations to rapidly adopt digital communication and its associated practices to address social distancing measures. Consequently, LTC homes, older adults, and their relatives have turned to communication technology as a means to connect with each other despite residents' physical and cognitive limitations. Notably, communication technology, including tablets and digital communication platforms, has played an important role in facilitating digital visits, providing an alternative to face-to-face communication between residents and their families during periods of social distancing (Burholt et al., 2023; Edelman et al., 2020; Eghtesadi, 2020; Gallistl et al., 2021).

This urgency left little time for developing strategies, providing adequate training, or exploring new technological approaches (Carroll & Conboy, 2020). Social distancing measures heightened the significance of online applications, leading to the rapid implementation of communication systems with limited planning and consideration of alternatives (Agerfalk et

al., 2020). Consequently, the surge in communication technology usage has had implications for the workflow and practices within LTC settings (Carroll & Conboy, 2020).

Another field note clarifies how new communication technology has affected the daily work in a care facility during the pandemic:

> 'A nurses' station in November 2020 at 09:30 a.m.: in the room was several units of KOMP, a tablet-like device for social contact (a name derived from Norwegian *kompis*, meaning ' buddy'). These devices had several yellow sticky notes with names of residents and their family members, and the time planned for video conversation. The nurses checked the determined times for video calls and coordinated them within their schedules to help residents start the video call. The nurses also called some relatives by phone to arrange time for video conversations. Most family members called the nurses first via phone to ask for help in turning the device on and off. The nurses also checked the workability of each tool to avoid unforeseen technical issues'.

This observation revealed new technology-associated practices that were added to the staff's daily agenda. These practices required them to organise and incorporate additional care practices alongside their regular work duties. However, the rapid implementation of these practices without previous planning and strategies introduced complexity and necessitated the acquisition of new skills and workflows.

During the pandemic, the limitations of communication technology infrastructures within LTC homes became evident, highlighting the deficiencies within healthcare organisations (Eghtesadi, 2020; Siette et al., 2020).

However, even before the pandemic, technology adoption in organisations and LTC facilities faced constraints, particularly in communication technology infrastructures (Moyle et al., 2018; Powell et al., 2019). Care staff often lacked communication technology skills, and LTC facilities displayed a cautious approach to technology usage (Konttila et al., 2019). Additionally, LTC residents had limited access to communication technology and faced challenges in utilising digital technologies (Moyle et al., 2018; Powell et al., 2019). Healthcare organisations had previously developed plans and strategies for technology adoption, but progress was slow compared to the rapid utilisation of technology during the pandemic.

Although feasibility and implementation studies have explored the use of digital communication in LTC homes, research on the experiences of healthcare professionals, older people and their families remains limited. Therefore, there is a need for more empirical studies to examine the experiences and practices regarding the use of communication technology in

LTC homes and its impact on the social lives of residents (Khosravi et al., 2016; Schuster & Hunter, 2019). This thesis addresses the knowledge gap in this area.

1.1. Context

The focus of this thesis is on the use of TMC in LTC settings in western Norway. The first study included healthcare professionals from seven LTC homes within the same county. The second study focused on healthcare professionals in a public short-term care facility where older residents could stay for a period of two to eight weeks. However, due to long waiting lists and limited spaces in LTC facilities, most residents usually extend their stay for up to two years. The third study encompassed older residents and their relatives in the same short-term care facility and other relatives for home-dwelling older people within the same county. In this thesis, LTC refers to the care environment for older adults in care facilities. Generally, residents in LTC settings exhibit more severe health conditions compared to those in short-term care homes and home care. Nonetheless, social activities are important for both groups during their respective stays.

Municipalities in Norway are responsible for financing and providing LTC, such as home care and nursing homes, as primary health care for older adults who require assistance in basic daily activities. The municipalities in western Norway have implemented various types of welfare technologies in most LTC homes. These technologies include technologies for monitoring and localisation technologies such as GPS trackers. Additionally, safety features such as fall detection sensors and social alarms are also available. Furthermore, residents have access to devices for social contact, such as tablets, smartphones, and KOMP.

Technological advancements in Scandinavian countries are providing a solution to the increasing demand for primary healthcare services caused by the growing population of older adults and the decreasing workforce (Norwegian Directorate of Health, 2013). Known as active-assistive living or welfare technology, as it is called in these countries, these advancements support and change the way care is provided and the roles of those involved (Melting & Frantzen, 2015; Norwegian Directorate of Health, 2013). Welfare technology is a term encompassing technologies designed to maintain or improve individuals' functioning, independence, and safety. By enhancing well-being and reducing the need for formal and informal care, these technologies aim to reduce reliance on caregiving (Norwegian Ministry of Health and Care Services, 2011). To further accelerate the integration of welfare technology into long-term healthcare services, the Norwegian government has launched an ambitious

program with the goal of achieving this integration by 2024 (Norwegian Directorate of Health, 2021).

Technology for social contact

Technology for social contact is used to connect older adults with their families and friends worldwide. Despite concerns regarding confidentiality and replacement of human care, technology for social contact has the potential to alleviate loneliness and reduce social isolation (Eghtesadi, 2020; Hajek et al., 2021; Thangavel et al., 2022). However, a Norwegian study conducted in 2019 (prior to the pandemic) indicated that technology for social contact, such as videoconferences and therapeutic robots, was the least popular among nursing homes compared to other categories of welfare technology (Rostad & Stokke, 2021). The care facilities involved in this research used KOMP, iPads, and smartphones to maintain social contact between residents and their families.

KOMP

KOMP (Figure 1), developed by the Norwegian company No Isolation, is a tool designed to combat loneliness and social isolation among older adults (No Isolation, 2021). This device facilitates digital communication between older individuals, their relatives, and friends through features such as shared pictures, text messages, and video conversations. Advertised as the 'one-button computer connecting generations', KOMP is equipped with a Wi-Fi connection and an eight-megapixel camera. With its 17-inch screen, it resembles a small TV and has a user-friendly interface, with a single on/off knob on the front. Operating KOMP does not require extensive training or digital skills (No Isolation, 2021).

Additionally, KOMP features clear and loud sound broadcasting capabilities. Images are displayed on the screen, either through rotating still images accompanied by text messages in large fonts or via live video feed. To cater for the needs of older individuals, the tool does not depend on a touchscreen interface, therefore, avoiding problems with capacitive sensing. Relatives, friends, and healthcare professionals can interact with the tool through an app that can be downloaded to a phone or tablet device. By creating a user profile and using a specific passcode, it is possible to send pictures and text messages, and conduct video calls through the KOMP (No Isolation, 2021).

Several feasibility studies conducted in Norway and worldwide have utilised iPads and smartphones to evaluate the effect of technology on social interaction among older adults in LTC and how it can support isolated and lonely older individuals (Banskota et al., 2020; Neves

et al., 2019; Østensen et al., 2017; Sacco et al., 2020; Shrader et al., 2021; Zamir et al., 2018). However, compared to KOMP, iPads and smartphones have been associated with frequent log-in problems related to usernames and passwords. Additionally, they require special apps for calls and messages and rely on a touchscreen, which is challenging with capacitive sensing with dry fingers in old age. Additionally, they have a smaller screen size and lower sound quality in comparison to KOMP. Moreover, as portable devices, they may cause problems for some older people with limited physical abilities.

Figure 1. KOMP by No Isolation (left: ©Photographer Harriet Gridley and right: ©Estera K. Johnsrud)

1.2. Aim and research questions

The objective of this thesis is to explore the experiences of older residents, their relatives, and healthcare professionals regarding the use of digital communication technology. It also examines the practices employed to facilitate and promote social contact between older people residing in long-term care homes and their relatives in western Norway during the pandemic.

The thesis targets the experiences and practices of the individuals involved in using the KOMP digital communication tool. It examines how digital communication was used during the exceptional circumstances of the pandemic. The thesis presents a diverse set of relationships between the involved actors (staff, residents, and relatives) and their use of technology to enhance social contact while maintaining physical distance. Additionally, it offers insights into how person-centredness can be followed through the facilitation of technology use in LTC. It also shows how different theoretical perspectives can be used to interpret the use of technology in LTC. Additionally, the thesis provides an example of conducting qualitative research during an extraordinary period when data collection was challenging.

This thesis addressed three research questions. The first addressed how the care facilities managed the rapid adoption of communication technology at the beginning of the pandemic to engage older residents in social contact with their relatives. The second question focuses on the continuation of technology usage after the initial phase of the pandemic and its possibility to sustain beyond the pandemic. The third question targets the experiences of older people and their families with digital communication in maintaining social contact throughout the pandemic.

The research questions are as follows:

RQ1: How and why did healthcare professionals facilitate the ad hoc and prompt use of a technology for social communication, known as KOMP, in care facilities in western Norway to promote communication and social engagement among residents and their next of kin during the COVID-19 crisis? (Paper I)

RQ2: How stable are practices with KOMP for maintaining social communication between residents and their relatives, and are these practices likely to last beyond the pandemic? (Paper II)

RQ3: How did older people and their relatives experience the use of technology-mediated communication through KOMP, a tablet-like device for supporting social contact in care facilities and homes during the pandemic? (Paper III)

1.3. The use of communication technology in long-term care (LTC) to enhance social contact

Communication technology provides beneficial solutions to maintain contact between older adults and their family and friends, and reduce social isolation (Chen & Schulz, 2016; Chu et al., 2020; Hajek & König, 2021; Khosravi et al., 2016; Shrader et al., 2021). As older adults become more proficient in using new technology, it can enhance their social participation and independence (Olphert & Damodaran, 2013). However, older adults may encounter limitations in adopting novel communication technology due to limited familiarity with digital devices, low digital literacy, and limited user skills (Choi, 2020; Manafò & Wong, 2013; Olphert & Damodaran, 2013). For instance, older adults may require support from busy healthcare professionals to initiate their use of the internet or tablet computers. Studies indicate that older individuals are less inclined to enjoy technologies that require significant effort to learn or use

(Mitzner et al., 2010), possibly due to limited exposure and familiarity during earlier stages of life. Therefore, it is crucial to provide training and technical support to facilitate technology adoption among older adults (Choi, 2020; Wang et al., 2011).

Haase et al. (2021) conducted a study examining the experiences of older adults using technology for socialisation during the pandemic. The study uncovered various obstacles to technology adoption, including limited access due to financial constraints, lack of knowledge, and age-related challenges. Additionally, the study identified specific preferences for certain types of technology and physical and cognitive limitations. However, the study also revealed factors that facilitated technology use, such as self-taught knowledge of technologies, reliance on support from family, friends, and internet searches. Additionally, the availability of user-friendly technology interfaces, suitable environments, clear instructions, and social motivation derived from observing others using technology played key roles in fostering adoption and engagement.

Communication technologies offer diverse channels for conveying information, including images, videos, audio, and text. The quality of communication may vary depending on the type of channel used, as highlighted by Kahlow et al. (2020). Prior to the pandemic, several studies addressed the feasibility of using different communication technologies among residents of LTC. For example, tablet computers (iPads) were introduced in LTC homes in Norway, employing one-to-one tutoring, to facilitate social engagement among older residents. The participants reported enjoying and being satisfied with the digital tools, and the use of communication apps, like messaging and video conversations, led to increased social participation (Østensen et al., 2017).

Another example, Neves et al. (2019) studied the feasibility of an iPad-based communication app for older adults to connect with family and friends. The results showed that the app was a viable communication tool, although participants needed time to adjust to its usage. It increased perceived social interaction with close contacts, but meaningful interaction and enhanced social connectedness were primarily reported by those with distant relatives.

Videoconferencing has emerged as a promising medium for helping older people in LTC homes maintain close relationships and improve their social well-being, despite various barriers (Robic & Rotar, 2021; Shrader et al., 2021). The use of video calls is steadily increasing, driven by the innovative nature of video communication. It provides individuals

not only to hear and speak to others but also to see their expressions, leading to more meaningful relationships compared to simple telephone calls (Hemberg & Fischer, 2018). This advancement is valued by residents who appreciate the opportunity to visually connect with family members living at a distance, especially when in-person visits are not possible. By adding a visual component to communication, video conversations enhance the sense of connection between residents and their families (Robic & Rotar, 2021; Shrader et al., 2021).

Moyle et al. (2020) reported favorable outcomes from the use of video-conferencing on iPads to support family connections with residents in LTC, despite the challenges posed by physical frailty and cognitive impairment experienced by both staff and residents. Interventions like 'Skype on Wheels' have been designed specifically to support older people in care settings, enabling them to communicate with their families through face-to-face contact via video calls. Nonetheless, ongoing modifications are required to adapt these technologies, overcome barriers, and enhance user engagement (Zamir et al., 2018). However, videoconferencing also presents challenges, including the user's health status, ease of use, technical difficulties, staff turnover, and the availability of family members for video calls (Zamir et al., 2018).

Video conferencing via iPads may present challenges for older residents in LTC without adequate staff assistance. Therefore, many of these trials have not progressed beyond the pilot stage, and only a few have been implemented in actual care practice outside of the project period. Providing appropriate support and guidance is crucial to ensure the effective utilisation of this communication tool for enhancing connections and well-being in LTC settings (Moyle et al., 2020).

Despite the benefits of communication technology in engaging older adults in social activities, there are drawbacks to consider. One such drawback is the potential reduction or substitution of face-to-face contact, which is crucial for fostering intimate and caring relationships (Siegel & Dorner, 2017). The use of communication technology can sometimes lead to a form of remote communication that is characterised by superficial personal connections, confinement within a smaller living environment, and an increased fear of loneliness. Studies have shown that older adults often perceive social relationships formed through technology as shallow compared to in-person communication and are hesitant to rely on digital means for forming or maintaining social connections (Hunsaker et al., 2020; Jung et al., 2017). Furthermore, a study conducted by Cone and Lee (2023) examined the effects of communication technology on the emotional well-being of older adults during the pandemic. The findings revealed that the

increased utilisation of communication technology had negative consequences for the emotional well-being of older adults, in contrast to the positive impact of face-to-face interactions.

Considering the aforementioned, it is crucial to take into account both the positive and negative aspects of communication technology to promote its widespread adoption and use among older adults in LTC settings.

1.4. Online social communication during and beyond the COVID-19 pandemic

The COVID-19 pandemic has had a profound impact on social life worldwide and is expected to continue shaping social interactions in the future. Online social communication has been used extensively to maintain social communication during the COVID-19 pandemic (Haase et al.,2021; Hantrais et al., 2021; Veloso et al., 2020). Older adults, in particular, experienced increased social disconnection during this time (Choi et al., 2022) leading to a widespread adoption of communication technologies, specifically videoconferencing (Greenwood-Hickman et al., 2021).

During the crisis, many individuals turned to various online video-calling software, such as Skype, FaceTime, and Zoom to stay connected to their families. These platforms have been suggested as effective tools for alleviating social isolation among older adults by enabling virtual interactions (Chu et al., 2020; Hajek & König, 2021).

Numerous global studies conducted during the pandemic have explored the impact of digital communication on older adults. Robic and Rotar (2021) investigated the use of communication technology in LTC homes across various countries and found that video calls enhanced satisfaction for LTC residents and their families. Similarly, the implementation of Zoom calls improved communication between LTC residents and their families, allowing for connections between residents in different units within the facility. However, despite efforts to connect residents, challenges related to isolation, loneliness, and depression persisted (Shrader et al., 2021).

Mobile technology, such as tablets and smartphones, shows promise for facilitating virtual communication, promoting social activity, and enhancing mental health among older individuals in LTC facilities (Banskota et al., 2020). Research has shown that residents effectively use digital communication devices, particularly video conferencing calls, to connect with others (Marin et al., 2020). However, a study by Sacco et al. (2020) found that older

individuals living in LTC settings exhibited a preference for telephone calls rather than video calls. Nonetheless, when assistance was provided to establish the communication, video calls were found to result in even greater satisfaction than telephone calls, despite both communication methods yielding similar satisfaction levels among LTC residents.

Although online social communication played a vital role in reducing social isolation during the pandemic (Shah et al., 2020). However, there are functional and technological barriers that limit its usage among older adults. Not all older adults have access to digital tools, and concerns about personal data security and privacy may also hinder widespread adoption. Moreover, relying on digital social media tools can impact close relationships due to reduced in-person interactions. Therefore, while digital communication offers opportunities for virtual social connections and networking, it is essential to address these challenges to ensure its effective adoption and utilisation among older adults.

While there is a growing body of literature discussing how the COVID-19 pandemic has facilitated the adoption of communication technologies among older adults (Golinelli et al., 2020; Haase et al., 2021), there remains a lack of studies exploring the future usage of new technologies among this demographic post-pandemic period (Diehl et al., 2022).

To address this research gap, Diehl et al. (2022) investigated the utilisation of new technologies by older adults during the COVID-19 pandemic and their expectations for technology usage in the post-pandemic period. The study provided insights into the factors influencing the adoption of these technologies post-pandemic, including privacy concerns, challenges related to digital literacy levels, internet access, and acceptance of new technology.

In a similar study, Finkelstein et al. (2023) explored the experiences of older adults with communication technology, aiming to provide insights into the development of digital devices designed for this demographic during and after the pandemic. The study emphasised the pivotal role of customised training that focuses on individual skills rather than age. It underscored the importance of understanding the interests and needs of older individuals to effectively address their requirements beyond the pandemic.

1.5. Challenges of adopting digital communication in long-term care

The introduction of new technologies in LTC homes poses a highly complex challenge, often involving conflicting interests and disagreements among various stakeholders (Fuglsang & Rønning, 2014; Sánchez-Criado et al., 2014; Zander et al., 2021). Despite the existence of

numerous digital tools for older adults, their adoption rate remains low. Previous studies have acknowledged the challenges associated with adopting communication technologies among older individuals (Granja et al., 2018; Kruse et al., 2015; Lee & Coughlin, 2015).

The routine usage of digital communication in healthcare institutions encounters obstacles arising from organisational, technical, and cultural barriers, as well as ethical dilemmas. These challenges are further compounded by the limited skills of older adults (Lee & Coughlin, 2015). In LTC settings, organisational factors, such as heavy workloads, short-term contracts leading to inadequate training, financial barriers, and the associated costs of hardware and infrastructure, can inhibit the regular and rapid adoption of new technologies.

Technical barriers to adopting digital interventions in LTC include a lack of technical support and inadequate IT infrastructure. Cultural factors also play a role in healthcare professionals' resistance to accepting technology, driven by a fear of change, scepticism towards novel technologies, and concerns regarding new responsibilities (Granja et al., 2018; Lee & Coughlin, 2015).

Ethical dilemmas arise in LTC when adopting technology, particularly concerning the privacy and security of users' personal information stored on digital platforms. Additionally, various factors related to older adults affect technology adoption, including cognitive and physical decline, limited digital knowledge, social obstacles, diverse motivations for technology use, and individual differences such as education and cultural background (Granja et al., 2018; Lee & Coughlin, 2015).

2. Theoretical background

Three theories were used in three studies to help understand the use of communication technology among older adults in LTC homes during the pandemic. These theories acted as interpretive lenses through which the findings were interpreted and discussed within structured frameworks. They helped to uncover the social aspects associated with technology use, thus generating new insights into real-life technology applications. Additionally, these theories facilitated the disclosure of factors that both facilitated or hindered the adoption of technology in LTC homes. Theoretical lenses assisted in uncovering the hidden meanings of participants' experiences and practices that might otherwise remain obscured. The presentation of these theories will be as follows:

2.1. Script

The notion of script originated within the field of science and technology studies (STS), which adopts a multidisciplinary approach to exploring the social and cultural aspects of science, technology, and innovation (Martin et al., 2011). The script concept was developed by Akrich (1997) and Latour (1992). Latour's focus was on the functioning of technological scripts and their role in shaping people's lives. He examined how networks between technologies and humans emerge and develop. According to Latour, although scripts can influence user behaviour, they do not exert absolute control (Latour, 1992).

Akrich (1997) used the term 'script' as a metaphor for an 'instruction manual' to illuminate interesting dimensions of technology in use through script analysis. This concept emphasises the intrinsic relationship between technologies and their broader contextual framework, recognising that technologies are always situated within a larger context. It reveals the specific roles that technological devices play within the diverse and interconnected contexts, with a particular emphasis on the users' involvement in negotiating with the script. Akrich's analysis also focuses on instances where technology use can deviate from prescribed scripts, allowing for flexibility and circumvention (Winthereik et al., 2008).

Similar to a film script, technologies can be designed with specific usage scenarios that outline the individuals involved, the actions to be taken, and the roles assigned (Moser, 2019, p. 52; Pols & Moser, 2009). By examining the scripts within healthcare technologies and their impact on users and daily practices, valuable insights into their performance can be obtained, stimulating further development to better address users' needs (Brodersen et al., 2015).

The script concept has been applied to study the relationship between technology and different user groups in healthcare. For instance, Brodersen et al. (2015) conducted a study using the script concept to explore the mutual adaptation process between older adults and two types of robotic nursing beds in nursing homes and rehabilitation centres. Their research investigated how this adaptation unfolds, its impact on daily practices, and the variations observed across different cases.

In another study, Pols and Moser (2009) utilised the script concept to examine the relationships that people develop through home-use technologies. The focus of their study was on the social, functional, and affective connections established with health technologies used at home. By examining the script of each technology, they traced the relations between technologies and their users, the identities formed through the interaction, and the values embedded in the design and features of the technology.

Similarly, a Norwegian study published around the same time as Paper I applied the script framework to understand the impact of KOMP in reducing loneliness among older people with cancer (Rasmussen et al., 2021). The authors examined the usage norms stimulated by KOMP and conducted a theory-driven analysis to investigate the consequences of the KOMP script. They explored how users encountered this script, the extent to which it aligned with users' expectations, the meanings it evoked, and its impact on the community (Rasmussen et al., 2021).

2.2. Normalisation process theory (NPT)

NPT is a sociological theory generally used in the field of STS and implementation science to elucidate the implementation of new technologies in healthcare settings (Nilsen, 2015). This theory provides a framework for understanding the practices that facilitate or hinder the integration of interventions into routine care (May et al., 2009; May et al., 2015). Within the NPT framework, the focus is on phenomena that result from collective cooperation and activities but are experienced and explained by individual participants (May et al., 2007). NPT emphasises the work performed by individuals and organisations to embed and sustain a new technology or practice in their daily tasks. It has been utilised to explore the disparity between health research evidence, policy, and actual practice (May et al., 2009; May et al., 2015).

The concept of normalisation, as defined by May and Finch (2009, p. 540), relates to the actions undertaken by individuals as they engage in a set of activities involving new or modified ways

of thinking, acting, and organising. It occurs when a novel technology becomes integrated into everyday practices (May & Finch, 2009).

NPT offers a range of sociological tools to understand the social processes that shape the implementation of practices (May & Finch, 2009). Implementation is operationalised through four generative mechanisms: coherence, cognitive participation, collective action, and reflexive monitoring (May et al., 2015; May et al., 2018; May & Finch, 2009). These mechanisms are influenced by various factors that either promote or inhibit the routine embedding or normalisation of practices within specific social contexts. The four mechanisms are dynamic and exhibit changeable interrelations over time.

The mechanism of coherence refers to the actors' understanding of a practice associated with a particular technology and their ideas about the meanings, uses, and utility of this practice (Mair et al., 2012). The embedding of practice is influenced by a range of factors that impact the actors' recognition of that practice. Differentiation, a process involving actors' understanding of the distinctions between a given practice and other (new) practices, plays a significant role in this context (Mair et al., 2012).

Cognitive participation includes the enrolment and engagement of human actors involved in the practices associated with a given digital tool. Factors that enhance or inhibit actors' engagement and participation affect the embedding of practices (Mair et al., 2012; May & Finch, 2009). To ensure the validity of actors' participation and engagement in a practice, 'legitimisation' is required. Legitimisation validates the evolved actions of caregivers and their involvement in embedding practices related to technology (Finch et al., 2018; Mair et al., 2012).

Collective actions refer to the efforts of professionals and organisations to execute and operationalise a practice, requiring investment and commitment (Finch et al., 2013; May & Finch, 2009). Contextual integration, a fundamental aspect of organising activities, ensures the necessary support from the organisation for practice integration within a social context (Mair et al., 2012).

Reflexive monitoring refers to the continuous evaluation of actions by actors involved in the routine embedding of technology, reflecting their everyday understanding of a practice (May & Finch, 2009). It includes judgments and assessments of the usefulness and effectiveness of

the practice, taking into account socially and institutionally shared beliefs. Factors that promote or hinder this evaluation influence the embedding of the technology (Finch et al., 2013).

The implementation of technologies in healthcare presents a complex challenge, particularly due to the need to change established care practices (Craig et al., 2008). Consequently, there is a pressing need to investigate the process of change itself. By utilising NPT (May et al., 2007), researchers can effectively address crucial questions regarding the factors that contribute to change and improvement (Kislov, 2019).

May et al. (2018) found that NPT was widely employed in study protocols and proved beneficial for feasibility studies of intricate healthcare interventions. NPT offered consistent explanations for implementation processes by identifying driving mechanisms and factors valuable for intervention development, planning, and evaluation. For instance, Scantlebury et al. (2017) investigated the implementation of electronic health records in maternity units using NPT, exploring the extent to which the system became normalised into routine practice. They adopted the four mechanisms of NPT as a theoretical framework to interpret their study's findings.

Hall et al. (2017) conducted another study that utilised the four mechanisms of NPT as a guiding framework to inform staff interviews. Through coding that aligned with the insights provided by NPT, they explored facilitators and barriers to the implementation of monitoring technologies in care homes for individuals with dementia, as part of routine daily practice.

Recent studies have also used NPT in various contexts. For example, Fredriksen et al. (2021) conducted a case study focused on the implementation of a digital system for collaboration between healthcare services and volunteer centres. They identified several themes through inductive analysis and subsequently applied deductive analysis based on the four constructs of NPT to explore critical issues and strategies in the implementation process of this digital solution.

In another study, Hogan-Murphy et al. (2021) employed NPT to investigate the facilitators and barriers associated with implementing electronic prescribing systems and robotic pharmacy systems in public hospital settings. They utilised NPT to underpin their qualitative data analysis, facilitating an in-depth and comprehensive examination of eHealth implementation.

Through these studies, NPT has proven to be a valuable theoretical framework for understanding and analysing the complexities of implementing healthcare interventions and technologies. It offers insights into the factors that shape their success or failure.

2.3. Person-centred care (PCC)

PCC has become a key aspect worldwide in developing national policies supporting health services for older adults, particularly in the context of LTC and nursing practice (WHO, 2015). According to World Health Organisation, PCC is an essential dimension of healthcare and a fundamental component of healthcare quality and primary care (WHO, 2015). It encompasses care practices and approaches that recognise and address the diverse needs, values, and goals of each individual (WHO, 2015).

Tom Kitwood (1997; 2019) has contributed to our understanding of the 'person' in the context of PCC. He defines personhood as the preservation of self-identity through social relationships and the attribution of recognition, respect, and trust by others (Kitwood, 1997; Kitwood & Brooker, 2019). By focusing on 'the person', the question becomes how health services can be tailored to meet the specific needs of older adults, rather than relying solely on established work routines (McCormack et al., 2012; McCormack & McCance, 2017; McCormack et al., 2021).

Kitwood's theory of PCC, initially developed in the context of dementia care, highlights the essential act of seeing the person and their psychosocial needs and relationships (Kitwood, 1997; Kitwood & Brooker, 2019). He emphasises the importance of seeing persons as they are, irrespective of their cognitive abilities (Kitwood & Brooker, 2019). While Kitwood's views have primarily focused on nursing practice for people with dementia, other researchers have further developed the PCC framework based on his work. These frameworks have gained support from strategic and policy changes, leading to international recognition (McCormack et al., 2012; McCormack et al., 2021).

The framework of person-centredness was developed by McCormack and McCance (2006, 2010) based on empirical studies emphasising person-centred practice with older adults and experiential approaches to care in nursing science (McCance, 2003; McCormack, 2003). In practice, person-centredness can be fostered through the development of meaningful relationships between caregivers and older adults, as well as important individuals in their lives. Values such as respect and understanding are considered essential in developing caring

relationships, while actively involving and recognising older persons during their care. Viewing the older person through the lens of the family, with respect and recognition of their personhood, is a central aspect of the person-centred approach (McCormack & McCance, 2010; McCormack et al., 2021).

The person-centred framework encompasses several constructs that are integral to effective care provision. One central element is caring processes, which involve collaborative work with the person, considering their beliefs and values, and gaining a comprehensive understanding of what contributes to their social well-being (McCormack & McCance, 2010). This construct emphasises the importance of tailoring care to align with the person's unique perspectives.

Another crucial aspect of person-centredness is the care environment, which focuses on the context in which care is delivered (McCormack & McCance, 2010). Recognising the influential role of the environment in shaping the care experience, this construct underscores the need to create a supportive and enabling setting that enhances the person's sense of comfort, dignity, and autonomy.

Despite the documented benefits of PCC and its wide adoption among healthcare professionals (Brownie & Nancarrow, 2013; McCormack et al., 2010; McCormack & McCance, 2017; McCormack et al., 2021), challenges exist in implementing this framework in clinical practice. One such challenge is the routine nature of care practices, which can hinder the establishment of meaningful relationships between care recipients and caregivers (Edvardsson et al., 2008; McCormack et al., 2010). To ensure consistent and thorough implementation of PCC, Ekman et al. (2011) recommend establishing routines and practices that initiate, integrate, and support PCC in daily clinical tasks.

In recent years, there has been a growing emphasis on using healthcare technologies to manage health in a person-centred manner (Snowdon et al., 2014). Digital interventions that enhance communication have demonstrated their potential in enabling PCC, particularly with well-trained staff (Evans et al., 2017; Hung et al., 2018). For instance, a study by Hung et al. (2018) addressed the practical feasibility and acceptance of using tablets to deliver family video messages, providing reassurance to older patients with dementia. Touchscreen tablets play a vital role in supporting PCC by addressing residents' needs and values of social connection in care settings (Hung et al., 2021). Shadarevian et al. (2020) identified two crucial factors that facilitate the effective use of tablets. These factors include user engagement for support and the

adjustment of implementation to meet the specific needs of older individuals. By incorporating these factors, both individual and group activities were supported, thereby promoting person-centred dementia care for patients.

In a Norwegian study conducted by Østensen et al. (2017), a person-centred model utilising tablets was developed for older adults in LTC settings. The findings revealed that this person-centred approach increased tablet usage among older adults in LTC homes. Consequently, they experienced greater enjoyment and improved social participation through engagement in meaningful activities. The utilisation of tablets in a person-centred manner proved to be an effective means of enhancing their overall well-being and quality of life.

2.4. Rationale for theoretical choice

The theoretical perspectives of this thesis—script, normalisation process theory (NPT), and PCC—result from a novice to a more competent and confident researcher on the use of technology in LTC. I submitted the PhD project's protocol shortly before the pandemic. At this stage, I had not designed or fully planned which theoretical perspectives to use in my research. Shortly afterward, the COVID-19 pandemic spread worldwide. Initially, the project aimed to explore the experiences of older people, their relatives, and staff in using TMC in care facilities to enhance social contact. However, the pandemic provided an opportunity to investigate the use of TMC during an exceptional period in recent human history. The context of social distancing in LTC settings emerged as an influential factor during my research. For instance, social distancing in LTC homes highlighted the need for alternative ways to supplement restricted physical visits. As a result, my supervisors and I had to revise the aim and research questions of the three studies to address the urgent circumstances during the pandemic. These new circumstances significantly impacted both data collection and challenges associated with KOMP usage that were revealed during my exploratory research.

As part of my PhD education, I had the opportunity to attend a course on *digitalisation in municipal health services*. This course provided valuable insights into various theoretical perspectives that can be applied to examine and understand the use of digital interventions in healthcare. During the course, I gained familiarity with the script concept and NPT, which focus on the interactions between individuals and technology (technology-in-use). These theoretical frameworks can be applied in qualitative empirical research to interpret and examine the actions, practices, attitudes, and events surrounding technology usage in

healthcare contexts. By adopting script and NPT, researchers can examine technology implementation in healthcare settings.

In western Norway, most care facilities had already embraced technology for social contact and other welfare technologies before the pandemic. However, interviews and systematic observations conducted during social distancing periods revealed rapid and extensive use of digital communication. This adoption occurred without previous planning, and resulted in a diverse range of social situations between individuals and technology. The idea of the first paper took shape, leading me to select script as a theoretical frame. I believed that the script concept could be useful for understanding how and why healthcare professionals acted as they did at a moment when there was a sudden need to use technology.

The concept of a script can be instrumental in uncovering the dynamics between KOMP and its users, including staff, residents, and their relatives. No Isolation, the company behind KOMP, originally scripted its use for home-dwelling older adults without requiring assistance from caregivers or family members. However, the circumstances surrounding the use of KOMP in care facilities differ from those in homes, due to the residents' physical and cognitive limitations. Drawing on script theory to examine KOMP usage showed how healthcare professionals reacted towards KOMP's original script, and how they created their own script to facilitate social contact between older people and their relatives through technology.

Fortunately, the period of social distancing came to an end, and the pandemic in Norway progressed through different phases over a span of two years. Throughout this period, society responded to the pandemic by implementing measures such as quarantine, self-isolation, and social distancing. The use of digital communication persisted during the entire period in care facilities and homes worldwide (Chu et al., 2020; Hajek & König, 2021; Veloso et al., 2020). However, pertinent questions arose: did the novel practices endure throughout the pandemic? What factors affected the stability of these practices? Would the use of technology for social contact like KOMP be replaced by physical contact after the pandemic? These vital questions came into focus before the second study on the stability of KOMP use. The question was whether these technology-associated practices became part of the other caring tasks during an exceptional period and whether they will continue after the pandemic. Therefore, the use of NPT was relevant to addressing these questions and understanding how normalisation of technology practices occurs.

Script theory and NPT are sociological frameworks derived from the field of STS. They focus on the social aspects of technology adoption and use, providing valuable insights into the social dynamics surrounding new technologies (Martin et al., 2011). Script theory examines the impact of broader social structures and norms on technology use, uncovering the roles and behavioural patterns associated with technology adoption (Akrich, 1997). However, NPT delves into the specific mechanisms and processes through which technologies are normalised and integrated into everyday routines (May et al., 2015).

Both frameworks contribute to a comprehensive understanding of the social implications and potential challenges posed by technological advancements. They shed light on the social situatedness of technologies and the factors that influence their adoption and integration. Through a critical examination of the social dimensions and consequences of new technologies, script theory and NPT enhance our understanding of the complex interactions between society, technology, and human behaviour.

The first two studies focused on examining the practices of healthcare professionals to facilitate technology use. In the third study, the objective was to investigate the experiences of older people and their relatives when they communicated socially through TMC during the pandemic. The analysis of the data of older people and their relatives began after reporting the results and discussions regarding healthcare professionals' experiences in the first two papers. These previous studies revealed the role of organisations in helping older adults in effectively utilising KOMP. Several informal caregivers privately purchased KOMP to maintain social interactions with their home-dwelling family members. LTC homes facilitated the use of technology through the provision of required human resources, KOMP units, IT infrastructure, economic resources, and effective leadership.

These facilitations improved collaboration between healthcare professionals and relatives of older adults. This collaborative effort between individuals and organisations centred on older adults and their social needs. Here, the older individual as a 'whole person' was placed at the centre, and the services revolved around them to fulfil their social needs. Consequentially, PCC emerged as a relevant theoretical framework for the third study, aiming to understand these interactions and experiences. Older persons were situated at the centre of care both in care facilities and among their family members when KOMP was adopted even before the pandemic. The earlier adoption of TMC, despite the heavy schedules, refers to an orientation towards the need for social contact for older people, which supports PCC.

During the thesis design, my supervisors and I had several discussions about choosing a theoretical background to approach the practices I documented in the three papers. Health professionals facilitated technology practices in a person-oriented way, using different forms with different residents, while focusing on the 'person' and what they cared about to maintain social communication with relatives. PCC places older adults at the centre of care by facilitating work tasks and developing best care practices (McCormack & McCance, 2010, 2017). Therefore, person-centredness was found suitable again to interpret the work of healthcare professionals in enhancing social contact. The facilitation of work in care facilities should revolve around the individual needs, preferences, and circumstances of older adults receiving care since what is important to one resident may be undesirable or unnecessary to another. Moreover, the facilitation can be modified over time to adapt to the changing needs of individuals.

2.5. The role of theories in the thesis

2.5.1. Script

The first paper utilised the script concept to examine KOMP practices and explore the social consequences associated with technology use. Script concept made it possible to approach technology in use, not only from the perspective of the designer but also from that of the real-world users. As in Rasmussen's et al.'s study (2021), it became possible to investigate the interaction between the technology's design and users' experiences in care facilities during the extraordinary period of the pandemic through the script concept.

KOMP design was tailored to meet the needs of independent older individuals residing in their own homes. However, when used by care facility residents with reduced abilities, adaptations were necessary to accommodate their needs. The script concept played a vital role in understanding the users' needs, limitations, how they benefited from KOMP, and how healthcare professionals reacted to and modified its script.

The first study utilised the script theory as an interpretive lens to examine the new practices adopted by healthcare professionals when incorporating KOMP into their caring practices. These new practices were categorised to represent the corresponding changes in routines. Two key perspectives of this framework, de-scripting and technology interdependence, were used to examine and discuss the new routines in the paper's discussion section.

Regarding de-scripting, technology users had the ability to modify their existing work tasks and create a new, more dynamic script that accounted for the needs and skills of individual users. Examining a category of *responsibility towards technology* within the context of de-scripting, revealed that the utilisation of technology necessitated adjustments to existing roles and interactions. In this respect, healthcare professionals modified their roles, responsibilities, and relationships with residents and their relatives to support and enhance their social interaction. De-scripting was also applied to another category, *adapting KOMP to different residents*. Healthcare professionals developed new adaptations to address physical and cognitive disabilities, as technology designers and developers did not offer strategies for use in the LTC context. Consequently, users had to adapt their technology use according to specific situations and the needs of each resident.

In terms of technology interdependence, a category of *the roles of the involved actors* was examined to reveal that technology does not work by itself but depends on collaboration with other actors. Examining this category underscored the need for collaboration and dependency between technology and various actors. In the case of KOMP, the sudden and rapid adoption of technology in care facilities necessitated a new form of collaboration among different actors. These actors included the residents who used the technology, their families who interacted with them, healthcare professionals who facilitated its use, and technology facilitators who provided technical support and training. Examining *the roles of the involved actors* in light of technology interdependence showed that the effective use of technology in LTC required collaboration, communication, and a willingness to adapt to and learn from each other.

Akrich and Latour (1992) introduced the term 'projected users' to refer to the expected users for whom the technology script is initially designed. This term explores how designers anticipate and shape users' behaviours and interactions with technological devices during the design and development process. In the case of KOMP, the technology was designed with the expectation that users would have a higher degree of independence. However, the reality is that the actual users and their real-world contexts within LTC facilities differ from these initially projected independent users.

In practice, certain tasks, such as facilitating video communications for residents who rely on staff assistance to use KOMP, can remain partially obscured and require significant effort. Consequently, when the users' abilities and circumstances differ from those of the projected users, the technology may not operate as spontaneously as intended by the developers' script.

Therefore, introducing new routines and creative adaptations through 'de-scripting' of technical objects like KOMP becomes necessary.

This understanding aligns with the notion that incorporating these 'invisible' routines can present challenges and burdens for healthcare workers (Oudshoorn, 2008). It underscores the need for adaptation and coordination to accommodate the diverse needs and abilities of the actual users, thus revealing the complexity of integrating technology into LTC settings.

2.5.2. NPT

In the second paper, NPT was utilised as an interpretive lens to examine the new practices of healthcare professionals when using KOMP for older residents during the pandemic and its potential to become a normal part of daily practices. NPT provided a structured framework for making sense of the revealed themes and the application of this theory facilitated in-depth discussions concerning these practices. The goal was to understand their integration into the daily routines of the care facility and their potential for post-pandemic use. Within the discussion section, the emerging themes resulting from the thematic analysis were examined and discussed in relation to the four constructs of NPT.

To illustrate, the themes of *engagement* and *working efficiently* were discussed in light of the constructs of NPT, specifically 'cognitive participation' and 'collective work'. The theme of *engagement* described how healthcare professionals were engaged and motivated to facilitate and embed KOMP into their caring practices. This was achieved through processes of learning and skilful adoption as they were motivated to involve as many residents as possible in the use of KOMP. 'Cognitive participation' refers to the extent to which participants are engaged and committed to working with the intervention (May et al.,2015).

The theme of *working efficiently* highlighted the significant role of organisational support in promoting effective usage of KOMP. This support included elements such as effective leadership, engagement of healthcare professionals, provision of IT infrastructure, required training, and economic resources. All actors involved were dedicated to facilitating the use of KOMP. 'Collective work' emphasised the collaborative efforts involved in utilising the technology in practice (May et al., 2015).

Drawing on 'cognitive participation' and 'collective work' to discuss these themes helped me understand how normalisation occurs when NPT mechanisms are achieved through discussing

the emerged findings. This may reveal the stability of the associated practices during and beyond the pandemic.

NPT facilitated the identification of key factors, mechanisms, and practices that contributed to the potential normalisation of the technology within the care facility. Its application shed light on the challenges and facilitators associated with using KOMP during the pandemic.

