

Promoting social activities and participation among seniors

Exploring and evaluating social and Internet-based occupational therapy interventions

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Umeå 2016

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ISBN: 978-91-7601-388-5
ISSN: 0346-6612
Omslagsbild: Jennie Carnudd
E-version available at <http://umu.diva-portal.org/>
Printed by: Print & Media
Umeå, Sweden 2016

To my family

*“Do not go where the path may lead, go instead
where there is no path and leave a trail”*

Ralph Waldo Emerson

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Abstract

Introduction

The use of technology and Internet-based activities (IBAs) is increasing in society. However, seniors with limited experiences with the Internet can experience restricted participation in meaningful activities that are dependent on the Internet. Also, social transitions during aging might lead to reduced social activities and social contacts and to increased experiences of loneliness, all of which might have negative health implications. Therefore, there is a need to advance the knowledge of how occupational therapists can support seniors' use of IBAs and create opportunities for social contacts and social activities during aging.

Aim

The overall aim of this thesis is to increase the knowledge of how Internet-based activities influence seniors' participation in society, how seniors experience and are influenced by support from a social Internet-based occupational therapy intervention, and how different aspects of this intervention can contribute to healthy ageing.

Methods

In study I, seniors' experiences of IBAs were explored and described through interviews with 10 seniors (66–82 years old) that were analyzed with the constant comparative method. In study II, a multiple case study with five seniors (65–85 years old) was used to explore the design of an Internet-based occupational therapy social intervention program and how it influenced social activities and social contacts among the participants. The qualitative and quantitative data from multiple sources were analyzed by pattern matching. In study III, an explorative randomized crossover study with an AB/BA design was conducted with 30 seniors (61–89 years old) who were vulnerable to loneliness and who participated in the intervention program. The quantitative data were analyzed with parametric and non-parametric statistics. In study IV, a qualitative interview study was conducted to collect the experiences of 15 seniors (66–87 years old) from the previous intervention process in study III. The interviews were analyzed with the constant comparative method. All participants in studies I–IV were community-dwelling, retired seniors without home-care services.

Results

Complex interactions of different aspects influence seniors' possibilities and preferences for taking part in IBAs. The performance of IBAs yielded different experiences of participation in society (study I). The initial explorative results indicated that the client-centered and individually adapted intervention program supports participation in social IBAs (SIBAs) and other social contexts (study II). After participation in the intervention program, the experiences of loneliness significantly decreased, and satisfaction with social contacts on the Internet increased for one group (study III). If an individual's requirements are met during the intervention process, experiences of habitual SIBA usage, increased self-reliance, and enriched social contacts and social activities both on and off the Internet might be facilitated (study IV).

Conclusion

This thesis provides knowledge of how social support, experiences of and accessibility to technology, life-changing events, and identified meaningfulness with online activities influence the motivation to participate in social and Internet-based activities. The occupational therapist should address the individual's perspective in the intervention program so as to adapt the intervention and to support experiences of satisfactory participation and enhanced social activities and social contacts for seniors. In addition, healthy aging might be supported by the intervention program due to the reduction in loneliness and increased participation in social activities and society. Further evaluation of the framework and content of the intervention program for seniors with restricted participation in IBAs and SIBAs and high levels of loneliness is suggested.

Keywords

Health promotion, social activities, social media, evidence-based practice.

Svensk sammanfattning

Introduktion

Användningen av teknologi och Internetbaserade aktiviteter (IBA) ökar i samhället. Seniorer med begränsad erfarenhet av Internet kan erfara inskränkt delaktighet i meningsfulla aktiviteter som kräver användning av Internet. Även sociala förändringar under åldrandet kan bidra till reducerade sociala aktiviteter och sociala kontakter samt ökad upplevelse av ensamhet, vilket negativt kan inverka på hälsan. Detta innebär att det finns ett behov att stärka kunskapen om hur arbetsterapeuter kan stödja seniorers användande av IBAs och skapa möjligheter för social kontakt och sociala aktiviteter under åldrandet.

Syfte

Det övergripande syftet med avhandlingen är att öka kunskapen om hur Internetbaserade aktiviteter inverkar på seniorers delaktighet i samhället, hur seniorer upplever och påverkas av stödet från en social och Internetbaserad arbetsterapeutisk intervention, samt hur olika aspekter av denna intervention kan bidra till hälsosamt åldrande.