2.5.3. PCC

In the third study, PCC was employed to explore how the use of KOMP was beneficial and valuable for older adults and their relatives during social distancing measures imposed by the pandemic. Similar to the other two studies, the theoretical framework was applied as an interpretive lens to discuss the empirical findings in the respective discussion sections.

In this study, three essential themes emerged, shedding light on how digital communication provided new forms of social contact between older adults and their relatives. These themes were examined within the framework of PCC, enabling a deeper understanding of the benefits and value of digital communication for the participants. When the themes were aligned with the relevant constructs of PCC, it became possible to suggest that the utilisation of communication technology promoted recognition and respect for older adults as whole persons. As a result, communication technology might have the potential to support the principles of PCC in both LTC and private homes.

PCC, guided by Kitwood's definition of personhood (Kitwood, 1997, 2019), discussed the lived experiences of older adults and their relatives through four forms of 'being': being in relation, being in a social world, being in place, and being with self (McCormack, 2004; McCormack & McCance, 2010). This approach provided insights into how digital communication can become a meaningful activity for older adults and their families in both LTC settings and private homes.

To provide an example, one prominent theme that emerged was the notion of *staying involved in each other's daily lives*. This theme described the crucial role played by KOMP in facilitating social connections between older residents and their relatives, regardless of physical distance or social distancing measures. Through regular social interactions, such as sharing photos and engaging in video conversations, KOMP effectively nurtured intergenerational bonds within families.

These experiences were discussed through the lens of 'being in a social world', which highlights the importance of meaningful connections within a social group (McCormack, 2004; McCormack & McCance, 2010). It demonstrated that participants formed relationships and fostered interconnection through the exchange of shared images and video conversations, ultimately bringing them closer together. The frequent and valuable contact facilitated by KOMP holds the potential to support person-centeredness, particularly by enabling more consistent communication with distant family members and overcoming physical and even international barriers.

Furthermore, PCC is used to discuss the main categories and themes of the three papers in the thesis, including the additional efforts required to facilitate the use of digital communication. These facilitations have been discussed through other attributes of PCC, such as communication, individualised focus, engagement, care environment, relationships, and respect (Eklund et al., 2019; McCormack & McCance, 2010). By drawing on these principles of PCC, a new understanding is acquired regarding how technology, such as KOMP, may assist caregivers in working in a person-oriented manner to meet residents' social needs.

3. Methodology

3.1. Epistemological and ontological foundations

My background as a medical doctor and a natural scientist who conducted quantitative research during my master's studies initially led me towards a positivist perspective. Positivism believes in the reality of the world and proposes that the natural world and social world share similarities, allowing for their study through identical methods (Creswell, 2013; Lincoln et al., 2011; Lincoln & Guba, 2013). Consequentially, my epistemic and ontological attitude was in the spirit of 'naive realism'.

However, as I engaged in my Ph.D. journey in qualitative research, I experienced a gradual shift from this positivist orientation. This shift led me to explore the cultural meaning and significance of technology and its societal orchestration. My exploration of technological practices in healthcare, combined with reading the broad literature on the socially situated nature of technology, has realigned my views towards a more constructivist perspective. Constructivism emphasises the subjective and socially constructed nature of knowledge (Creswell, 2013; Lincoln & Guba, 2013).

The thesis seeks to understand how individuals construct meaning, knowledge, and understanding within their particular social contexts. It investigates the experiences of different participant groups using communication technology in LTC homes during the social distancing measures of the pandemic. Each participant's perspective contributes to the distinctive construction of their reality within this context. Particular attention is given to the influential role of context and social construction to understand the significance and implications of communication technology when physical visits were not possible. Their experiences are shaped by unique interactions with communication technology and others around them, making their realities subjective and contextually bound. By adopting this philosophical standpoint, the thesis aims to provide an understanding of the dynamic interplay between technology practices and human experiences in LTC settings.

The thesis utilises qualitative methods, including focus group discussions, individual interviews, and participant observation. These methods actively involve the researcher in engaging with the participants, providing a deeper exploration of their experiences with digital communication technology. Moreover, the thesis applied inductive content analysis, inductive thematic analysis, and meaning condensation of phenomenology as appropriate analytical tools. Inductive approaches in qualitative data analysis involve deriving patterns and themes

that emerge organically from the participants' narratives, reflecting their subjective perspectives and meanings. These inductive approaches align with constructivism epistemology by allowing researchers to co-construct meaning with participants and generate insights that emerge from the data itself without imposing preconceived notions or theoretical frameworks.

Through these methodological choices, the thesis underscores the significance of the participants' voices and perspectives in shaping the research findings. It recognises that the social practice of using technologies in care is an ongoing and dynamic process influenced by the interactions between individuals and their environment.

The research is focused on understanding and interpreting the subjective meanings and experiences of the participants. To achieve this, the thesis employs three theoretical frameworks as interpretive lenses, enabling an exploration of the different social aspects of technology use in LTC homes during the pandemic. Through these interpretive lenses, knowledge is actively constructed by engaging with the data in the form of themes or categories, discussing it, and deriving meaningful insights.

3.2. Design

Qualitative research is suitable for exploring and providing in-depth insights and understanding of real-world problems by studying various aspects of human behaviour, opinions, beliefs, practices, and experiences (Moser & Korstjens, 2017; Patton, 2015). It is valuable in evaluating the processes of interventions or phenomena and developing novel concepts and theories (Patton, 2015).

In the initial phases of research, qualitative approaches play a pivotal role as they allow researchers to acquire in-depth knowledge of the topic, allowing the future identification and testing of assumptions (Patton, 2015). Another advantage of qualitative research lies in its focus on the participation and engagement of participants. By actively listening to their voices and valuing their unique perspectives, researchers cultivate a more holistic understanding of the individuals or communities under study. This approach enhances the ethical conduct of research in the health sciences and ensures that research outcomes truly reflect the experiences and needs of the studied populations (Moser & Korstjens, 2017).

This thesis followed a qualitative exploratory research design, from developing the aim and research questions to identifying different methods to collect and analyse data, and finally, to

interpreting the findings (Patton, 2015). Exploratory qualitative research is a quest to investigate and comprehend complex phenomena, often conducted with limited pre-existing knowledge or theories to guide the exploration (Patton, 2015). A qualitative design helped investigate and understand various human experiences and gain in-depth information about how TMC was used in LTC homes during the pandemic. This involved asking the participants—as technology users—about their perspectives, experiences, and practices when they adopted technology for social contact, and how their knowledge was constructed in the context of LTC.

Three qualitative approaches were adopted in this thesis: an exploratory, a case study, and an open phenomenological approach. By adopting different qualitative research approaches, the thesis helped address the research questions and examine various aspects of the phenomenon of digital communication among older adults in LTC. At the beginning of this project, it was not possible to plan the three studies in detail. However, as a qualitative researcher with a focus on explorative design, I remained responsive to changing the design as the research unfolded. The research questions were also open to unexpected findings throughout the process. These questions aimed to explore how the participants experienced the use of digital communication, how it affected their daily social life, and why they kept using or rejecting it. Table 1 presents an overview of the methodology employed in the papers included in this thesis.

Table 1: Overview of the methodology of the three papers

	Paper I	Paper II	Paper III
Aim	Explore how and why healthcare professionals facilitate the ad hoc and prompt use of a technology for social communication, known as KOMP, in care facilities in western Norway to promote communication and social engagement among residents and their next of kin during the COVID-19 crisis.	Investigate the stability of practices with KOMP for maintaining social communication between residents and their relatives, and consider whether these practices are likely to last beyond the pandemic.	Examine how older people and their relatives experienced the use of technology-mediated communication through KOMP, a tablet-like device for supporting social contact in care facilities and homes during the pandemic.
Study design	Exploratory study	Case study	Phenomenological study
Data collection methods	Focus groups interviews, individual interviews, and observations	Focus group interviews, individual interviews, and observations	Individual interviews
Analysis	Inductive content analysis	Inductive thematic analysis	Meaning condensation of phenomenology
Answered research questions	Answers research question 1	Answers research question 2	Answers research question 3

Exploratory research

Exploratory research enables a deeper understanding of phenomena characterised by limited or unavailable information. In this context, exploratory qualitative research functions as a gateway to uncover the depth of human experiences (Flick, 2022). Researchers who adopt an exploratory research approach acknowledge the existence of uncertainty and ambiguity as they

venture into unexplored domains, striving to gain a profound understanding of the subject of interest (Mansourian, 2008). This uncertainty arises from the absence of predefined frameworks or theories that could offer clear directions for the investigation.

However, instead of becoming discouraged by the unclear aspects of the overall picture, researchers are encouraged to embrace this uncertainty as an inherent aspect of the exploratory process (Mansourian, 2008; Patton, 2015). They understand that uncertainty is a natural element encountered when exploring new frontiers and are aware that deeper insights will gradually unfold as they progress through the research journey. This method of research proves particularly valuable in situations where little is known about the topic and conventional research designs might not be suitable.

A distinguishing feature of exploratory qualitative research lies in its flexibility in data collection, allowing each participant to shape the interview. By granting participants the freedom to express their perspectives, experiences, and insights in their own unique ways, researchers can obtain a rich and diverse dataset (Braun & Clarke, 2006, 2022). This participant-driven approach not only facilitates the emergence of unexpected lines of inquiry but also provides access to novel viewpoints that might not have been uncovered with more structured interview methods. Consequently, the data gathered becomes more authentic and reflective of the participants' lived experiences, enriching the overall understanding of the research topic.

Additionally, the use of interviews with open-ended questions plays a crucial role in mitigating bias in exploratory qualitative research (Braun & Clarke, 2006, 2022). Unlike closed-ended questions that restrict responses to pre-defined choices, open-ended questions invite participants to provide comprehensive and unrestrained answers, allowing them to shape the narrative based on their own perspectives and experiences. This approach ensures that the research findings are grounded in the participants' viewpoints, reducing the influence of the researcher's preconceived notions and promoting a deeper appreciation of the studied phenomena.

An essential aspect of exploratory qualitative research is its inductive nature (Mansourian, 2008). This means that researchers generate insights based on the data collected and the patterns that emerge during the analysis process. Instead of starting with pre-established hypotheses, exploratory researchers allow the data to speak for itself, thus gradually building

an understanding of the phenomenon under study. This inductive approach is particularly suited to exploratory research, as it empowers researchers to explore new realms of knowledge without the constraints of predefined assumptions (Patton, 2015).

The exploratory approach was also chosen for Paper I due to the limited existing knowledge concerning the rapid use of TMC for older individuals residing in care facilities during the pandemic. The phenomenon had not been widely explored in previous research, making it suitable for an exploratory investigation. Additionally, the experiences and practices of the involved actors (older residents, relatives, and health staff) in this context were relatively unfamiliar to previous researchers, further emphasising the need for an exploratory qualitative research design.

Case study

Paper II focused on a single care facility as a case study to carefully examine specific evolved work practices of healthcare professionals in a public care facility in western Norway during the crisis in its real-world context.

A case study is a research approach employed to develop a comprehensive and multi-faceted understanding of a complex issue within its real-life context (Crowe et al., 2011). Simons (2009, p. 21) describes a case study as providing an in-depth understanding of a particular project, institution, policy, event, or real-world system. By closely examining a single case in depth, researchers can uncover intricate details and nuances that might remain hidden in a larger, more generalised sample. This approach enables the exploration of contextual factors, individual experiences, and specific circumstances contributing to a comprehensive understanding of the subject under study (Yin, 2018).

Unlike other research methods that rely on representative samples, case studies are not primarily chosen based on their ability to represent a broader population or group. Instead, the selection of a case is driven by its uniqueness and the richness of information it can offer (Thomas, 2011, p. 514; Yin, 2018). In the case in Paper II, the chosen care facility was particularly selected because it had adopted an array of active-assistive living tools for everyday work. Moreover, most healthcare professionals in this facility had experience in using digital technologies, including communication tools such as KOMP.

Each case holds distinctive features that set it apart from others, making it a valuable source of insights and knowledge that may be difficult to obtain through other research designs (Yin,

2018). Selecting a single care facility for the study acknowledges the uniqueness and individuality of the case. This specific focus allows for a detailed examination of the participants' experiences and practices when they used communication technology during the period of social distancing. The case study approach is well-suited for gathering information pertaining to probing questions, particularly those centred around the how, what, and why. It proves to be effective in investigating issues such as the implementation and perception of the intervention by the stakeholders in the real context (Crowe et al., 2011).

This case study encompassed several inquiries to gain an understanding of how KOMP was integrated and utilised in the real context, how practices of new technologies became normalised in the facility, how healthcare professionals interacted with the technology, and the alignment between what healthcare professionals expressed and their actual actions observed during the study. To develop a comprehensive understanding of the case, the case study approach usually involves the collection of multiple qualitative methods, such as interviews, focus groups, and observations (Yin, 2018).

Phenomenology

My understanding of phenomenology as a philosophical tradition has been shaped by the syntheses found in scholarship on phenomenology as an applied research method for qualitative inquiry (Dahlberg & Dahlberg, 2019; Davidsen, 2013; Kvale & Brinkmann, 2015; Zahavi, 2019).

Phenomenological qualitative research focuses on exploring experiences and meanings within their context to capture the essence of the phenomenon. As elucidated by Zahavi (2019, p. 13), the phenomenon has often been defined within the philosophical tradition as the manner in which an object manifests to us, shaped by our perceptions and categories, in contrast to its inherent nature. Phenomenology is focused on understanding how things reveal and present themselves, accomplished by allowing them to display their genuine and unaltered essence. Phenomenological methods provide rich descriptions of human experience, drawing upon diverse philosophical strands that shape their approaches, including descriptive, interpretive, hermeneutic, and lifeworld phenomenology, each with distinct focuses and structures (Finlay, 2012).

Phenomenological philosophy, pioneered by Edmund Husserl, seeks to understand phenomena through rich contextualised descriptions based on lived experiences, avoiding preconceived

biases (Zahavi, 2019). In his phenomenological objective, Husserl (2014) aimed to grasp experience in its pure and original form, avoiding explanations, interpretations, or theorising. His approach is less inclined toward interpretation, emphasising a more descriptive approach instead. According to Zahavi (2019), Husserl's objective was not a straightforward first-order exploration of worldly objects to uncover new facts. Instead, his primary epistemological endeavor revolved around studying consciousness and its role in constituting phenomena, aiming to describe how phenomena manifest to the subject and shape their experiences.

However, Heidegger defined phenomenology as allowing that which reveals itself to be perceived in the exact manner in which it manifests itself (Davidsen, 2013; Zahavi, 2019). Although Heidegger's approach has ontological aspects, it aligns with the core idea of phenomenology focusing on what presents itself (Davidsen, 2013). Heidegger introduced the existential turn in phenomenology, seeking to understand existence (Stolorow, 2006). He considered individuals as actors and therefore he concentrated on the interpretations of participants' experiences in their life world. While phenomenology relies on description, Heidegger argued that every description inevitably entails interpretation, leading him to develop phenomenology in a hermeneutic direction (Stolorow, 2006).

In recent years, several contemporary perspectives on phenomenology have emerged. According to Zahavi (2019, p. 122-124), among the most prominent approaches are Giorgi's descriptive phenomenology and van Manen's hermeneutic phenomenology. Giorgi's approach asserts that his phenomenological psychology encompasses an adaptation and refinement of the philosophical method pioneered by Husserl. Moreover, Giorgi emphasises the importance of providing a true description of the fundamental structures of lived experience. In contrast, van Manen's approach diverges from Giorgi's by highlighting the necessity of incorporating a hermeneutical and interpretative component. Despite this contrast, van Manen is equally explicit about the philosophical nature of phenomenology (Zahavi, 2019).

Paper III adopted an open phenomenological approach with a focus on studying the phenomenon of using communication technology among older adults during the pandemic. It examines the lived experiences of older adults and their relatives from a first-person perspective, exploring the meanings within their life world (Kvale & Brinkmann, 2015; Zahavi, 2019). Adopting an open phenomenological approach allows for a receptive, reflective, and unrestricted exploration of participants' experiences, promoting flexibility and inclusivity in the data analysis without imposing preconceived frameworks. The openness inherent in this

approach is driven by curiosity, reflecting a genuine interest in comprehending the phenomenon without being influenced by pre-existing assumptions (Dahlberg & Dahlberg, 2019; Eskilsson, 2015). It is closely linked to a reflective stance, where the researcher consciously distances themselves from the natural attitude, avoiding taking things for granted and critically focusing on the phenomenon (Dahlberg et al., 2008). Through this approach, the study openly investigates the meanings of participants' experiences of using KOMP during a time of unprecedented social distancing.

The open phenomenological approach was used as an applied qualitative method, revealing emergent meanings from the participants' own perspectives as shared in interviews. Following Zahavi's suggestion, I adopt a 'pragmatic attitude' that merits consideration based on the insights it generates regarding first-person experiences. This approach involves being less concerned with strict adherence to Husserl's, Heidegger's, or Merleau-Ponty's notions of phenomenological application. Instead, it shifts the focus toward extracting practical implications and tangible real-world insights from participants' lived experiences. These insights provide valuable viewpoints on first-person perspectives.

The central question does not revolve around the alignment of the research with orthodox phenomenology but around its demonstration of high quality (Zahavi, 2019). To meet the standards of commendable phenomenological research, the methods employed must demonstrate their relevance and impactful contributions, potentially yielding novel insights (Zahavi, 2019). By revealing the meanings of participants' everyday lived experiences, new insights were gained into how digital communication through KOMP introduced novel forms of social interaction between older adults and their families.

3.3. Methods

Primary research methods in this qualitative design are focus groups, individual interviews, and participant observation. In this thesis, a combination of focus groups, individual interviews, and observations was employed to leverage the advantages of each method. The utilisation of multiple methods allowed for data confirmation and enrichment from different sources. Focus groups, with their interactive and dynamic nature, encouraged lively discussions among participants, leading to the collection of rich and meaningful data. Moreover, individual interviews provided personalised and in-depth discussions with participants, fostering a deeper exploration of their thoughts and experiences.

Observations provided an opportunity to compare participants' statements during interviews with their actual actions in real-life contexts, thus enhancing the credibility of the data. By conducting individual interviews during the observation, it was possible to capture spontaneous experiences in specific situations of technology use. This enabled a closer examination of how healthcare professionals reacted to the use of KOMP in real-world scenarios, providing context-related insights.

3.3.1. Focus groups interviews

Focus group interviews, also known as 'group discussions' or 'collective conversations', are valuable research tools designed to understand the perspectives and views of a selected group of individuals, whether the group is small or large. These interviews aim to gain insight into a specific issue from the participants' standpoint (Kamberelis & Dimitriadis, 2008, p. 375; Krueger & Casey, 2015; Liamputtong, 2016). Conducted as moderated group discussions on pre-defined topics, focus groups have gained popularity in healthcare research due to their ability to explore collective experiences, perspectives, attitudes, and behaviors (Goodman & Evans, 2015; Shaha et al., 2011). They offer a way to gather rich, in-depth data and identify agreements and inconsistencies within and, when relevant, between groups (Goodman & Evans, 2015; Krueger & Casey, 2015).

In this thesis, three focus groups were conducted with a moderated dialogue involving healthcare professionals from different care facilities. Involving participants with different backgrounds and professions enriched discussions and provided valuable contributions through group dynamics. To allow a comfortable and open environment for discussion, the interviews began with informal introductions and small talk before delving into the project description. Both the main supervisor, acting as a secretary and I, as the moderator, introduced ourselves and asked the participants to introduce themselves in an informal way. This approach encouraged participants to share their opinions and experiences freely, facilitating a successful focus group discussion (Liamputtong, 2016).

However, organising and managing focus groups can be challenging due to the number of participants involved. Additionally, they may not be suitable for exploring sensitive topics that participants might feel uncomfortable discussing in a group setting (Goodman & Evans, 2015). To address these limitations, focus groups can be combined with other research methods, including individual interviews and observations, to corroborate, expand, and enrich the

understanding of participants' experiences and offer alternative insights (Goodman & Evans, 2015).

The three focus groups in the thesis were conducted both in-person and digitally, with two of the groups taking place through video conversations due to the pandemic restrictions. Conducting digital focus groups provided the advantage of observing participants' expressions and interactions throughout the interviews, allowing for the capture of not only their opinions but also their non-verbal cues. The adoption of digital technologies in qualitative research has proven to be beneficial, offering convenience, cost-effectiveness, and the ability to overcome geographical constraints. This has facilitated the inclusion of 'hard to reach' participants (Lee et al., 2016; Macfarlane & Bucknall, 2015), as was the case in this research due to the social distancing measures imposed by the pandemic. However, online focus groups may introduce additional ethical challenges related to informed consent, access, and secure data storage, which should be addressed thoughtfully (Macfarlane & Bucknall, 2015; Abrams & Gaiser, 2016).

3.3.2. Individual interviews

Individual or personal interviews serve as common methods for data collection in qualitative research, providing valuable insights into the social environment in which individuals exist (Sandelowski, 2002). These interviews are flexible and purposeful, aimed at gaining in-depth perspectives, beliefs, and perceptions about a specific phenomenon (Kvale & Brinkmann, 2015). By delving into the participant's world, individual interviews offer researchers the opportunity to explore the nuances of their experiences, beliefs, and motivations (Gill et al., 2008; Patton, 2015). Unlike focus groups, which gather information and assess its validity across a group of participants, individual interviews allow for an extensive exploration from a single perspective (Gill et al., 2008).

In qualitative studies, one-to-one, face-to-face interviews with research participants are commonly utilised. This involves arranging a mutually convenient time and place, obtaining informed consent, and audio-recording the interview. However, digital technologies have broadened the scope of interviews in research, enabling individuals to participate regardless of their location (Gill & Baillie, 2018).

Telephone interviews offer a practical alternative to face-to-face interactions and are frequently used in qualitative research (Gill & Baillie, 2018). They allow participants from different geographical areas to take part and can be less burdensome for respondents than meeting a

researcher in person (Oltmann, 2016). One potential drawback of telephone interviews is the absence of visual cues between the interviewer and the participant. This is mitigated by using software for audio and video calls, such as Skype, to conduct interviews in qualitative studies. This approach offers the advantage of being able to observe non-verbal communication through video calls and the software can be free to use. However, it does require participants to have access to a device and internet connection, as well as basic computer literacy, which could limit participation (Gill & Baillie, 2018).

In this thesis, individual interviews were carried out in two distinct settings. Initially, interviews were conducted outside the care facility, engaging the relatives of home-dwelling older individuals. Furthermore, interviews took place at a specific care facility during the period of observation, involving healthcare professionals, older residents, and their relatives. These personal interviews served as valuable tools for gaining a deep understanding of the participants' lived experiences and providing insightful perspectives into their interactions with KOMP, contributing to the depth of the research findings.

3.3.3. Participant observation

What people say in a focus group interview or individual interview may substantially differ from their actual practices, reflecting what they do in a real-world context. Therefore, to gain a deeper understanding, systematic field observations were conducted in a short-term care facility to investigate how participants used KOMP 'in the wild', and to better comprehend the context in which it was used. Observation refers to the systematic description of events, actions, behaviour, and performances in the social setting chosen for study (DeWalt & DeWalt, 2011; Tjora, 2019). Participant observation was employed to gain insights into how healthcare professionals and residents utilised KOMP within the naturalistic context of the care facility.

The observations were conducted over six consecutive days. The care facility chosen for the observation was the same one selected for the case study. In this particular care facility, the first focus group session took place before the observation began. During the observation period, healthcare professionals who participated in the first focus group were also observed, as it was conducted in their workplace. Additionally, other healthcare professionals took part in both individual interviews and observations. Similarly, older residents were engaged in both the individual interviews and the observation. Their participation provided valuable insights into the interactions and experiences of using KOMP within the care facility setting.

My background as a physician and doctoral student at NTNU enabled me to conduct participant observation of activities within the care facility as desired, even though I was not a full-fledged member of the observed community. The first day of observation started with a meeting with the care facility leader, who provided me with a guided tour of the care facility. This included visits to the wards, physiotherapy clinic, and staff changing room. During this introductory meeting, the leader introduced me to the care facility staff and showed me the COVID-19 contact tracker logbook, a mandatory registration for all staff and visitors during the pandemic. This initial meeting was informative, professional, and friendly.

Throughout my observations, I attentively watched, listened, and took notes about social life in the ward and how KOMP was used in this context. My interlocutors in the ward were informed of my role as a researcher. Conducting focus group interviews before participant observation allowed me to address specific issues raised by participants during those interviews. Furthermore, it was possible to observe events or practices that informants did not articulate during the interviews. This is illustrated in a field note from daily life in the care facility I observed:

> 'Ward for short-term stay, common living room, November 2020, 10:30 a.m. to 10:45 a.m.: two women who reside in the ward sit quietly and watch the TV in silence. One of the nurses assists a resident with a walker in the corridor passing through the living room. One resident reads a newspaper. I can hear the ringing tone from one KOMP emanating from a nearby room… A few moments later, one of the nurses visits the room where the KOMP is calling to check if a video conversation with the family has been established, or if any intervention is required'.

Observing the natural activities in the nursing home provided me with illuminating and informative data. Through both focus group interviews and individual interviews, participants shared information about their daily activities, tasks, as well as the social and physical engagements of the residents. The observations further clarified this, revealing a monthly social and physical activities plan designed for the residents. These activities encompassed common activities, such as watching concerts or football matches on TV, as well as engaging in kitchen activities like decorating and baking cakes. Moreover, a 30-minute activity round was scheduled every Tuesday.

However, during my observations, a particular scene caught my attention, as described in the vignette above. Many residents were sitting silently, watching TV with the sound muted, leaving me curious. Upon inquiring with the nurses, they said that the sounds from the TV

could be potentially irritating for some residents with cognitive decline. As a result, they required a quieter environment, often necessitating encouragement to engage in activities or conversations; otherwise, they would remain silent. Based on this field note, I assumed that some residents might need motivation to use KOMP, or there might be a need to offer this type of digital contact more frequently for some older residents.

Observing conversations between residents and their families during video calls posed ethical dilemmas and concerns about privacy. Participants' rights, including their right to privacy and personal boundaries, need to be respected, and any possibility of violating these rights has to be avoided. It was crucial to ensure that the participants felt comfortable and at ease, as being observed could be intimidating and cause discomfort. However, observing conversations through KOMP could have potentially provided valuable and comprehensive data regarding the interactional aspects of these conversations. This, in turn, could lead to interesting insights and a deeper understanding of how these interactions unfolded.

3.4. Recruitment and participants

The recruitment of participants began in August 2020 during the pandemic. To identify potential participants, the main supervisor and I contacted the person in charge of assistive living technology at the municipality and obtained information about the care facilities that had experience using KOMP. I then reached out to the managers of 16 short-term and long-term care facilities across various geographical locations within the same county via email. These emails contained a study description, an invitation to take part in the research, a consent form, and contact information for both the main supervisor and me. The managers then forwarded these emails to healthcare professionals within their facilities.

Of the 16 care facilities that were invited to participate, 8 agreed to take part in the study. However, one facility later withdrew due to conflicting commitments. Among these, only one facility agreed to conduct both focus group, individual interviews, and observations with their healthcare professionals and residents.

I obtained permission to conduct observations at the care facility that agreed to participate. The observation period took place during the morning shift for six days in November 2020. Ten healthcare professionals agreed to participate in both individual interviews and observation and assist in recruiting residents and their relatives who used KOMP. They provided me with the necessary information for recruitment and requested residents and their relatives to participate in the study. As a result, twenty-two individual interviews were conducted in the same care

facility where the observations took place. The participants included ten healthcare professionals, eight relatives, and four resident women aged between 87 and 92 years.

Additionally, snowball sampling was used to recruit five relatives of home-dwelling older people who used KOMP, aiming to gather diverse perspectives on its usage. Friends and acquaintances of the main supervisor and myself, who were familiar with KOMP and had older adults within their close networks, were approached to disseminate the study description and extend invitations for participation. The total number of individual interviews, both inside and outside the care facility, was 27.

Three focus groups included 12 participants from seven care facilities in the same county. Two of the groups consisted of five participants each, while one group had two participants. The informants in the three focus groups were eight registered nurses (six of them were health care managers), two assistant nurses, one radiographer, and a physiotherapist.

The total number of participants was 39, including healthcare professionals, older residents, and their relatives. Among them were six men and 33 women. The distribution of informants in each study is as follows.

The first paper includes 22 healthcare professionals, comprising 18 women and 4 men. Among them, 16 participants were from the same care facility where the observations were conducted. These professionals took part in the first focus group, individual interviews, and observations. The remaining six professionals were from other care facilities within the same county and participated in the second and third focus groups.

The second paper includes data gathered from 15 healthcare professionals who participated in a case study. The context of this study was a specific care facility, with the research aiming to capture the participants' experiences and practices regarding the regular and stable use of KOMP in a real-world context. Among the participants, 13 were women, and 2 were men. One informant took part in both the first focus group and individual interviews. They actively engaged in various data collection methods, including the first focus group, individual interviews, and observations. Their practices, as noticed through observations, and stated through their experiences in interviews, helped to understand how the stable use of KOMP occurred within the context of a care facility during social distancing.

The third paper includes 17 participants (13 relatives of older adults and 4 residents) who shared their perspectives in 16 interviews. Among them, four residents, eight relatives from the

care facility, and five relatives of home-dwelling older adults took part in individual interviews. Additionally, one individual interview in the care facility included two relatives (a son and a daughter-in-law). Table 2 shows the participants' gender, age of residents, type of interview, interview method, and participants who took part in observation, following the guidelines for reporting qualitative research (Tong et al., 2007).

3.5. Data collection

Data collection was initially planned to start in March 2020. However, due to quarantine and restrictions in the nursing homes, data collection was delayed for six months and started in September 2020, when access to care facilities became possible. Data collection lasted throughout November 2020. I adhered to the pandemic guidelines during data collection, conducting focus group interviews both in person and digitally using Microsoft Teams.

In the past, interviews and focus groups were limited to in-person interactions, exclusively conducted face-to-face with participants. However, the advent of digital technologies, such as video chat and online forums, offers alternative methods to recruit participants and gather data. Researchers now benefit from advanced capabilities in recruiting participants, engaging study subjects, and collecting and analysing data. These technological advancements have streamlined and enriched the research experience, providing novel approaches to qualitative research (Macfarlane & Bucknall, 2015). This enables remote engagement in research and revolutionises the traditional approach to focus groups (Macfarlane & Bucknall, 2015).

Abrams and Gaiser (2016) emphasise this evolution, noting that focus groups can now be effectively conducted online. This transition has expanded the potential reach and impact of focus groups, fostering greater diversity and inclusivity in participation. Lee et al. (2016) suggest that integrating digital technologies not only improves data collection efficiency but also broadens the horizons of qualitative research.

The first focus group took place in person at the care facility and involved five healthcare professionals from the same institution where the subsequent observation took place. Following that, the second focus group was conducted digitally through Microsoft Teams. This group comprised five healthcare managers from different care facilities within the county, all of whom possessed experience in utilising digital communication within their respective organisations. The third focus group was also conducted digitally through Microsoft Teams and initially consisted of three participants.

Table 2 Overview of the participants

Number	Participant	Age	Gender	Individual interview	Focus group	Method of interview	Observation	Paper number
01	AN		F		FG1	In-person	x	I, II
02	HM		F		FG1	In-person	x	I, II
03	HM		F	x	FG1	In-person	x	I, II
04	RN		F		FG1	In-person	x	I, II
05	RN		F		FG1	In-person	x	I, II
06	HM		F		FG2	Teams		I
07	HM		F		FG2	Teams		I
08	HM		F		FG2	Teams		I
09	HM		M		FG2	Teams		I
10	HM		M		FG2	Teams		I
11	AN		F		FG3	Teams		I
12	PH		F		FG3	Teams	x	I, II
13	AM		F	x		In-person	x	I, II
14	RN		F	x		In-person	x	I, II
15	RN		F	x		In-person	x	I, II
16	RN		F	x		In-person	x	I, II
17	RN		F	x		In-person	x	I, II
18	RN		F	x		In-person	x	I, II
19	AN		F	x		In-person	x	I, II
20	AN		M	x		In-person	x	I, II
21	MD		F	x		In-person	x	I, II
22	MD		M	x		In-person	x	I, II
23	Daughter		F	x		In-person		III
24	Daughter living abroad		F	x		WhatsApp		III
25	Daughter living abroad		F	x		WhatsApp		III
26	Grandchild		F	x		Teams		III
27	Daughter		F	x		Phone		III
28	Spouse		F	x		In-person		III
29	Daughter		F	x		Phone		III
30	Son and a daughter-in-law		M, F	x		In-person		III
31	Spouse		M	x		Phone		III
32	Daughter		F	x		Phone		III
33	Daughter		F	x		Phone		III
34	Daughter		F	x		Phone		III
35	Resident	92	F	x		In-person	x	III
36	Resident	90	F	x		In-person	x	III
37	Resident	87	F	x		In-person	x	III
38	Resident	90	F	x		In-person	x	III

Notes: *RN,* registered nurse; *AN,* assistant nurse; *AM,* activity manager; *PH,* physiotherapist; *MD,* medical doctor; *HM,* health care manager; and *FG,* focus group

Unfortunately, one of the informants withdrew just 10 minutes before the scheduled interview due to scheduling inconveniences. Consequently, the third focus group proceeded with only two participants. Although these two professionals provided relevant and rich information, the absence of the third informant limited the potential for more group interactions and discussions.

All individual interviews with healthcare professionals in the care facility were conducted in person and separately in the nursing room. Individual interviews with the four residents were conducted in person in their private rooms. Seven individual interviews with eight relatives of residents were conducted either in person or digitally using the phone of the care facility. A phone interview with an older relative over 85 years old with a hearing disability was challenging and resulted in a very short interview (five minutes).

Two in-person interviews with relatives were conducted at the stairway landing where relatives visited the residents during the pandemic. At this time, relatives were not allowed inside the ward. Conducting the interviews in an open place, rather than in a closed or private place, could have affected the informants' privacy.

The five individual interviews with relatives of home-dwelling older people were conducted in person on campus and digitally through audio calls via phone, WhatsApp, and Microsoft Teams.

The focus group interviews and the individual interviews were conducted based on a semi-structured interview guide using open-ended questions (Patton, 2015). Semi-structured interviews are widely utilised in healthcare research, providing researchers the flexibility to ask predetermined questions while allowing participants to discuss topics they find meaningful. The questions in semi-structured interviews offer flexibility and can be adjusted based on the specific situation and participant responses provided (Guest et al., 2017; Kruger et al., 2019; Tanwir et al., 2021). These in-depth interviews are conducted either individually or in a group, typically lasting from 30 minutes to over an hour (Corbin & Strauss, 2008; Krueger & Casey, 2015; Patton, 2015).

To conduct these interviews, researchers rely on a topic guide, also known as an interview schedule, which acts as a roadmap for guiding the conversation. Ensuring that the topic guide includes open-ended questions is crucial as it encourages participants to share in-depth information and express their thoughts on issues that hold personal significance to them. This approach facilitates a comprehensive and enriching exchange of insights throughout the interview process (Guest et al., 2017; Kruger et al., 2019; Tanwir et al., 2021).

The guide for focus group interviews included questions and prompts specifically formulated to encourage group interactions and foster dynamic discussions among participants. In this context, the interview guide accounts for the unique dynamics, enabling participants to build upon each other's responses and share diverse perspectives, enriching the overall dialogue (Krueger & Casey, 2015). However, it is important to note that the same interview guide was used for both focus groups and individual interviews with healthcare professionals, which can be considered a limitation. To ensure effective data collection, it is crucial to employ distinct semi-structured interview guides for different types of interviews.

The guide for individual interviews should be tailored for a one-on-one interaction, where a single participant engages solely with the interviewer. The questions are framed to elicit detailed and personal responses from each individual, free from the influence of others' opinions. To gain deeper insights into the unique experiences and perceptions of each participant, the interview guide may incorporate more in-depth and probing questions. This personalised approach allows researchers to gain a profound understanding of each person's viewpoint (Guest et al., 2017; Kruger et al., 2019; Tanwir et al., 2021).

Although using the same interview guide, the inclusion of flexible and modifiable follow-up questions played a crucial role in obtaining in-depth and more detailed information from the participants tailored to their specific situations and responses. For instance, one question focused on the ad hoc introduction of technology in connection with the pandemic, specifically asking participants to describe the residents' social activity at the institution before and during the COVID-19 pandemic. This question was complemented by inquiries concerning professionals' experiences and reactions to the rapid adoption of communication technology to enhance social activity during the pandemic.

Additionally, there were other questions centred on professionals' expectations before using KOMP, particularly regarding residents and their relatives during the pandemic. Furthermore, their experiences with the use of KOMP afterward were also explored. These questions were followed by complementary inquiries based on the ongoing conversation, seeking more information on how they responded to the rapid and prompt introduction of KOMP to maintain social communication between residents and their relatives.

The moderated focus group interviews lasted between 60 and 90 minutes. Individual interviews lasted between five and 37 minutes. The interviews were digitally recorded and transcribed verbatim.

3.6. Data analysis

The thesis applied inductive approaches across the three papers. In health and social science studies, an inductive approach is frequently used to condense and summarise findings from raw qualitative data to establish links between the research objectives and derived findings and patterns (Thomas, 2003). Inductive methods provide a systematic set of procedures for analysing qualitative data through detailed readings of raw data to derive categories or themes and create valid and reliable findings. It provides a broader analysis of a whole data set and allows the codes to emerge and further determine the themes or categories (Bingham & Witkowsky, 2022; Thomas, 2003). In this thesis, three inductive approaches were adopted: content analysis, thematic analysis, and meaning condensation of phenomenology as an applied qualitative method.

Content analysis and thematic analysis are two different data analysis approaches that perform similar functions in qualitative descriptive studies (Sandelowski & Leeman, 2012). However, there is some confusion regarding the similarities and variations between content and thematic analyses, primarily because of the lack of clear boundaries between the two strategies (Sandelowski & Leeman, 2012). Both methods fall under the qualitative descriptive design and involve techniques to analyse textual data and elucidate themes (Sandelowski & Leeman, 2012). Although both approaches are used to analyse textual data, they have different purposes and methodologies. A defining feature of these methods is the structured coding process, comprehending meaning, and provision of a description of the social reality through the creation of themes (Vaismoradi et al., 2013).

The description and interpretation of participants' perspectives are common features in all qualitative approaches. However, some researchers believe that the application of qualitative content analysis and thematic analysis is suitable for those who prefer a more direct level of interpretation. They focus on presenting a clear portrayal of the content with limited reflection on its underlying meaning (Sandelowski, 2010; Smith et al., 2011; Vaismoradi et al., 2013). However, meaning condensation of phenomenology involves studying the essence of human experiences and phenomena by condensing and extracting the fundamental meanings from the participants' narratives (Kvale & Brinkmann, 2015; Zahavi, 2019).

Content analysis is often sorted as a type of narrative analysis. It is a content sensitive and flexible that can be applied to different research designs and used to analyse diverse types of open data sets (Sandelowski & Barroso, 2003; Vaismoradi et al., 2013). Content analysis

adopts a systematic approach to identify themes, patterns, and relationships within textual, visual, or audio content. It explores how the data can contribute to theoretical insights in research studies while also quantifying qualitative data (Vaismoradi et al., 2013). This structured and objective method is particularly suitable for handling large datasets and aims to describe the characteristics of the document's content by examining who says what, to whom, and with what effect (Vaismoradi et al., 2013).

Thematic analysis is an approach used to explore a dataset, aiming to identify, analyse, and report repeated patterns across the data (Braun and Clarke, 2006, 2022). The themes derived from the data play an active crucial role in constructing patterns of meaning and addressing specific research questions. These themes represent patterned responses or meanings extracted from coded data, encompassing fundamental concepts that are integrated within the larger dataset. Thematic analysis is effective for describing data, as it enables the researcher's interpretation to guide the selection of codes and the construction of themes. This approach is more interpretive and flexible, with a specific focus on exploring participants' experiences or perspectives and comprehending the underlying meaning behind their responses. The primary objectives of thematic analysis are to identify significant themes within the data, explore the connections between these themes and how they appear in the data, and utilise these themes to gain fresh insights into a specific phenomenon (Braun and Clarke, 2006, 2022).

The key distinctions between thematic analysis and content analysis can be summarised as follows: Thematic analysis is a qualitative approach utilised to identify patterns and themes in textual data, whereas content analysis can be either quantitative or qualitative and involves some degree of data quantification. In content analysis, the primary focus is on tallying the presence of concepts or terms to deduce meaning, while thematic analysis extracts high-level concepts to attribute significance. Thematic analysis emphasises the identification of overarching themes in the data and explores their connections, whereas content analysis involves the quantification of coded concepts and terms within extensive textual data, with less emphasis on comparing or contrasting those codes (Vaismoradi et al., 2013).

Both methods share some common features. They entail analysing qualitative data and have the potential to yield novel insights from the data. Additionally, both approaches require a cyclical and thorough exploration of the data, demanding a deep understanding of the data under study. Furthermore, both methods can be used to substantiate theoretical propositions in research studies (Vaismoradi et al., 2013).

Thematic analysis was applied to a case study with a small sample size of healthcare professionals in the second paper. The four main themes in the second paper were interconnected through their relation to the stability of using KOMP and its related practices in the care facility. The findings from the thematic analysis were discussed using NPT, although other theories could be applied as well. Thematic analysis offers flexibility regarding the choice of theoretical frameworks provided the interconnection among the main themes, and it can also be applied to different study designs and sample sizes (Kiger & Varpio, 2020). However, this flexibility may be seen as a disadvantage due to the absence of clear and concise guidelines; therefore, it is important to clearly explain the role of theory in thematic analysis to avoid inconsistency (Clarke & Braun, 2013, 2022).

Content and thematic analyses aim to analyse narrative data from real life into smaller units of content. Content analysis involves systematic coding of the content of each meaning unit to identify categories representing participants' perspectives and practices during the use of KOMP. Thematic analysis was used to identify and report similar patterns that shared common characteristics or features related to specific issues concerning the stable use of KOMP and its role in working practices at the care facility. 'Patterns' refer to observable similarities in the data, while 'themes' are higher-level categories identified from these patterns. Data were analysed iteratively, with repeated visits to the data until the results emerged.

Meaning condensation in phenomenology distinguishes itself from content and thematic analysis by focusing on extracting the meanings presented in each quote and understanding their significance to the participant's everyday life. This method requires researchers to approach their work with an open mind, avoiding any preconceived notions, and prioritise the immediate experiences of the participants from a first-person perspective (Zahavi, 2019). According to Kvale and Brinkmann (2015), this qualitative research method aims to identify and condense the essential meanings of human experiences as described by the participants. The goal is to uncover the essence of their lived experiences and identify their meanings through central themes. Researchers follow a systematic process of analysis to extract the core meanings shared among the participants, leading to a deeper understanding of the fundamental aspects of the phenomenon under study. Meaning condensation in phenomenology is particularly valuable for exploring subjective and personal experiences, emotions, and perceptions, providing valuable insights into the lived realities of the participants.

In the third paper, the open phenomenological approach is primarily used to explore individuals' lived experiences and gain a deep understanding of their subjective perspectives. Adopting this approach as an applied qualitative method based on meaning condensation from the first-person perspective (Kvale & Brinkmann, 2015; Zahavi, 2019), provided a detailed description of older people's and their relatives' experiences of communicating digitally through KOMP to maintain social contact.

One distinguishing feature of meaning condensation in phenomenology is the uncovering of the meaning of participants' experiences with their quotes, which differentiates it from content and thematic analyses. Meaning condensation is not limited to phenomenology and has been used in other qualitative studies. In the third paper, the condensed themes were further subjected to thematic analysis to sort and organise the underlying meanings of participants' lived experiences. Thematic analysis involves identifying interconnected main themes that help structure and make sense of the findings. For example, in the third paper, the three main themes were found to be interrelated, as each theme represented a new form of social contact between older adults and their families.

I transcribed the interviews and observations for the three studies. During the initial stages, I conducted the analyses and interpreted the data for each study. The main supervisor reviewed the interviews in their raw text and assessed the logical connections between code extracts and categories. We also had several supervisory meetings involving all supervisors to collaboratively examine, discuss, and refine the coding scheme. Consequently, each manuscript received repeated feedback from all supervisors on codes, categories, and textual descriptions within the results.

Data analysis commenced at the start of data collection, particularly during the transcription of audio recordings and observational field notes. Ideas for data analysis began to emerge while gathering the data and further developed during transcription. The data collected from both observations and interviews with healthcare professionals were subsequently utilised in the first two studies, while the third study relied solely on data from individual interviews with residents and their relatives.

After transcribing the focus groups, individual interviews, and observational field notes into digital texts, all data were organised into three separate digital files in NVivo 12 (version 1.3), one file for each group of informants (healthcare professionals, older people, and their relatives). The meaning units in each interview were initially coded in NVivo 12. Observational

field notes were also primarily coded in the same way in NVivo 12. The data from different sources were coded separately at the beginning in NVivo 12 and further analysed together through radial maps of MindManager, a 'virtual whiteboard' software to map, arrange, and group the data, for each study.

This approach facilitated data display and organisation within a single software program, simplifying the comparison of data from different sources. It allowed collective analysis of data aligning with each paper's objectives. Using a single program made it more convenient for me to access, store, and search for relevant data. Furthermore, it allowed me to analyse data from multiple sources (individual interviews, focus group discussions, and observation) without switching between multiple programs, saving time and reducing the risk of missing important information.

The analysis in the three papers began with detailed and repetitive reading of the raw data to obtain a general idea of its content. Then, open coding or initial coding was performed to make sense of the data in content and thematic analyses by developing initial meaning/codes of the relevant quotes. Open codes were identified from the raw data and expressed using words similar to or slightly modified from the raw data. This was followed by the identification of emerging patterns across the data. The created codes were then condensed to reduce the data size to fewer analytic topics.

The MindManager program was used to create radial maps to organise, map, abstract, and group the codes (the labels or tags assigned to data segments during coding) into broader and higher-level orders. This aided in displaying the data overall and visualising the interrelations between codes. By creating a radial map, I was able to identify the relationships between different codes and group them into broader categories, enabling the identification of the patterns and themes in the data. Radial maps helped visualise connections between different ideas and identify gaps in the data that required further exploration. The subsequent step involved developing themes or categories and reporting the findings.

Data analyses in each paper are described in the following sections.

3.6.1. Inductive content analysis

In the first paper, the experiences of healthcare professionals were analysed using inductive content analysis based on interviews and observational field notes without drawing on script theory. However, script theory was employed as an interpretive lens in the discussion section to discuss the revealed findings. A systematic approach was employed to analyse the data

collected from focus groups, individual interviews and observational field notes of healthcare professionals. Initially, all data were transcribed into digital text to ensure accuracy and facilitate analysis. Subsequently, the digital files were indexed, enabling efficient retrieval and organisation during the analytical phase.

Subsequently, the organised data underwent inductive, open coding. This entailed a detailed and iterative examination of the content, allowing initial codes and categories to emerge organically from the raw data, free from pre-existing theoretical frameworks. This exploratory approach, led to the development of higher-level categories and abstractions, revealing the underlying structure and meaning within the data.

Following Elo and Kyngas (2008), the analysis had three steps: preparation, coding and organising, and reporting. During the preparation phase, a comprehensive examination of the documented digital files was conducted to become familiar with the data's content. This crucial initial step facilitated understanding of the data content and its nuances.

In the coding and organising phase, the meaning units were identified and selected from the data. These units were then labelled as primary or initial codes, capturing the essence of the information they represented. Open coding applied to the data from interviews and observations, resulting in a total of 162 initial codes. To ensure accuracy and relevance, the labelled codes underwent inspection, verifying their alignment with pertinent aspects of the phenomena under investigation. As the analysis progressed, these initial codes were further organised into higher-order headings, forming coherent subcategories based on content similarities. This systematic approach resulted in a total of 20 subcategories, further enhancing the organisation of the data. The subcategories were then grouped together, resulting in the emergence of 10 generic categories.

These categories provided deeper insights and patterns within the data, offering a more profound understanding of the studied phenomena. In the final stage, the 10 generic categories were condensed and grouped, resulting in two main categories: 'new routines accompanying the use of KOMP as an interactive technology' and 'why KOMP is valuable as a practical and meaningful tool for social communication'. These two main categories represented the key findings of the study, shedding light on the impact of KOMP as a technology for social communication on daily routines in the care facility.

Using NVivo 12 (version 1.3) aided in displaying and organising the initial codes. Additionally, I utilised MindManager to create radial maps, which facilitated the process of displaying, abstracting, and grouping connections into more comprehensive and higher-level categories.

3.6.2. Inductive thematic analysis

The experiences of healthcare professionals within the particular care facility underwent inductive thematic analysis, following Braun and Clarke (2006, 2022) approach. The purpose was to explore similar patterns concerning the stability of technology-associated practices at the facility. In this analysis, healthcare professionals' experiences were examined without relying on theoretical frameworks. However, in the discussion section, NPT was adopted as an interpretive lens to further discuss and interpret the findings.

The initial phase of analysis involved reading the interview transcripts and field notes several times to become familiar with the overall meanings and identify the most relevant units of meaning. Subsequently, a primary list of prominent codes was created. Each initial code corresponded to a code extract. To facilitate this process and ensure a systematic inquiry across the entire dataset, NVivo 12 (version 1.3) was utilised. Through this approach, relevant code extracts emerged, leading to the formation of initial codes.

Following that, I proceeded to organise and map each code extract alongside its corresponding initial code. To enhance the organisation and clarity of the data, MindManager software was used. MindManager allowed for the visual arrangement and mapping of all the code extracts and initial codes in one radial map. This step was valuable in visualising the interrelations between codes and facilitated a more holistic understanding of the data.

The data was condensed into broader thematic headings by regrouping similar initial codes under new subthemes, resulting in the creation of seven subthemes. By building on the relationships between these subthemes, four comprehensive themes emerged. These themes were identified as the need to communicate with a suitable tool, engagement, working efficiently, and evaluating KOMP.

3.6.3. Meaning condensation

Drawing on Kvale and Brinkmann (2009, 2015), meaning condensation in phenomenology focuses on meaning coding and analysis. Each relevant meaning unit revealed a specific meaning in the participants' daily lives. Through condensation, the aim is to reduce the words of the original first-person narratives to shorter formulations that include the immediate meanings expressed by the participants. Searching for and reviewing themes were organised

similarly to thematic analysis. To identify and group similar ideas together into themes, the data was compared and reviewed multiple times until meaningful patterns emerged. Meaning condensation helps analyse interview transcripts by identifying natural meaning units and expressing the main themes. These themes can be used for broader interpretations and theoretical analyses (Kvale & Brinkmann, 2015).

Analysis of the individual interviews of older residents and their relatives included the following steps: reading the interviews repeatedly and carefully to form a general understanding of the data, finding the relevant meaning units (quotations) expressed by the participants, and their significance in their everyday life, restating the initial themes clearly, examining the relevance of the initial theme for each meaning unit, grouping similar experiences under the same sub-theme, and coalescing similar sub-themes into one essential theme. Three essential themes emerged: overcoming social distancing through adopting digital meetings, staying involved in each other's daily lives, and togetherness in a digital space.

3.7. Ethical consideration

The protection of human rights is basic in all types of research. In this thesis, all methods used were conducted according to the ethical principles for research outlined in the Helsinki Declaration (World Medical Association, 2013). The thesis underwent an evaluation by the Regional Committees for Medical and Health Research Ethics, who determined that the study fell outside their mandate. Further, the thesis received approval from the Data Protection Official for Research at the Norwegian Centre for Research Data (NSD), now known as Norwegian Agency for Shared Services in Education and Research (SiKt, reference 108323).

Before data collection, healthcare professionals received emails containing information about the study. The emails emphasised that participation was voluntary and that they could withdraw participation at any time. The emails contained a study description, an invitation to take part, a consent form, and contact information for both the main supervisor and myself. Emails were sent to healthcare managers, who then forwarded them to healthcare professionals in corresponding care facilities. Healthcare professionals agreed to participate and recruit older residents and their relatives who used KOMP. For residents' recruitment, healthcare professionals requested them to participate in the study. Healthcare professionals also requested relatives to participate when they visited their family members in the facility.

Older residents and their relatives in the care facility were informed that participation was voluntary and they had the option to withdraw from the study at any point. Regarding relatives

of home-dwelling older people, they received the same emails before data collection. All participants provided their informed consent, either written or verbal, based on adequate information, according to the Norwegian Personal Data Act. During participant observation, the observed group was made aware of the researcher's role and the purpose of the research.

According to the recommendations of the World Medical Association's Declaration of Helsinki (World Medical Association, 2013), all personal data in the thesis was anonymised to ensure the privacy and confidentiality of participants' information. The written informed consent forms and handwritten field notes were stored in a locked cabinet at the university. The audio-recorded files were encoded, and information on participants and municipalities was anonymised during transcription. The audio and digital text files were safely stored in my personal account in the university's Microsoft OneDrive.

3.8. The researcher's reflexivity

In qualitative research, 'researcher's reflexivity' refers to the process by which the researcher critically examines their own beliefs, biases, assumptions, and values that may influence the research process and outcomes. Reflexivity is an essential aspect of qualitative research, as it acknowledges that the researcher's presence and subjectivity can influence how the research is conducted, analysed, and interpreted (Creswell, 2014).

As a medical doctor with work experience in Egypt and Norway, I have benefited from my involvement in this PhD research in healthcare. It has expanded my knowledge and experiences beyond traditional clinical practices, specifically in caring for older patients facing social challenges. Unlike clinical practices that primarily focus on diagnosing and treating patients without delving into the introduction of care, this PhD project has provided insight into the efforts made to provide medical and social care despite understaffing and various technical, infrastructural, and financial challenges. Prior to this project, I had not realised the extent of the challenges that arise when using seemingly simple tools like KOMP with older adults. This newfound knowledge has been invaluable, offering me a deeper understanding of the complexities involved in providing care for this population.

In addition to my quantitative research background from my master's education, I have also acquired skills to conduct qualitative research which helped me shift my focus from number-driven findings to a more meaning-centred approach to participants' perspectives and their actions. Compared to working with rigid numbers, qualitative research enabled me to ask

questions that cannot be quantified to understand human experience and gain insights into people's opinions, thoughts, and beliefs.

Working in a Norwegian hospital paved the way for dealing with healthcare professionals, patients, their families, and ethical challenges associated with this context. However, conducting interviews and observations with unfamiliar people in a care facility was slightly stressful, particularly in the context of social distancing during the pandemic. A prior visit before the pandemic with the supervisors to this care facility was extremely helpful to get to know each other and reduce this stress. During this visit, we met the care facility leader, the technology facilitator, and some nurses and assistant nurses.

During this visit, the technology facilitator presented various welfare technologies and digital devices that were adopted in the care facility and their strategy to train the staff, residents, and their families to benefit from them. This introduction helped me become familiar with the care facility to conduct the first focus group interview together with the main supervisor who attended the interview and followed the discussions as a secretary. Experiences and training from the first focus group discussion helped me conduct the subsequent two discussions more efficiently.

During my observation, I was astonished by the ages of some frail residents over 95 years who received LTC. Some residents needed help in almost all daily activities, which created a work overload for their caregivers. The fact that there were residents over 90 years who used digital communication, even with some help, was remarkable.

4. Results

In this thesis, several themes and categories emerged to describe the participants' experiences and practices when they used technology-mediated communication to enhance social contact in care facilities in western Norway during the pandemic. The experiences of older people, relatives, and healthcare professionals provided knowledge on how and why communication technology was practiced in care facilities. The results generally encompass two main parts: practices and the value of digital communication.

The practices are described in the first and second papers, which highlight how healthcare professionals facilitated the use of digital communication. In the first paper, the practices included new routines and adaptations to facilitate social contact between older residents and their relatives during the pandemic. The second paper presents the practices developed by healthcare professionals to integrate communication technology regularly into their daily working tasks.

The value of digital communication and its meaningful properties were described in the three papers. In the first paper, most healthcare professionals found KOMP as an enjoyable and easy tool that helped maintain safe and frequent contact between older residents and their family members, despite the distance. The simple user interface of KOMP helped older people independently use it in care facilities and homes. Staff and relatives suggested that KOMP could help residents recall and converse about special and meaningful events potentially stimulating their memory. The second paper revealed the staff's understanding of the pressing need to communicate through a suitable digital tool and the perceived value of safe digital communication during social distancing. The third paper revealed a more detailed understanding of the value of digital communication from older people's and their relatives' perspectives, describing how it created new forms of social contact, fostering a sense of involvement and togetherness in digital spaces.

Overview of the results from the three papers are mentioned in the following sections.

4.1. Paper I

In March 2020, digital communication was extensively and rapidly used in several care facilities in western Norway. This sudden adoption of KOMP resulted in additional work routines and created unforeseen work responsibilities in the care facilities. The healthcare professionals offered KOMP to newly admitted residents and creatively adapted its use according to residents' needs and cognitive and physical abilities. For example, they used

pictures to calm residents and engaged them in friendly discussions about family photos. Before using KOMP, the staff committed to ensure its usability and feasibility, and after using it, they worked to solve unexpected events and minimise noise to keep the ward quiet. The use of KOMP necessitated cooperation among various actors, including older residents and their relatives, staff, and technology facilitators, each with different roles and responsibilities, to facilitate technology usage and enhance social contact.

4.2. Paper II

The adoption of digital communication tools by healthcare professionals was influenced by their understanding of the need for a tool with an inclusive design that catered for the capabilities and needs of older people, compared to other tools like iPads and smartphones. Healthcare professionals were motivated to learn and adopt communication technology into their daily practices to engage residents and their relatives. However, several obstacles were identified that could affect this engagement and influence the long-term use of communication technology. These obstacles included staff preferences, challenges in engaging residents with cognitive and physical decline, issues of privacy and ethical dilemmas associated with the use of the tool, and technical abilities of older relatives. The efficient integration of technology was facilitated by the supportive role of organisations, which provided the required training, economic resources, and IT infrastructure. Healthcare professionals assessed the impact of their use of communication tool on their working practices within the care facility.

4.3. Paper III

The adoption of digital communication in response to social distancing measures imposed by governments led to new forms of social interaction for older people and their relatives. Through digital communication, older people were able to perform their roles as parents and grandparents despite physical distance and establish intergenerational connections with their family members. The use of KOMP's photo and video functions enabled older adults and their relatives to stay involved in each other's daily lives and create a sense of a homely atmosphere through virtual meetings. These virtual interactions provided opportunities for both verbal and nonverbal communication, allowing for a sense of presence in preferred places, and creating meaningful and fulfilling social relationships.

5. Discussions

First, this chapter discusses the key findings of the three papers from the perspective of person-centredness. Then, it discusses the rigor and trustworthiness of the methodology adopted in this thesis to highlight the strengths and limitations of the research and measures taken to ensure the validity and reliability of the results.

5.1. Discussion of the findings

This section examines how healthcare professionals facilitated the use of KOMP to enhance social contact between older people and their families. This includes a discussion of the new practices from the perspective of PCC and the relationship of script perspectives and NPT constructs to these new practices. Examining these practices from the PCC perspectives can provide a lens through which to understand how healthcare professionals can work in a person-oriented way through facilitation of technology use and how digital communication can bring meaning and benefits to older adults.

The experiences of older people and their relatives, as well as the new practices of healthcare professionals, were interpreted through the lenses of script, NPT, and PCC. This enabled a deeper understanding of how KOMP can be a meaningful technology, and how modifications to digital communication usage can help older adults engage in valuable social activities, whether in LTC or private homes. Healthcare professionals added these adaptations to their schedules, demonstrating their commitment to facilitate technology use that exhibits person-centredness towards older residents' social needs, preferences, relationships, and communication values during the extraordinary circumstances of the pandemic. By approaching these facilitations and adaptations through the lens of person-centredness, new opportunities can arise for using technology-mediated communication to support PCC for older people.

Eklund et al. (2019) identified several meaningful attributes that describe PCC for older people including communication, individualised focus, engagement, relationships, and respect. Additionally, McCormack and McCance (2010) highlighted the importance of a caring environment in PCC. These attributes can provide insights into how healthcare professionals can facilitate technology use in a way that promotes PCC and improves social contact between older people and their families through KOMP. As per McCormack and McCance's (2017) recommendation, technology should be introduced and implemented within health and social care institutions with a person-centred approach. By adopting this method, the goal is to

enhance relationships among all stakeholders involved while also accommodating the diverse needs and preferences of older adults.

Communication is an important attribute of PCC and refers to a two-way interaction between care recipients and caregivers, involving sharing and communicating information (Eklund et al., 2019, p. 7). An interesting category of experiences coded as *paving the way for friendly talk* (Paper I), showed how displaying family photos on the screen provided an opportunity for friendly discussions between healthcare professionals and residents. Each time they entered the resident's room, there was always something to converse about, either family members or special events involving relatives.

Older persons often prefer talking about their families, as they recall valuable and favourite memories (Prebble et al., 2013). Here, the photo function helped healthcare professionals to know more about the person's background and valuable relationships. Additionally, it allowed the older person to show how meaningfulness of these relationships to them (Paper I). For older people in care settings, Nolan et al. (2004) developed a theoretical framework of PCC emphasising the importance of feeling valued and recognised through meaningful and satisfying relationships. A positive and friendly relationship between residents and staff is at the heart of best practices, which supports a focus on personhood for older persons (Kitwood & Brooker, 2019; McCormack & McCance, 2010; McCormack et al., 2021). Prioritising personhood and quality of life in this way can create a more homelike environment in LTC (Barken & Lowndes, 2018).

Good communication also allows caregivers to consider and reflect on the individual values of care recipients (McCormack & McCance, 2006; McCormack et al., 2021). Meaningful conversations between healthcare professionals and residents have been shown to improve behaviours and calm agitated residents (Stein-Parbury et al., 2012). However, due to heavy workloads, communication interactions in LTC settings may be short, infrequent, or fragmented, despite their importance in sustaining PCC (Kolanowski et al., 2006; Savundranayagam, 2014).

During video conversations facilitated by healthcare professionals, there were frequent interactions with relatives about the tool's workability and readiness leading to discussions about the residents' daily lives (Paper I). This increased the involvement of relatives in the care of their loved ones, as they were able to participate in the residents' daily lives in LTC. PCC emphasises the importance of situating individuals at the centre of care, considering their

history, context, family, strengths, and limitations (Ekman et al., 2011). This approach can foster collaborative relationships between healthcare professionals, residents, and family members (Barken & Lowndes, 2018). However, many LTC settings lack the necessary infrastructures to facilitate continuous engagement and involvement of family members (Barken & Lowndes, 2018).

When healthcare professionals engage in discussions with residents about their families through photos and video conversation, it becomes crucial to address the ethical implications, as it may potentially compromise the privacy of both the residents and their relatives. Therefore, it is essential to investigate how family members perceive being exposed to healthcare professionals through discussions on photos and video calls. Additionally, understanding to what extent healthcare professionals are permitted to access personal information about the residents and their families becomes paramount.

Growing concerns about online privacy and data security for older adults accompany the increased adoption of digital communication, especially when considering that many of them have lower digital literacy (Wahid et al., 2021; Zanchetta et al., 2022). Consequently, they become more vulnerable to online privacy and personal data security risks (Sheahan et al., 2022).

For instance, Ray (2022) found comparable risks among older adults who embraced video conversation technology during the pandemic. As many participants focused on overcoming technical hurdles, they tended to overlook privacy concerns and data security best practices. To address these challenges, Mortenson et al. (2015) highlight the importance of older adults being cautious about the information they share or modify when using online communication platforms, as this plays a pivotal role in safeguarding their privacy.

Person-centredness emphasises the importance of individualised care that accounts for each person's unique needs and abilities (Eklund et al., 2019, p. 8). For individuals with disabilities or limitations, modified and adaptive responses are necessary to facilitate their care (Wilberforce et al., 2017). A category named *adapting KOMP to different residents* (Paper I) revealed how digital communications using KOMP were facilitated and adapted to each resident according to their physical and cognitive abilities and social needs. This involved assessing each resident's ability to effectively use KOMP for video calling, messaging, and photo sharing, and adapting the device to meet their specific needs.

While KOMP was originally designed for independent use by older individuals at home with sufficient physical and cognitive abilities (No Isolation, 2021), frail residents in LTC settings required more assistance in operating the device. Even simple tasks, such as turning KOMP on and off, necessitated staff assistance (Paper I, II).

The adoption of communication technology among older adults is influenced by their physical and cognitive capabilities. A specific example from the care facility illustrates this point (Paper I), where a resident with impaired vision repeatedly dropped the KOMP on the floor due to being unable to see its placement. This example highlights that even seemingly easy-to-use devices like the KOMP have an embodied character, indicating that physical abilities and limitations significantly impact interactions with technology and place an additional workload on caregivers.

To meet the diverse needs of residents, healthcare professionals had to 'de-script' the technology usage (Akrich, 1997) by introducing novel work practices and adapting their approach to individual needs (Paper I). Conducting individual assessments became necessary to determine the level of staff intervention required for KOMP use. The individualised focus of PCC was thus supported by facilitating and adapting work practices to suit the needs of each resident.

Finkelstein et al. (2023) underscore the importance of personalised support and training for technology, with a focus on tailoring it to individual skills. Therefore, it is vital to introduce customised assistance and training programs that take into account an individual's interests and needs. Recently, several studies have explored simple and user-friendly technology for older adults. However, there are still fewer customised solutions specifically tailored to meet the unique needs of older adults (Ibarra et al., 2020).

Providing individualised care is a core principle of PCC; however, achieving this in practice can be challenging. In Paper I, an example was demonstrated regarding how healthcare professionals were able to achieve individualisation by facilitating video conversations for older residents with dementia while keeping their doors open, while residents without dementia had video calls more privately with closed doors. During busy days, staff sometimes had to keep the doors open for some residents to listen to incoming calls and provide help on demand. While this approach allowed staff to cater to the cognitive needs of each resident and facilitate the use of communication technology in different ways, it also raised ethical concerns about the privacy of both residents and their families. Healthcare professionals should balance the

need to provide individualised care with the need to maintain privacy and dignity for residents and their families.

Respecting privacy is central to personhood, and a breach of it may affect the long-term use of technology due to the reduced control over the private information of the residents and their families, and hence lacking trust and interest to use such technology. Despite the necessity of an individualised focus to support person-centredness, it is challenging due to heavy schedules and ethical issues. It is crucial to acknowledge that individualised care is not a one-size-fits-all approach, and healthcare professionals should be flexible and adaptable to meet each resident's unique needs.

Engagement is a key aspect of practicing PCC, as it refers to giving the caregiver's time to the older person, not just time in its objective sense (i.e., measured clock time), and fostering involvement and commitment (Eklund et al., 2019, p. 6). When it comes to utilising digital communication tools like KOMP in LTC, engagement takes on various forms and plays a crucial role in enhancing the overall experience.

Engagement began with healthcare managers encouraging healthcare professionals to try KOMP in their work and understand its application in activities with appropriate residents (Paper II). Subsequently, healthcare professionals actively engaged in learning, training, and adapting to new practices for utilising KOMP. They also found creative ways to engage the residents in social activities through digital communication, including sharing and discussing preferred pictures in a friendly and interactive manner with the involved staff (Paper I).

Moreover, the scope of engagement extended beyond just the residents themselves; it also encompassed their relatives. Healthcare professionals encouraged and involved them in using KOMP to facilitate social contact with residents, particularly during the challenging times of pandemic-induced social distancing measures (Paper II). These dedicated professionals motivated and guided the relatives, ensuring they were well-informed and equipped with the necessary information to utilise KOMP effectively.

Engagement helped stabilise technology practices in everyday life in care facilities during the pandemic, as indicated by the NPT construct of 'cognitive participation' (Paper II). Cognitive participation is a practice that helps the routine embedding of technology in daily life through engagement and involvement (May & Finch, 2009; May et al., 2015). Previous research has demonstrated that user engagement among older adults during technology adoption has facilitated the effective use of tablets, promoting person-centredness (Hung et al., 2018;

Shadarevian et al., 2020). The active participation and involvement of older individuals as significant actors in all phases of digital communication adoption and implementation should be recognised as a foundational element for any communication technology intervention (Todd et al., 2022). To achieve this, it is essential to understand older adults' attitudes, motivations, and opinions to learn and continue using technologies, ensuring continuous enrolment in training and usage (Diehl et al., 2022).

Although engagement was expressed in different ways, there were also threats to engagement (Paper II). These threats included a lack of technical expertise among healthcare professionals, reduced cognitive and physical abilities of residents, privacy and ethical issues, and technical skills of older relatives (Paper II). These factors can counteract staff engagement and affect its legitimisation or validity (Mair et al., 2012). They can also hinder the development and practice of person-centredness during the use of digital communication in LTC. Further research investigating these threats will be useful in understanding this topic.

The care environment is an important aspect of PCC as it sets the context for how care is provided and received, which affects the quality of engagement of healthcare professionals and residents (McCormack & McCance, 2010). This focus on the context in which care is introduced is complemented by supportive organisational systems (McCormack & McCance, 2010). A category, referred to as *organisational support* (Paper II) elucidated the vital role played by organisations in facilitating and stabilising the use of digital communication. Notably, healthcare managers hold a key position in motivating and engaging staff to embrace KOMP usage. Additionally, they facilitated essential training, strategic planning, and follow-up to ensure smooth and effective technology use. This organisational support further extended to encompass IT assistance, technical infrastructure maintenance, financing, and even providing a designated technology facilitator (Paper II).

In their study, Sjögren et al. (2017) emphasised the importance of organisational and environmental factors in supporting PCC in LTC homes. For healthcare managers and leaders aiming to promote PCC in daily practice, it is crucial to recognise their essential role in motivating, assisting, and guiding staff. Moreover, fostering PCC in residential care facilities involves tailoring the environments to align with the distinct abilities and needs of each individual resident (Sjögren et al., 2017).

Healthcare professionals highlight the importance of stable Wi-Fi connections and other essential infrastructure for maintaining consistent technology use. In line with the principles of

NPT, achieving productive technology usage is not solely reliant on motivated individuals; it necessitates collective action at the organisational level. In the LTC setting, a supportive organisation was created through a management structure that prioritised relationships, culture, values, communication, and professional responsibility. This establishment facilitated a stable care environment that allowed for the effective use of technology (Paper II).

While organisational support contributes to successful implementation, several challenges persist and hinder progress. Inadequate IT infrastructure and limited financial resources for technology development and purchase, along with staff's busy schedules and unfamiliarity with adapting to technological changes, have been identified as major obstacles to the effective implementation of technological infrastructure (Zander et al., 2021). Addressing these challenges is crucial to ensuring the successful integration of technology. Establishing a strong technological infrastructure, including stable internet connectivity and appropriate hardware and software, not only enables residents to meet their social needs by connecting with loved ones but also enhances their independence (Haase et al., 2021;Wilson et al., 2022; Zander et al., 2021).

The leadership in the care facility played an important role in establishing a flexible and supportive organisation by making resources available, motivating staff to incorporate KOMP into their daily work, and allowing the modification of practices according to each resident's needs (Paper II). This approach can assist healthcare professionals in working in a person-centred way through technology use. In support of this, Wilson et al., 2022, recommend using technologies in a person-centred approach within LTC to enhance technology adoption. Previous studies also emphasise the significance of a flexible and supportive organisation in enabling person-centredness (Boomer & McCormack, 2008; McCormack, McCance, 2010; McCormack et al., 2021).

Respect is another attribute of PCC and refers to dealing with individuals in a respectful way, including respecting their beliefs, preferences, values, and dignity (Eklund et al., 2019, p. 6). Working with persons' beliefs and values promotes principles of PCC, as it helps develop a comprehensive understanding of what matters to the person (McCormack & McCance, 2010). In the context of older adults using KOMP, their relatives and healthcare professionals demonstrated respect in different ways. For example, Paper III showed how parents, grandparents, and spouses maintained social contact with their relatives through KOMP, even without talking in some cases. Older persons with speech or hearing disabilities communicated

nonverbally through video conversations with their family members. Therefore, relatives expressed respect for their parents or grandparents and preserved their roles in their families' lives, which was highly valued by the residents. Sustaining these familial bonds holds paramount importance for older adults, contributing to their sense of belonging and social well-being (O'Rourke & Sidani, 2017).

Children and grandchildren found time to see their parents and grandparents and talk with them despite their health limitations, which connotes respecting older adults' need for social contact. Older people liked to see and follow their children and grandchildren in doing different activities. Digital communication provided older persons and their relatives with a new form of social contact during the pandemic, overcoming distance and health limitations, which enhances the perception of older adults as individuals by preserving their respect, recognition, and dignity (Paper III).

Older persons who independently used the tool could further enhance their independence and maintain their respect and dignity, despite their health limitations. When using KOMP without relying on external help from formal and/or informal caregivers, they could decide when, how, and for how long they would digitally communicate with their family members. This independent use of technology may strengthen the autonomy and self-esteem of older adults, thus supporting person-centredness. Communication technology offers numerous benefits for the elderly, enabling them to maintain social engagement and enjoy a higher quality of daily life. By leveraging such technology, older adults can preserve their independence, dignity, and autonomy, while also enhancing their social participation (Blazun et al., 2012).

However, for those who require assistance starting a video conversation, other factors may limit their use of communication technology, including staff capacity and relatives' availability, which may degrade one's self-esteem. Healthcare professionals supported older residents who needed extra help to communicate through video conversation, despite the required time and effort during busy days (Paper I). This exhibited their respect for older residents' need for social contact during the pandemic. Healthcare professionals also understood and respected residents' needs and values to stay calm in the facility. One category, *displaying pictures to calm down residents* (Paper I), revealed how healthcare professionals used the photo function to settle down restless residents. They found that displaying specific pictures could be useful in calming down an agitated person. They were familiar with residents' backgrounds, allowing them to understand who this person was and what could be valued by

them according to their needs. This level of respect for what is valuable to each person is essential in developing a person-centred approach to care.

These examples demonstrate how facilitation of technology use can support healthcare professionals' orientation towards PCC, enabling them to fulfil resident's needs, preferences, and values despite their hectic schedule during the pandemic.

Establishing relationships with others is a crucial element of PCC. Humans are social beings, and their social world is central to their lives, including their health and well-being (McCormack & McCance, 2010; McCormack et al., 2021). The use of virtual contact helped older people and their relatives create meaningful social interrelationships within the family. Through the exchange of pictures and daily discussions via video conversation (Paper III), they became actively involved in each other's lives, fostering connections between grandparents, parents, children, grandchildren, and spouses. They sustained these bonds through the sharing of special snapshots they mutually valued. These digital meetings stimulated and eased cross-generational connections with distant family members, which would have been difficult to achieve without technology during the pandemic. Social technologies, including video-conferencing, played a crucial role in bridging the physical distance and combating isolation among older residents. Video conversations have been found to enhance connectivity between residents and their families (Chu et al., 2020; Hajek & König, 2021; Robic & Rotar, 2021; Shrader et al., 2021; Todd et al., 2022).

Person-centredness emphasises the quality of relationships that are mutual, supportive, and empowering to the person (Gabrielsson et al., 2015; McCormack et al., 2021). Amidst the challenges posed by social distancing during the pandemic, digital communication has emerged as a valuable tool, enabling older individuals and their families to create meaningful connections and relationships, thereby contributing positively to PCC practices. These valuable relationships not only enrich their social lives but also enable healthcare professionals to become familiar with residents' close contacts, who can be reached and notified when necessary.

Despite the advantages of digital communication, a study conducted by Cone and Lee (2023) uncovered contrasting findings. They observed that higher reliance on communication technology during the pandemic had an adverse impact on the emotional well-being of older adults compared to in-person interactions. The researchers argued that maintaining quality relationships through digital communication proved to be challenging.

During the pandemic, digital communication has had both positive and negative implications for older adults showcasing the significance of well-designed and thoughtful technology integration in supporting their social well-being.

5.2. Methodological discussion

In this section, the research methodology will be discussed in terms of rigor and trustworthiness. Rigor and trustworthiness are important considerations in qualitative research to establish the credibility and validity of the findings (Cypress, 2017; Thomas & Magilvy, 2011). Qualitative research is often criticised for lacking scientific rigor and accuracy compared to quantitative research, which uses objective experimental methods (Mays & Pope, 1995).

Some criticisms of qualitative research include the reliance on personal and subjective accounts rather than facts, susceptibility to researcher bias, and limited generalisability due to the comprehensive information about a single phenomenon or context with a small sample size (Koch & Harrington, 1998). While it may be difficult to generalise the findings from one qualitative study, multiple qualitative studies discussing the same issue can help identify common themes and views about it (Ring et al., 2011). Therefore, trustworthiness of qualitative research lies in its ability to provide in-depth and comprehensive insights into complex phenomena that may not be fully captured by quantitative research methods.

Rigorous qualitative research involves a systematic and comprehensive approach to data collection, analysis, and interpretation to establish the credibility, dependability, transferability, and confirmability of the findings (Cypress, 2017; Schwandt et al., 2007). These four criteria as presented by Lincoln and Guba (1985), are commonly used to evaluate and enhance rigor and trustworthiness in qualitative research (Schwandt et al., 2007). In the following section, these criteria will be discussed to highlight the strengths and limitations of the methods used in this thesis.

Credibility:

Credibility is the criterion that allows others to recognise the included experiences within the study by assessing the representativeness of the data (Thomas & Magilvy, 2011). To enhance the credibility of this research, various strategies were used to reflect the experiences of the participants, particularly, in recruitment, data collection, and data analysis. The recruitment methods were thoroughly described, providing details such as the number of participants, their

gender, profession, age, and the method and location of interviews, according to the integrated criteria for reporting qualitative research (Tong et al., 2007).

In data collection, a combination of different methods–individual interviews, focus group discussions, and observations, was employed to gather data on the use of communication technology among older people during the pandemic. This helped ensure that multiple methods produced similar data and conclusions, and enabled the consideration of data from different perspectives (Laumann, 2020). The interview guides included open-ended questions, including iterative questions, to support the credibility of the informants' answers during the open conversations (Shenton, 2004).

In data analysis, the purpose of each analysis was defined, and the methods of data analysis were thoroughly presented and described to help the reader follow the steps. Data from all informants were included and described within a transparent process from data analysis to conclusion.

Dependability:

A study is dependable or reliable when another researcher can follow the methods used by the researcher. One approach to establish dependability is, for instance, having peers participate in the analysis process (Thomas & Magilvy, 2011). This was done by reading of all transcripts and field notes by the main supervisor and me. Additionally, all authors reviewed and agreed on the coding process and interpretation of the data, ensuring that the categories appropriately covered the data (Laumann, 2020). Additionally, a study is considered dependable when its findings can be replicated with similar informants in similar contexts (Patton, 2015). Documenting the research setting by describing the care facility in detail in the period of observation, data collection methods, and details of the involved healthcare professionals supports dependability of the findings by helping readers understand the methods used in the study.

Transferability:

Transferability refers to the extent to which the findings of a study can be applied to other contexts (Houghton et al., 2013; Thomas & Magilvy, 2011). For this, it is essential to provide adequate details about the context under investigation so that readers can evaluate whether the findings are applicable to their own situations (Houghton et al., 2013; Thomas & Magilvy, 2011). One way to enhance transferability is by using thick descriptions that provide rich and detailed information about the participants and their experiences. In the third paper, thick

descriptions were used to uncover and report the meanings of the experiences of older people and their relatives. This approach enables readers to gain a thorough understanding of the phenomenon under study and helps compare it with other similar situations, which supports transferability (Polit & Beck, 2021). In the second paper, selecting a single care facility as a case study and providing a detailed description of its context and limitations, supports transferability to similar contexts.

Confirmability:

Confirmability in research refers to the extent to which the data collected and presented are reflective of the participants' perspectives, rather than the researcher's biases or preconceptions (Polit & Beck, 2021). This is typically established when credibility, transferability, and dependability have been demonstrated (Thomas & Magilvy, 2011). To ensure confirmability in the studies, codes and categories were presented through tables and figures demonstrating the inductive process of the data analysis, starting from quotes, initial themes, and subthemes to the main themes (Shenton, 2004). This helps readers understand how the themes emerged from the data and how they related to the participants' experiences. Furthermore, the findings in the three papers were presented by inserting several rich, vivid quotes or citations in the analysis and in the results section to provide evidence for the validity and confirmability of the findings (Cope, 2014; Korstjens & Moser, 2018). To minimise the potential bias (Laumann, 2020), I tried to openly reflect on the participants' data throughout the research process, using their own views during analysis of the data and reporting of the results.

Limitations:

The challenges posed by the pandemic limited the recruitment of more residents from additional care facilities and restricted the physical interviewing of older adults who lived at home. Consequently, the third study has a small sample size of older residents, presenting a limitation. Additionally, due to health conditions, healthcare professionals recommended that only four residents be interviewed from the observed facility. Despite the small sample size, there has not been a significant disagreement in opinions among residents, their relatives, and healthcare professionals.

In the third study, the sample size consisted of 17 participants, four of whom were residents. Although the sample size of older residents was small, it is important to consider the adequacy of sample size in phenomenological studies can vary depending on the study design and research questions. According to some sources in the qualitative research literature, a small

sample size between eight and twelve can be adequate, and some more radical views suggest that even a sample size of one person may be sufficient (Marshall et al., 2013; Sim et al., 2018).

Another limitation of the third study is the inclusion of two short individual interviews, lasting only five and eleven minutes. These brief interviews deviate from the standard duration required for in-depth phenomenological interviews, which often last from 30 minutes to over an hour (Corbin & Strauss, 2008; Patton, 2015; Tanwir et al., 2021). The brevity of these two interviews can be attributed to specific circumstances. Both interviews involved older spouses (over 85 years) of residents in the care facility.

The first interview was conducted over the phone with an older man who had a hearing disability, which presented challenges that resulted in a very short interview lasting only five minutes. However, the second interview, with an older woman, took place at the stairway landing of the care facility during the pandemic, where relatives visited residents. The open and noisy setting, with healthcare staff passing by, could potentially compromise the participant's privacy, leading to a short 11-minute interview. Selecting a quiet setting is advantageous to maintain confidentiality, enabling the researcher and participant to fully engage in the discussion, and ensure precise audio recording (Gill and Baillie, 2018).