Metod

I studie I användes intervjuer för att utforska och beskriva tio seniorers (66-82 år) erfarenheter av IBA. Intervjuerna analyserades med en konstant komparativ metod. I studie II användes en kvalitativ multipel fallstudie med fem deltagande seniorer (65-85 år), för att utforska utformningen av ett socialt Internetbaserat arbetsterapeutiskt interventionsprogram och dess påverkan på sociala aktiviteter och sociala kontakter bland deltagarna. Kvalitativ och kvantitativ data insamlades via flera metoder och analyserades genom "Pattern matching". I studie III genomfördes en utforskande randomiserad crossover studie, med en AB/BA studie design där 30 seniorer (61-89 år), med presumtiv upplevd ensamhet, deltog i interventionsprogrammet. Kvantitativ data analyserades med parametriska och icke parametriska statistiska analyser. I studie IV genomfördes en kvalitativ intervjustudie med 15 seniorer (66-87 år) för att undersöka deras erfarenheter av att delta i interventionsprocessen i studie III. Intervjuerna analyserades med en konstant komparativ metod. Samtliga deltagare i studie I-IV var pensionärer och bosatta i ordinärt boende utan hemtjänst.

Resultat

Resultatet indikerar att det är flera interagerande aspekter som påverkar seniorers möjligheter och preferenser för att delta i IBA. Seniorernas utförande av IBA genererade även olika erfarenheter av delaktighet i samhället (studie I). De initiala utforskande resultaten indikerar att det klientcentrerade och individuellt anpassade interventionsprogrammet stödjer delaktighet i sociala IBA (SIBA) och andra sociala kontexter (studie II). Efter deltagande i interventionsprogrammet minskade upplevd ensamhet signifikant och tillfredsställelsen med sociala kontakter inom Internet ökade för en av grupperna (studie III). Seniorernas erfarenheter av deltagande i interventionsprocessen reflekterade vikten av att de individuella behoven tillgodosågs under processen, som en följd av detta kunde vanemässigt utförande av SIBA uppnås, en ökad självförtroende och stärkta sociala kontakter. Vidare främjade användningen av SIBA sociala aktiviteter såväl inom Internet och utanför (studie IV).

Konklusion

Denna avhandling bidrar med kunskap om hur socialt stöd, erfarenheter av och tillgänglighet till teknologi, livsomvälvande händelser, samt identifierad meningsfullhet med on-line aktiviteter påverkar motivationen att delta i IBA och SIBA. Arbetsterapeuten bör utgå från individens perspektiv för att möjliggöra individuell utformning av interventionsprogrammet, och därmed stödja upplevelsen av delaktighet och bidra till stärkta sociala kontakter och sociala aktiviteter bland seniorerna. Dessutom finns potentialen att stödja ett hälsosamt åldrande genom deltagande i interventionsprogrammet, på grund av minskad ensamhet, ökad delaktighet i sociala aktiviteter och i samhället. Det finns behov av fortsatta studier av ramverket och innehållet i interventionsprogrammet bland seniorer som upplever begränsad delaktighet i IBA och SIBA och påtagligt starka känslor av ensamhet.

Abbreviations

ACRS	Assessment of Computer-Related Skills
COPM	Canadian Occupational Performance Measure
ESI	Evaluation of Social Interaction Skills
GAS	Goal Attainment Scaling
ICF	International Classification of Functioning, Disability and Health
IBAs	Internet-Based Activities
MRC	Medical Research Council
OT	Occupational Therapy
OTs	Occupational Therapists
OTIPM	Occupational Therapy Intervention Process Model
PHA	Public Health Agency of Sweden
RM-ANOVA	Repeated Measures of Analysis of Variance
SIBAs	Social Internet-Based Activities
WHO	World Health Organization

Original papers

This thesis is based on the following papers:

- I Larsson, E., Larsson-Lund, M., & Nilsson, I. (2013). Internet Based Activities (IBAs): Seniors' experiences of the conditions required for the performance of and the influence of these conditions on their own participation in society. *Educational Gerontology, 39*(3), 155-167.
- II Larsson, E., Nilsson, I., & Larsson-Lund, M. (2013). Participation in social internet-based activities: Five seniors' intervention processes. *Scandinavian Journal of Occupational Therapy, 20* (6), 471-480.
- III Larsson, E., Padyab, M., Larsson-Lund, M., & Nilsson, I. Effects of a social internet-based intervention program for older adults: An explorative randomized crossover study. *(Submitted)*.
- IV Larsson, E., Larsson-Lund, M., & Nilsson, I. Developing social contact and participation in social activities: Seniors experiences from a social internet-based intervention process. *(Manuscript)*.