As a consequence of these two short interviews, the mean interview length, when combined with other individual interviews, was calculated to be 16 minutes. Although these interviews deviate from the traditional format of in-depth interviews, they have yielded meaningful insights. The essence of phenomenology lies in uncovering the underlying meaning of lived experiences. Participants were engaged and shared their experiences, opinions, and sentiments regarding the use of technology and its impact on their daily lives during the period of social distancing. Their narratives aided in comprehending how KOMP became a meaningful tool in their everyday lives.

In the third study, conducting individual interviews over the phone promoted a sense of privacy and encouraged participants to openly share their personal feelings. However, it is worth noting that telephone interviews lacked visual cues, potentially limiting effective interaction between the interviewer and interviewee (Novick, 2008).

The limitation of recruiting only women in the sample of older residents is also acknowledged in the third study, as it might have resulted in a lack of heterogeneity. Due to the gender distribution of older adults in municipal LTC homes in Norway and due to the longer life expectancy of women compared to men, resulting in greater number of female residents than

male residents (Leknes & Løkken, 2022). Although interviewing more men could have potentially offered additional perspectives and experiences on the use of KOMP, this was not possible due to the poor representation of male participants. Therefore, future studies should pay more attention to gender balance and the gender dynamics of KOMP users to ensure a comprehensive understanding of the technology's impact.

The use of the same semi-structured interview guide for both focus group and individual interviews with healthcare professionals can be considered a limitation in the first and second studies. Employing a specific guide for individual interviews would have allowed for a more personalised and in-depth data collection, ultimately enhancing the quality of the findings (Kruger et al., 2019). Using a guide for individual interviews would have facilitated a more nuanced exploration of participants' responses, capturing rich, context-specific information, and contributing to a more valid study outcome.

However, this limitation was addressed by incorporating complementary and detailed questions based on the ongoing interaction with each participant. This approach contributed to eliciting in-depth information from the participants during individual interviews, allowing them to freely express their personal perspectives and sentiments.

Although observation is a valuable method for collecting data on participants' behaviour and interactions with technology, it is prolonged, time-consuming, and costly, and requires a sufficient amount of time to extract precise and informative outcomes. Limitations associated with observation include the short period of observation and personal bias, which might lead to different understandings and perceptions of the same scene or event by different observers. However, the observation in this research provided a considerable amount of data that supported and validated the data collected from interviews, which can help reduce readers' concerns about researcher bias (Patton, 2015). Future studies should consider longer observation periods or alternative methods for collecting data on participants' behaviour and interactions with technology.

6. Conclusions, implications, and future research

6.1. Conclusions

This thesis provides insight into the additional work done by healthcare professionals to facilitate and promote social contact between older people and their relatives using technology-mediated communication during the pandemic. Healthcare professionals demonstrated adaptability in their practices to accommodate the individual needs and capabilities of each resident, as resources permitted. Healthcare professionals and residents' relatives engaged to promote valuable social communication and relationships between older residents and their families. Healthcare professionals modified and adapted technology practices based on each resident's health status and social requirements, which highlights their focus on individualised care.

To facilitate technology usage effectively, a supportive care environment that encourages active engagement is essential. However, various obstacles including hectic schedules, ethical dilemmas, barriers to engagement, and lack of organisational support can hinder the facilitation of work practices. Facilitating the use of digital communication among residents in long-term care can help healthcare professionals meet residents' social needs and values in a person-oriented way.

Interpreting this additional work through the lenses of person-centredness, script theory, and normalisation process theory revealed the meaningful role of KOMP as a technology. Person-centred care provided insight into how digital communication enables the creation of novel and valuable forms of social contact between older people and their families during the pandemic. It also helps to understand how healthcare professionals can effectively facilitate technology usage in a person-oriented manner. Script theory played a crucial role in examining how new technology routines were adapted and modified to facilitate individualised social contact for residents in different situations. The normalisation process theory has helped examine and interpret how technology practices are partially embedded as a normal part of daily routines.

6.2. Implications for practice

This thesis has emphasised the role of technology-mediated communication for social contact in the daily lives of older people and their relatives and the role of healthcare professionals in LTC settings during the pandemic. It is expected that organisations will adopt digital communication to strengthen social contact between older people and their families.

The knowledge presented in this thesis can be useful at multiple levels of health services including the micro-, meso-, and macro-levels, particularly during an extraordinary period such as the pandemic. The effects of employing digital communication for older people in LTC homes can benefit them and their relatives, and healthcare professionals at the micro level (i.e., the individual level). The thesis emphasises the need for individualised focus and adapting technology practices according to residents' needs and abilities in a way that can benefit older people. Consequently, relatives can benefit when their family members receive the best care.

The thesis emphasises the urgent need for social communication between older people and their families during and beyond the pandemic and highlights the importance of maintaining relationships through new forms of social contact enabled by technology. Healthcare professionals should prioritise the residents' needs for social contact alongside other care practices.

At the meso-level, which includes the institution and technology developers, this thesis provides valuable real-world experience and insights into the utilisation of communication technology during a hectic period. This knowledge can benefit healthcare managers and professionals at LTC organisations by providing them with best practices for technology use. Technology developers can improve the design of existing technology based on the insights provided. Paper II emphasises the important supporting role that organisations play in effectively using technology, and how care settings practice technology during crisis. Healthcare managers in other institutions may pay attention to staff's diverse preferences and technical skills, as mentioned in Paper II, to better understand their strengths and weaknesses and identify improvement areas for healthcare professionals.

Additionally, Paper I and II disclosed the role of activity managers and technology facilitators in LTC as facilitators of technology usage. The activity manager was responsible for engaging residents in social and physical activities, while the technology facilitator played an important role in training healthcare professionals on how to use the new devices and solve the technical issues. These findings can be encouraging for other institutions to start adopting new technology, as they can follow these facilitations.

The experiences and findings from this thesis can be applied to other care facilities that share a similar care context. The thesis focused on the limitations and frailty of older residents to reveal their realistic health status during technology use and to highlight the expectations that healthcare professionals and technology developers should have regarding older people's

abilities. This may explain why most of these technologies are not widely applied. Therefore, it is recommended to lower expectations when designing technology for older people with reduced abilities to ensure that the technology is accessible and useful for them.

At the macro-level, this thesis provides insights into important topics for affluent societies, such as Norway, including demographic changes, an aging population, and a growing need for LTC. The thesis highlights central barriers to technology use in LTC, including understaffing and tight schedules, which affect not only individual residents but also the broader society. It emphasises the need for older people to maintain social contact, both in person and digitally, in a way that is valuable to society.

6.3. Suggestions for further research

This thesis studied the use of technology-meditated communication to promote social contact between older people and their relatives in LTC during the pandemic. However, there is a need for further longitudinal studies that examine the long-term impact of this technology on the working environment and caring practices in LTC.

The findings of Paper III were discussed theoretically using the PCC framework. Nevertheless, conducting feasibility studies to assess the potential of novel technologies in supporting PCC would offer insights into other creative adaptations and facilitations that healthcare professionals can undertake during technology use. In this context, researching how the facilitation of technology use can promote a person-oriented approach could open new avenues for investigation.

The thesis highlighted various barriers to facilitating technology use that may adversely affect the social contact between older people and their families. Further research is required to explore these barriers and understand their impact on technology practices in LTC. By doing so, we can better understand the hindering factors and develop effective strategies to overcome them.

References

Abrams, K. & Gaiser, T. (2016). Online focus groups. In Field N, Lee R, Blank G (Eds.). *The SAGE Handbook of Online Research Methods* (pp. 435–450). London: Sage Publications.

Agerfalk, P., Conboy, K. & Myers, M. (2020). Information systems in the age of pandemics: COVID-19 and beyond. *European Journal of Information Systems*, *29*(3), 203-207. https://doi.org/10.1080/0960085X.2020.1771968

Akrich, M. & Latour, B. (1992). A summary of a convenient vocabulary for the semiotics of human and nonhuman assemblies. In Bijker, W & Law, J. *Shaping Technology/ Building Society Studies in Sociotecnical Change* (pp.259-264). The MIT Press

Akrich, M. (1997). The de-scription of technical objects. In J. Law & W. Bijker (Eds.). *Shaping Technology/Building Society: Studies in Sociotechnical Change* (pp. 205-224). MIT Press.

Alzheimer's Society. (2020, June). *Thousands of people with dementia dying or deteriorating not just from coronavirus as isolation takes its toll. Alzheimer's Society.* https://www.alzheimers.org.uk/news/2020-06-05/thousands-people-dementia-dying-or-deterioratingnot-just-coronavirus-isolation

Armitage, R., & Nellums, L. B. (2020). COVID-19 and the consequences of isolating the elderly. *Lancet Public Health*, *5*(5), e256. https://doi.org/10.1016/S2468-2667(20)30061-X

Banskota, S., Healy, M., & Goldberg, E. M. (2020). 15 smartphone apps for older adults to use while in isolation during the Covid-19 pandemic. *Western Journal of Emergency Medicine*, *21*(3), 514–525. https://doi.org/10.5811/westjem.2020.4.47372

Barken, R., & Lowndes, R. (2018). Supporting family involvement in long-term residential care: promising practices for relational care. *Qualitative Health Research*, *28*(1), 60–72. https://doi.org/10.1177/1049732317730568

Berg-Weger, M., & Morley, J. E. (2020). Loneliness and social isolation in older adults during the COVID-19 pandemic: implications for gerontological social work. *The Journal of Nutrition, Health & Ageing, 24*(5), 456–458. https://doi.org/10.1007/s12603-020-1366-8

Bingham, A.J., & Witkowsky, P. (2022). Deductive and inductive approaches to qualitative data analysis. In C. Vanover, C., Mihas, P., & Saldaña, J. (Eds.). *Analyzing and interpreting qualitative data: After the interview* (pp. 133-146). SAGE Publications.

Blažun, H., Saranto, K., Kokol, P., & Vošner, J. (2012). Information and communication technology as a tool for improving physical and social activity of the elderly. NI 2012: 11th International Congress on Nursing Informatics, June 23-27, 2012, Montreal, Canada. International Congress in Nursing Informatics (Montreal, Quebec), 2012, 26.

Boomer, C., & McCormack, B. (2008). 'Where are we now?' a process for evaluating the context of care in practice development. *Practice Development in Health Care*, *7*(3), 123–133. https://doi.org/10.1002/pdh.258

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2022). *Thematic analysis: a practical guide.* SAGE Publications Ltd. Los Angeles, California.

Brodersen, S., Hansen, M., and Lindegaard, H. (2015). Script of healthcare technology: do designs of robotic beds exclude or include users? *Design Issues, 31*(2),16-28. https://doi.org/10.1162/DESI_a_00319

Brooke, J., & Clark, M. (2020). Older people's early experience of household isolation and social distancing during COVID-19. *Journal of Clinical Nursing*, *29*(21–22), 4387–4402. https://doi.org/10.1111/jocn.15485

Brown, L., Mossabir, R., Harrison, N., Brundle, C., Smith, J., & Clegg, A. (2021). Life in lockdown: a telephone survey to investigate the impact of COVID-19 lockdown measures on the lives of older people (≥75 years). *Age Ageing*, *50*(2), 341–346. https://doi.org/10.1093/ageing/afaa255

Brownie, S., & Nancarrow, S. (2013). Effects of person-centered care on residents and staff in aged-care facilities: a systematic review. *Clinical Interventions in Aging*, *8*, 1–10. https://doi.org/10.2147/CIA.S38589

Burholt, V., Percival, J., & Morgan, D. J. (2023). Communication technologies in older people's long-distance family relationships, and the impact on isolation and loneliness. *Information, Communication & Society.* https://doi.org/10.1080/1369118X.2023.2230246

Carroll, N., & Conboy, K. (2020). Normalising the "new normal": changing tech-driven work practices under pandemic time pressure. *International Journal of Information Management, 55,* 102186. https://doi.org/10.1016/j.ijinfomgt.2020.102186

Chen, Y. R., & Schulz, P. J. (2016). The effect of information communication technology interventions on reducing social isolation in the elderly: a systematic review. *Journal of Medical Internet Research*, *18*(1), e18. https://doi.org/10.2196/jmir.4596

Choi M. (2020). Association of eHealth use, literacy, informational social support, and health-promoting behaviors: mediation of health self-efficacy. *International Journal of Environmental Research and Public Health*, *17*(21), 7890. https://doi.org/10.3390/ijerph17217890

Choi, N. G., Hammaker, S., DiNitto, D. M., & Marti, C. N. (2022). COVID-19 and loneliness among older adults: associations with mode of family/friend contacts and social participation. *Clinical Gerontologist*, *45*(2), 390–402. https://doi.org/10.1080/07317115.2021.2013383

Chu, C. H., Donato-Woodger, S., & Dainton, C. J. (2020). Competing crises: COVID-19 countermeasures and social isolation among older adults in long-term care. *Journal of Advanced Nursing*, *76*(10), 2456–2459. https://doi.org/10.1111/jan.14467

Chu, C. H., Wang, J., Fukui, C., Staudacher, S., A Wachholz, P., & Wu, B. (2021). The impact of covid-19 on social isolation in long-term care homes: perspectives of policies and strategies from six countries. *Journal of Aging & Social Policy*, *33*(4-5), 459–473. https://doi.org/10.1080/08959420.2021.1924346

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, *26*(2), 120-123.

Cone, N., & Lee, J. E. (2023). Older adult communication types and emotional well-being outcomes during COVID-19 pandemic. *BMC Geriatrics*, *23*(1), 178. https://doi.org/10.1186/s12877-023-03856-8

Cope, D. G. (2014). Methods and meanings: credibility and trustworthiness of qualitative research. *Oncology Nursing Forum*, *41*(1), 89–91. https://doi.org/10.1188/14.ONF.89-91

Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: techniques and procedures for developing grounded theory*. Sage, Thousand Oaks. https://doi.org/10.4135/9781452230153

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., Petticrew, M., & Medical Research Council Guidance (2008). Developing and evaluating complex interventions: the new medical research council guidance. *BMJ (Clinical Research ed.)*, *337*, a1655. https://doi.org/10.1136/bmj.a1655

Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches.* (4th ed.). Thousand Oaks, California, SAGE Publications.
Creswell, J.W. (2013). *Qualitative inquiry & research design: choosing among the five approaches.* Thousand Oaks, CA: Sage Publications, Inc.
Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology*, *11*, 100. https://doi.org/10.1186/1471-2288-11-100
Cypress B. S. (2017). Rigor or reliability and validity in qualitative research: perspectives, strategies, reconceptualization, and recommendations. *Dimensions of Critical Care Nursing*: DCCN, *36*(4), 253–263. https://doi.org/10.1097/DCC.0000000000000253
Dahlberg H. & Dahlberg K.(2019). Open and reflective lifeworld research: a third way. *Qualitative Inquiry, 26*(5), 458–64. https://doi.org/10.1177/1077800419836696
Dahlberg, K., Dahlberg, H., & Nyström, M. (2008). *Reflective lifeworld research*. Lund: Studentlitteratur.
Davidsen A. S. (2013). Phenomenological approaches in psychology and health sciences. *Qualitative Research in Psychology*, *10*(3), 318–339. https://doi.org/10.1080/14780887.2011.608466
DeWalt, K. M., & DeWalt, B. R. (2011). *Participant observation: a guide for fieldworkers.* (2nd ed.). AltaMira Press.
Díaz-López, M. d. P., López-Liria, R., Aguilar-Parra, J. M., & Padilla-Góngora, D. (2016). Keys to active ageing: new communication technologies and lifelong learning. *Springerplus*, *5*(1), 1–8. https://doi.org/10.1186/s40064-016-2434-8
Diehl, C., Tavares, R., Abreu, T., Almeida, A. M. P., Silva, T. E., Santinha, G., Rocha, N. P., Seidel, K., MacLachlan, M., Silva, A. G., & Ribeiro, O. (2022). Perceptions on extending the use of technology after the COVID-19 pandemic resolves: a qualitative study with older adults. *International Journal of Environmental Research and Public Health, 19*(21), 14152. https://doi.org/10.3390/ijerph192114152
Edelman, L. S., McConnell, E. S., Kennerly, S. M., Alderden, J., Horn, S. D., & Yap, T. L. (2020). Mitigating the effects of a pandemic: facilitating improved nursing home care delivery through technology. *JMIR Aging*, *3*(1), e20110. https://doi.org/10.2196/20110
Edvardsson, D. P., Winblad, B., & Sandman, P. O. P. (2008). Person-centred care of people with severe Alzheimer's disease: current status and ways forward. *Lancet Neurology*, *7*(4), 362–367. https://doi.org/10.1016/S1474-4422(08)70063-2
Eghtesadi M. (2020). Breaking social isolation amidst covid-19: a viewpoint on improving access to technology in long-term care facilities. *Journal of the American Geriatrics Society*, *68*(5), 949–950. https://doi.org/10.1111/jgs.16478
Eklund, J. H., Holmström, I. K., Kumlin, T., Kaminsky, E., Skoglund, K., Höglander, J., Sundler, A. J., Condén, E., & Summer Meranius, M. (2019). "Same same or different?" a review of reviews of person-centered and patient-centered care. *Patient Education and Counseling*, *102*(1), 3–11. https://doi.org/10.1016/j.pec.2018.08.029
Ekman, I., Swedberg, K., Taft, C., Lindseth, A., Norberg, A., Brink, E., Carlsson, J., Dahlin-Ivanoff, S., Johansson, I.-L., Kjellgren, K., Lidén, E., Öhlén, J., Olsson, L.-E., Rosén, H., Rydmark, M., & Sunnerhagen, K. S. (2011). Person-centered care — ready for prime time. *European Journal of Cardiovascular Nursing*, *10*(4), 248–251. https://doi.org/10.1016/j.ejcnurse.2011.06.008
Elo, S., & Kyngas, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x
Eskilsson, C., Hörberg, U., Ekebergh, M., Lindberg, E. & Carlsson, G. (2015). Caring and learning intertwined in supervision at a dedicated education unit – a

phenomenological study. *Reflective Practice*, *16*(6), 753-764. https://doi.org/10.1080/14623943.2015.1095726

Evans SB, Bray J, and Evans SC. (2017). The iPad project: introducing iPads into care homes in the UK to support digital inclusion. *Gerontechnology*, *16*(2), 91-100. https://doi:10.4017/ gt.2017.16.2.004.00

Finch, Girling, M., May, C. R., Mair, F. S., Murray, E., Treweek, S., McColl, E., Steen, I. N., Cook, C., Vernazza, C. R., Mackintosh, N., Sharma, S., Barbery, G., Steele, J., & Rapley, T. (2018). Improving the normalization of complex interventions: part 2-validation of the NoMAD instrument for assessing implementation work based on normalization process theory (NPT). *BMC Medical Research Methodology*, *18*(1), 135–135. https://doi.org/10.1186/s12874-018-0591-x

Finch, R. T., Girling, M., Mair, F. S., Murray, E., Treweek, S., McColl, E., Steen, I. N., & May, C. R. (2013). Improving the normalization of complex interventions: measure development based on normalization process theory (NoMAD): study protocol. *Implementation Science*, *8*(1), 43–43. https://doi.org/10.1186/1748-5908-8-43

Finkelstein, R., Wu, Y., & Brennan-Ing, M. (2023). Older adults' experiences with using information and communication technology and tech support services in New York City: findings and recommendations for post-pandemic digital pedagogy for older adults. *Frontiers in Psychology*, *14*, 1129512. https://doi.org/10.3389/fpsyg.2023.1129512

Finlay, L. (2012). Debating phenomenological research methods. In N. Friesen, T. Saevi, & C. Henriksson (Eds.). *Hermeneneutic phenomenology in education: method and practice* (pp. 17–37). Rotterdam: Sense Publishers.

Flick, U. (2022). *An Introduction to Qualitative Research.* (7th ed.). SAGE.

Francis, J., Rikard, R. V., Cotten, S. R., & Kadylak, T. (2019). Does ICT use matter? how information and communication technology use affects perceived mattering among a predominantly female sample of older adults residing in retirement communities. *Information, Communication & Society*, *22*(9), 1281–1294. https://doi.org/10.1080/1369118X.2017.1417459

Fredriksen, E., Thygesen, E., Moe, C. E., & Martinez, S. (2021). Digitalisation of municipal healthcare collaboration with volunteers: a case study applying normalization process theory. *BMC Health Services Research*, *21*(1), 410. https://doi.org/10.1186/s12913-021-06429-w

Fuglsang, L., & Rønning, R. (2014). *Framing innovation in public service sectors: A contextual approach* (pp. 15-31). Routledge. https://doi.org/10.4324/9781315885612-8

Gabrielsson, S., Sävenstedt, S., & Zingmark, K. (2015). Person-centred care: clarifying the concept in the context of inpatient psychiatry. *Scandinavian Journal of Caring Sciences*, *29*(3), 555–562. https://doi.org/10.1111/scs.12189

Gallistl, V., Seifert, A., & Kolland, F. (2021). COVID-19 as a "digital push?" research experiences from long-term care and recommendations for the post-pandemic era. *Frontiers in Public Health, 9,* 660064. https://doi.org/10.3389/fpubh.2021.660064

Giebel, C., Cannon, J., Hanna, K., Butchard, S., Eley, R., Gaughan, A., Komuravelli, A., Shenton, J., Callaghan, S., Tetlow, H., Limbert, S., Whittington, R., Rogers, C., Rajagopal, M., Ward, K., Shaw, L., Corcoran, R., Bennett, K., & Gabbay, M. (2021). Impact of COVID-19 related social support service closures on people with dementia and unpaid carers: a qualitative study. *Aging and Mental Health*, *25*(7), 1281–1288. https://doi.org/10.1080/13607863.2020.1822292

Gill, P., & Baillie, J. (2018). Interviews and focus groups in qualitative research: an update for the digital age. *British Dental Journal*, 10.1038/sj.bdj.2018.815. Advance online publication. https://doi.org/10.1038/sj.bdj.2018.815

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal*, *204*(6), 291–295. https://doi.org/10.1038/bdj.2008.192

Goethals, L., Barth, N., Guyot, J., Hupin, D., Celarier, T., & Bongue, B. (2020). Impact of home quarantine on physical activity among older adults living at home during the COVID-19 pandemic: qualitative interview study. *Journal of Medical Internet Research*, *22*(5), e19007. https://doi.org/10.2196/19007

Golinelli, D., Boetto, E., Carullo, G., Nuzzolese, A. G., Landini, M. P., & Fantini, M. P. (2020). Adoption of digital technologies in health care during the covid-19 pandemic: systematic review of early scientific literature. *Journal of Medical Internet Research, 22*(11), e22280. https://doi.org/10.2196/22280

Goodman C., & Evans C. (2015). Focus Groups. In Gerrish K., Lathlean J. (editors). *The research process in nursing* (pp. 401–412). Oxford: Wiley Blackwell.

Granja, C., Janssen, W., & Johansen, M. A. (2018). Factors determining the success and failure of eHealth interventions: systematic review of the literature. *Journal of Medical Internet Research*, *20*(5), 1–21. https://doi.org/10.2196/10235

Greenwood-Hickman, M.A., Dahlquist, J., Cooper, J., Holden, E., McClure, J.B., Mettert, K.D., Perry, S.R., and Rosenberg, D.E. (2021). "They're Going to Zoom It": a qualitative investigation of impacts and coping strategies during the covid-19 pandemic among older adults. *Frontier Public Health,* 9, 679976. https://doi.org/10.3389/fpubh.2021.679976

Guest, G., Namey, E., Taylor, J., Eley, N., & McKenna, K. (2017). Comparing focus groups and individual interviews: findings from a randomized study. *International Journal of Social Research Methodology*, *20*, 693-708. https://doi.org/10.1080/13645579.2017.1281601

Haase, K. R., Cosco, T., Kervin, L., Riadi, I., & O'Connell, M. E. (2021). Older adults' experiences with using technology for socialization during the COVID-19 pandemic: cross-sectional survey study. *JMIR Aging*, *4*(2), e28010. https://doi.org/10.2196/28010

Hajek, A., & König, H. H. (2021). Social isolation and loneliness of older adults in times of the COVID-19 pandemic: can use of online social media sites and video chats assist in mitigating social isolation and loneliness?. *Journals of Gerontology*, *67*(1), 121–124. https://doi.org/10.1159/000512793

Hall, A., Wilson, C. B., Stanmore, E., & Todd, C. (2017). Implementing monitoring technologies in care homes for people with dementia: a qualitative exploration using normalization process theory. *International Journal of Nursing Studies*, *72*, 60–70. https://doi.org/10.1016/j.ijnurstu.2017.04.008

Hantrais L., Allin P., Kritikos, M., Sogomonjan, M., Anand, P. B., Livingstone, S., et al. (2021). Covid-19 and the digital revolution. *Contemporary Social Science: Journal of the Academy of Social Sciences*, *16*(2), 256-270. https://doi.org/10.1080/21582041.2020.1833234

Hemberg, J., & Santamäki Fischer, R. (2018). A window toward the world: older adults' experiences of becoming in health and developing as human beings through interacting with others using real video communication. *Holistic Nursing Practice*, *32*(2), 90–97. https://doi.org/10.1097/HNP.0000000000000254

Hogan-Murphy, D., Stewart, D., Tonna, A., Strath, A., & Cunningham, S. (2021). Use of normalization process theory to explore key stakeholders' perceptions of the

facilitators and barriers to implementing electronic systems for medicines management in hospital settings. *Research in Social & Administrative Pharmacy* : *RSAP, 17*(2), 398–405. https://doi.org/10.1016/j.sapharm.2020.03.005

Houghton, C., Casey, D., Shaw, D., & Murphy, K. (2013). Rigour in qualitative case-study research. *Nurse Researcher*, *20*(4)*,* 12–17. https://doi.org/10.7748/nr2013.03.20.4.12.e326

Hung, L., Au-Yeung, A., Helmer, C., Ip, A., Elijah, L., Wilkins-Ho, M., & Chaudhury, H. (2018). Feasibility and acceptability of an iPad intervention to support dementia care in the hospital setting. *Contemporary Nurse*, *54*(4-5), 350–361. https://doi.org/10.1080/10376178.2018.1505436

Hung, L., Chow, B., Shadarevian, J., O'Neill, R., Berndt, A., Wallsworth, C., Horne, N., Gregorio, M., Mann, J., Son, C., & Chaudhury, H. (2021). Using touchscreen tablets to support social connections and reduce responsive behaviours among people with dementia in care settings: a scoping review. *Dementia (London, England), 20*(3), 1124–1143. https://doi.org/10.1177/1471301220922745

Hunsaker, A., Hargittai, E., Piper, A.M. (2020). Online social connectedness and anxiety among older adults. *International Journal of Communication*, *14*, 697-725. https://doi.org/10.5167/uzh-186376

Husserl, E. (2014). *Ideas for a pure phenomenology and phenomenological philosophy*. First book: general introduction to pure phenomenology. Indianapolis, IN: Hackett Publishing.

Ibarra, F., Baez, M., Cernuzzi, L., & Casati, F. (2020). A systematic review on technology-supported interventions to improve old-age social wellbeing: loneliness, social isolation, and connectedness. *Journal of Healthcare Engineering, 2020,* 2036842. https://doi.org/10.1155/2020/2036842

Jung, E.H., Walden, J., Johnson, A.C., & Sundar, S.S. (2017). Social networking in the aging context: why older adults use or avoid Facebook. *Telematics Informatics*, *34*, 1071-1080. https://doi.org/10.1016/j.tele.2017.04.015

Kahlow, J. A., Coker, M. C., & Richards, R. (2020). The multimodal nature of Snapchat in close relationships: toward a social presence-based theoretical framework. *Computers in Human Behavior*, *111*, 106409. https://doi.org/10.1016/j.chb.2020.106409

Kamberelis, G. & Dimitriadis, G. (2008). Focus groups: contingent articulations of pedagogy, politics, and inquiry. In Denzin, N. K., & Lincoln, Y. S. (Eds.). *Collecting and interpreting qualitative materials* (pp. 375). Sage Publications.

Khosravi, P., Rezvani, A., & Wiewiora, A. (2016). The impact of technology on older adults' social isolation. *Computers in Human Behavior*, *63*, 594-603. https://doi.org/10.1016/j.chb.2016.05.092

Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher*, *42*(8), 846–854. https://doi.org/10.1080/0142159X.2020.1755030

Kislov R. (2019). Engaging with theory: from theoretically informed to theoretically informative improvement research. *BMJ Quality & Safety, 28*(3), 177–179. https://doi.org/10.1136/bmjqs-2018-009036

Kitwood, T. (1997). *Dementia reconsidered: the person still comes first*. Open University press, Berkshire.

Kitwood, T., & Brooker, D. (Ed.) (2019). *Dementia reconsidered, revisited: the person still comes first* (p. 8). UK Higher Education OUP Humanities & Social Sciences Health & Social Welfare.

Koch, T., & Harrington, A. (1998). Reconceptualizing rigour: the case for reflexivity. *Journal of Advanced Nursing*, *28*(4), 882–890. https://doi.org/10.1046/j.1365-2648.1998.00725.x

Kolanowski, A., Buettner, L., Litaker, M., & Yu, F. (2006). Factors that relate to activity engagement in nursing home residents. *American Journal of Alzheimer's Disease & Other Dementias*, *21*(1), 15–22. https://doi.org/10.1177/153331750602100109

Konttila, J., Siira, H., Kyngäs, H., Lahtinen, M., Elo, S., Kääriäinen, M., Kaakinen, P., Oikarinen, A., Yamakawa, M., Fukui, S., Utsumi, M., Higami, Y., Higuchi, A., & Mikkonen, K. (2019). Healthcare professionals' competence in digitalisation: a systematic review. *Journal of Clinical Nursing*, *28*(5-6), 745–761. https://doi.org/10.1111/jocn.14710

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), 120–124. https://doi.org/10.1080/13814788.2017.1375092

Krueger, R.A. & Casey, M.A. (2015). *Focus groups: A practical guide for applied research.* Sage Publications Inc, Thousand Oaks.

Kruger, L. J., Rodgers, R. F., Long, S. J. & Lowy, A. S. (2019). Individual interviews or focus groups? interview format and women's self-disclosure. *International Journal of Social Research Methodology*, *22*(3), 245-255. https://doi.org/10.1080/13645579.2018.1518857

Kruse, C. S., Mileski, M., Alaytsev, V., Carol, E., & Williams, A. (2015). Adoption factors associated with electronic health record among long-term care facilities: a systematic review. *BMJ Open*, *5*(1), e006615. https://doi.org/10.1136/bmjopen-2014-006615

Kvale, S., & Brinkmann, S. (2009). *Interviews: learning the craft of qualitative research interviewing* (2nd ed.). Sage Publications.

Kvale, S., & Brinkmann, S. (2015). *Det kvalitative forskningsintervju* (3. utg. ed.) (Anderssen, T. M., & Rygge, J., Trans.). Gyldendal akademisk. (Original work published 2015).

Latour. (1992). Where are the missing masses? the sociology of a few mundane artifacts. In W. E. Bijker & J. Law. (Eds.). *Shaping technology/building society: Studies in sociotechnical change*. MIT Press.

Laumann, K. (2020). Criteria for qualitative methods in human reliability analysis. *Reliability Engineering and System Safety, 194,* 106198. https://doi.org/10.1016/j.ress.2018.07.001

Lee, C., & Coughlin, J. F. (2015). Perspective: older adults' adoption of technology: an integrated approach to identifying determinants and barriers: Older adults' adoption of technology. *The Journal of Product Innovation Management, 32*(5)*,* 747–759. https://doi.org/10.1111/jpim.12176

Lee, R., Fielding, N., Blank, G. (2016). Online research methods in the social sciences: An Editorial Introduction. In Fielding, N., Lee, R., Blank, G. (editors). *The SAGE Handbook of Online Research Methods* (pp. 3–16). London: Sage Publications.

Leknes, S., & Løkken, S. A. (2022). *Befolkningsframskrivinger for kommunene 2022 (Population projections for the municipalities in 2022).* Statistisk sentralbyrå (Statistics Norway) [Report]. https://www.ssb.no/befolkning/befolkningsframskrivinger/artikler/befolkningsframskrivinger-for-kommunene-2022

Liamputtong, P. (2016). *Focus group methodology: principles and practice*. Sage Publications. http://doi.org/10.4135/9781473957657

Lincoln, Y. S., & Guba, E. G. (2013). *The constructivist credo*. Left coast press.

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions and emeging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.). *The SAGE Handbook of Qualitative Research* (4th ed., pp. 99–128). Thousand Oaks, CA: Sage.

Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry*. Sage Publications. http://doi.org/10.1016/0147-1767(85)90062-8

Macfarlane, S. & Bucknall, T. (2015). Digital technologies in research. In Gerrish K, Lathlean J (editors*). The Research Process in Nursing* (7th edition., pp. 71–86). Oxford: Wiley Blackwell.

Mair, F. S., May, C., O'Donnell, C., Finch, T., Sullivan, F., & Murray, E. (2012). Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review. *Bulletin of the World Health Organization*, *90*(5), 357–364. https://doi.org/10.2471/BLT.11.099424

Manafò, E., & Wong, S. (2013). Promoting eHealth literacy in older adults: key informant perspectives. *Canadian Journal of Dietetic Practice and Research* : a publication of Dietitians of Canada = Revue canadienne de la pratique et de la recherche en dietetique : une publication des Dietetistes du Canada, *74*(1), 37–41. https://doi.org/10.3148/74.1.2013.37

Mansourian Y. (2008). Exploratory nature of, and uncertainty tolerance in, qualitative research. *New Library World*, *109*(5/6), 273–286. https://doi.org/10.1108/03074800810873614

Marin, G. B., Wasserman, P., Cotoia, J., Singh, M., Tarnavska, V., Gershon, L., Lester, I., & Merritt, R. (2020). Experiences of rhode island assisted living facilities in connecting residents with families through technology during the COVID-19 pandemic. *Rhode Island Medical Journal (2013)*, *103*(8), 59–61.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research?: a review of qualitative interviews in is research. *The Journal of Computer Information Systems, 54(1),* 11–22. https://doi.org/10.1080/08874417.2013.11645667

Martin, B.R., Nightingale, P., & Yegros-Yegros, A. (2011). Science and technology studies: exploring the knowledge base. *Research Policy, 41*, 1182-1204. https://doi.org/10.1016/j.respol.2012.03.010

May C. R., Cummings, A., Girling, M., Bracher, M., Mair, F. S., May, C. M., Murray, E., Myall, M., Rapley, T., & Finch, T. (2018). Using normalization process theory in feasibility studies and process evaluations of complex healthcare interventions: a systematic review. *Implementation Science*, *13*(1), 80. https://doi.org/10.1186/s13012-018-0758-1

May, C. & Finch, T. (2009). Implementing, embedding, and integrating practices: an outline of normalization process theory. *Sociology*, *43*(3), 535–554. https://doi.org/10.1177/0038038509103208

May, C. R., Mair, F., Finch, T., MacFarlane, A., Dowrick, C., Treweek, S., Rapley, T., Ballini, L., Ong, B. N., Rogers, A., Murray, E., Elwyn, G., Légaré, F., Gunn, J., & Montori, V. M. (2009). Development of a theory of implementation and integration: normalization process theory. *Implementation Science* : IS, 4, 29. https://doi.org/10.1186/1748-5908-4-29

May, C., Finch, T., Mair, F., Ballini, L., Dowrick, C., Eccles, M., Gask, L., MacFarlane, A., Murray, E., Rapley, T., Rogers, A., Treweek, S., Wallace, P., Anderson, G., Burns, J., & Heaven, B. (2007). Understanding the implementation of complex interventions in health care: the normalization process model. *BMC Health Services Research*, *7*, 148. https://doi.org/10.1186/1472-6963-7-148

May, C., Rapley, T., Mair, F. S., Treweek, S., Murray, E., Ballini, L., MacFarlane, A., Girling, M., & Finch, T. (2015). *Normalization process theory on-line users' manual, toolkit, and NoMAD instrument [Online]*. Retrieved May 28, 2021 from http://www.normalizationprocess.org/

Mays, N., & Pope, C. (1995). Rigour and qualitative research. *British Medical Journal (Clinical research ed.)*, *311*(6997), 109–112. https://doi.org/10.1136/bmj.311.6997.109

McCance, T. V. (2003). Caring in nursing practice: the development of a conceptual framework. *Research and Theory for Nursing Practice, 17*(2), 101–116. https://doi.org/10.1891/rtnp.17.2.101.53174

McCormack, B. (2003). A conceptual framework for person-centred practice with older people. *International Journal of Nursing Practice*, *9*(3), 202–209. https://doi.org/10.1046/j.1440-172X.2003.00423.x

McCormack, B. (2004). Person-centredness in gerontological nursing: an overview of the literature. *Journal of Clinical Nursing*, *13*(s1), 31–38. https://doi.org/10.1111/j.1365-2702.2004.00924.x

McCormack, B., & McCance, T. (2010). *Person-centred nursing: theory and practice*. Wiley-Blackwell.

McCormack, B., & McCance, T. (2017). *Person-centred practice in nursing and health care: theory and practice* (2nd ed.). Wiley-Blackwell.

McCormack, B., & McCance, T. V. (2006). Development of a framework for person-centred nursing. *Journal of Advanced Nursing*, *56*(5), 472–479. https://doi.org/10.1111/j.1365-2648.2006.04042.x

McCormack, B., Karlsson, B., Dewing, J., & Lerdal, A. (2010). Exploring person-centredness: a qualitative meta-synthesis of four studies. *Scandinavian Journal of Caring Sciences*, *24*(3), 620–634. https://doi.org/10.1111/j.1471-6712.2010.00814.x

McCormack, B., McCance, T., Bulley, C., Brown, D., McMillan, A. and Martin, S. (Eds.) (2021). *Fundamentals of person-centred healthcare practice*. Chichester, UK: John Wiley & Sons.

McCormack, B., Roberts, T., Meyer, J., Morgan, D., & Boscart, V. (2012). Appreciating the 'person' in long-term care. *International Journal of Older People Nursing*, *7*(4), 284-294. https://doi.org/10.1111/j.1748-3743.2012.00342.x

Melting, J.B., & Frantzen, L. (2015). *Første gevinstrealiseringsrapport med anbefalinger. Nasjonalt velferdsteknologiprogram [First report of realization of gains and recommendations. The national welfare technology program] Kommunesektorens organisasjon [The Norwegian Association of Local and Regional Authorities].* https://omsorgsforskning.brage.unit.no/omsorgsforskning-xmlui/handle/11250/2630005

Mitzner, T. L., Boron, J. B., Fausset, C. B., Adams, A. E., Charness, N., Czaja, S. J., Dijkstra, K., Fisk, A. D., Rogers, W. A., & Sharit, J. (2010). Older adults talk technology: technology usage and attitudes. *Computers in Human Behavior*, *26*(6), 1710–1721. https://doi.org/10.1016/j.chb.2010.06.020

Morciano, M., Stokes, J., Kontopantelis, E., Hall, I., Turner, A. J. (2021). Excess mortality for care home residents during the first 23 weeks of the COVID-19 pandemic in England: a national cohort study. *BMC Medicine, 19*(1), 71. https://doi.org/10.1186/s12916-021-01945-2

Mortenson, W. B., Sixsmith, A., & Woolrych, R. (2015). The power(s) of observation: theoretical perspectives on surveillance technologies and older people. *Ageing and Society*, *35*(3), 512–530. https://doi.org/10.1017/S0144686X13000846

Moser, A., & Korstjens, I. (2017). Series: Practical guidance to qualitative research. Part 1: Introduction. *European Journal of General Practice*, *23*(1), 271–273. https://doi.org/10.1080/13814788.2017.1375093

Moser, I. (2019). *Velferdsteknologi: en ressursbok*. Cappelen Damm akademisk.

Moyle, W., Jones, C., Murfield, J., & Liu, F. (2020). 'For me at 90, it's going to be difficult': feasibility of using iPad video-conferencing with older adults in long-term aged care. *Aging & Mental Health*, *24*(2), 349–352. https://doi.org/10.1080/13607863.2018.1525605

Moyle, W., Jones, C., Murfield, J., Dwan, T., & Ownsworth, T. (2018). 'We don't even have Wi-Fi': a descriptive study exploring current use and availability of communication technologies in residential aged care. *Contemporary Nurse*, *54*(1), 35-43. https://doi.org/10.1080/10376178.2017.1411203

Nedeljko, M., Bogataj, D., Perović, B.T., & Kaučič, B. M. (2022). The use of information and communication technologies affects mental health and quality of life of older adults during the COVID-19 pandemic. *IFAC PapersOnLine, 55*(10), 940–945. https://doi.org/10.1016/j.ifacol.2022.09.461

Neves, B. B., Franz, R., Judges, R., Beermann, C., & Baecker, R. (2019). Can digital technology enhance social connectedness among older adults? a feasibility study. *Journal of applied gerontology : the official journal of the Southern Gerontological Society*, *38*(1), 49–72. https://doi.org/10.1177/0733464817741369

Nilsen, P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, *10*(1), 53–53. https://doi.org/10.1186/s13012-015-0242-0

No Isolation, A. (2021). *KOMP: The one-button computer connecting generations*. Retrieved February 25, 2021 from https://www.noisolation.com/global/komp/

Nolan, M. R., Davies, S., Brown, J., Keady, J., & Nolan, J. (2004). Beyond 'person-centred' care: a new vision for gerontological nursing. *Journal of Clinical Nursing*, *13*(s1), 45–53. https://doi.org/10.1111/j.1365-2702.2004.00926.x

Norwegian Directorate of Health. (2013). *Velferdsteknologi. En fagrapport om implementering av velferdsteknologi i de kommunale helse- og omsorgstjenester.* https://www.helsedirektoratet.no/tema/velferdsteknologi

Norwegian Directorate of Health. (2021). *Velferdsteknolgi. Gevinstrealiseringsrapport- en kunnskapsoppsummering fra Nasjonalt velfersreknologiorogram.* https://www.helsedirektoratet.no/tema/velferdsteknologi

Norwegian Ministry of Health and Care Services. (2011). *Innovasjon i omsorg*. *(Innovation in the care services).* NOU 2011:11. Norwegian Ministry of Health and Care Services. Accessed 2022.12.15 from https://www.regjeringen.no/en/dokumenter/nou-2011-11/id646812/

Novick, G. (2008). Is there a bias against telephone interviews in qualitative research?. *Research in Nursing and Health*, *31*(4), 391–8. https://doi.org/10.1002/nur.20259

Olphert, W., & Damodaran, L. (2013). Older people and digital disengagement: a fourth digital divide? *Journals of Gerontology*, *59*(6), 564–570. https://doi.org/10.1159/000353630

Oltmann, S. (2016). Qualitative interviews: a methodological discussion of the interviewer and respondent contexts. Forum Qualitative Sozialforschung Forum: *Qualitative Social Research*, *17*(2). https://doi.org/10.17169/fqs-17.2.2551

O'Rourke, H. M., & Sidani, S. (2017). Definition, determinants, and outcomes of social connectedness for older adults: a scoping review. *Journal of Gerontological Nursing*, *43*(7), 43–52. https://doi.org/10.3928/00989134-20170223-03

O'Rourke, H. M., Collins, L., & Sidani, S. (2018). Interventions to address social connectedness and loneliness for older adults: a scoping review. *BMC Geriatrics*, *18*(1), 214. https://doi.org/10.1186/s12877-018-0897-x

Østensen, E., Gjevjon, E. R., Ødegård, T., & Moen, A. (2017). Introducing technology for thriving in residential long-term care. *Journal of Nursing Scholarship*, *49*(1), 44–53. https://doi.org/10.1111/jnu.12268

Oudshoorn N. (2008). Diagnosis at a distance: the invisible work of patients and healthcare professionals in cardiac telemonitoring technology. *Sociology of Health & Illness*, *30*(2), 272–288. https://doi.org/10.1111/j.1467-9566.2007.01032.x

Patton, M. Q. (2015). *Qualitative research & evaluation methods: integrating theory and practice* (4th ed.). Sage publications.

Polit, D. F., & Beck, C. T. (2021). *Nursing research: generating and assessing evidence for nursing practice* (11th. ed.). Lippincott Williams & Wilkins.

Pols, J., & Moser, I. (2009). Cold technologies versus warm care? on affective and social relations with and through care technologies. *Alter*, *3*(2), 159–178. https://doi.org/10.1016/j.alter.2009.01.003

Powell, K. R., Alexander, G. L., Madsen, R., & Deroche, C. (2019). A national assessment of access to technology among nursing home residents: a secondary analysis. *The Journal of Medical Internet Research Aging*, *2*(1), e11449. https://doi.org/10.2196/11449

Prebble, S. C., Addis, D. R., & Tippett, L. J. (2013). Autobiographical memory and sense of self. *Psychological Bulletin*, *139*(4), 815–840. https://doi.org/10.1037/a0030146

Prieto-Flores, M.-E., Forjaz, M. J., Fernandez-Mayoralas, G., Rojo-Perez, F., & Martinez-Martin, P. (2011). Factors associated with loneliness of noninstitutionalized and institutionalized older adults. *Journal of Aging and Health*, *23*(1), 177–194. https://doi.org/10.1177/0898264310382658

Procter, R., Wherton, J., Greenhalgh, T., Sugarhood, P., Rouncefield, M., & Hinder, S. (2016). Telecare call centre work and ageing in place. *Computer Supported Cooperative Work, 25*(1)*,*79–105. https://doi.org/10.1007/s10606-015-9242-5

Rasmussen, E., Askheim, C., Oppedal, B., & Haldar, M. (2021). Varm teknologi mot ensomhet blant eldre? en skriptanalyse av kommunikasjonsløsningen komp. *Tidsskrift for Samfunnsforskning*, *62*(4), 353–372. https://doi.org/10.18261/issn.1504-291X-2021-04-03

Ray, H. (2022). *Towards understanding usable privacy concerns among older adults.* Ph.D. Thesis, University of Maryland, College Park, MD, USA.

Ring, N., Jepson, R., & Ritchie, K. (2011). Methods of synthesizing qualitative research studies for health technology assessment. *International Journal of Technology Assessment in Health Care*, *27*(4), 384–390. https://doi.org/10.1017/S0266462311000389

Robic, M., & Rotar Pavlic, D. (2021). COVID-19 and care for the elderly in long-term care facilities: the role of information communication technology. *Acta Medica Academica*, *50*(3), 414–422. https://doi.org/10.5644/ama2006-124.363

Rostad, H. M., & Stokke, R. (2021). Integrating welfare technology in long-term care services: nationwide cross-sectional survey study. *Journal of Medical Internet Research*, *23(8),* e22316. https://doi.org/10.2196/22316

Sacco, G., Lléonart, S., Simon, R., Noublanche, F., Annweiler, C., & TOVID Study Group (2020). Communication technology preferences of hospitalized and institutionalized frail older adults during COVID-19 confinement: cross-sectional survey study. *JMIR mHealth and uHealth*, *8*(9), e21845. https://doi.org/10.2196/21845

Sánchez-Criado, T., López, D., Roberts, C., & Domènech, M. (2014). Installing telecare, installing users: felicity conditions for the instauration of "usership". *Science, Technology, & Human Values, 39*(5), 694–719. https://doi.org/10.1177/0162243913517011

Sandelowski M. (2010). What's in a name? qualitative description revisited. *Research in Nursing & Health*, *33*(1), 77–84. https://doi.org/10.1002/nur.20362

Sandelowski, M. (2002). Reembodying qualitative enquiry. *Qualitative Health Research*, *12*(1), 104–115. https://doi.org/10.1177/1049732302012001008

Sandelowski, M., & Barroso, J. (2003). Writing the proposal for a qualitative research methodology project. *Qualitative Health Research*, *13*(6), 781–820. https://doi.org/10.1177/1049732303013006003

Sandelowski, M., & Leeman, J. (2012). Writing usable qualitative health research findings. *Qualitative Health Research*, *22*(10), 1404–1413. https://doi.org/10.1177/1049732312450368

Savundranayagam, M. Y. (2014). Missed opportunities for person-centered communication: implications for staff-resident interactions in long-term care. *International Psychogeriatrics*, *26*(4), 645–655. https://doi.org/10.1017/S1041610213002093

Scantlebury, A., Sheard, L., Watt, I., Cairns, P., Wright, J., & Adamson, J. (2017). Exploring the implementation of an electronic record into a maternity unit: a qualitative study using normalisation process theory. *BMC Medical Informatics and Decision Making*, *17*(1), 4. https://doi.org/10.1186/s12911-016-0406-0

Schrack, J. A., Wanigatunga, A. A., & Juraschek, S. P. (2020). After the COVID-19 pandemic: the next wave of health challenges for older adults. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, *75*(9), e121–e122. https://doi.org/10.1093/gerona/glaa102

Schuster, A. M., & Hunter, E. G. (2019). Video communication with cognitively intact nursing home residents: a scoping review. *Journal of Applied Gerontology*, *38*(8), 1185–1196. https://doi.org/10.1177/0733464817711962

Schwandt, T. A., Lincoln, Y. S., & Guba, E. G. (2007). Judging interpretations: but is it rigorous? trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation*, *2007*(114), 11–25. https://doi.org/10.1002/ev.223

Seifert, A., & Cotten, S.R. (2020). In care and digitally savvy? modern ICT use in long-term care institutions. *Educational Gerontology*, *46*(8), 473 - 485. https://doi:10.1080/03601277.2020.1776911

Seifert, A., Cotten, S. R., & Xie, B. (2021). A double burden of exclusion? digital and social exclusion of older adults in times of COVID-19. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *76*(3), e99–e103. https://doi.org/10.1093/geronb/gbaa098

Seifert, A., Doh, M., Wahl, H-W. (2017). They also do it: internet use by older adults living in residential care facilities. *Educational Gerontology*, *43*(9), 451-461. https://doi: 10.1080/03601277.2017.1326224

Shadarevian, J., Chan, C., Berndt, A., Son, C., Gregorio, M., Horne, N., Mann, J., Wallsworth, C., Chow, B., O'Neill, R., & Hung, L. (2020). Creating a toolkit with stakeholders for leveraging tablet computers to support person-centred dementia care in hospitals. *Journal of Rehabilitation and Assistive Technologies Engineering*, *7*, 2055668320960385. https://doi.org/10.1177/2055668320960385

Shah, S. G. S., Nogueras, D., van Woerden, H. C., & Kiparoglou, V. (2020). The COVID-19 pandemic: a pandemic of lockdown loneliness and the role of digital technology. *Journal of Medical Internet Research*, *22*(11), e22287. https://doi.org/10.2196/22287

Shaha, M., Wenzel, J., & Hill, E. E. (2011). Planning and conducting focus group research with nurses. *Nurse Researcher*, *18*(2), 77–87. https://doi.org/10.7748/nr2011.01.18.2.77.c8286

Sheahan, J., Hjorth, L., Figueiredo, B., Martin, D. M., Reid, M., Aleti, T., & Buschgens, M. (2022). Co-creating ICT risk strategies with older australians: a workshop model. *International Journal of Environmental Research and Public Health*, *20*(1), 52. https://doi.org/10.3390/ijerph20010052

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63–75. https://doi.org/10.3233/EFI-2004-22201

Shrader, C. D., Assadzandi, S., Pilkerton, C. S., & Ashcraft, A. M. (2021). Responding to a COVID-19 outbreak at a long-term care facility. *Journal of Applied Gerontology* : the official journal of the Southern Gerontological Society, *40*(1), 14–17. https://doi.org/10.1177/0733464820959163

Siegel, C., & Dorner, T. E. (2017). Information technologies for active and assisted living—influences to the quality of life of an ageing society. *International Journal of Medical Informatics*, *100*, 32–45. https://doi.org/10.1016/j.ijmedinf.2017.01.012

Siette, J., Wuthrich, V., & Low, L. F. (2020). Social preparedness in response to spatial distancing measures for aged care during COVID-19. *Journal of the American Medical Directors Association*, *21*(7), 985–986. https://doi.org/10.1016/j.jamda.2020.04.015

Sim, J., Saunders, B., Waterfield, J., & Kingstone, T. (2018). Can sample size in qualitative research be determined a priori?. *International Journal of Social Research Methodology*, *21*(5), 619–634. https://doi.org/10.1080/13645579.2018.1454643

Simons, H. (2009). *Case study research in practice*. Sage publications. https://dx.doi.org/10.4135/9781446268322

Sjögren, K., Lindkvist, M., Sandman, P. O., Zingmark, K., & Edvardsson, D. (2017). Organisational and environmental characteristics of residential aged care units providing highly person-centred care: a cross sectional study. *BMC Nursing*, *16*, 44. c

Smith J. M. (2012). Toward a better understanding of loneliness in community-dwelling older adults. *The Journal of Psychology*, *146*(3), 293–311. https://doi.org/10.1080/00223980.2011.602132

Smith, J., Bekker, H., & Cheater, F. (2011). Theoretical versus pragmatic design in qualitative research. *Nurse Researcher*, *18*(2), 39–51. https://doi.org/10.7748/nr2011.01.18.2.39.c8283

Snowdon, A., Schnarr, K. and Alessi, C. (2014). *It's all about me: the personalization of health systems.* The University of Western Ontario. https://www.ivey.uwo.ca/media/3467873/its-all-about-me-the-personalization-of-health-systems. pdf (accessed in July 14th 2023).

Stein-Parbury, J., Chenoweth, L., Jeon, Y. H., Brodaty, H., Haas, M., & Norman, R. (2012). Implementing person-centered care in residential dementia care. *Clinical Gerontologist*, *35*(5), 404–424. https://doi.org/10.1080/07317115.2012.702654

Stolorow, R. D. (2006). Heidegger's investigative method in being and time . *Psychoanalytic Psychology*, *23*(3), 594–602. https://doi.org/10.1037/0736-9735.23.3.594

Tanwir, F., Moideen, S., Habib, R. (2021). Interviews in healthcare: a phenomenological approach a qualitative research methodology. *Journal of Public Health International*, *4*(2), 10-15. https://doi.org/10.14302/issn.2641-4538.jphi-21-3881

Thangavel, G., Memedi, M., & Hedström, K. (2022). Customized information and communication technology for reducing social isolation and loneliness among older adults: scoping review. *JMIR Mental Health*, *9*(3), e34221. https://doi.org/10.2196/34221

Thomas, D. R. (2003). A general inductive approach for qualitative data analysis. *American Journal of Evaluation*, *27*(2), 237-246. Available online: https://www.researchgate.net/publication/228620846_A_General_Inductive_Approach_for_Qualitative_Data_Analysis (accessed on 09 February 2023).

Thomas, E., & Magilvy, J. K. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Pediatric Nursing: JSPN*, *16*(2), 151–155. https://doi.org/10.1111/j.1744-6155.2011.00283.x

Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative Inquiry*, *17*(6), 511–521. https://doi.org/10.1177/1077800411409884

Tjora, A. H. (2019). *Qualitative research as stepwise-deductive induction* (Vol. 26). Routledge. https://doi.org/10.4324/9780203730072

Todd, E., Bidstrup, B., & Mutch, A. (2022). Using information and communication technology learnings to alleviate social isolation for older people during periods of mandated isolation: a review. *Australasian Journal on Ageing*, *41*(3), e227–e239. https://doi.org/10.1111/ajag.13041

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349-357. https://doi.org/10.1093/intqhc/mzm042

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, *15*(3), 398–405. https://doi.org/10.1111/nhs.12048

Veloso, A. I., Ferreira, S., Vale Costa, L., Mealha, Ó., & Santos, C. (2020). Aging in online communities: a systematic literature review of design recommendations. *ESSACHESS-Journal for Communication Studies*, *13*(2), 87–106.

Victor, C.R. (2012). Loneliness in care homes: a neglected area of research?. *Aging Health*, *8*(6), 637-646. https://doi.org/10.2217/AHE.12.65

Wahid, S.D.M., Buja, A.G., Jono, M.N.H.H., Aziz, A.A. (2021). Assessing the influential factors of cybersecurity awareness in Malaysia during the pandemic outbreak: a structural equation modeling. *International Journal of Advanced Technology and Engineering Exploration, 8*(74), 73-81. http://dx.doi.org/10.19101/IJATEE.2020.S1762116

Wang, A., Redington, L., Steinmetz, V., & Lindeman, D. (2011). The ADOPT model: accelerating diffusion of proven technologies for older adults. *Ageing International*, *36*(1), 29–45. https://doi.org/10.1007/s12126-010-9072-1

Wilberforce, M., Challis, D., Davies, L., Kelly, M. P., Roberts, C., & Clarkson, P. (2017). Person-centredness in the community care of older people: a literature-based concept synthesis. *International Journal of Social Welfare, 26*(1)*,* 86–98. https://doi.org/10.1111/ijsw.12221

Wilson, M. G., Gauvin, F. P., DeMaio, P., Alam, S., Drakos, A., Soueidan, S., Costa, A., Reid, R., Simeonov, D., Sixsmith, A., Sveistrup, H., & Lavis, J. N. (2022). Enhancing the use of technology in the long-term care sector in Canada: insights from citizen panels and a national stakeholder dialogue. *Healthcare Management Forum*, *35*(5), 310–317. https://doi.org/10.1177/08404704221108466

Winthereik, B. R., Johannsen, N., Strand, D. L. (2008). Making technology public: challenging the notion of script through an e-health demonstration video. *Information Technology & People*, *21*(2), 116-132. https://doi:10.1108/09593840810881042

World Health Organization. (2015). *WHO global strategy on people-centred and integrated health services.*

http://apps.who.int/iris/bitstream/10665/155002/1/WHO_HIS_SDS_2015.6_eng.pdf . Accessed February 8, 2023.
World Medical Association. (2013). World medical association declaration of helsinki: ethical principles for medical research involving human subjects. JAMA, *310*(20), 2191–2194. https://doi.org/10.1001/jama.2013.281053
Yin RK. *Case study research and applications: design and methods*. 6th ed. Los Angeles, California: SAGE; 2018
Zahavi, D. (2019). *Phenomenology: the basics*. Routledge. https://doi.org/10.4324/9781315441603
Zamir, S., Hennessy, C. H., Taylor, A. H., & Jones, R. B. (2018). Video-calls to reduce loneliness and social isolation within care environments for older people: an implementation study using collaborative action research. *BMC Geriatrics*, *18*(1), 1–13. https://doi.org/10.1186/s12877-018-0746-y
Zanchetta, C., Schiff, H., Novo, C., Cruz, S., & Vaz de Carvalho, C. (2022). Generational inclusion: getting older adults ready to own safe online identities. *Education Sciences*, *12*(10), 715. https://doi.org/10.3390/educsci12100715
Zander, V., Gustafsson, C., Landerdahl Stridsberg, S., & Borg, J. (2021). Implementation of welfare technology: a systematic review of barriers and facilitators. *Disability and rehabilitation. Assistive Technology*, 18(6), 913-928. Advance online publication. https://doi.org/10.1080/17483107.2021.1938707
Zhang, X. M., Dou, Q. L., Zhang, W. W., Wang, C. H., Xie, X. H., Yang, Y. Z., & Zeng, Y. C. (2019). Frailty as a predictor of all-cause mortality among older nursing home residents: a systematic review and meta-analysis. *Journal of the American Medical Directors Association, 20*(6), 657–663.e4. https://doi.org/10.1016/j.jamda.2018.11.018

Papers I-III

Paper I

BMC Health Services Research

RESEARCH

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Improvised use of a digital tool for social interaction in a Norwegian care facility during the COVID-19 pandemic: an exploratory study

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Abstract

Background: Digital tools for social communication have been deployed in care facilities during the COVID-19 pandemic to facilitate social connectedness between older people and their next of kin in a safe manner. This study explores how and why health care professionals facilitate the ad hoc and prompt use of a technology for social communication, known as KOMP, in care facilities in western Norway to promote communication and social engagement among residents and their next of kin during the crisis.

Methods: To investigate the perspectives and practices of health care professionals, we conducted focus groups, individual interviews, and participant observation in public short- and long-term care facilities in western Norway. An explorative investigation with inductive content analysis was applied to analyse interview transcripts and fieldnotes from participant observation.

Results: The resulting qualitative data reveal that prompt implementation of interactive technology to cope with social distancing during the pandemic added new routines to the staff workload. Using this interactive technology entailed new forms of collaborative work among residents, next of kin, health care professionals and technology facilitators. Additionally, the staff articulated a sense of responsibility towards using KOMP as a meaningful and practical tool for social communication in an extraordinary period of reduced social contact.

Conclusions: Improvised implementation of KOMP as an interactive technology shapes work routines, introduces new tasks and creates additional responsibilities. Despite creative efforts by health care staff, however, using KOMP remains constrained by the physical and cognitive abilities of its users. We suggest that health care managers ask a deceptively simple question when introducing novel technologies in health care contexts, namely: what kind of invisible work do these devices entail?

Keywords: Interactive technology, Caring practices, Care facilities, Pandemic, Social communication

Background

A growing number of technology-based interventions are used to support the health and quality of life of residents in care facilities. The onset of COVID-19 and the ensuing social distancing policies have led to a burgeoning interest in technology-based solutions, including digital devices such as tablets, wearable devices, and digital

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communication platforms to provide care and promote health [1]. Indeed, during the COVID-19 pandemic, several digital technologies have been adopted as alternatives to face-to-face communication [2]. To reduce loneliness and social isolation, many long-term care facilities have provided technologies such as Skype, FaceTime, and Zoom to allow residents to interact digitally with their relatives [3–5].

Previous studies on the feasibility of using digital interactive technologies among elderly individuals document the promises and challenges of these technologies [6, 7]. Siniscarco et al. [8] concluded that communication through video conferencing, when in-person visits are limited or impossible, may benefit residents who are distanced from close family or friends to reduce social isolation and mitigate loneliness. Applications of mobile technologies could also help older adults stay connected to friends and family, remain active, and access resources to address their physical and mental health needs [9]. Video-call interventions, such as a system known as 'Skype on Wheels', have been devised to support older people in care environments to better connect with their families. Such technology, however, requires continuous adjustments to accommodate characteristic features at each site of intervention to overcome barriers and maximize engagement from users [10]. Another recent trial, in a Norwegian context, introduced tablet computers (iPads), based around one-to-one tutoring, to facilitate social engagement among older adults in care facilities [11]. Participants reported satisfaction with these devices, and the authors observed an increase in social participation through communication apps, such as messaging and video conversations.

Nevertheless, routine use of digital communication tools in health care services in general, particularly in nursing homes, is challenging due to organizational, cultural, technological, and ethical issues. Some elderly individuals also struggle with digital technologies due to physical and cognitive impairments, low digital literacy, and social barriers [12]. There are also factors endogenous to care facilities that may prevent rapid adoption of novel technology in such institutions. For example, a strenuous workload and other practical constraints in the social ecology of care facilities preclude acceptance of technology by residents, their next of kin, and health workers. Other concerns include staff turnover due to rotation of health care professionals between departments and short-term contracts that require new training and a lack of adequate learning arrangements for making use of new digital tools. Disruptions of existing workflows, a lack of defined roles, and negative sentiments about technology are other barriers to the adoption and implementation of digital interventions in care [13].

The COVID-19 pandemic offers a unique opportunity to explore how a novel tablet-like device known as KOMP for promoting social communication affects practices of care. Designed to facilitate communication between users and next of kin in a simple and safe way, KOMP was adopted to support digital communications by many care facilities in Norway, beginning in March 2020. This *ad hoc* implementation of a device for corresponding with next of kin was necessitated by enforcement of social distancing and visitation restrictions. In contrast to many technologies, whose use in health care contexts is carefully planned, the prompt use of KOMP did not appear to be associated with comprehensive plans due to the necessity to maintain social communication between residents and their next of kin during mandatory social distancing. Data collection during a period characterized by exceptional restrictions on social life in health care facilities therefore offered an occasion to explore how people use this technology to promote social communication and interaction between residents and their next of kin, who could not visit as usual. Additionally, this case illustrates how the intensified use of interactive technology altered work practices within the care facility.

In a classic study of socially situated technology, Akrich [14] invoked the notion of a "script" to conceptualize how designers and product developers build assumptions about the world, including social practices, values, and cultural beliefs, into the "technical contents" of new devices. Like a film script, technical objects have intended uses and meanings, which define "a framework of action, together with the actors and the space in which they are supposed to act" [14, p. 208]. A metaphor drawn from the performing arts; the notion of a script is also useful for analysing new technologies in contexts such as health care. This concept implies that actors frequently adapt existing scripts or fashion new scripts that are suitable for the practical context in which a technology is applied. In Akrich's terms, a script is dynamic, and it can be fine-tuned to various applications. This process, whereby scripts, as a framework for action, are repurposed by different stakeholders in novel situations, is known as "re-scripting" [14]. While a technological script by itself does not determine the actual use and distribution of roles with respect to a given technology [15], users frequently adapt existing scripts according to their goals. This can be understood as a negotiation process between technology, users, and different use contexts [16]. Moser [17], for instance, explored the social consequences of active-assisted living (AAL) devices through the lens of "re-scripting" by analysing models of videoconferencing consultations in patients' homes. These practices require new collaboration patterns and involvement of professionals in both municipal health care and specialist care.

In our study, we employ this framework to explore how KOMP performs as an interactive technology for social communication in care facilities. While the main users of this "one-button computer" are usually elderly people who live at home but want to connect with family and friends, the use of KOMP in care facilities requires a productive interplay between a wider cast of characters, which includes relatives, health care professionals, and technology facilitators.

To the best of our knowledge, there is a descriptive report (in Norwegian) that deals with experiences of elderly individuals with cancer who use KOMP to counter loneliness [18], and refined and theory-driven analysis of the use of KOMP to bring people together and reduce loneliness among older adults [19]. Additionally, there are few studies describing the implementation of interactive technology devices for social communication between older people and their next of kin in care facilities [20]. In our study, we ask how and why health care professionals facilitate communication and social engagement between older people and their next of kin in care facilities using interactive technologies. Through the conceptual lens of a script, we can examine the social consequences and meanings of technologies such as KOMP [15]. This includes the practices and perspectives of different characters, their needs, and how roles, responsibilities, and relations between different actors are distributed.

Methods

Research design

This study examines the improvised use of a new interactive technology during the pandemic in care facilities. Since there is a scarcity of knowledge about the use of interactive technology for social communication in care facilities [20], it is appropriate to adopt a qualitative, exploratory design to investigate how and why health care professionals facilitate communication and social engagement in care facilities. Here, data triangulation, where more than one method is used to collect data on the same phenomenon, was necessary to capture a range of relevant dimensions about the use of KOMP and to ensure valid interpretations of the data [21].

First, focus group interviews with a moderated dialogue helped us obtain data from a group of health care professionals experienced with KOMP and to gain an in-depth understanding of attitudes and sentiments towards the technology [22, 23]. Participants were strategically sampled for the interviews to include a variety of professional perspectives on the use of interactive technology in care facilities. However, what people say in the context of an interview and what they do in real-life practice may differ in profound ways. We therefore conducted systematic field observations in a short-term care facility to explore how KOMP was performed 'in the wild' [24]. Fieldwork to document situated practices in the natural setting of the care facility was supported by individual interviews with health care professionals to gain insight into perceptions, experiences, and beliefs about KOMP [25].

Sampling

Recruitment for the focus groups began in August 2020. The first and last authors had a discussion with the person in charge of assistive living technology at the municipality to get information about which care facilities have experience with the use of KOMP. Based on this, we sent emails to the managers of 16 short-term and long-term care facilities that had recently made use of KOMP and distributed in different geographical locations in the same county. The emails included the study description, an invitation to participate, a consent form and contact information for the first and the last authors. Managers then forwarded emails to health care professionals in their care facilities. From these 16, we received eight positive answers. Among them, one care facility agreed to participate in both the interviews and observations, and one care facility apologised for withdrawing before the interview, due to conflicting commitments. From the remaining seven care facilities we recruited a total of 12 participants, organized in three focus groups (two groups had five participants, and one group had two). One focus group consisted of five participants from the care facility where the observations were conducted. The other two focus groups included seven participants from different care facilities. Participants in the focus groups counted eight registered nurses (six of them were health care managers), one radiographer, two assistant nurses and a physiotherapist.

Additionally, we obtained permission to make observations in a care facility that provided residents with different AAL devices, including KOMP. Observations were made over six days in November 2020. Ten health professionals, including five registered nurses, two assistant nurses, two care facility doctors, and an activity manager, agreed to participate in the observational study and share their experiences.

In total, the study included 22 health care professionals, 18 females and four males. Their ages ranged from 26 to 60 years. Their experience with health care work ranged from one year to three decades. For details, see Table 1, which follows guidelines for reporting qualitative research [26].

Setting

The care facility where we performed observations had two wards for short-term stays, where residents would live from two to eight weeks (notably, due to long waiting

Table 1 Overview of the participants

Number	Profession	Individual interview	Focus group	Gender
01	AN		FG1	F
02	HM		FG1	F
03	HM	×	FG1	F
04	RN		FG1	F
05	RN		FG1	F
06	HM		FG2	F
07	HM		FG2	F
08	HM		FG2	F
09	HM		FG2	M
10	HM		FG2	M
11	AN		FG3	F
12	PH		FG3	F
13	AM	×		F
14	RN	×		F
15	RN	×		F
16	RN	×		F
17	RN	×		F
18	RN	×		F
19	AN	×		F
20	AN	×		M
21	MD	×		F
22	MD	×		M

Abbreviations: *RN* registered nurse, *AN* assistant nurse, *AM* activity manager, *PH* physiotherapist, *MD* medical doctor, *HM* health care manager, *FG* focus group

lists in long-term care, some residents had their stay extended well past eight weeks). Observations were made during the morning shift, where there were six or seven health care professionals at work. Among the 31 comorbid residents in these two wards, eleven residents used the KOMP from 2019 to 2020. A majority of these residents had reduced cognitive ability, with Mjørud et al. [27] estimating this share in care facilities to be approximately 80%.

Recruitment of health care professionals was based on their experiences with residents who had used KOMP. Notably, this particular facility had introduced an assortment of technologies to support the care of residents over the past years, including systems for remote monitoring of various parameters and behaviours, including mobile phones and iPads, and sensor-based devices such as RoomMate [28], and Somnofy [29]. However, most of the care facilities in the municipality used other devices, such as smartphones and tablets. These devices, however, were not considered to be suitable for older people, especially those with hearing and vision impairment, and problems with capacitive sensing. To efficiently use these devices, older people were said to need assistance from the health care staff.

Fig. 1 KOMP from No Isolation (©Photographer Estera K. Johnsrud). The image is accompanied by a caption (white text) describing the name of the person who has sent the image (here: 'Nora')

KOMP had also been used by a few residents before the pandemic. As a result of their ongoing efforts to adopt new technologies for care, this facility employed a facilitator who trained staff in their use and fixed technical issues. Furthermore, it should also be noted that focus group interviews were not restricted to staff from this facility and included health care professionals from other short- and long-term care facilities to gain insight into different perspectives on KOMP use.

KOMP

KOMP, as shown in Fig. 1, is an interactive tool designed to connect elderly individuals with their families and friends via pictures, text messages, and video calls. KOMP is marketed as the "one-button computer connecting generations" and designed to look like a small TV with a 17-inch screen. It has a Wi-Fi connection and an eight-megapixel camera. Intentionally designed to have a simple user interface, with a single on/off knob on the front, KOMP is advertised as not requiring any complicated training or effort to use by elderly individuals. The screen is used to display images either through a live video feed or as a series of rotating still images with accompanying text in large fonts. The device does not rely on a touch screen as an interface to avoid problems with capacitive sensing among elderly individuals (see black knob in lower right corner). KOMP is also designed to broadcast sound clearly and loudly [30].

The care facilities use a commercial version, known as KOMP PRO, designed for communication between residents and their next of kin, as well as between residents and health care professionals. Despite KOMP's simple physical interface, next-of-kin and health professionals primarily interact with the device through an app that is downloaded to a phone or tablet device. Having set up a user profile through this application, it is possible to send images and texts, and make video calls directly to

the KOMP with a passcode or invitational code unique to that device.

In Akrich [14] terms, designers of such devices rely on a "projected user" with specific competencies to productively use the technology. In the case of KOMP, the device was originally designed to be used by independent older persons who had adequate cognitive and physical abilities and lived at home [30]. As described by its manufacturer No Isolation, the device "bridges the communication gap between those that struggle to use modern-day technology, and their more tech-savvy family and friends". However, our analysis will highlight how productive applications of KOMP in the context of care facilities require considerable efforts to "re-script" the technology, in Akrich's terms.

Data collection

Data collection began in September and lasted throughout November 2020. The first focus group interview was carried out in person at the meeting room in the same care facility where observations were conducted. Because of restrictions pertaining to COVID-19, the next two focus group interviews were arranged virtually in October 2020 (using Microsoft Teams).

Participant observations were performed in two wards in the short-term care facility in November 2020 for three days in each ward during the morning shift. These observations were documented through comprehensive fieldnotes. Additionally, 11 individual interviews were carried out.

Both the focus group interviews, and the individual interviews were supported by a semi structured interview guide based on open-ended questions. The goal was to generate in-depth responses from informants about their experiences and perceptions of using interactive technologies such as KOMP in their work. Questions deliberatively focused on the impact and challenges of using interactive technology in daily life and social activities to support well-being and address social isolation. During interviews, the guide was complemented by follow-up questions to pursue additional topics that appeared through the conversation at the interviewers' discretion. A moderator (first author) and a secretary (last author) conducted the focus group interviews, modelled after Patton [21]. The moderator hosted the interviews, while the secretary took notes and regularly summed up the contents to validate intended meanings throughout the session. Focus groups lasted 60 and 90 min. Individual interviews with health care professionals were conducted by the first author, lasting between eight and 24 min, with an average of 14 min. All interviews were digitally recorded and then transcribed verbatim in Norwegian.

Field observations at the care facility were carried out by the first author. Her role as a researcher was disclosed to all participants in the study [31]. Having negotiated her status in the field around her health care background as a physician now researching the use of KOMP in caring practices, the first author was 'marginally involved' in work and conversations at the facility [21]. Descriptive fieldnotes from these observational sessions were transcribed in Norwegian.

Data analysis

Answering how and why health care professionals facilitate communication and social engagement between older people and their next of kin in care facilities during a period of rapid increase in the use of interactive technologies required an inductive, qualitative approach to content analysis [32, 33]. Interviews and observational fieldnotes were transcribed as digital text, indexed, and then organized as separate files. Documents were then eligible for inductive, open coding to create higher-level categories and abstractions. The analysis was an outcome of three phases: preparation, coding and organization, and reporting. The preparation phase involved re-reading the material several times by the first and last authors to become familiar with the data. Raw data were then systematically organized by identifying and selecting meaningful units and labelling these units as substantial codes. This process of open coding of the materials from interviews and observations generated a total of 162 initial codes. Labelled codes were then inspected to ensure they reflected relevant aspects of the phenomena in question and the relevant units of meaning checked for consistency vis-a-vis each other. Following the framework of Elo and Kyngas [32], we then grouped the initial codes under higher-order headings based on content similarities, producing a total of 20 subcategories.

Examples of these 20 subcategories are shown in Table 2, to exemplify the iterative coding process. Subcategories were then grouped together, yielding 10 generic categories. Examples of the most relevant subcategories and the generic categories are shown in Fig. 2. These generic categories were then grouped and condensed into two main categories that describe new routines accompanying the use of KOMP as an interactive technology and why KOMP is valuable, i.e., as a practical and meaningful tool for social communication. The coding process was supported by NVivo 12 (version 1.3). Using MindManager, we also created radial maps to identify, abstract, and group connections into broader, higher-level categories.

The materials coded under the main category of 'new routines' address the question of what health care professionals do to facilitate communication and social engagement between the residents and their next of kin through

Table 2 Three examples from the abstraction process, from raw data to main analytical category

Quotes	Initial code	Sub-category	Generic category	Main category
"It has become a part of everyday affairs, or in a way a part of when the patient arrives, if he is capable of having a KOMP, he gets the offer, so it has become part of the care process"(PN14).	Part of care process	Added task	KOMP as an additional actor in daily work	New routines
"We have to rethink and be conscious about these sudden events that can be a problem" (PN02).	Technical issues	Interaction between staff	Responsibility towards technology	New routines
"When they get up in the morning, the first thing they do is to turn on the KOMP and look for new messages from their daughter or their sons, new images when they are at the cinema, or trips or in the mountains. There are a lot of residents who really enjoy this" (PN18).	Daily habit every morning	Mastering the tool	Easy and enjoyable tool	Value as practical and meaningful tool for social communication

Abbreviations: *PN* participant number

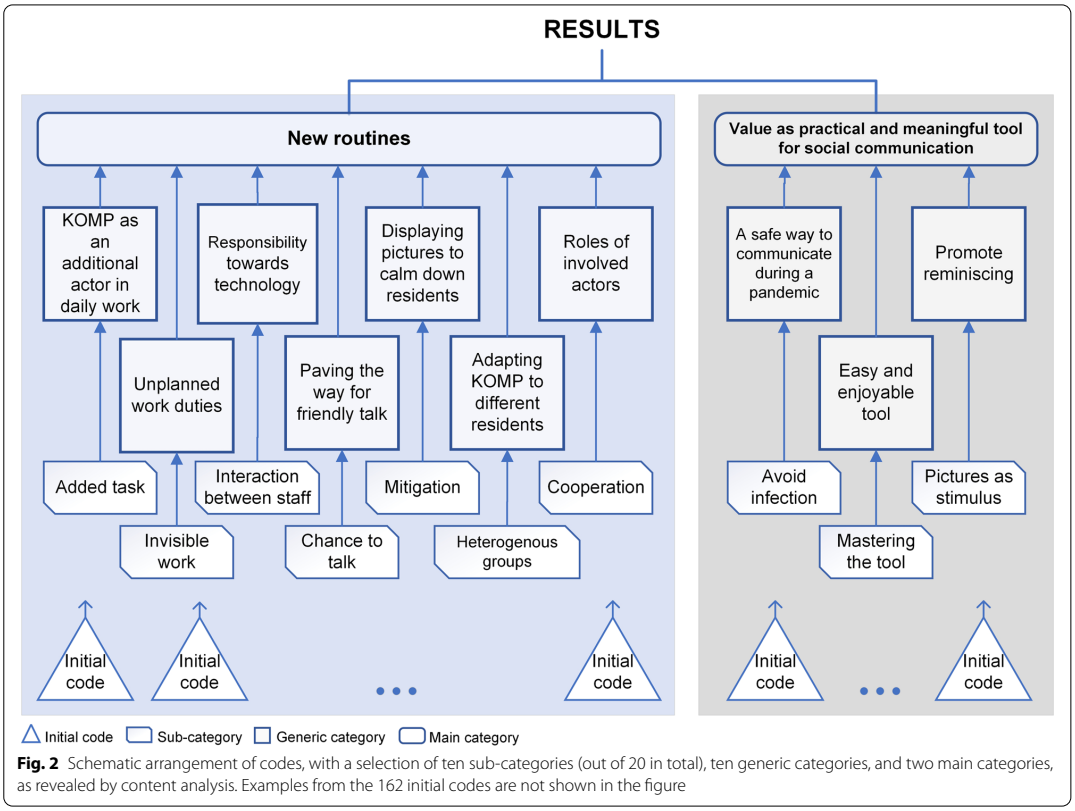

Fig. 2 Schematic arrangement of codes, with a selection of ten sub-categories (out of 20 in total), ten generic categories, and two main categories, as revealed by content analysis. Examples from the 162 initial codes are not shown in the figure

interactive technology in care facilities, and how this is accomplished. Materials labelled under KOMP's value as a practical and meaningful tool for social communication help answer the question of why health care professionals use the technology to support communication and social engagement between the residents and their next of kin. Relationships among different levels in the coding scheme are displayed in Fig. 2.

Results

New routines

The coding process revealed seven categories about the prompt use of KOMP, which specify new work routines in the care facility associated with the technology.

KOMP as an additional actor in daily life

Field observations in November 2020 revealed that KOMP had become a part of the daily routine at the care facility. Its use was repeatedly mentioned and discussed in the ward, and yellow sticky notes about scheduled calls between residents and their relatives could be seen displayed around the nurses' offices. The care facility had eight KOMP devices that rotated between residents, with appropriate measures for infection control, in between. In addition, several devices had been bought privately for residents by their next of kin. Participants in the study considered KOMP to have become an integrated part of caring practices in the facility. As one nurse described, "It has become a part of everyday affairs, or in a way, a part of when the patient arrives. If he is capable of having a KOMP, he gets the offer, so it has become part of the care process" (Participant Number,PN14). Staff reported that they had residents who made good use of KOMP and that there was a need to facilitate its use. "We have one patient who has the screen in her room during breakfast and then enjoys the photos and answers calls from next-of-kin who call" (PN01), a nurse reported. To initiate a video conversation when the KOMP rang, staff moved residents from the common room to their private rooms. However, facilitating these video communications also required staff to frequently answer calls and text messages from relatives in advance to coordinate conversations with KOMP. Field observations also revealed that health care professionals developed routines to encourage residents to communicate more frequently with their relatives using the KOMP. However, although there were attempts to involve most residents in social activities through KOMP, some residents also had challenges that could not be easily accommodated with the technology, such as reduced physical and cognitive capabilities that prevented them from productively using KOMP as a communication device.

Unplanned work duties

The health care professionals stated that KOMP requires a type of "planning" that was not readily identified as such in the regular sense of the term. For example, when a resident failed to use KOMP without additional support, relatives would call one of the caregivers to arrange and facilitate a conversation. One of the caregivers would then turn on the KOMP while also ensuring that the resident's door was kept open to make certain that the resident was engaging with the caller during the duration of the call before turning it off. Some nurses experienced that this calling routine required considerable time and effort. They added that even in the case of patients who managed to initiate calls with KOMP themselves, relatives often failed to get the reply they expected when dialling the KOMP directly, upon which they would call the staff on the phone to ensure that the resident was doing well.

Responsibility towards technology

Health care professionals reported that they were committed to using interactive AAL technologies during the pandemic. However, new responsibilities with respect to the technology also added new routines to staff workloads. For instance, staff would always test new digital tools before using them in the ward, to ensure usability and feasibility and to mitigate problems such as poor Wi-Fi reception or other technical issues. "We have to rethink and be conscious about these sudden events that can be a problem" (PN02), one nurse reported. The participants noted that using the technology was often complicated by unforeseen events, such as missing codes and passwords, low battery notifications, and messages on private phones from relatives reminding the staff to turn on or off a given KOMP. Occasionally, the device would also call out loudly while health care professionals were in the middle of other tasks, meaning that they had to rush off to answer the device to keep the ward quiet. As one nurse reported, "After finishing a video call, we must remember to turn off KOMP to limit interruptions while we are doing other tasks and to keep it, the ward, quiet" (PN03).

Paving the way for friendly talk

A main feature of KOMP is the display of a photo library with images sent from next of kin. To communicate with the KOMP, an application for a smartphone or tablet needs to be installed, and a user profile is created. It is then possible to add other family members so that they can also communicate with the device via the app. One popular form of communication was sending family photos or other images that the resident might be interested in. Images in the photo library are rotated as still images

on the large screen over a certain number of days. Health care staff appreciated how KOMP displayed photos in this manner, since this provided them with a resource for friendly discussions about the resident's family, such as specific memories that the elderly recalled when looking at the display. When visiting the private rooms of patients, the array of photos displayed on the KOMP from next of kin frequently became 'talking points' that invited meaningful conversations between residents and staff.

Displaying pictures to calm down residents

Occasionally, nurses and relatives collaborate to calm down agitated residents by strategically making use of the KOMP. For instance, staff reported that they sometimes displayed specific pictures, which they assumed had a relaxing effect on the behaviour of residents who acted confused and restless. They would, on occasion, obtain information from relatives about specific preferences for pictures. Caregivers also reported that some residents were noticeably calmer after KOMP sessions with their families. As one nurse pronounced, in plain terms, "daily conversation with a daughter or a spouse with KOMP can improve a resident's mood" (PN01, 03). Staff also noticed that some residents who would walk restlessly through corridors in the facility would sometimes remain seated for longer time periods to enjoy the pictures displayed on the screen. They also exemplified how one patient suffering from impaired vision preferred to contact family via KOMP rather than engage the family through other social activities, such as outside strolls. This preference was attributed to the resident's worry over the inability to orient in outside surroundings.

Adapting KOMP to different residents

KOMP is not suitable for all residents and situations. Depending on their cognitive and physical abilities, many residents require help for even very simple tasks, such as turning on and off the device, despite its one-button interface. Nearly all participants reported that cognitive disorders such as dementia generally made social interactions challenging, adding that it was necessary to always map out the needs, benefits, and risks of using technology with different residents.

A physician at the care facility highlighted the unabating importance of bodily function for social interactions with KOMP, despite the apparent simplicity of the device's interface. This point can be illustrated by an observation from an assistant nurse, who described how one resident with impaired vision had dropped KOMP on the floor several times, simply because she could not see where it was placed. As such, even a deceptively simple device such as the KOMP, which is designed to require little to no effort to operate, has an embodied character. In the observed facility, for instance, only two out of 11 patients had adequate physical and cognitive abilities for turning their KOMP on without assistance from staff. This aspect is not trivial since it has implications for caregiver workload at the facility, as staff sometimes have to service multiple residents and their next of kin while struggling to make the technology work for their respective conversations.

Roles of involved actors

Facilitating the use of KOMP required a cast of characters that included residents, relatives, health care professionals, and technology facilitators, all with different experiences, roles, and expectations. Relatives send and update the photo library to involve their loved ones in their lives. In the words of one health care professional, "relatives are good at updating KOMP with interesting pictures so residents can feel that they share the moments of their relatives" (PN08). Health care staff reported that this made residents feel more actively engaged in the daily lives of their families. Some relatives also preferred to purchase a KOMP device privately to have more freedom to communicate. This was beneficial for other residents since it meant fewer users per shared device and reduced the workload of health care staff who would otherwise spend valuable time administering different user accounts. Health care staff also reported how relatives played a key role during the pandemic by adopting KOMP as a safe alternative to physical visits, in compliance with strict measures for infection control. In the words of one professional, "with KOMP, relatives become more available than before, they can call daily or many times a day" (PN15). Observations, however, revealed that health care professionals were more comfortable using KOMP when a technology facilitator was available. In the words of one nurse, "as long as we have a person who helps and facilitates with technology, it works well…" (PN16). From her perspective, the technology facilitator played a significant supportive role in the daily implementation of interactive technology by answering questions about the technology from staff and troubleshooting unexpected technical issues.

Value as practical and meaningful tool for social communication

A safe way to communicate during a pandemic

In interviews, participants stressed that COVID-19 triggered an increase in KOMP use, as the technology offered a means to safely maintain communications despite mandatory measures for social distancing between residents and next of kin. Staff added that KOMP helped residents maintain contact with children, grandchildren, and

family members, despite considerable physical distance. Health staff disclosed that families who used KOMP to communicate with residents were generally satisfied, as it helped them to see each other more frequently. Notably, they suggested that KOMP's video functionality and photo libraries helped some patients with dementia to better recognize and connect with their relatives. Some of these patients could sometimes spend many days without family visits, and KOMP afforded other kinds of embodied interaction than what is possible over the telephone. Not only were there strict restrictions on physical visits during the pandemic, but these required prior planning, including booking an appointment for a limited duration at a safe location in the facility to reduce the risk of viral transmission. In comparison, digital visits made it possible for some residents to engage in video communications several times per day, although the availability of next of kin and staff capacity to some extent constrained the frequency of digital meetings.

Easy and enjoyable tool

Staff reported that KOMP's user interface was easy to use. Compared to a smartphone or tablet, for instance, the device has a large screen and a single knob, both convenient for vision-impaired users. As one nurse disclosed, KOMP was now integrated into the daily routines for many residents who enjoy using it for social connectedness: "When they get up in the morning, the first thing they do is to turn on the KOMP and look for new messages from their daughter or their sons…. there are many residents who truly enjoy this" (PN18). In terms of user issues, in the narrow sense of problems pertaining to the interface *per se*, these appeared limited to the cognitive and physical challenges of specific residents.

Promote reminiscing

Health care professionals described how KOMP supported various forms of 'memory work', a sustained effort by staff to stimulate memory and recall by jointly watching pictures on the KOMP while talking about these visuals with the resident. Noting that residents were often homesick, staff suggested that KOMP offered a medium by which they could jointly look at pictures, recall significant events in their lives, and talk about meaningful events. Caregivers suggested that this imagery helped keep residents socially connected and stimulated the recall and articulation of past experiences. As one nurse remarked, "looking at old family photos, birthplaces, and the places where they grew up, refreshes their memory" (PN04). Caregivers also observed that KOMP offered an opportunity to share significant events with family members, such as gardening work, dinner preparations, and birthday celebrations. This 'memory work' included talking about pictures of significant others, such as grandchildren and other categories of kin, which some residents had problems recognizing.

Discussion

Studies on the long-term implementation and feasibility of digital interventions for social communication in care facilities are still limited due to restricted access, challenges with recruiting of elderly users, and ethical challenges [34, 35]. Other studies have shown that residents in care facilities are less likely to utilize interactive compared with those living in private homes, as physical and cognitive limitations prevent them from employing such technologies without considerable support from health care professionals [36–38].

Asking the question of how and why health care professionals facilitate communication and social engagement between residents and their next of kin in care facilities using KOMP helps us better understand the contingent process by which novel technologies of care are implemented in the wild. The rapid adoption of KOMP at the care facility during the pandemic entailed new forms of collaboration between actors. Akrich's notion of scripting and re-scripting casts light on key dimensions of collaborative efforts around this socially situated technology, whereby new routines emerged to facilitate implementation of KOMP. In the context of nursing practice, Zisberg et al. ([39], p. 446) have described routines as "a concept pertaining to strategically designed behavioural patterns (conscious and subconscious) used to organize and coordinate activities along the axes of time, duration, social and physical contexts, sequence and order". In the case of KOMP, some of these additional routines manifested as highly visible tasks at both the individual and organizational levels, while others were partially obscured by other features of the everyday workload at the care facility. Some of these everyday routines were tailored to suit the needs of particular residents and their next of kin [40], while others entailed new organizational routines and responsibilities towards a technology that would, on occasion, act unpredictably [41]. An example of a new, visible routine was the assessment of whether it would be convenient to offer KOMP to newly admitted residents. On the other hand, an example of a partially obscured task was the considerable work necessary to facilitate video communications to residents who could not use KOMP without staff assistance. An implication of such coordination in advance of conversations is that the technology does not work as spontaneously as the script for "projected users" might suggest [14]. It is well known that adding such 'invisible' routines can be taxing on workers [40]. In the context of the nursing home, "re-scripting" a technical object such as the KOMP beyond

the "projected user", through new routines and creative adaptations that resonate with user needs in the wild, requires considerable work on behalf of health care professionals [14]. Participants in this study noticed how the introduction of KOMP as an interactive technology for supporting the social life of residents entailed a change in their professional responsibilities and their relationships with both residents and their families. In practice, this change in roles and responsibilities also demands a "re-scripting" of existing, routine work tasks [16]. Since novel interactive technologies may entail new tasks and additional labour, there is a need to investigate how these affect the working environment of health care professionals in the long term.

In this study, we have seen examples of how KOMP was introduced in care facilities during a pandemic characterized by strict measures for social distancing. Without much advance preparation or planning, this technology helped elderly residents maintain social communications and engagement with their next of kin. Studies recommend both the adaptation of existing technologies, as well as development of new technologies to address challenges associated with the COVID-19 pandemic [42].

As an example of inclusive technology design, KOMP's projected users (again invoking one of Akrich [14] terms) are cognitively and physically capable of using the device independently. In the context of care facilities, however, where many residents suffer from cognitive decline and physical disability, there is a need for re-scripting, which entails new forms of work by health care professionals. For residents to benefit from KOMP, health care professionals had to adapt their work routines to fulfill individual needs while accommodating and balancing a variety of technological and social constraints.

The professionals reported that KOMP, as a novel interactive technology, demanded new responsibilities and commitments. According to Pols and Moser [15], technologies of care have normative implications by prescribing new relationships between different actors. These included preparations for unexpected technical faults, ensuring that users of KOMP did not disturb other residents, and attending to the intrusive demands of the technology despite having other important tasks to do. For some professionals, the use of KOMP also entailed a sense of moral responsibility, a "technological imperative" to utilize advanced technologies to enhance everyday life for residents at the facility [43]. Our results also suggest that while valuation is always determined contextually and directly influenced by expectations towards the service being provided [44], the added value of KOMP partly depends on the physical and cognitive abilities of each individual resident. Despite KOMP's inclusive design, physical and cognitive disabilities can only be partially mitigated by organizational efforts and staff endeavours.

Strengths and limitations

Data triangulation, combining focus group interviews with field observations and individual interviews, strengthens the reliability and internal consistency of this study. The purpose of triangulation was to gain insight into how KOMP was socially situated in care facilities and to assure sound interpretations of what KOMP meant for health care professionals. Observations of these professionals in the natural context of their workplace also helped the research team reach an ecologically valid understanding of how KOMP was integrated into daily practices of care and to identify challenges with the technology. Another strength is that the interlocutors in the study came from different professional backgrounds, thus offering a diverse set of perspectives on the use of interactive technology for elderly care. Limitations include a relatively limited period of participant observation in the short-term care facility. Long-term, immersive fieldwork would likely reveal other dimensions about the social significance of KOMP than those documented here.

Conclusion

This study examined the ad hoc and prompt use of an interactive technology for social communication known as KOMP in care facilities during the pandemic through the conceptual lens of script theory [14]. The implementation of interactive technology for social engagement in care facilities is a complex process, as technologies do not work spontaneously on their own. Productive use of KOMP in care facilities required cooperation between a host of actors, including residents, relatives, health care professionals and technology facilitators. Despite its simple user interface, the use of KOMP is constrained by the physical and cognitive abilities of users. Not all users benefit from KOMP, and the process of rapidly implementing this interactive technology introduced new routine tasks and responsibilities for health care professionals. This process can be fruitfully analysed through the concept of "re-scripting". In this process, technology and care are mutually shaped, as both are adapted to the needs and capabilities of different residents. Some of these new tasks were also partially obscured due to the complex nature of care work. The 'hidden' nature of tasks associated with this new interactive technology makes it difficult to estimate workloads and to evaluate the technology's long-term feasibility. We suggest that health care managers should ask a deceptively simple question when introducing novel technologies in health care contexts, namely, what kind of 'invisible' work is entailed for health

care workers by implementing the device in question? Answering this question will not be straightforward. More longitudinal research is needed to explore the long-term impact of using interactive technology in care facilities and how such technology adds value to the lives of residents and health care professionals.

Abbreviations

AAL: Active-Assisted Living; NSD: Norsk Senter for Forskningsdata (Norwegian Centre for Research Data); COVID-19: Corona Virus Disease of 2019; PN: Participant Number.

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Authors' contributions

A.B., M.S., A.O., and R.A. designed the study. A.B. and R.A. conducted the interviews. A.B. conducted the observations and transcribed the interviews and observations. The analyses and interpretation of data were done by A.B. and R.A. with support from M.S. and A.O. All authors contributed, but A.B. had the main responsibility of writing the manuscript. All authors read, revised, and approved the final version of the manuscript.

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Availability of data and materials

The datasets generated and analysed during the current study are not publicly available due to participants' confidentiality but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was evaluated by the Regional Committees for Medical and Health Research Ethics and they decided that the study was outside their mandate. The study was further approved by the Data Protection Official for Research at Norwegian Centre for Research Data (NSD), reference 108323. Informed consent was collected from all participants in the study, based on adequate information, in confirmation with the Norwegian Personal Data Acts. Participants were informed that participation was voluntary and that they could withdraw from the project at any point. All data in the study have been anonymized. All methods were carried out in accordance with Helsinki declaration.

Consent for publication

The participants gave their consent to be interviewed and that the anonymised material from the interviews and observation can be used for research and for scientific publication. The photographer of the picture shown in Fig. 1 gave her consent and permission to use the figure in scientific publications.

Competing interests

The authors declare that they have no competing interests.

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References

1. Su Z, Meyer K, Li Y, McDonnell D, Joseph NM, Li X, et al. Technology-based interventions for nursing home residents: implications for nursing home practice amid and beyond the influence of COVID-19: a systematic review protocol. Res Sq. 2020 Preprint at https://doi.org/10.21203/rs.3.rs-56102/v2.
2. Gallistl V, Seifert A, Kolland F. COVID-19 as a "Digital Push?" Research Experiences From Long-Term Care and Recommendations for the Post-pandemic Era. Public Health Front. 2021;9:660064. https://doi.org/10.3389/fpubh.2021.660064.
3. Chu CH, Donato-Woodger S, Dainton CJ. Competing crises: COVID-19 countermeasures and social isolation among older adults in long-term care. J Adv Nurs. 2020;76(10):2456–9. https://doi.org/10.1111/jan.14467.
4. Chen YR, Schulz PJ. The Effect of Information Communication Technology Interventions on Reducing Social Isolation in the Elderly: A Systematic Review. J Med Internet Res. 2016;18(1):e18. https://doi.org/10.2196/jmir.4596.
5. Baker S, Warburton J, Waycott J, Batchelor F, Hoang T, Dow B, et al. Combatting social isolation and increasing social participation of older adults through the use of technology: A systematic review of existing evidence. Australas J Ageing. 2018:184-93.https://doi.org/10.1111/ajag.12572.
6. Hülür G, Macdonald B. Rethinking social relationships in old age: digitalization and the social lives of older adults. Am Psychol. 2020;75(4):554–66. https://doi.org/10.1037/amp0000604.
7. Charness N, Boot WR. Aging and information technology use: potential and barriers. Curr Dir Psychol Sci. 2009;18(5):253–8. https://doi.org/10.1111%2Fj.1467-8721.2009.01647.x.
8. Siniscarco MT, Love-Williams C, Burnett-Wolle S. Video conferencing: an intervention for emotional loneliness in long-term care. Act. Adapt. Aging. 2017;41(4):316–29. https://doi.org/10.1080/01924788.2017.1326763.
9. Banskota S, Healy M, Goldberg EM. 15 smartphone apps for older adults to use while in isolation during the Covid-19 pandemic. West J Emerg Med. 2020;21(3):514–25. https://dx.doi.org/10.5811%2Fwestjem.2020.4.47372.
10. Zamir S, Hennessy CH, Taylor AH, Jones RB. Video-calls to reduce loneliness and social isolation within care environments for older people: an implementation study using collaborative action research. BMC Geriatr. 2018;18(1):1–13. https://doi.org/10.1186/s12877-018-0746-y.
11. Østensen E, Gjevjon E, Øderud T, Moen A. Introducing technology for thriving in residential long-term care. J Nurs Scholarsh. 2017;49(1):44–53. https://doi.org/10.1111/jnu.12268.
12. Lee C, Coughlin JF. PERSPECTIVE: older adults' adoption of technology: an integrated approach to identifying determinants and barriers: older adults' adoption of technology. J Prod Innov Manage. 2015;32(5):747–59. https://doi.org/10.1111/jpim.12176.
13. Granja C, Janssen W, Johansen MA. Factors determining the success and failure of ehealth interventions: systematic review of the literature. J Med Internet Res. 2018;20(5):1–21. https://doi.org/10.2196/10235.
14. Akrich M. The De-Scription of technical objects. In: Law J, Bijker W, editors. Shaping technology/building society: studies in sociotechnical change. Cambridge (MS), London (GB): MIT Press; 1997. p. 205–24.
15. Pols J, Moser I. Cold technologies versus warm care? on affective and social relations with and through care technologies. Alter. 2009;3(2):159–78. https://doi.org/10.1016/j.alter.2009.01.003.
16. Oudshoorn NEJ, Pinch T. How Users Matter: The co-construction of users and technology. Cambridge: Cambridge: MIT Press; 2003. p. 340.
17. Moser I. Velferdsteknologi: en ressursbok. 1. utgave. ed. Oslo: Cappelen Damm akademisk; 2019. p. 69.
18. Oppedal B, Askheim C, Haldar M. Erfaringer med KOMP som velferdsteknologi. Fakultet for samfunnsvitenskap/ Institutt for sosialfag - OsloMet - storbyuniversitetet; 2019. Report No.: 3.
19. Rasmussen EB, Askheim C, Oppedal B, Haldar M. Varm teknologi mot ensomhet blant eldre? Tidsskr Samfunnsforsk. 2021;62(04):353–72. https://doi.org/10.18261/issn.1504-291X-2021-04-03.
20. Schuster AM, Hunter EG. Video communication with cognitively intact nursing home residents: a scoping review. J Appl Gerontol. 2019;38(8):1185–96. https://doi.org/10.1177%2F0733464817711962.
21. Patton MQ. Qualitative research & evaluation methods: integrating theory and practice. 4th ed. ed. Los Angeles, Calif: Sage; 2015.

22. Malterud K. Fokusgrupper som forskningsmetode for medisin og helsefag. Oslo: Universitetsforl.; 2012.
23. Liamputtong P. Focus group methodology: principles and practice. London: SAGE; 2016.
24. Mays N, Pope C. Qualitative Research: Observational methods in health care settings. Prov Med Surg J. 1995;311:182–84. https://dx.doi.org/10.1136%2Fbmj.311.6998.182.
25. Ryan F, Coughlan M, Cronin P. Interviewing in qualitative research: The one-to-one interview. Int J Ther Rehabil. 2009;16(6):309–14. https://doi.org/10.12968/ijtr.2009.16.6.42433.
26. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349–57. https://doi.org/10.1093/intqhc/mzm042.
27. Mjørud M, Engedal K, Røsvik J, Kirkevold M. Living with dementia in a nursing home, as described by persons with dementia: a phenomenological hermeneutic study. BMC Health Serv Res. 2017;17(1):1–9. https://doi.org/10.1186/s12913-017-2053-2.
28. RoomMate A. Increased welfare and safety with intelligent and anonymous remote supervision. 2021. https://www.roommate.no/en/home/. Accessed 18 August 2021.
29. Somnofy Vt. Quantum of sleep. 2021. https://somnofy.com/. Accessed 18 August 2021.
30. KOMP: The one-button computer connecting generations. 2021. https://www.noisolation.com/global/komp/. Accessed 18 August 2021.
31. Tjora AH. Qualitative research as stepwise-deductive induction. Abingdon, Oxon: Routledge; 2019.
32. Elo S, Kyngas H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–15. https://doi.org/10.1111/j.1365-2648.2007.04569.x.
33. Bernard H, Wutich A, Ryan G. Analyzing qualitative data: systematic approaches. 2nd ed. Thousand Oaks, California: SAGE; 2017.
34. Neves BB, Franz RL, Munteanu C, Baecker R. Adoption and feasibility of a communication app to enhance social connectedness amongst frail institutionalized oldest old: an embedded case study. Inf Commun Soc. 2018;21(11):1681–99. https://doi.org/10.1080/1369118X.2017.1348534.
35. Hall S, Longhurst S, Higginson IJ. Challenges to conducting research with older people living in nursing homes. BMC Geriatr. 2009;9(1):1–8. http://www.biomedcentral.com/1471-2318/9/38.
36. Seifert A, Cotten SR. In care and digitally savvy? Modern ICT use in long-term care institutions. Educ Gerontol. 2020;46(8):473–85. https://doi.org/10.1080/03601277.2020.1776911.
37. Francis J, Rikard RV, Cotten SR, Kadylak T. Does ICT Use matter? How information and communication technology use affects perceived mattering among a predominantly female sample of older adults residing in retirement communities. Inf Commun Soc. 2019;22(9):1281–94. https://doi.org/10.1080/1369118X.2017.1417459.
38. Seifert A, Doh M, Wahl H-W. They also do it: Internet use by older adults living in residential care facilities. Educ Gerontol. 2017;43(9):451–61https://doi.org/10.1080/03601277.2017.1326224.
39. Zisberg A, Young HM, Schepp K, Zysberg L. A concept analysis of routine: relevance to nursing. J Adv Nurs. 2007;57(4):442–53. https://doi.org/10.1111/j.1365-2648.2007.04103.x.
40. Rytterström P, Unosson M, Arman M. The significance of routines in nursing practice. J Clin Nurs. 2011;20(23-24):3513–22. https://doi.org/10.1111/j.1365-2702.2010.03522.x.
41. Becker MC, Zirpoli F. Applying organizational routines in analyzing the behavior of organizations. J Econ Behav Organ. 2008;66(1):128–48. https://doi.org/10.1016/j.jebo.2007.04.002.
42. Cosco TD, Fortuna K, Wister A, Riadi I, Wagner K, Sixsmith A. COVID-19, Social Isolation, and Mental Health Among Older Adults: A Digital Catch-22. J Med Internet Res. 2021;23(5):e21864-e. https://doi.org/10.2196/21864.
43. Hofmann B. Is there a technological imperative in health care? Int J Technol Assess Health Care. 2002;18(3):675–89. https://doi.org/10.1017/S0266462302000491.
44. Osborne SP, Radnor Z, Strokosch K. Co-Production and the Co-Creation of Value in Public Services: A suitable case for treatment? Public Manag Rev. 2016;18(5):639–53. https://doi.org/10.1080/14719037.2015.1111927.

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Normalization of technology for social contact in a Norwegian care facility during COVID-19

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Abstract

Background: The COVID-19 pandemic has seen unprecedented growth in the use of interactive technologies in care facilities for social contact between residents and their close contacts due to the need for social distancing. As the pandemic is transitioning into a new phase, there is a need to critically examine the new practices associated with technology usage.

Objective: Our analysis is based on a case study of how a care facility in western Norway adopted a novel technology called KOMP. We empirically investigate the stability of practices with KOMP for maintaining social communication between residents and their relatives and consider whether these practices are likely to last beyond the pandemic. We draw on normalization process theory (NPT) to interpret our findings and critically examine how stable embedding of new technologies for social communication occurs under extraordinary circumstances.

Methods: We conducted a case study based on participant observation and interviews, and the data were analyzed through inductive thematic analysis. Participants are health care professionals from a public care facility in western Norway.

Results: Four major themes emerged from the data. The first revolved around the pressing need for communications between residents and relatives with a suitable tool. Second, staff showed engagement through motivation to learn and adapt the technology in their practices. A third theme centered on how staff and the organization could work effectively to embed KOMP in daily practice. Our fourth theme suggested that the professionals continuously assessed their own use of the technology.

Conclusion: From the perspective of NPT, practices with KOMP have been partially embedded by developing a shared understanding, engaging through cognitive participation, working collectively with staff and the organization, and reflexively monitoring the benefits of using KOMP. However, staff engagement with the technology was continuously threatened by factors related to diverging staff preferences, the burden of facilitating KOMP for residents with impaired cognitive and physical abilities, issues of privacy and ethics, and the technical skills of the residents' relatives. Our analysis suggests that caring practices via KOMP have become relatively stable despite barriers to engagement and are therefore likely to persist beyond the pandemic.

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Keywords: Interactive technology, Social contact, Normalization process theory, Implementation, Case study, Care facilities, Older people

Introduction

During the COVID-19 pandemic, elderly residents in Norwegian care facilities have experienced severe restrictions on visitations from their relatives, which can negatively affect their social relationships and well-being [1–4]. Maintaining a social network and relationships with family and friends are widely considered to benefit the quality of life of older adults [5, 6]. Today, many technologies enable the maintenance of relationships at a distance, such as telephones, messaging services, and video calls [3, 7, 8]. In an affluent welfare state such as Norway, residents and staff in many public care facilities have access to a diverse group of digital tools for supporting communication and maintaining social contact [9, 10].

More recently, a tablet-like device known as KOMP (a name derived from Norwegian *kompis*, meaning 'buddy') was introduced to a limited extent in some care facilities in western Norway. Known as "The one-button computer connecting generations", KOMP was adopted by care facilities so that residents can maintain contact with their families during the pandemic. An important question is therefore whether the use of KOMP has become a stable routine for digital communication in these contexts. By stability, we here mean the regular facilitation of digital communication through KOMP by health care staff amidst other everyday caring tasks, promoting long-term use.

The use of such a technology at this moment is not unique to the Norwegian context, as health care organizations worldwide have moved rapidly to introduce technologies for social contact to support quality of life under critical conditions during the pandemic, instilling new practices for care and affecting the nature of the care environment [11, 12]. Consequently, health care workers and organizations have had to modify their work regimes [13, 14]. To achieve the goal of productively using a technology for social contact with elderly users, it is essential to empirically understand causes of stability and instability in the long term [15]. Research on the sustainable use of technologies for social contact among this user group, however, is scarce [15].

In a previous publication, we documented aspects of this ad hoc use of KOMP during the COVID-19 pandemic, revealing multiple aspects of new and modified routines associated with KOMP usage [16]. In this article, we examine a different set of issues and practices, namely the normalization of KOMP adoption in care facilities, considering the potential stability of these practices beyond the pandemic. To understand the extent and consequences of normalization, we adopt a theoretical framework known as Normalization Process Theory, to discuss how staff engage with KOMP as part of everyday care within the facility.

Several theoretical frameworks and models attempt to describe how new technologies are implemented in health care practice [17, 18]. Examples include the quality implementation framework; the active implementation framework; the conceptual model; diffusion of innovations theory and the implementation effectiveness model [17–19]. These frameworks, theories and models have different assumptions, aims, and characteristics and entail different commitments for the researcher who uses them [17]. For instance, the active implementation framework and the conceptual model aim to explain, predict, or interpret implementation outcomes. Other classic theories account for mechanisms of change and how this occurs in implementation. Evaluation frameworks, on the other hand, determine implementation success [17].

Normalization process theory (NPT), however, is a theory of implementation centered on identifying the situated actions that workers take to ensure the routine embedding of new technologies and sustained embedded practices, i.e., "integration" [17, 19, 20]. NPT identifies four core constructs (coherence, cognitive participation, collective action, and reflection) that represent generative mechanisms for social action and the work that professionals do to routinely make use of new technology in health care. The framework offers a processual account of new technology in the workplace and why some work practices become normalized within organizations, while others do not [20, 21]. For new technologies to accomplish their goals, we need to be reflexive about how they become "normalized" in work practices [11]. Through reflexivity about how normalization occurs in healthcare, it is possible to better understand, recognize and disclose practical implementation problems with specific technologies [22].

Based on experiences accumulated from recent efforts to introduce KOMP in the context of Norwegian care facilities, we empirically investigate the stability of practices with KOMP for maintaining social communication between residents and their relatives and consider whether these practices are likely to last beyond the

pandemic. Practices associated with KOMP usage will be examined in light of NPT to answer whether these practices stabilized during the pandemic.

Methods

Research design

This case study centers on a public short-term care facility in western Norway. Specifically, we follow the work of health care professionals in one organization as they grapple with interactive technology for social contact during COVID-19, accommodating this novel tool as part of their daily practice under exceptional circumstances. Drawing on NPT as an analytical framework, we then consider how KOMP was accommodated and stabilized in everyday caring practice. The case was delineated by the organizational and physical boundaries of the care facility in question, aiming toward analytical and conceptual generalization, not statistical representativity [24], p. 20. Our particular case made it possible to use three different methods, including a focus group, interviews with individuals, and participant observation, to gain an in-depth understanding of how KOMP was used in this real-world context [23, 24]. First, we carried out a focus group interview in the care facility with a moderated dialog to gain initial insights about the experiences, views, and beliefs of health care professionals about KOMP and related practices [25]. Then, individual interviews were conducted to generate in-depth responses about the informants' experiences, perceptions, and feelings about KOMP [26]. Finally, we performed participant observation to better understand how health care professionals engaged with the technology in a naturalistic context [24, 27].

The case

The care facility had two wards for short-term stays ranging from two to eight weeks in duration. However, due to long waiting lists for long-term care, it was not uncommon that residents had to prolong their stays for up to two years. The two wards had a total of 31 residents between 85 and 100 years of age. It was estimated that approximately 80% of care facility residents in Norway live with some kind of cognitive impairment according to Mjørud et al. [28]. There were six to seven health care professionals on the morning shift (i.e., registered nurses, assistant nurses, an activity manager, and sometimes two nursing students) and two to three health care professionals on the evening shift. Like many other care facilities in Norway, this facility had some experience using interactive technologies, including smartphones and iPads, with residents so they could maintain social contact with their relatives. Before the pandemic, the facility had also begun experimenting with KOMP, but its use was limited to a couple of residents at first. However, as we began collecting data during the pandemic in the fall of 2020, the number of residents who used KOMP increased to eleven.

KOMP

As illustrated in Fig. 1, KOMP is a technology for social contact designed so those elderly individuals can interact with their families and friends by sharing pictures, exchanging text messages, and entertaining video calls. KOMP comes equipped with a 17-inch screen, an eight-megapixel camera, a microphone and speaker, Wi-Fi technology, and an easy-to-grip adjustment knob. The large screen is ideal for users with poor eyesight, and the interface is not based on touch response to avoid problems with capacitive sensing. KOMP also amplifies sound to be suitable for users who have hearing difficulties [29].

Sampling

The first and last authors began the recruitment process in August 2020 by contacting the person in charge of assistive living technology at the municipality to gain information about care facilities that had experiences using KOMP. Based on this information, emails were sent to sixteen care facilities in the same county. Emails

Fig. 1 KOMP from No Isolation (©Photographer Estera K. Johnsrud)

included a study description, an invitation to participate with a consent form, and the contact information for both the first and last author. One care facility agreed to contribute by allowing the research team to interview staff (after voluntary consent) and carry out participant observation within their organization. In addition, five health care professionals from this particular care facility, including two managers of different wards, two registered nurses, and an assistant nurse, agreed to attend a focus group interview. In November 2020, observations were conducted for six days during the morning shift. Ten health care professionals, including five registered nurses, two assistant nurses, two care facility physicians, and an activity manager, agreed to participate and share their experiences through individual interviews. They also allowed the main author to conduct observations of their work. In sum, the study included fifteen health care professionals, thirteen women, and two men. One informant attended both the focus group and an individual interview.

Data collection

Data collection began in September and lasted throughout November 2020. The focus group was carried out in person at the meeting room in the care facility. Participant observations were performed by the first author in two wards in the short-term care facility in November 2020 for three days in each ward, mainly during the morning shift. The first author's role as a researcher was disclosed to all participants [27]. These observations were documented through field notes. The eleven individual interviews were conducted separately in the nursing room.

A semi structured interview guide based on open-ended questions was used for both the focus group interview and the eleven individual interviews. The focus group interview was carried out by the first and last authors. The first author hosted the interview, while the last author took notes and documented the meeting content in a session lasting one hour. Individual interviews with health care professionals were then conducted by the first author, lasting between eight and twenty-four minutes (average: fourteen minutes). All interviews were digitally recorded and transcribed verbatim. Descriptive fieldnotes from observational sessions were transcribed in Norwegian. The first author transcribed the interviews and observational field notes.

Data management and ethics

The Regional Ethics Committee declared the study to fall outside the jurisdiction of the Act on Medical and Health Research, and the study was assessed and recommended by the Data Protection Official for Research at the Norwegian Centre for Research Data (ref. 108323). All personal data were collected based on informed consent. Notably, participation was voluntary, and the research subjects could withdraw their consent at any point. All data in the study have been anonymized, and the research was carried out in accordance with the Helsinki Declaration.

Data analysis

To identify patterns of meaning concerning the use of KOMP and its role in caring practice at the facility, we performed a systematic, thematic analysis with an inductive approach, inspired by Braun and Clarke [30]. In the first phase of analysis, we thoroughly familiarized ourselves with the interview transcripts and field notes, determining the most interesting and relevant units of meaning regarding the use of interactive technology for maintaining social communication between residents and their relatives. Second, we generated an initial list of salient codes using NVivo 12 (version 1.3) based on systematic inquiry across the whole dataset. From this process, several relevant code extracts emerged, resulting in the initial codes.

We then organized and mapped this information in the software MindManager, a 'virtual whiteboard'. To further condense these data and identify broader thematic elements, we regrouped initial codes with a high degree of similarity under a new subtheme, generating seven subthemes. Using MindManager, we were able to visualize the interrelations between codes. Based on interconnections between seven subthemes, this assortment, in turn, coalesced into four overarching themes. Table 1 and Fig. 2 illustrate this inductive process, from the selection of code extracts, via initial codes and subthemes, to the identification of the four final themes. Below, we further unpack this coding scheme.

Results

Our thematic analysis revealed four central themes described below that represent the working practices within the care facility when KOMP was used.

The need to communicate with a suitable tool

Staff understood the necessity of communicating digitally due to drastic measures to enforce social distancing between residents and their relatives, and they actively highlighted the differences between KOMP and iPads or smartphones after KOMP was available in the care facility.

Table 1 Examples from the inductive process of code extraction, initial codes, subthemes, and themes

Code extract	Initial code	Subtheme	Theme
"Residents had flexible visiting hours and daily activities before COVID-19, but they have been very restricted"	Visitation restrictions	Finding a safe alternative	The need to communicate with a suitable tool
"I think that some relatives may experience more safety when using KOMP because they can contact their loved ones frequently"	Safe and frequent communication		
"I think that it is very positive that KOMP has a large screen, particularly for residents with poor vision"	Different needs	Inclusive design	
"We think that more staff want to learn about technology"	Desire to learn	Motivation, adoption, and learning	Engagement
"We struggle with some older relatives when they are unable to download the KOMP application on their phones to send pictures"	Workflow disruption	Obstacles	
"We have four KOMPs in each ward—the more, the better"	Availability	Organizational support	Working efficiently
"We have a daily whiteboard meeting in each ward, where we plan out the daily tasks and organize digital tool testing"	Testing tools	Providing training	
"KOMP stimulates the residents in many ways so that they never get bored and takes over the social engagement process in a way that is better than what we can do"	KOMP as a stimulus	Assessment through practice	Evaluating KOMP
"We must think that it makes sense for us to use KOMP; it should be a useful tool"	Thinking about value		

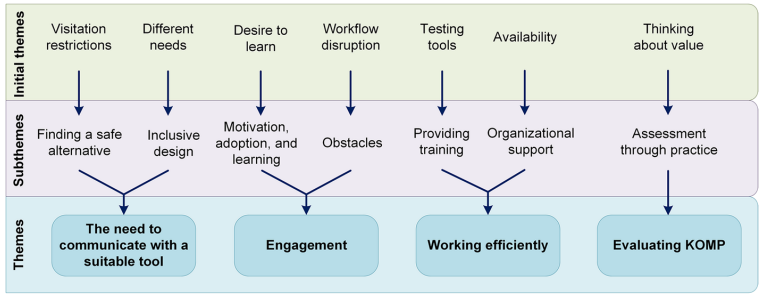

Fig. 2 Illustration of the inductive process from the identification of the initial themes to the identification of the four overarching themes

Finding a safe alternative

As the pandemic progressed, health care professionals had to deal with a dramatic change in everyday social life at the facility, particularly with respect to social contact between residents and families and other social activities due to new regulations on visitations to the facility. In the words of one nurse, "Residents had flexible visiting hours and daily activities before COVID-19, but they have been very restricted". Staff also noticed that these limitations on social life had a negative impact on the residents they cared for, and they soon realized that one of the only ways of maintaining social connections between the frail residents and their relatives in compliance with the need for social distancing was by facilitating digital communications. They addressed the increased need to use KOMP when visits were not allowed. A consensus emerged among staff that KOMP offered an alternative and safe way to keep the residents socially connected and engaged. Staff reasoned that residents' relatives may have had the same impression about the use value of KOMP under these conditions. As one nurse mentioned, "I think that some relatives may experience more safety when using KOMP because they can contact their loved ones frequently". Staff therefore strived to embed KOMP as a normal part of their daily routines. They would, for instance, offer KOMP to newly admitted residents and

make sure that the device was turned on when each resident woke up in the morning so that it could display photos and receive video calls.

Inclusive design

Based on experiences from an intensified use of technology during the pandemic, staff also highlighted differences between KOMP and iPads or smartphones in our interviews. In particular, the many features of KOMP accentuated various affordances of different devices they had used to facilitate social contact. As one nurse explained, they had substituted iPads for KOMPs with some residents since KOMP was suitable for residents with quite different needs. Another issue favoring the use of KOMP was the frequent log-in problems staff had experienced with iPads and smartphones. Furthermore, KOMP's simple user interface was seen as convenient and appropriate for users with cognitive and physical impairments.

Using smartphones and iPads, for instance, often entailed problems with log-in (usernames and passwords) and necessitated dedicated apps for calls, messaging, and photo sharing with relatives. Staff also remarked how making iPads and smartphones work adequately to facilitate social interactions between residents and relatives outside the care facility required assistance from either a caregiver or another family member. Those residents who required less assistance from a caregiver also used KOMP more frequently. As explained by one nurse, "When a call goes directly from relatives to the resident without the intervention of health care professionals, video calling occurs more frequently". Staff considered ease of use for older people to be a significant criterion when deciding which digital solution, they should embed as part of their daily routine. Notably, some of the challenges reported by the health care professionals pertained to seemingly mundane hassles, such as lack of internet availability due to poor coverage in the building.

Staff also reported that elderly users sometimes had dry skin on their fingertips, which made it difficult for them to control smart devices based on a touch interface. Conversely, KOMP usage does not rely on a touch interface. Instead, it is a nonportable device with a large screen and an easy-to-grip adjustment knob. The knob is used to switch the KOMP on and off and to adjust the sound volume. Participants in our study also noted that KOMP had a capable loudspeaker, suitable for those with hearing impairments, and that the large 17-inch screen was suitable for those with poor eyesight.

Engagement

The health care professionals in the study declared that they were motivated to learn about KOMP and adopt the new technology. However, they also identified potential barriers against engagement and use by different actors in the care facility.

Motivation, adoption, and learning

We observed that both managers and caregivers in the facility were inclined toward using KOMP with most of the residents whenever possible, and according to the cognitive and physical abilities of each resident. An issue that was first mentioned through interviews, but later confirmed via observations in the care facility, was the role of health care managers in motiving staff by encouraging them to try KOMP in their work and learn how to apply it in activities with eligible residents. The care facility manager presented the following folk theory about how technology diffused within their organization: "Adopting a new technology requires motivated health professionals who desire to change and like to try new technology. This is how change has been done since technology started". Another interlocutor noticed that widespread use of a new technology necessitated that staff have an interest in changing how they think and that each new technology deserves a fair trial. In the words of one nurse, "We think that more staff want to learn about technology".

Staff highlighted another facet of working productively with KOMP, namely, the need to motivate and engage the residents themselves, and their families. An event that was observed in a nursing room, illustrates this involvement process. In this case, a nurse had introduced KOMP to a recently admitted resident by presenting the device as a means of communication between the resident and his relatives. She instructed the resident about how he could turn on the KOMP himself, and how he could obtain assistance from staff when this was needed. The nurse then called the resident's family, described KOMP's functionality, and demonstrated how they could log in at the KOMP website to communicate via the device. She also showed how they could add other family members to the group. Finally, the nurse gave the family a chance to reflect on its use and ask questions. This example shows how the nurse was motivated to encourage the resident and his relatives to utilize KOMP as part of their daily social routine.

Obstacles

Although the stakeholders in the facility were actively engaged in adopting KOMP through everyday practices, we also identified factors that could influence their engagement, with possible implications for the long-term trajectory of KOMP usage. These factors pertained to staff preferences, challenges with residents who had cognitive and physical impairments, issues of privacy and

ethical dilemmas when using KOMP, and the technical abilities of older relatives.

Staff reported to us that they had quite variable experiences when interacting with technologies such as KOMP. They also had different attitudes, preferences, and skills, which led them to respond quite differently in diverse situations involving the technology. For instance, some workers had voiced their skepticism quite loudly before trying out KOMP in their work practices, and accordingly, they did not have high expectations about its use value. Since most residents could not even use smartphones, they reasoned, how would they receive any benefit from KOMP or even understand its purpose?

One issue that was repeatedly emphasized by the health care staff in the facility was the need for a certain level of cognitive and physical functionality among residents for them to be able to meaningfully socialize with others using KOMP. Unsurprisingly, staff saw considerable variations in the motivations of residents toward its use. One persisting challenge was getting cognitively impaired residents involved in social activities using the device. These residents were often confused and did not understand the purpose of KOMP or why they should take an interest in it. In cases where residents had advanced dementia, they also struggled to recognize their interlocutors on the device, such as having problems connecting specific voices to the source on the screen, potentially causing distress, confusion, and anxiety. While familiar with television and telephones, elderly residents with dementia were not used to multimodal, two-way communication technologies that combined voice and live imagery. As relatives could "dial in" using the app whenever KOMP was turned on, staff-related stories about patients who were startled when relatives abruptly began talking to them through the screen. Based on these experiences, staff had to spend more time and effort helping those users who needed caregivers' assistance with the device at the potential expense of other residents.

In the care facility, we observed a salient phenomenon related to this issue, namely, that when residents with dementia used KOMP for video communications, the door to their room would be kept open. Residents without dementia, on the other hand, would usually take video calls more privately, with their doors closed. Caregivers explained this peculiar arrangement as a consequence of their need to listen for any incoming calls so that they could quickly facilitate conversations for residents if needed. On occasion, some residents also became annoyed during video calls and thus required immediate assistance. By keeping the doors open, staff could be attentive and intervene to address communication problems when needed. This was not a case of staff "listening in", but it still suggests that using KOMP as a tool for personalized care with cognitively impaired residents raised dilemmas related to privacy and ethics that health care workers had to address on the spot in specific situations and had to work around.

In interviews, staff also reported that they sometimes struggled with making KOMP work for interacting with residents' older relatives, who found downloading the app to make calls or to send pictures and text messages difficult. As relayed by one nurse, "We struggle with some older relatives when they are unable to download the KOMP application on their phones to send pictures". They recognized that new technologies were difficult to implement and that age was an important factor in terms of becoming familiar with its use. As such, KOMP was not considered a panacea to the problem of social contact: some residents were over 90 years old and probably had children well over the age of sixty who lacked the technical knowledge needed to deal efficiently with smartphones and mobile apps to call or send pictures.

Working efficiently

To facilitate the use of KOMP in everyday life, there was a demand for training to use KOMP, as well as organizational support.

Providing training

As part of their efforts, the care facility offered training sessions for the staff before they made use of the digital solution with patients. The everyday use of KOMP was planned ahead administratively, with one manager referring to staff meetings as an important arena for coordinating activity throughout the day: "We have a daily whiteboard meeting in each ward where we plan out the daily tasks and organize testing the digital tools". Observations of morning meetings, where the caring tasks were distributed, revealed that KOMP figured in lively discussions among staff. For instance, staff ensured that all available devices were used by residents, and that all the nurses on the shift had the necessary training to facilitate and troubleshoot their use. If needed, nurses could also request a technology facilitator to help identify, solve problems, and develop best practices for KOMP use.

Organizational support

At the organizational level, there was also support for adapting the technology into new routines, with respect to the availability of economic resources, provision of IT infrastructure, and IT-support from a dedicated technology facilitator. In interviews, the professionals singled out the managerial role as central for securing adequate infrastructure and other resources so they could deliver high-quality technology-supported care. As one of the managers noted, implementing a new

piece of interactive technology required meticulous planning, as well as close follow-up to ensure that staff used it continuously. The informants also mentioned that facilitation of social activities added an extra task. They also identified a need for additions to the workforce to be able to provide an adequate level of social activity for the residents.

The professionals also emphasized how support from a dedicated technology facilitator was a major asset and helped ensure successful outcomes. Regarding the supply side of the technology, one manager noted that while they now had an adequate number of KOMP units available, more devices would still be advantageous: "We have four KOMPs in each ward—the more, the better". The rationale was that more units meant they could spend less time switching user accounts between residents. A reliable stock of devices, however, did not solve issues with unstable Wi-Fi connections and other infrastructure essential to maintain reliable use. In the frank words of one nurse, "The major problem is, what is the Wi-Fi-password?" Addressing this frustration, the facility manager emphasized that future iterations of KOMP should come with a dedicated 4G mobile internet connection, which was seen as a significant advantage for residents and staff alike, potentially resolving one major frustration among users.

Evaluating KOMP

Assessment through practice

In both interviews and during participant observation, the participants reflected upon the role that KOMP played in facilitating social communication during the pandemic. While several interactive communication tools were in use before the pandemic, they had not been utilized to their full potential in supporting social interactions between residents and their relatives. During the pandemic, however, staff realized the value and potential impact of such tools. As declared by one manager, "It is quality of life to stay connected with relatives". Staff also emphasized how they intended to continue assisting residents who benefited from KOMP beyond the pandemic. In their view, KOMP was able to attract and stimulate residents with pictures and video conversations in ways that facilitated social engagement. As one nurse explained, "KOMP stimulates the residents in many ways so that they never get bored and takes over the social engagement process in a way that is better than what we can do". Staff saw themselves as able to adapt to and accommodate KOMP in their caring practices, making it fit into the hectic schedule of everyday work in the ward, as well as to the cognitive and physical abilities of those they cared for.

Discussion

Our results have revealed a rich set of practices and reflections by health care practitioners concerning KOMP as an interactive technology, extensively used during an extraordinary situation. During a pandemic characterized by social distancing, it quickly became paramount for caretakers to adopt new technology to facilitate social contact between residents and their relatives. According to our data, health care professionals collectively endeavored to accomplish this goal.

We now ask whether these practices for KOMP usage are becoming stable in the sense that they are undergoing normalization processes [20]. The stability of a practice can be considered an outcome of normalization whereby it becomes a normal part of daily tasks resulting in the continuity of practice over time. To address this issue, we interpret emergent themes from our data through the lens of four core theoretical constructs of NPT. Since this framework focuses on the work of embedding and sustaining practices, we discuss the social processes that may lead to routine embedding and durable integration of KOMP usage in the care facility beyond the pandemic.

In their programmatic outline of the NPT framework, May and Finch [20, p. 4] defined the embedding of practices as "making practices routine elements of everyday life" and the integration of practices as "sustaining embedded practices in their social contexts". Accordingly, implementation processes are driven by four generative mechanisms: coherence, cognitive participation, collective action, and reflexive monitoring. These mechanisms are affected by factors promoting or inhibiting the routine embedding or "normalization" of practice in its social context [20, 21]. According to our data, situational demands during the pandemic required staff to rapidly mature in their understanding of how KOMP could provide residents with safe communication with their families, who were barred from physical visitation. They quickly developed a shared understanding of the usefulness of the device and its potential for easing the burden of social distancing. Having been forced to act rapidly and enforce social distancing at the start of pandemic in March 2020, there was limited time to develop comprehensive strategies and measures for social visits. We believe that the urgency of pandemic measures and the need to identify workable, adequate solutions to maintain social contact between residents and their relatives promoted routine embedding of KOMP practices. During an exceptional period, there seems to have been a radical shift in the mindset of health care staff about the value of technology for digital communication [16].

According to Mair et al. [31], the shared views and understanding that users have when a new technology is implemented can be conceptualized as "coherence".

Through shared understanding, staff were able to implement and realize a new set of practices to establish safe communication through KOMP and make sense of the differences between these practices and former visitation practices, and its impact on everyday work.

Health care professionals at the facility agreed about the convenience of using KOMP compared to other tools (such as iPads and smartphones), given the capacities of their residents. Compared to other tools, staff perceived KOMP to be an accessible tool. Its use could also be tailored to each resident's abilities, whether this was vision impairments, hearing impairments, or the problem of capacitive sensing with dry fingertips. They also explicitly compared KOMP with more established digital devices, through a process of "differentiation" [31]. Furthermore, the professionals construed practices involving KOMP as coherent by defining the elements composing the practice and how these elements differed from practices involving other technologies [20]. Gradually, KOMP practices became a stable aspect of everyday work at the facility through a coherent and shared set of perceptions and understandings.

The work of embedding technology in normalization processes is influenced by factors that promote or inhibit the participation of actors [20]. Known as "cognitive participation", this process entails individuals' enrollment in and legitimization of new technology-based practices aiming to be integrated into practice [31, 32]. Staff were engaged and motivated when facilitating and embedding KOMP in caring practices through processes of learning and skillful adoption. Our reported observation of the keen attempts by one nurse to facilitate the use of KOMP with the family of one resident illustrates one aspect of cognitive participation. Staff were motivated to involve as many residents as possible, in the use of KOMP. No longer facilitating physical visits for their residents, they now facilitated digital visits using KOMP, despite busy schedules. While the perceived value of safe, digital communications stimulated more staff to engage and participate in the embedding of KOMP, our results do, however, suggest nuances in levels of engagement among staff. Our data suggest that engagement was influenced by several factors, including variations in technical expertise and preferences among staff, the physical and cognitive disabilities of residents, privacy and ethical dilemmas, and the technical skills of older relatives who wanted to communicate via KOMP. These factors posed barriers against staff engagement, affecting what Mair et al. [31] calls "legitimization". Legitimization refers to actions taken by professionals to validate their participation in the embedding process by harnessing the value of KOMP in their own work. In this context, efficacious and ethically sound practices of care were seen as essential for long-term sustainability. For instance, privacy and ethical issues need to be managed to ensure confidentiality for the residents in the ward when they were conversing with family. But as we highlighted in the data above, the hectic schedules of health care workers also required them to occasionally keep doors open, so that they could monitor interaction through KOMP and intervene when needed. Such barriers could potentially affect the sustainability of practice in the long run. In post-pandemic times, however, the affordances of KOMP that were valued at the time of our study could eventually be eclipsed by the detrimental impact of additional "technostress" on health care professionals [11, 14].

Another component of normalization concerns the collective work achieved by the staff in the organization. "Collective work" is defined by Finch et al. [32] as the work done by individuals and organizations to execute a new practice. The production and reproduction of a practice require that actors collectively invest and commit to it [20]. Both managers and staff invested in the use of KOMP with residents so they could communicate safely with relatives and friends. This meant that work was adapted to accommodate KOMP. A central dimension of collective work is "contextual integration". Contextual integration concerns the presence of organizational support and the integration of practices within a social context [31]. The availability of organizational support in terms of human resources, IT infrastructure, and economic resources played a prominent role in facilitating KOMP usage. For a technology to be integrated into an organization, there is a need to ensure staff training, maintenance, adaptation, and facilitation of its use in specific contexts. KOMP was developed to help elderly residents maintain social contact in an era of mass digitization; however, as our examples from the care facility suggest, many older people in such settings are frail, with reduced cognitive and physical abilities. The fact that managers made resources available in the care facility and motivated staff to incorporate KOMP into everyday work helped the routine embedding of these practices. But as Jacobsen has recently pointed out regarding the use of assistive technology in the context of Norwegian health care, we need to be more realistic about the use value and limitations of such technologies for the frailest users [33].

Staff's reflections about KOMP's benefits and drawbacks revealed a final mechanism involved in its stabilization. NPT refers to this aspect of normalization as "reflexive monitoring". According to Finch et al. [32], this includes considerations of the user experience and the tangible impacts that result from a new practice. Reflexive monitoring can also involve judgments about the utility and effectiveness of a new practice, with reference

to socially patterned and institutionally shared beliefs. Health care professionals developed judgments and assessments about KOMP's ease of use, its social value during social distancing, problematic issues, the effects of KOMP on their work environment, and how they could adapt to these matters. Assessing the benefits of technology promotes its routine embedding, while the unclear benefits of technology for users and health staff can result in these individuals ignoring or rejecting it [20]. The factors that promote or inhibit staff's evaluation of the benefits of KOMP are related both to their schedules and to residents' physical and cognitive capabilities. Staff continuously reflected on their practices with KOMP and evaluated the technology in ways that reshaped and accommodated its use across the contexts of care.

At present, KOMP balances different stakeholder needs, offering a convenient interface compared to other digital communications tools. Depending on future design iterations and the developmental trajectory of the device, it may or may not become obsolete over time. But whatever technologies for social contact will appear in the future, these must satisfice the same constraints and practices in elderly care that KOMP currently does. As such, this case study of normalization work, carried out under extraordinary circumstances, offers critical lessons for future work on technologies of care.

Strengths and limitations

Despite restrictions during the COVID-19 pandemic, gaining access to the care facility presented an opportunity to contextualize data from interviews with observations from a naturalistic context. By exploring one care facility through both interviews and observation, we could compare what health care professionals said with what they did. Triangulation by drawing on different sources of evidence is a considerable asset for case studies [23].

Conducting such a case study can provide knowledge about the impact of social distancing on social contact between frail elderly and their families and the role of technology to reduce this burden. Additionally, using KOMP as an example of communication technology makes other research on different communication technologies relevant and comparable considering the needs of involved stakeholders.

Our choice of this care facility, which has a tradition of using many different AAL devices in their work, comes with some caveats. Clearly, the participants in our study had considerable experience with digital assistive technologies, which likely influenced their experiences with KOMP. We do not, however, have a reason to suspect that our sample of professionals is atypical for the Norwegian context.

A relatively brief observation period (six days) also presents a limitation on our findings, as a longer period would have given us a broader sample of KOMP-related events to analyze. There were also potential biases from observing only the morning shift at work, as the evening shift might face quite different challenges regarding the use of KOMP, such as fewer staff at work. The challenges posed by the COVID-19 pandemic affected both the size of our sample and the observational period. Among other issues, the facility was understaffed due to sick leaves during this critical period, and we were not able to access other care facilities.

We recognize that interviewing managers and subordinates together in the same focus group can sometimes present challenges due to perceived differences in social status and the potential for social desirability bias when answering questions, particularly about sensitive issues in the workplace. In turn, this can affect the richness and truthfulness of how a group of respondents answers a query. Notably, the topic of this study was not a controversial one, in the context of Norwegian care practices. Furthermore, the focus group discussions were characterized by openness, with both staff and managers contributing equally to the conversation [25]. In addition to a relatively egalitarian work-life culture, Norwegian employees also have strong labour rights that protect them from arbitrary retaliation from employers. While respondent bias due to small group dynamics cannot be ruled out in principle, the research team had no reason to suspect that our informants were self-censoring their opinions. Data from the observations did not reveal any inconsistencies with the views articulated by managers and staff during the focus group interviews.

Conclusion

Our case analysis reveals a rich set of social processes contributing to the embedding of KOMP as a tool for digital communication. Four aspects of these processes were highlighted first through the crucial need for digital communication with a suitable tool between residents and relatives. Second, staff engaged with the technology and were motivated to learn about how it could be adapted to their practices. The third aspect focused on how staff and the organization worked collectively in an efficient way to routinely embed KOMP in daily life. The fourth showed how the staff reflected on KOMP's benefits and continuously evaluated its use through the practices. Drawing on the NPT framework, we examined these four aspects with respect to four generative mechanisms: coherence, cognitive participation, collective action, and reflexive monitoring. We suggest that practices involving KOMP become partially embedded within the organization. The sustained use of a technology depends on whether

it becomes part of the routines and practices for care. In this case, it is likely that KOMP usage, as a practice for social contact, will outlast the pandemic. However, our data also reveal some potential barriers regarding engagement among staff. Thus, we need more longitudinal research on the long-term influences of these technologies on practices of care.

Abbreviations

AAL: Active-Assisted Living; COVID-19: Coronavirus Disease 2019; NPT: Normalization Process Theory; NSD: Norsk Senter for Forskningsdata (Norwegian Centre for Research Data).

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Authors' contributions

A.B., M.S., A.O., and R.A. designed the study. A.B. and R.A. conducted the focus group interview. A.B. conducted the individual interviews and observations and transcribed the interviews and observational field notes. The analyses and interpretation of data were performed first by A.B. and then modified and revised by R.A., M.S., and A.O. The manuscript writing was done mainly by A.B. All authors read, modified, revised, and approved the final version of the manuscript.

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Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available to protect participants' confidentiality but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Data Protection Official for Research at Norwegian Centre for Research Data (NSD), reference 108323. The study was submitted to the Regional Committees for Medical and Health Research Ethics, and it was decided that it was outside their mandate. According to the Norwegian Personal Data Acts, all participants in the study were asked to give informed consent based on adequate information provided by the authors. It was confirmed that participation in this study was voluntary and that participants had the right to withdraw from the project at any point. All data in the study have been anonymized. All methods were carried out in accordance with the Helsinki Declaration.

Consent for publication

Participants in this study gave their consent to be interviewed, and the anonymized data collected from the interviews, observations and findings can be used for research purposes and for scientific publication. An informed consent was obtained from all participants for publication. The photographer of the picture shown in Fig. 1 gave consent and permission to use the figure in scientific publications.

Competing interests

The authors declare that they have no competing interests.

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References

1. Kimura M, Ojima T, Ide K, Kondo K. Allaying Post-COVID19 Negative Health Impacts Among Older People: The "Need To Do Something With Others"—Lessons From the Japan Gerontological Evaluation Study. APJPH. 2020;32(8):479–84. https://doi.org/10.1177/1010539520951396.
2. Chu CH, Donato-Woodger S, Dainton CJ. Competing crises: COVID-19 countermeasures and social isolation among older adults in long-term care. J Adv Nurs. 2020;76(10):2456–9. https://doi.org/10.1111/jan.14467.
3. Gallistl V, Seifert A, Kolland F. COVID-19 as a "Digital Push?" Research Experiences From Long-Term Care and Recommendations for the Post-pandemic Era. Public Health Front. 2021;9:660064. https://doi.org/10.3389/fpubh.2021.660064.
4. Cosco TD, Fortuna K, Wister A, Riadi I, Wagner K, Sixsmith A. COVID-19, Social Isolation, and Mental Health Among Older Adults: A Digital Catch-22. J Med Internet Res. 2021;23(5):e21864. https://doi.org/10.2196/21864.
5. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, et al. Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. J Nutr Health Aging. 2020;24(9):938–47. https://doi.org/10.1007/s12603-020-1500-7.
6. Douglas H, Georgiou A, Westbrook J. Social participation as an indicator of successful aging: an overview of concepts and their associations with health. Aust Health Rev. 2017;41(4):455–62. https://doi.org/10.1071/AH16038.
7. Hasan H, Linger H. Enhancing the wellbeing of the elderly: Social use of digital technologies in aged care. Educ Gerontol. 2016;42(11):749–57. https://doi.org/10.1080/03601277.2016.1205425.
8. Chen K. Use of Gerontechnology to Assist Older Adults to Cope with the COVID-19 Pandemic. J Am Med Dir Assoc. 2020;21(7):983–4. https://doi.org/10.1016/j.jamda.2020.05.021.
9. Nakrem S, Jóhannes S. Velferdsteknologi i praksis: Perspektiver på teknologi i kommunal helse- og omsorgstjeneste. Oslo: Cappelen Damm akademisk; 2017.
10. Helsedirektoratet. Velferdsteknologi. En fagrapport om implementering av velferdsteknologi i de kommunale helse- og omsorgstjenester 2013–2030. Oslo; 2012. https://www.helsedirektoratet.no/tema/velferdsteknologi. Accessed 24 Mar 2022.
11. Carroll N, Conboy K. Normalising the "new normal": Changing tech-driven work practices under pandemic time pressure. J Inf Manag. 2020;55:102186. https://doi.org/10.1016/j.ijinfomgt.2020.102186.
12. Wister A, Fyffe I, O'Dea E. Technological interventions for loneliness and social isolation among older adults: a scoping review protocol. Syst Rev. 2021;10(1):1–217. https://doi.org/10.1186/s13643-021-01775-6.
13. Davison RM. The Transformative Potential of Disruptions: A Viewpoint. Int J Inf Manage. 2020;55:102149. https://doi.org/10.1016/j.ijinfomgt.2020.102149.
14. Richter A. Locked-down digital work. Int J Inf Manage. 2020;55:102157. https://doi.org/10.1016/j.ijinfomgt.2020.102157.
15. Peek STM, Luijkx KG, Vrijhoef HJM, Nieboer ME, Aarts S, van der Voort CS, et al. Understanding changes and stability in the long-term use of technologies by seniors who are aging in place: a dynamical framework. BMC Geriatr. 2019;19(1):236. https://doi.org/10.1186/s12877-019-1241-9.
16. Badawy A, Solberg M, Obstfelder AU, Alnes RE. Improvised use of a digital tool for social interaction in a Norwegian care facility during the COVID-19 pandemic: an exploratory study. BMC Health Serv Res. 2022;22(1). https://doi.org/10.1186/s12913-022-07526-0.
17. Nilsen P. Making sense of implementation theories, models, and frameworks. Implement Sci. 2015;10(1):53. https://doi.org/10.1186/s13012-015-0242-0.
18. Tabak RG, Khoong EC, Chambers DA, Brownson RC. Bridging research and practice: Models for dissemination and implementation research. Am J Prev Med. 2012;43(3):337–50. https://doi.org/10.1016/j.amepre.2012.05.024.
19. Skolarus TA, Lehmann T, Tabak RG, Harris J, Lecy J, Sales AE. Assessing citation networks for dissemination and implementation research frameworks. Implement Sci. 2017;12(1):97. https://doi.org/10.1186/s13012-017-0628-2.

20. May C, Finch T. Implementing, Embedding, and Integrating Practices: An Outline of Normalization Process Theory. Sociology. 2009;43(3):535-54, p 4. https://doi.org/10.1177/0038038509103208.
21. May C, Rapley T, Mair FS, Treweek S, Murray E, Ballini L, et al. Normalization Process Theory On-line Users' Manual, Toolkit and NoMAD Instrument [Online] 2015. Available from: http://www.normalizationprocess.org/. Accessed 24 Mar 2022.
22. May C. A rational model for assessing and evaluating complex interventions in health care. BMC Health Serv Res. 2006;6(1):86. https://doi.org/10.1186/1472-6963-6-86.
23. Yin RK. Case study research and applications: design and methods. 6th ed. Los Angeles, California: SAGE; 2018.
24. Tjora AH. Qualitative research as stepwise-deductive induction. Abingdon, Oxon: Routledge; 2019.
25. Krueger RA, Casey MA. Focus groups: a practical guide for applied research. 5th ed. Los Angeles: Sage; 2015.
26. Bourgeault I, Dingwall R, De Vries R. The Sage handbook of qualitative methods in health research. London: Sage; 2010.
27. DeWalt KM, DeWalt BR. Participant observation: A guide for fieldworkers. 2nd ed. Lanham, Md: AltaMira Press; 2011.
28. Mjørud M, Engedal K, Røsvik J, Kirkevold M. Living with dementia in a nursing home, as described by persons with dementia: a phenomenological hermeneutic study. BMC Health Serv Res. 2017;17(1):1–9. https://doi.org/10.1186/s12913-017-2053-2.
29. KOMP: The one-button computer connecting generations. 2021. https://www.noisolation.com/global/komp. Accessed 24 Mar 2022.
30. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. https://doi.org/10.1191/1478088706qp063oa.
31. Mair FS, May C, O'Donnell C, Finch T, Sullivan F, Murray E. Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review. Bull World Health Organ. 2012;90(5):357–64. https://doi.org/10.2471/BLT.11.099424.
32. Finch TL, Rapley T, Girling M, Mair FS, Murray E, Treweek S, et al. Improving the normalization of complex interventions: Measure development based on normalization process theory (NoMAD): Study protocol. Implement Sci. 2013;8(1):43. https://doi.org/10.1186/1748-5908-8-43.
33. Jacobsen FF. Ti år med mer innovasjon i omsorgtjenestene? Tidsskrift for omsorgsforskning. 2022;8(1):1–4. https://doi.org/10.18261/tfo.8.1.3.

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Together, at a distance: experiences with a novel technology for social contact among older people and their relatives in Norway during the COVID-19 pandemic

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Abstract

Background The recognition that people are social beings is fundamental for person-centered care. During the COVID-19 pandemic, the lives of older people were restricted in ways that dramatically reduced their opportunities for face-to-face contact. Limited contact with family members due to social distancing raised concerns about the well-being of older people. In Norway, interactive technologies were therefore introduced to older people to help them maintain social contact while practicing physical distancing.

Objectives This study was designed to examine how older people and their relatives experienced the use of technology-mediated communication through KOMP, a tablet-like device for supporting social contact in care facilities and homes during the pandemic.

Methods We adopted an open phenomenological approach inspired by Kvale and Brinkmann (2009) to explore how the use of KOMP became meaningful during the pandemic. The study was based on individual interviews with 4 residents in care facilities and 13 relatives.

Results The lived experiences of using KOMP among older people and their relatives revealed that adopting digital communication helped older people, and their families mitigate social distancing and maintain relationships with each other, despite the restrictions imposed by the government. Virtual involvement through KOMP afforded meaningful interconnections in the social lives of the users and their distant family members, thereby supporting their roles as parents and grandparents despite the distance, and promoting cross-generational connections among family members. Digital meetings also provided opportunities for older people and their relatives to enjoy each other's presence in favored places, by conveying a homely atmosphere, for instance. These virtual encounters did not rely exclusively on talk as the only means of communication.

Conclusion This study suggests that communicating via KOMP was a meaningful activity for the participants. Technologies for social contact can, to some extent, facilitate person-centered care for older people in care facilities and their private homes, despite circumstances requiring social distancing.

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Keywords Social communication, Older people, Technology for social contact, Pandemic, Relatives, Person-centered care

Introduction

Strict public measures were imposed by governments after recommendations from healthcare authorities and experts around the globe due to COVID-19, resulting in reduced face-to-face contact [1]. This dramatic decrease in social interaction and participation in communal and family activities due to physical distancing is widely considered to have had a negative impact on the mental and physical health of older people [2–6]. As a vulnerable population, older adults living at home and in care facilities were at risk of experiencing social isolation and loneliness due to restrictions on social contact [7–11]. This constituted a major societal problem, since social isolation can have negative consequences and accelerate cognitive decline [12].

In this article, we draw on the framework of person-centered care (PCC) to explore how the use of a new technology for social contact, KOMP (derived from the Norwegian *kompis*, meaning 'buddy'), became meaningful for older people and their family members during a period of mandatory physical distancing. Respect, engagement, relationships, communication, and a focus on the individual's values and preferences are central to PCC as a philosophy of care [13]. PCC emphasizes the importance of maintaining family ties to sustain a sense of belonging [14, 15], including relationships with friends and significant others as central aspects of both communal life and personal identity [16]. PCC is a framework that puts the whole person at the center of care, encompassing their history and family, social and cultural context, and personal strengths and weaknesses [17]. The social needs of residents in long-term care facilities, in particular, should be accommodated by helping them maintain satisfactory relationships with their families through meaningful conversation [18].

However, it is challenging for older people to maintain close familial relationships after moving to long-term care facilities due to impaired health abilities, physical relocation, and sometimes the loss of a spouse [19, 20]. High levels of social contact with family and friends have been reported to help residents adapt to living in institutional care facilities and to enhance their quality of life [14, 16, 19, 21]. When older people move to a care facility due to physical and cognitive disability, their communication patterns may change, and they become more dependent on relatives or other caregivers to determine the type and amount of social contact they have [22].

When the pandemic intensified in March 2020, and social distancing was enforced by the healthcare authorities, there was an urgent need to keep frail older adults in contact with their loved ones. Health professionals in care facilities, for instance, took the initiative to ensure that older people remained both safe and socially engaged during the crisis [10]. Communication technologies offered a wide range of possibilities for maintaining social communication despite the need to stay physically distanced at this time [23]. Computers, tablets, and cellular phones allow older people to communicate digitally, sometimes helping them overcome physical or cognitive limitations [24]. Video communication offers one possible way of maintaining or increasing communication between older people and their families [22]. It offers an alternative mode of communicating while providing an opportunity for multimodal interaction that combines verbal and nonverbal aspects of social interaction. In contrast, telephone does not allow for the same degree of nonverbal, embodied communication as video which has a greater capacity to convey information and multiple conversational cues through immediate feedback, body language, and facial expressions [22, 25].

This study contributes to our empirical understanding of communication via technologies for social contact from the perspective of older users and their relatives during the pandemic, a topic for which there is a significant knowledge gap [22, 26]. Specifically, this research adds to our knowledge about this pressing topic by investigating experiences with KOMP, a tablet-like device. This form of technology-mediated communication has been used extensively in Norwegian care facilities and homes to maintain social communication between older people and their relatives while they remain physically separated. While previous studies have investigated the perspectives of health care staff on the use of KOMP to support social contact during the pandemic and the degree to which it was normalized in caring practices [27, 28], this study specifically examines how older people and their relatives experienced the use of technology-mediated communication through KOMP for supporting social contact in care facilities and homes during the pandemic.

Approaching these accounts of KOMP usage from the perspective of PCC adds to our understanding of what role such technologies can play in the social life of older users in a time of crisis.

KOMP

KOMP, shown in Fig. 1, is an interactive tool designed to connect older people with their families by sending pictures, text messages, and video calls. KOMP looks like a small 17-inch TV screen and has built-in Wi-Fi and an eight-megapixel camera. It has a single on/off knob. It

Fig. 1 KOMP from No Isolation (©Photographer Harriet Gridley (left photo) and Estera K. Johnsrud (right photo))

also comes with a large screen to display images (either a live video feed or rotating still images). It does not rely on a touch screen as an interface to avoid problems with capacitive sensing. It is intentionally designed with clear and loud sound to make it easier for older people to understand what others say [29].

Methods

Inspired by Kvale and Brinkmann [30, 31], we applied an open phenomenological approach to examine participants' experiences with KOMP and their associated meanings. As a philosophical project, phenomenology is the study of phenomena, and how everyday experiences appear to people from a first-person perspective under the assumption that there cannot be a view of phenomena from nowhere [32]. Phenomenology emerged as a deeply philosophical enterprise in the late 19th and early 20th centuries. More recently, however, phenomenology has been operationalized as an empirical and applied research program in qualitative inquiry to examine the lifeworld experiences and perspectives of individuals across various domains of life [30, 31]. This mode of inquiry seeks to describe the essence of first-person perspectives on specific social phenomena, identifying and analyzing significant units of meaning. It is achieved through a process of meaning condensation that entails reducing participants' statements to shorter formulations and essential meanings that reproduce the immediate meanings of what has been said, usually in much fewer words than the original first-person narratives [31]. The phenomena in question (here, the experiences of communication via KOMP during a time of unprecedented social distancing) are described in an open and reflective way to reveal emergent meanings from the first-person perspective, as recalled through interviews. Such experiences may involve perceptions, thoughts, memories, imagination, and emotions [33, 34].

Participants and recruitment

Recruitment of participants for the study began in August 2020 by contacting the manager of a short-term care facility that had recently started using KOMP. Initial contact was established via email and included a description of the study, an invitation to participate in interviews, the contact information of the first and last authors, and a consent form. The manager then forwarded the email to health care staff in the care facility. Health care professionals agreed to provide information about the recruitment process to residents and their relatives who used KOMP. Four women in the facility who used KOMP, aged between 87 and 92, were asked by the staff to participate in the interviews. Three of these residents had adequate cognitive and physical abilities for their age, and one had mild cognitive impairment. Eight close family members, including daughters, a son, a daughter-in-law, and spouses of residents in the care facility who used KOMP, also consented to requests from the staff to be interviewed for the study.

Snowball sampling was used to recruit relatives of the older people who used KOMP at home. Friends and acquaintances of the first and last authors who knew about KOMP, and had older adults in their close networks, were asked to disseminate the study description, along with an invitation to participate. Snowball sampling provided a sample of five potential respondents. The first author then sent emails to those five relatives describing the study and including a request to participate, along with the contact information of the first and last authors. Written consent to participate was obtained both in person, and digitally via email, from the five relatives.

In total, the recruitment process resulted in a sample of 17 participants (13 relatives and four residents), who shared their perspectives in 16 interviews[1]. Table 1 shows

[1] One individual interviewee in the care facility had two relatives (a son and a daughter-in-law).

Table 1 Overview of the participants, their affiliations, and the interview methods

Interview	Participant	Age	Older person's place of residence	Interview method
1	Daughter		Care facility	In-person
2	Daughter living abroad		Home	WhatsApp
3	Daughter living abroad		Home	WhatsApp
4	Grandchild		Care facility	Teams
5	Daughter		Home	Phone
6	Spouse		Care facility	In-person
7	Daughter		Care facility	Phone
8	Son and daughter-in-law		Care facility	In-person
9	Spouse		Care facility	Phone
10	Daughter		Care facility	Phone
11	Daughter		Care facility	Phone
12	Daughter		Care facility	Phone
13	Resident	92	Care facility	In-person
14	Resident	90	Care facility	In-person
15	Resident	87	Care facility	In-person
16	Resident	90	Care facility	In-person
16 interviews	17 participants			

the participants, the older person's place of residence, the older person's age, and the interview method.

Data collection

Data were collected from September to November 2020. Eleven individual interviews in the care facility were conducted in November 2020. The care facility had two short-term wards where residents could stay from three weeks to more than two years. Individual interviews with four residents were conducted in person in their private rooms. Seven individual interviews were conducted with eight relatives; two were held in person at the care facility, and five were conducted digitally using the phone number of the care facility.

The five remaining individual interviews with relatives (four daughters and a grandchild) of older people living outside the care facility, either at home or in another care facility, were conducted in person on campus or digitally by phone, WhatsApp, or Microsoft Teams audio calls.

A semi-structured interview guide with open-ended questions was utilized. Examples of the questions in the resident's interview guide include: (1) Would you talk about your reasons for using KOMP to contact your family? (2) How does the use of KOMP affect other forms of family communication (physical visitations and telephone)? (3) What are the benefits and challenges of using KOMP?, and (4) What are your thoughts about further use of KOMP? Examples of questions in the interview guide for the relative include: (1) What do you think about your relative's social life in the care facility/home? (2) How do you experience changes in your relative's daily life after using KOMP?, and (3) Would you describe some positive and negative experiences of using KOMP to maintain social contact?

The purpose of the interview was to determine the feelings, perceptions, beliefs, thoughts, and experiences of the participants in using digital communication to enhance social contact during the pandemic. All individual interviews were conducted by the first author and lasted between five and 37 min (average of 16 min). The interviews were digitally recorded and transcribed verbatim.

Data management and ethics

The Regional Committees for Medical and Health Research Ethics declared that the study was outside their authority. The committee believed that the purpose of the study was not primarily to acquire new knowledge about medicine and health, but rather to investigate how residents and their relatives would experience a new technology for social contact, therefore, the study has the character of being a different type of research than medical and healthcare research. The Data Protection Official for Research at the Norwegian Centre for Research Data (NSD) – currently called Norwegian Agency for Shared Services in Education and Research (SiKt) – approved this study under reference number 108,323. At the beginning of the interviews, the authors obtained verbal consent, per the Norwegian Personal Data Act, from all participants, including residents who with cognitive impairments. Written consent to participate was also obtained from the relatives of the older persons living at home. The participants were informed that participation was entirely voluntary, and that they could withdraw from the study at any time. All data in the study were anonymized. All methods were carried out in accordance with the Helsinki Declaration.

Analysis

The analysis was inspired by Kvale and Brinkmann [30, 31], focusing on the coding and analysis of meanings. Analysis of the interviews proceeded via five steps. First, the interview transcripts were read several times to obtain an overall sense of what they were about. We then identified the relevant meaning units (quotations) in each interview, as they were expressed by the participants, with direct significance for the investigated phenomenon (the use of KOMP to transcend social distancing). The third step was to restate the initial theme and immediate meaning of our informants' original statements as simply and clearly as possible. We tried to read the interviews in an unbiased way to the greatest extent possible and thematize all statements from the participants'

point of view. In the fourth step, the initial theme of each meaning unit was examined considering the phenomena under scrutiny to determine the experience associated with each theme. Similar experiences were then categorized under the same subtheme. Finally, in the fifth step, homogeneous subthemes were collected under an essential theme. Three essential themes emerged from the data: (1) overcoming social distancing by adopting digital meetings, (2) staying involved in each other's daily lives, and (3) togetherness in a digital space. Table 2 provides examples of how we condensed meanings, from units of meanings as quotations via initial themes and subthemes, to essential themes.

Results

In the following section, we present the three essential themes that emerged from reported experiences of KOMP usage among older people and their relatives when maintaining social contact during the pandemic.

Overcoming social distancing by adopting digital meetings

A central theme in the reported experiences was how adopting KOMP for digital meetings offered our informants a way to overcome social distancing.

KOMP as an alternative way to visit

As in many other countries, limitations on social contact were enforced in Norway to reduce the risk of infection. In mid-March 2020, care facilities placed unprecedented restrictions on physical visits to minimize the chances of viral transmission among visitors and residents. Around this time, municipal healthcare organizations such as nursing homes began facilitating KOMP use to maintain social contact for older adults. There was an urgent need to find an alternative way to help older people and their loved ones communicate safely and frequently. One daughter, in a family that had acquired the technology privately, expressed the situation as follows: "We chose to buy KOMP at the beginning of the pandemic when it was very restricted to visit my dad…it was a way to keep in regular contact with him." Both relatives and residents emphasized how KOMP appeared to be a safe way to

Table 2 Examples of meaning condensation from meaning units to initial themes of meanings units, subthemes, and essential themes

Interview	Meaning units (quotes)	Initial themes of meaning units	Sub-themes	Essential themes
1	"We chose to buy KOMP at the beginning of the pandemic when it was very restricted to visit my dad…it was a way to keep in regular contact with him."	Need for social contact Differentiating between physical and digital meetings	KOMP as an alternative way to visit	Overcoming social distancing by adopting digital meetings
12	"It is useful to have KOMP when visits are limited so we can see my mom and talk to her daily."			
10	"If I had two choices, to visit my mom or to use KOMP, I would visit her in person. But I have only one choice, to use KOMP, during the pandemic; it is good that we have an alternative."			
10	"KOMP does not substitute for visits; however, it is an alternative way to keep in contact."			
3	We send photos in the morning, and then we talk in the evening by video. It is pleasant."	Maintain contact through photos and videos A pleasant way to communicate	Social contact at a distance by sharing photos and videos	Staying involved in each other's daily lives
7	"A nice and wonderful way to get so close to my mom in the pandemic. She enjoys looking at pictures so that she will not forget her beloved family, which is very important."			
16	"I have KOMP on all day. I like to see the photos of my family rotating all the time and enjoy seeing their birthdays."			
15	"It is nice to have KOMP to talk with my family and to know how they are doing."			
8	"KOMP gathers the whole family, both children, and grandchildren."	Different family members meet in a digital room	KOMP enhances intergenerational connections	
1	"With the camera on, the video chat is more convenient for all the family members, including many siblings dispersed both across Norway and abroad."			
3	"We sometimes have something to talk about, and sometimes we just sit or eat so mom can see us around the dining table or in different situations."	Communicating without talking	Embodied video calls	Togetherness in a digital space
1	"Although my dad does not talk during the call, we can see him smiling, nodding or turning his head toward someone sitting in his room, such as my mom or one of us."			
7	"My dad likes my mom to remotely join him while he is at home, or eats in the kitchen, and both of them enjoy these moments."	Conveying a homely atmosphere via KOMP	Sharing moments in favored places	
4	"Through KOMP, I call my grandfather to show him his house or cottage"			

communicate during the pandemic when they had few alternative choices. Two other daughters, who were living abroad, appreciated that KOMP enabled them to maintain contact across a significant physical distance, and valued these digital encounters with their mother: "It is easier to keep in touch with my mom through KOMP during the pandemic. KOMP has removed restrictions of social distancing and shortened the distance through technology."

Another daughter in our sample articulated the dilemma of the situation as follows: "If I had two choices, to visit my mom or use KOMP, I would visit her in person. But I have only one choice, to use KOMP, during the pandemic. It is good that we have an alternative." Here, the daughter made an explicit comparison between in-person visits and digital meetings. While preferring meeting her mother in person, this was not feasible at that time, with virtual meetings presenting themselves as an adequate way of maintaining contact. The mother, who lived with multimorbidity, resided in the care facility, and required help from the staff to turn KOMP on and off. Using an iPad or smartphone was not suitable for her, due to her state of physical and cognitive decline, and KOMP was presented as a more convenient alternative. The daughter noted that even though they communicated virtually, in-person visits were not easily replaced: "KOMP does not substitute for visits; however, it is an alternative way to keep in contact."

Several of our respondents stressed the safety aspects of KOMP, which reduced their worries about contagion when meeting physically. One relative noted how "KOMP is effective and practical when there is a risk of infection, so we talk safely with loved ones without worrying about getting infected". Another relative, emphasized that "It is useful to have KOMP when visits are limited so we can see my mom and talk to her daily". Most relatives and older residents reported experiences about how digital meetings with KOMP offered them a safe, practical, and effective way to communicate during the pandemic, thereby overcoming the burden of social distancing.

Staying involved in each other's daily lives

The second essential theme in our material revolves around how KOMP has mitigated social distancing and helped older people and their relatives to be more involved in each other's lives despite the circumstances. By frequently maintaining social contact at a distance, KOMP promoted intergenerational connections among family members.

Social contact at a distance by sharing photos and videos

The two daughters living abroad emphasized KOMP's photo and video functionality, enjoying these features by sending photos in the morning and talking in the evening via video link. Describing their mother's relationship with KOMP, they made explicit comparisons with a regular TV, emphasizing that receiving video calls and photos on the device did not require their mother to have specific digital skills, thereby allowing her to maintain her independence in old age (90 years old) while living alone in her private home. In their view, KOMP enabled them to digitally care for their mother, follow up on her day-to-day issues, and spend holidays together (regardless of closed borders). They could involve her in everyday life virtually including having playtime with grandchildren, sharing meals, and having conversations.

Other participants highlighted their positive experiences and satisfaction with KOMP's photo function too, which enabled them to conveniently share and show snapshots of things they mutually valued. These images were seen by our informants as cues for conversations, helping older people remember details about their families. One daughter described the value of KOMP during an otherwise distressing time as follows: "A nice and wonderful way to get so close to my mom in the pandemic. She enjoys looking at pictures so that she will not forget her beloved family, which is very important." The participants in our study articulated how the photo function helped them feel closer to each other, prompting daily discussions about the meaning and significance of various old and new images, refreshing memories of their loved ones, and creating new impressions. For instance, one daughter cherished how carefully selecting specific photos from albums, such as pictures from when they were young, could spark conversations about family members.

The value of participating in family activities through KOMP was also articulated by the older users themselves. As one resident in long-term care commented to us during an interview, "It is nice to have KOMP to talk with my family and to know how they are doing." A socially active ninety-year-old resident, who was interviewed in her room in the care facility, stressed how she was independently capable of using KOMP. Mentioning no difficulties, she was able to turn it on and off, reply to messages, make a video call to her family, and comment on the rotating photos on the KOMP screen. She received these communications from a network of 21 persons who were registered on the device's list of contacts. The device allowed her to actively participate in her family's social network: "I have KOMP on all day. I like to see the photos of my family rotating all the time and enjoy seeing their birthdays". Despite their encounters being mediated by new technology, the older residents found it deeply meaningful to follow the lives of their children and grandchildren, despite these encounters being mediated virtually.

KOMP enhances intergenerational connections

KOMP also presented families with novel ways to connect across generations. One daughter emphasized how KOMP, in her experience, connected different generations of family members: "After my mom used KOMP, she said that she felt as if she had visited her grandchildren". Family members located in different places could participate through a smartphone application, sharing text messages, photos and making video calls, thereby keeping up-to-date with information about each other. One daughter described the value of these interactions in the following words: "KOMP is a very good tool, not only for older people but for everyone in the family to be updated about what happens with each other, especially for those who live far away. KOMP gathers the whole family, both children, and grandchildren." Similarly, the daughter of an elderly man who resided in a care facility described how KOMP had helped family members in different geographical locations across the county meet and interact digitally with her father when she was allowed to visit him in person: "With the camera on, the video chat is more convenient for all the family members, including many siblings dispersed both across Norway and abroad." A common sentiment in these experiences of digital socialization across different generations was that of togetherness.

Togetherness in a digital space

The participants in our study also reported on experiences with new forms of social interaction that were impossible to sustain with more conventional technologies, such as the telephone. For instance, in the virtual space that KOMP made it possible, new forms of embodied communication took place between older people and their relatives.

Embodied video calls

Video conversations allowed for a suite of nonverbal modalities were especially useful when older adults had difficulty talking. One daughter illustrated this as follows: "We sometimes have something to talk about, and sometimes we just sit or eat so mom can see us around the dining table or in different situations." She described how their communication did not necessarily entail talking, as KOMP facilitated access to a broader range of facial expressions, gestures, and other body movements. As described by the pair of daughters who lived abroad, a meaningful interaction with their mother could sometimes be as simple as her watching them while they were eating or performing various mundane activities.

Another illustrative example of how KOMP supported nonverbal communications involved an elderly man with cognitive impairment and a speech disorder. Living in a care facility, he used KOMP to communicate with his large family. In the words of his daughter: "although my dad does not talk during the call, we can see him smiling, nodding or turning his head toward someone sitting in his room, such as my mom or one of us." In addition, she reported how her father had begun remembering his family members by watching photos that were rotating on the device. In her view, simply watching him in his room, without any talking, helped them feel close to him.

Sharing moments in favored places

Our interviews also revealed how digital communications through KOMP afforded new forms of social contact making it possible to share special moments in favored places. In one case, a daughter described vividly how the technology helped maintain relationships between her mother, who lived in a care facility, and the father, who lived in his private home: "My dad likes my mom to remotely join him while he is at home or eats in the kitchen, and both of them enjoy these moments." In their daughter's words, the mother used KOMP to interact with her husband while he prepared food and ate in their kitchen at home, both appreciating a sense of place in these shared moments of togetherness, despite living in two different places.

A similar experience of sharing meaningful moments in special places via KOMP was reported by a granddaughter: "My grandfather has a better opportunity now to follow the daily life of his children, grandchildren, and great-grandchildren and be part of their lives than he did before." She used KOMP to provide her grandfather with insights about various aspects of their daily lives, such as trips, birthdays, or family gatherings. The technology also helped her to connect him with places that were saturated with meaning for both: "Through KOMP, I call my grandfather to show him his house or cottage." Beyond conveying a homely atmosphere, she described how KOMP made it possible for her grandfather to take an active part in her daughter's first day of school.

Discussion

Adopting an open phenomenological approach reveals how KOMP enabled a diverse set of meaningful experiences for older people and their relatives. Our analysis condensed these experiences into three essential themes: overcoming social distancing by adopting digital meetings, staying involved in each other's daily lives, and togetherness in a digital space. Together, these three themes illuminate how digital communication provided new forms of social contact. In this section, we discuss these themes in light of concepts drawn from the person-centered care literature (PCC). We suggest that situating these new communication practices within the PCC framework helps us better understand how digital

communication is meaningful for older people and their families.

Kitwood describes person-centeredness as a status that is granted to one person by others in the context of social relationships and in alignment with values such as respect, recognition, and trust [35]. McCormack (2004) argued, based on previous literature on person-centeredness and Kitwood's definition, that PCC encompasses four main concepts of being: being in relation, being in a social world, being in place, and being with self [36, 37].

Following McCormack, we suggest that virtual communications via KOMP highlight new modes of being with respect to these four dimensions of person-centeredness. According to McCormack (2004), the concept of *being in relation* refers to how persons exist in relationships with other persons [36, p. 27, 37]. From a person-centered perspective, relationships are crucial for older people and include their personhood as a parent, grandparent, or spouse [36]. Being in relation can help boost the recognition and respect of older people's role in their families' lives.

The participants in our study overcame mandatory social distancing by adopting digital communication to maintain such social relationships. Due to a pressing need to maintain social contact between older people and their families, beginning in March 2020, several care facilities in western Norway reacted swiftly by widely adopting KOMP. Being commercially available, the device was also adopted privately by some consumers and purchased as an off-the-shelf technology, often acquired by informal caregivers on behalf of their older relatives. KOMP was also provided by some municipal home care providers. Our respondents emphasized the value of staying in contact to maintain their relationships with older family members. This is a critical issue, because the social networks of older persons typically shrink with age [38].

Using KOMP also helped older people remember their relatives through features such as photo sharing. Looking at family members and narrating about memories and places where they were born and grew up may stimulate older adults' memory. Recalling memories not only retrieves past events but also elucidates the self through autobiographical memory, to address the question of 'who am I?' [39] and reflect on the past and present self [40].

Being in a social world is a second core feature of PCC, and revolves around how individuals need meaningful, situated interconnections in a social group [36, p. 28, 37]. Reporting their experiences to us, our informants articulated how KOMP enabled meaningful, even delightful, experiences that satisfied their desire to include older family members. Our respondents also created meaningful interconnections through conversations about pictures that were continuously shared on the screen, an experience they described as bringing them closer to each other. These were valued by the participants in our study as safe, available, and workable in an extraordinary situation. Since it is challenging to maintain regular and meaningful physical contact with older persons due to mobility issues and geographic barriers [41], having frequent and meaningful contact through KOMP can potentially support person-centeredness. In particular, the technology made it possible to communicate more frequently with distant family members, transcending closed doors and other boundaries, even transnational borders. KOMP helped them involve their distant, older relatives in meaningful social situations through video conversations and photos, including events like birthdays and other family gatherings, as well as the daily lives of children and grandchildren.

A third pillar of PCC is *being in place*; this refers to a context to which persons have their personhood attached [36, p. 29, 37]. Our informants articulated several experiences of how KOMP enabled being in place. Places connect people and provide a sense of belonging. One example of this was the wife who watched her husband prepare food and eating in their kitchen, although she was living in a care facility at the time. For this couple, the kitchen was a highly meaningful place, and the technology helped them virtually interact in this place at a distance. Interacting via KOMP helped the couple maintain relationships by conveying a homely atmosphere and connecting them to a favored place, instilling a sense of family and closeness. As such, these virtual meetings were characterized by a sentiment of togetherness, making it possible to share and recall meaningful moments. Such connections with valued places, which could be mediated via video conversations or photos, promoting health and well-being among older people.

Being with self, a fourth basis for person-centeredness, suggests how recognition, respect, and trust affect a person's sense of self [36, p. 30, 37]. This concept explains how maintaining social contact with older parents or grandparents could result in recognition and respect for them. Family members showing an interest in conversing with, listening to and looking at their loved ones may support an older person's sense of self. The example with the mother who lived in her home, and who used KOMP independently to communicate with her daughters and grandchildren, illustrates how technology can support independent living.

Our two examples of how KOMP supported nonverbal communication also highlights how technology can support a sense of self, by giving users with speech disorder the opportunity to virtually observe and participate in what the other person is doing without necessarily talking. Facial expressions, eye contact, gaze, posture, and body language were all considered expressive and

meaningful acts by our informants, regardless of their virtual character, instilling a sense of being together despite significant physical boundaries between the participants. These experiences suggest that communication technologies such as KOMP have the potential to promote recognition and respect for older people as whole persons at a distance, undeterred by their health limitations.

Strengths and limitations of the study

The data in our study were collected when there was an pressing need to maintain contact with older people during a period of enforced social distancing. Basing our analysis on data collected in a real-life context where our informants actually used this technology intensively, increases the ecological validity of our interpretations.

The sample included relatives of older people who lived in both care facilities and at home, adding a rich set of experiences to our study. Here, telephone interviews with relatives were also strength, as they helped to increase privacy, encouraging participants to be more open when discussing their personal sentiments by removing visual signals. Telephone interviews, however, are limited by a lack of visual information, which may disrupt smooth communications between the interviewer and respondent [42, 43]. For instance, a telephone interview involving an elderly spouse (86 years) to a woman who resided in the care facility ended within five minutes, because the man had a hearing disability that made the interview very challenging.

The inability to physically interview older adults who lived at home, due to pandemic restrictions, also presents a limitation. In-person interviews in homes where respondents interact with KOMP could have provided interesting perspectives on situated use of this technology.

The limited number of elderly users we were able to interview presents a limitation for our study. Restrictions during the pandemic made recruitment of more residents from additional care facilities challenging. Since health care staff facilitated our recruitment process, we were able to interview four residents in long-term care. However, due to the health situation of the residents, it was not possible to interview more residents from this particular care facility. The adequacy of our sample should be judged against the literature on sample size in qualitative research, which states that the usual sample size for phenomenological studies is between eight and twelve (with more radical views stating that a sample size as low as one person might also be adequate), depending on the study design and research questions [44, 45].

In Norwegian long-term care, the gender ratio is skewed towards more women than men (partly explained by women having a longer life expectancy) [46]. Accordingly, the number of men in the whole care facility during our data collection in November 2020 did not exceed eight men, and only one of these had access to a KOMP at the time we collected data. The main author attempted to interview this man in his private room, but due to his health condition, the interview was challenging and uninformative. Although the device was present in his room all the time, and it was occasionally used by the staff to set up meetings with family members, the resident denied that he knew or used the device. While interviewing more men could potentially have offered additional perspectives and experiences on the use of KOMP, this demographic was simply not available in the field. Future studies should therefore pay more attention to the gender dynamics of KOMP usage. However, the results presented here suggest that the question of whether an individual can benefit from KOMP is not reducible to single variables like gender but must be answered based on an individual assessment of the whole person, in line with the principles of person-centered care.

Conclusion

An open phenomenological approach, examining experiences with a novel technology for social contact among older people and their relatives in Norway during COVID-19, revealed three essential themes: (1) overcoming social distancing by adopting digital meetings, (2) staying involved in each other's daily lives, and (3) togetherness in a digital space. Older people and their families adopted digital communication to mitigate strict requirements for social distancing by the government. Our discussion considered these experiences in light of the framework of person-centered care. Drawing on McCormack and McCance's concepts of *being in relation*, *being in a social world*, *being in place*, and *being with self*, our analysis shows how the respondents in our study adopted digital communications to maintain their social relationships despite significant barriers. Digital communication helped our participants create meaningful interconnections in their social world through frequent video conversations and shared photos, particularly with distant family members, thereby supporting their roles as parents and grandparents. Virtual meetings provided older people and their loved ones with a meaningful experience of being together and connected in favored places. In addition to conveying a homely atmosphere, the technology also made it possible to communicate nonverbally, thereby promoting recognition, respect, and trust for the older person despite any health disabilities. On this basis, we suggest that these technology-mediated communications have the potential for supporting PCC for older people in care facilities and at home, both during the pandemic and beyond. Future empirical and theoretical work could benefit from situating novel technologies

for social contact, such as KOMP, within the framework of PCC.

List of Abbreviations

COVID-19	Coronavirus Disease 2019
NSD	Norsk Senter for Forskningsdata (Norwegian Centre for Research Data)
PCC	Person-Centered Care

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We would like to thank the residents in the care facility, their relatives, and relatives of home-dwelling older people for sharing their experiences and views.

Author Contribution
A.B. designed the study and conducted and transcribed the individual interviews. Analyses and data interpretation were initially performed by A.B., with revisions and input from R.A., M.S., and A.O. The main author of the manuscript was A.B., with all the authors reading, revising, and approving the final version.

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Data Availability
The datasets generated and analyzed during the current study are not publicly available to protect participants' confidentiality but are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The study was first submitted to the Regional Committees for Medical and Health Research Ethics, and it was decided that it was outside their mandate due to the fact that the study has the character of being a different type of research than medical and healthcare research. Furthermore, the Data Protection Official for Research at Norwegian Centre for Research Data (NSD) - currently called Norwegian Agency for Shared Services in Education and Research (SiKt) - approved this study, with reference number 108323. Written informed consent and verbal recorded consent were obtained from all individual participants included in the study based on adequate information provided by the authors according to the Norwegian Personal Data Act. Participation in this study was confirmed to be voluntary, and participants could leave the project at any time. All data in the study have been anonymized. All methods were carried out in accordance with the Helsinki Declaration.

Consent for publication
Participants in this study gave their informed consent to be interviewed, and the anonymized data of the individual interviews and results can be used for scientific publication. Participants gave informed consent for publication. Participants gave informed consent for publishing the data in open access journal. The photographer of the pictures shown in Fig. 1 gave informed consent and permission to use the pictures in scientific publications.

Competing interests
The authors declare that they have no competing interests.

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References

1. Giebel C, Cannon J, Hanna K, Butchard S, Eley R, Gaughan A, et al. Impact of COVID-19 related social support service closures on people with dementia and unpaid carers: a qualitative study. Aging Ment Health. 2021;25(7):1281–8. https://doi.org/10.1080/13607863.2020.1822292
2. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020;395(10227):912–20. https://doi.org/10.1016/S0140-6736(20)30460-8
3. Morley JE, Vellas B. COVID-19 and older adult. J Nutr Health Aging. 2020;24(4):364–5. https://doi.org/10.1007/s12603-020-1349-9
4. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, et al. Impact of social isolation due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. J Nutr Health Aging. 2020;24(9):938–47. https://doi.org/10.1007/s12603-020-1469-2
5. Brooke J, Clark M. Older people's early experience of household isolation and social distancing during COVID-19. J Clin Nurs. 2020;29(21–22):4387–402. https://doi.org/10.1111/jocn.15485
6. Armitage R, Nellums LB. COVID-19 and the consequences of isolating the elderly. Lancet Public Health. 2020;5(5):e256–e. https://doi.org/10.1016/S2468-2667(20)30061-X
7. Brown L, Mossabir R, Harrison N, Brundle C, Smith J, Clegg A. Life in lockdown: a telephone survey to investigate the impact of COVID-19 lockdown measures on the lives of older people (≥ 75 years). Age Ageing. 2021;50(2):341–6. https://doi.org/10.1093/ageing/afaa255
8. Banskota S, Healy M, Goldberg EM. 15 smartphone apps for older adults to use while in isolation during the Covid-19 pandemic. West J Emerg Med. 2020;21(3):514–25. https://doi.org/10.5811/westjem.2020.4.47372
9. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395(10229):1054–62. https://doi.org/10.1016/S0140-6736(20)30566-3
10. Berg-Weger M, Morley JE. Loneliness and social isolation in older adults during the COVID-19 pandemic: implications for gerontological Social Work. J Nutr Health Aging. 2020;24(5):456–8. https://doi.org/10.1007/s12603-020-1366-8
11. Drageset J, Kirkevold M, Espehaug B. Loneliness and social support among nursing home residents without cognitive impairment: a questionnaire survey. Int J Nurs Stud. 2011;48(5):611–9. https://doi.org/10.1016/j.ijnurstu.2010.09.008
12. Goethals L, Barth N, Guyot J, Hupin D, Celarier T, Bongue B. Impact of home quarantine on physical activity among older adults living at home during the COVID-19 pandemic: qualitative interview study. JMIR Aging. 2020;3(1):e19007–e. https://doi.org/10.2196/19007
13. Eklund JH, Holmström IK, Kumlin T, Kaminsky E, Skoglund K, Höglander J, et al. Same same or different?" A review of reviews of person-centered and patient-centered care. Patient Educ Couns. 2019;102(1):3–11. https://doi.org/10.1016/j.pec.2018.08.029
14. McGilton KS, Boscart VM. Close care provider-resident relationships in long-term care environments. J Clin Nurs. 2007;16(11):2149–57. https://doi.org/10.1111/j.1365-2702.2006.01636.x
15. Demiris G, Oliver DRP, Hensel B, Dickey G, Rantz M, Skubic M. Use of videophones for distant caregiving: an enriching experience for families and residents in long-term care. J Gerontol Nurs. 2008;34(7):50–5. https://doi.org/10.3928/00989134-20080701-02
16. Murphy K, Shea EO, Cooney A. Quality of life for older people living in long-stay settings in Ireland. J Clin Nurs. 2007;16(11):2167–77. https://doi.org/10.1111/j.1365-2702.2006.01865.x
17. Ekman I, Swedberg K, Taft C, Lindseth A, Norberg A, Brink E, et al. Person-centered Care — Ready for Prime Time. Eur J Cardiovasc Nurs. 2011;10(4):248–51. https://doi.org/10.1016/j.ejcnurse.2011.06.008
18. Boudiny KIM. Active ageing': from empty rhetoric to effective policy tool. Ageing Soc. 2013;33(6):1077–98. https://doi.org/10.1017/S0144686X1200030X
19. Drageset J. The importance of activities of daily living and social contact for loneliness: a survey among residents in nursing homes. Scand J Caring Sci. 2004;18(1):65–71. https://doi.org/10.1111/j.0283-9318.2003.00251.x

20. Adams KB, Roberts AR, Cole MB. Changes in activity and interest in the third and fourth age: Associations with health, functioning and depressive symptoms. Occup Ther Int. 2011;18(1):4–17. https://doi.org/10.1002/oti.304
21. Newman MG, Zainal NH. The value of maintaining social connections for mental health in older people. Lancet Public Health. 2020;5(1):e12–e3. https://doi.org/10.1016/S2468-2667(19)30253-1
22. Schuster AM, Hunter EG. Video Communication with cognitively intact nursing home residents: a scoping review. J Appl Gerontol. 2019;38(8):1185–96. https://doi.org/10.1177/0733464817711962
23. Conroy KM, Krishnan S, Mittelstaedt S, Patel SS. Technological advancements to address elderly loneliness: practical considerations and community resilience implications for COVID-19 pandemic. Work Older People. 2020;24(4):257–64. https://doi.org/10.1108/wwop-07-2020-0036
24. Díaz-López MdP, López-Liria R, Aguilar-Parra JM, Padilla-Góngora D. Keys to active ageing: new communication technologies and lifelong learning. Springerplus. 2016;5(1):1–8. https://doi.org/10.1186/s40064-016-2434-8
25. Ogara SO, Koh CE, Prybutok VR. Investigating factors affecting social presence and user satisfaction with Mobile Instant Messaging. Comput Hum Behav. 2014;36:453–9. https://doi.org/10.1016/j.chb.2014.03.064
26. Petrova K, Schulz MS. Emotional experiences in technology-mediated and in-person interactions: an experience-sampling study. Cogn Emot. 2022;36(4):750–7. https://doi.org/10.1080/02699931.2022.2043244
27. Badawy A, Solberg M, Obstfelder AU, Alnes RE. Improvised use of a digital tool for social interaction in a Norwegian care facility during the COVID-19 pandemic: an exploratory study. BMC Health Serv Res. 2022;22(1). https://doi.org/10.1186/s12913-022-07526-0
28. Badawy A, Solberg M, Obstfelder AU, Alnes RE. Normalization of technology for social contact in a Norwegian care facility during COVID-19. BMC Health Serv Res. 2022;22:1248. https://doi.org/10.1186/s12913-022-08618-7
29. KOMP. : The one-button computer connecting generations 2021 https://www.noisolation.com/global/komp. Accessed 24 Oct 2022
30. Kvale S, Brinkmann S. Interviews: learning the craft of qualitative research interviewing. 2nd ed. Los Angeles, Calif: Sage; 2009.
31. Kvale S, Brinkmann S. Det kvalitative forskningsintervju. 3. Utg. ed. Oslo: Gyldendal akademisk; 2015.
32. Zahavi D. Phenomenology the basics. Routledge; 2018 Oct. p. 8.
33. Dahlberg H, Dahlberg K. Open and reflective Lifeworld Research: a third way. Qual Inq. 2019;26(5):458–64. https://doi.org/10.1177/1077800419836696
34. Dahlberg K, Dahlberg H, Nyström M. Reflective lifeworld research. 2nd ed. Lund: Studentlitteratur; 2008.
35. Kitwood T, Brooker D. Dementia Reconsidered; the person still comes first (Ed.). UK Higher Education OUP Humanities & Social Sciences Health & Social Welfare Paperback – England. 2019.
36. McCormack B, McCance T. Person-centred nursing: theory and practice. Chichester: Wiley-Blackwell; 2010.
37. McCormack B. Person-centredness in gerontological nursing: an overview of the literature. J Clin Nurs. 2004;13(s1):31–8. https://doi.org/10.1111/j.1365-2702.2004.00924.x
38. Cornwell B, Laumann EO, Schumm LP. The Social Connectedness of older adults: a National Profile. Am Sociol Rev. 2008;73(2):185–203. https://doi.org/10.1177/000312240807300201
39. Wang Q. The autobiographical self in time and culture. Oxford University Press; 2013 Jul. p. 26.
40. Prebble SC, Addis DR, Tippett LJ. Autobiographical memory and sense of self. Psychol Bull. 2013 Jul;139(4):815.
41. Zaine I, Frohlich DM, Da Hora Rodrigues KR, Cunha BCR, Orlando AF, Scalco LF, et al. Promoting social connection and deepening relations among older adults: design and qualitative evaluation of media parcels. J Med Internet Res. 2019;21(10):e14112. https://doi.org/10.2196/14112
42. Novick G. Is there a bias against telephone interviews in qualitative research? Res Nurs Health. 2008;31(4):391–8. https://doi.org/10.1002/nur.20259
43. Stephens N. Collecting data from elites and Ultra elites: telephone and face-to-face interviews with Macroeconomists. Qual Res. 2007;7(2):203–16. https://doi.org/10.1177/1468794107076020
44. Sim J, Saunders B, Waterfield J, Kingstone T. Can sample size in qualitative research be determined a priori? Int J Soc Res Methodol. 2018;21(5):619–34.
45. Marshall B, Cardon P, Poddar A, Fontenot R. Does sample size matter in qualitative research?: a review of qualitative interviews in is Research. J Comput Inf Syst. 2013;54(1):11–22.
46. Leknes S, Løkken, SA. Befolkningsframskrivinger for kommunene 2022 (Population projections for the municipalities in2022). Statistisk sentralbyr? (Statistics Norway) (2022) [Report]. https://www.ssb.no/befolkning/befolkningsframskrivinger/artikler/befolkningsframskrivinger-for-kommunene-2022

Publisher's Note

Appendices

Appendix 1: Approval from Norwegian Centre for Research Data

Appendix 2: Letter from The Regional Committee for Medical and Health Research Ethics

Appendix 3: Information about the study given to healthcare professionals

Appendix 4: Information about the study given to older residents

Appendix 5: Information about the study given to older adults' relatives

Appendix 6: Interview guide for focus groups with healthcare professionals

Appendix 7: Interview guide for individual interviews with older residents

Appendix 8: Interview guide for individual interviews with older adults' relatives

Sikt

Vurdering av behandling av personopplysninger

Referansenummer	Vurderingstype	Dato
108323	Standard	29.04.2020

Prosjekttittel
Bruk av interaktive digitale teknologier for eldre i omsorgssentre i Norge: en kvalitativ utforskende studie.

Behandlingsansvarlig institusjon
Norges teknisk-naturvitenskapelige universitet / Fakultet for medisin og helsevitenskap (MH) / Institutt for helsevitenskap i Ålesund

Prosjektansvarlig
Abeer Badawy

Prosjektperiode
01.05.2020 - 12.08.2022

Kategorier personopplysninger
Alminnelige
Særlige

Lovlig grunnlag
Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)
Uttrykkelig samtykke (Personvernforordningen art. 9 nr. 2 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 12.08.2022.

Meldeskjema

Kommentar
Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 29.04.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html
Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle særlige kategorier av personopplysninger om helseforhold og alminnelige kategorier av personopplysninger frem til 12.08.2022.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 nr. 11 og art. 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse, som kan dokumenteres, og som den registrerte kan trekke tilbake.

Lovlig grunnlag for behandlingen vil dermed være den registrertes uttrykkelige samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a, jf. art. 9 nr. 2 bokstav a, jf. personopplysningsloven § 10, jf. § 9 (2).

Dersom beboerne i omsorgssenteret (utvalg 1) har begrenset samtykkekompetanse, vil det innhentes samtykke fra nærmeste pårørende. Utvalgets samtykkekomentase vil vurderes løpende i dialog med helsepersonell.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen

- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke viderebehandles til nye uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp underveis (hvert annet år) og ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet/pågår i tråd med den behandlingen som er dokumentert.

Lykke til med prosjektet!

Kontaktperson hos NSD: Jørgen Wincentsen
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

REK
REGIONALE KOMITEER FOR MEDISINSK OG HELSEFAGLIG FORSKNINGSETIKK

Region:	Saksbehandler:	Telefon:	Vår dato:	Vår referanse:
REK midt	Magnus Alm	73559949	03.03.2020	93250
			Deres referanse:	

Abeer Elsayed Ahmed Badawy

93250 Bruk av interaktive digitale teknologier for eldre beboere i omsorgssentre i Norge: en utforskende studie.

Forskningsansvarlig: Norges teknisk-naturvitenskapelige universitet

Søker: Abeer Elsayed Ahmed Badawy

Søkers beskrivelse av formål:

Dette forskningsprosjektet skal undersøke hvordan eldre, deres pårørende og helsepersonell opplever introduksjonen av to typer teknologi i omsorgssentre.
I den første studien skal undersøke implementeringen av en ny digital enhet kjent som Komp Pro i utvalgte omsorgssentre på Nord-Vestlandet, og hvordan den brukes av beboere og helsepersonell for å opprettholde kontakten med familie og venner. Den andre studien vil undersøke konsekvensene av aktiviteter med den sosiale roboten Pepper. Begge studiene er kvalitative og utforskende.

REKs vurdering

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional komité for medisinsk og helsefaglig forskningsetikk Midt-Norge (REK midt) i møtet 12.02.2020. Vurderingen er gjort med hjemmel i helseforskningsloven § 10.

Komiteens prosjektsammendrag: Hensikten med studien er å undersøke hvordan eldre, deres pårørende og helsepersonell opplever introduksjonen av to typer teknologi i omsorgssentre. I den første delen av studien skal man kartlegge hvordan Komp Pro blir brukt av beboere og helsepersonell for å opprettholde beboernes kontakt med familie og venner. I den andre delen av studien skal man undersøke effekter av bruk av den sosiale roboten Pepper. Utvalget skal bestå av anslagsvis 16 pasienter, 16 pårørende og 20

helsepersonell ved omsorgssentre på Nord-Vestlandet. Pasientene vil være 65 år eller eldre, og ca. 80% vil ha demens og komorbiditet. Forskningsdata skal innhentes ved hjelp av intervjuer og observasjoner. Det skal gjøres lydopptak av intervjuene. Observasjonene skal i hovedsak foregå uten videoopptak, men hvis det er mulig ønsker man å gjøre noen videoopptak for å få noen eksempler på hvordan deltakerne interagerer med teknologien. Studien er samtykkebasert. Ved manglende samtykkekompetanse skal stedfortredende samtykke innhentes fra pårørende. Studien er en del av en doktorgrad i helsevitenskap ved NTNU.

Saksopplysninger: REK etterspurte intervjuguider 27.01.2020. Vi mottok seks intervjuguider 02.02.2020.

Inhabilitet

Komiteen vurderte at komiteens representant for sykepleie, Lene Blekken, var inhabil. Hun deltok derfor ikke i vurderingen av prosjektet.

Vurdering: Utenfor mandat

Komiteen mener at prosjektet har karakter av å være annen type forskning enn medisinsk og helsefaglig forskning. Formålet med prosjektet er ikke primært å skaffe til veie ny kunnskap om medisin og helse, men heller å undersøke hvordan beboere og helsepersonell ved omsorgssentre opplever introduksjonen av to typer teknologi. Prosjektet er følgelig ikke omfattet av helseforskningslovens saklige virkeområde, jf. helseforskningslovens §§ 2 og 4. Du kan derfor gjennomføre og publisere prosjektet uten godkjenning fra REK. Vi minner imidlertid om at dersom du skal registrere personopplysninger, må prosjektet ha et selvstendig behandlingsgrunnlag, jf. ny personopplysningslov. Behandlingsgrunnlaget må forankres i og avklares med egen institusjon.

Vurderingen er gjort på grunnlag av de innsendte dokumenter. Dersom du gjør endringer i prosjektet, kan dette ha betydning for REKs vurdering. Du må da sende inn ny søknad/framleggingsvurdering.

Vedtak

Avvist (utenfor mandat)

Med vennlig hilsen

Vibeke Videm
Professor dr.med. / Overlege
Leder, REK Midt

Magnus Alm
rådgiver, REK midt

Klageadgang
Du kan klage på komiteens vedtak, jf. forvaltningsloven § 28 flg. Klagen sendes til REK midt. Klagefristen er tre uker fra du mottar dette brevet. Dersom vedtaket opprettholdes av REK midt, sendes klagen videre til Den nasjonale forskningsetiske komité for medisin og helsefag (NEM) for endelig vurdering.

FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKTET

Bruk av interaktive digitale teknologier for eldre beboere i omsorgssentre i Norge

Dette er et spørsmål til deg om å delta i et forskningsprosjekt for å få innsikt i din erfaring med bruk av KOMP og hvordan bruk kan påvirke beboernes daglige liv og omsorgskvaliteten ved institusjonen

HVA INNEBÆRER PROSJEKTET?

Vi tar kontakt med deg fordi vi er kjent med at du arbeider ved en avdeling hvor Pro Komp har blitt brukt. For deg vil prosjektet innebære å delta i et fokusgruppeintervju sammen med flere av dine kolleger. I tillegg vil forsker gjøre observasjoner i avdelingen og i den sammenhengen også kunne stille deg spørsmål om din bruk eller erfaring med Pro komp. Det vil bli tatt lydopptak av intervjuene. Fokusgruppeintervjuet vil vare ca i 45 minutter. Opplysninger om navn, kjønn, og alder vil bli anonymisert når lyd-og videoopptak blir skrevet ned til en tekst.

FRIVILLIG DELTAKELSE OG MULIGHET FOR Å TREKKE SITT SAMTYKKE

Det er frivillig å delta i prosjektet. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke. Dersom du trekker deg fra prosjektet, kan du kreve å få slettet innsamlede prøver og opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner. Dersom du senere ønsker å trekke deg eller har spørsmål til prosjektet, kan du kontakte:

Abeer Badawy. Tel: 97351137. e-post: abeer.badawy@ntnu.no

HVA SKJER MED OPPLYSNINGENE OM DEG?

Opplysningene som registreres om deg skal kun brukes slik som beskrevet i hensikten med prosjektet. Du har rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Du har også rett til å få innsyn i sikkerhetstiltakene ved behandling av opplysningene.

Alle opplysningene vil bli behandlet uten navn og fødselsnummer. En kode knytter deg til dine opplysninger gjennom en navneliste. Det er kun Abeer Badawy, som har tilgang til denne listen. Opplysningene om deg vil bli anonymisert eller slettet senest 01. 08.2022.

DELING AV DATA OG OVERFØRINGER TIL UTLANDET

Ved å delta i prosjektet, samtykker du også til at opplysninger (kjønn, og alder) kan overføres til utlandet som ledd i forskningssamarbeid og publisering. Prosjektleder vil sikre at dine opplysninger blir ivaretatt på en trygg måte.

Koden som knytter deg til dine personidentifiserbare opplysninger vil ikke bli utlevert.

GODKJENNING

Prosjektet er godkjent av Norsk Senter for Forskingsdata (NSD), prosjekt nr.108323. Etter ny personopplysningslov har behandlingsansvarlig ved NTNU og prosjektleder Abeer Badawy. Tel: 97351137. e-postadresse: abeer.badawy@ntnu.no et selvstendig ansvar for å sikre at behandlingen av dine opplysninger har et lovlig grunnlag. Dette prosjektet har rettslig grunnlag i EUs personvernforordning artikkel 6 nr. 1a og artikkel 9 nr. 2a og ditt samtykke. Du har rett til å klage på behandlingen av dine opplysninger til Datatilsynet.

KONTAKTOPPLYSNINGER

Dersom du har spørsmål til prosjektet kan du ta kontakt med

Abeer Badawy. e-post: abeer.badawy@ntnu.no Tel: 97351137.

Rigmor Einang Alnes. e-post: rigmor.e.alnes@ntnu.no Tel: 70161396

Personvernombud ved institusjonen er thomas.helgesen@ntnu.no

JEG SAMTYKKER TIL Å DELTA I PROSJEKTET OG TIL AT MINE PERSONOPPLYSNINGER BRUKES SLIK DET ER BESKREVET

Sted og dato

Deltakers signatur

Deltakers navn med trykte bokstaver

FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKTET

Bruk av interaktive digitale teknologier for eldre beboere i omsorgssentre i Norge

Dette er et spørsmål til deg om å delta i et forskningsprosjekt for å få innsikt i din erfaring med bruk av KOMP og hvordan dette påvirker ditt daglig liv.

HVA INNEBÆRER PROSJEKTET?

Vi er kjent med at du er en av dem som har tatt i bruk KOMP. Din deltakelse vil innebære en eller flere samtaler med deg om din erfaring med dette kommunikasjonsverktøyet. Samtalene vil foregå på ditt rom. Det vil bli tatt lydopptak av samtalene. Det kan også være aktuelt å ta videoopptak mens du bruker Komp, Komp pro eller nettbrett. Intervjue skal vare i ca 30-45 minutter.

Opplysninger om navn, kjønn, alder, sosialt liv, og aktivitet vil bli anonymisert når lyd og videoopptak blir skrevet ned til en tekst.

MULIGE FORDELER OG ULEMPER

Prosjektet innebærer ingen behandlingsintervensjoner

FRIVILLIG DELTAKELSE OG MULIGHET FOR Å TREKKE SITT SAMTYKKE

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Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en navneliste. Det er kun Abeer Badawy, som har tilgang til denne listen. Opplysningene om deg vil bli anonymisert og slettet senest 01.08.2022.

GODKJENNING

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Sted og dato

Deltakers signatur

Deltakers navn med trykte bokstaver

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Dette er et spørsmål til deg om å delta i et forskningsprosjekt. Hensikten med prosjektet er å få innsikt i bruken av KOMP som kommunikasjonshjelpemiddel. Vi ønsker å komme i kontakt med deg som nærmeste pårørende for å få innsikt i din erfaring med å bruk av dette verktøyet og hvordan dette påvirker din pårørendes daglige liv.

HVA INNEBÆRER PROSJEKTET?

For deg innebærer dette å delta i et intervju. Intervjuet kan foregå på et avtalt sted på omsorgssenteret, i ditt hjem eller ved NTNU Ålesund. Hvis det er vanskelig å møtes kan det være aktuelt med en samtale på telefon. Det vil bli tatt lydopptak av intervjuene. Intervjuer vil vare i ca 30 minutter. Opplysninger om kjønn, alder, og relasjonen til beboeren vil bli anonymisert når intervjuene blir nedskrevet til tekst.

FRIVILLIG DELTAKELSE OG MULIGHET FOR Å TREKKE SITT SAMTYKKE

Det er frivillig å delta i prosjektet. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke. Dersom du trekker deg fra prosjektet, kan du kreve å få slettet innsamlede opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner. Dersom du senere ønsker å trekke deg eller har spørsmål til prosjektet, kan du kontakte:

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JEG SAMTYKKER TIL Å DELTA I PROSJEKTET OG TIL AT MINE PERSONOPPLYSNINGER BRUKES SLIK DET ER BESKREVET

Som nærmeste pårørende til _ (Fullt navn) samtykker jeg til å delta i prosjektet.

Sted og dato

Pårørendes signatur

Pårørendes navn med trykte bokstaver

Focus group interviews with healthcare professionals about the use of KOMP for social communication between residents and their relatives during the pandemic.

Would you tell me a little about your background (age, education, how long have you worked in older people's care, and how long have you worked in this department/care centre)?

How would you assess the residents' well-being and social activity at the institution before and during the COVID-19 pandemic?

Keywords: loneliness and social isolation, family, friends, visitations, residents' participation

What expectations did you have before using KOMP and regarding residents and their relatives?

What was your experience with the use of KOMP afterward?

How often has KOMP been used?

Keywords: technical problems, supplement, aid, more load, quality of care, increased contact

What are your thoughts about residents' social lives and daily working lives during the use of KOMP?

How did KOMP change residents' everyday lives?

Which of the residents can enjoy and benefit from KOMP?

What skills do residents need to use this technology?

What do you think about the introduction of this type of technology and its impact on residents' well-being and activity?

Would you tell me what you have been doing to effectively benefit from using KOMP to enhance social contact between older residents and their families?

What are the disadvantages or negative experiences of using KOMP?

What other functions do you think may be added to improve this tool?

Do you have other experiences or thoughts to share?

Individual interviews

Interview guide for residents about the use of KOMP to maintain social contact with relatives during the pandemic.

Would you please say a little about yourself, your age, your background, and how long you have lived in the care facility?

Would you describe your social life in the care facility?

Keywords: social activity, visits, friends, family, memories

How would you describe your social network outside the care facility regarding your family and friends?

What are your reasons for using KOMP to contact your family?

What is your experience of using KOMP as a communication tool? How often have you used KOMP?

How does the use of KOMP affect other forms of family communication (physical visits and phone calls)?

What do you think about the introduction of this type of technology and its impact on your well-being and activity?

What are the benefits and challenges of using KOMP?

What are your thoughts about the further use of KOMP?

Would you like to share other experiences regarding the use of KOMP?

Individual interviews

Interview guide for older adults' relatives about the use of KOMP for social contact with older people.

Would you like to say a little about yourself, your age, and your relationship with the resident/older adult?

What do you think about your relative's social life in the care facility/home?

Can you tell me about how you communicate with your father/mother in the care facility/home?

What is your experience with the use of KOMP/tablet/phone to communicate with your mother/father in the care facility/home?

How often have you used KOMP with your mother/father?

What changes in your mother/father's daily life have you observed since using KOMP?

Would you describe some positive and negative experiences of using KOMP to maintain social contact?

How has socialising and communication changed since your mother/father started using KOMP at the care facility/ home?

What do you think in general about the use of this type of technology in care facilities/homes?

Would you tell me about the differences you have observed since using this type of technology during the pandemic?

What other functions do you think may be added to improve the tool?

What are your thoughts about the future use of KOMP for your father/mother?

Would you like to mention other experiences?

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NTNU

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