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PREFACE

As an occupational therapist, I have met seniors who are participating in different social activities and contexts. The seniors are integrated in a social setting where their relatives or friends are closely related to the activities they need and want to participate in. These social contacts can influence the interest and joy of continued participation in society. On the other hand, I have experienced how devastating the lack of a confidant can be and how it can diminish the longing to stay active and to participate in society. I recognize that the process of aging is influenced by contextual and societal barriers and supportive components.

Seniors might be used to other ways of interacting, communicating, and participating in activities during life, which now are more and more digitalized. Some seniors can due to that shift in society, experience challenges in daily activities and restraints, for example, in paying bills online. In line with this shift in society, however, there are also opportunities. The Internet might be a tool to support seniors in maintaining social activities, reaching out to a larger and more diverse group of potential social contacts, and using it to overcome limitations in bodily functions, environmental barriers, or reduced participation. Thus the Internet might become a useful tool to support seniors in maintaining their health.

When I had the opportunity to develop my knowledge as a PhD student in occupational therapy, I wanted to explore how Internet-based activities could support inclusion in society and the various social settings within it. I recognized the possibility that seniors' social contacts, social activities and participation could be maintained through evolving life events and the ever-increasing digitalization of society.

INTRODUCTION

This thesis focuses on several aspects related to seniors in a technological society and how occupational therapy might contribute to maintaining their participation in society. I will start with a brief introduction to give a theoretical viewpoint and understanding of the subject. These aspects will be developed in forthcoming sections of the thesis.

To start with, rapid technological developments and the use of the Internet in society might influence seniors' participation in daily activities and society. Seniors' lack of abilities, access to technology, and social support might cause barriers to participation when activities become Internet-based. Among others, the Swedish government (Digitaliseringskommissionen, 2015) has recognized this age-related digital divide. It is suggested, for example, that economic support and knowledgeable persons to support seniors' participation in society are needed (Digidel, 2013). Therefore, this thesis focuses specifically on the Internet as a way to participate in activities. Increasing knowledge of how to support seniors' participation via Internet-based activities (IBAs) might help to develop interventions to support seniors participate in society as they desire.

In addition to technological developments, significant social changes and transitions occur during the later phases of aging, and these put seniors at risk for reduced satisfactory social contacts and for experiences of loneliness. Loneliness is indicated to be a threat to health during aging. Therefore, the use of social IBAs (SIBAs) as one possible way to support satisfactory social contacts and social activities and to reduce loneliness is highlighted in this thesis.

A related concept to this thesis is healthy ageing. Health can be described as the balance between aspects that inhibit and factors that support a person in doing what they want to do in certain circumstances (Nordenfelt, 2014) as well as whether the individual possesses the ability to achieve vital goals in life. Thus I will focus on the individuals' experiences of having a satisfactory health. Satisfactory health can be experienced even in the face of functional decline that can accompany an aging body. Participation in meaningful activities is believed to support experiences of satisfactory health and might be useful to support healthy ageing (Beard & Bloom, 2015; The Public Health Agency of Sweden (PHA), 2007; World Health Organization (WHO), 2002).

The first study included in this thesis (study I) was designed to increase the understanding of seniors' experiences of performance of and participation in meaningful IBAs. Then, in studies II and III, a client-centered and individually adapted occupational therapy intervention program was explored and evaluated for introduction of seniors to SIBAs and to understand how experiences of loneliness, social contacts, and participation in social activities are influenced. In study IV, experiences of participation in the intervention process were explored.

I will continue to describe how healthy ageing can be supported as a general concept of this thesis. I will then focus on participation in meaningful activities and IBAs (including the digital divide and societal rights) followed by a review of my understanding of the importance of social activities and the consequences of limited social contacts during aging. Later in the introduction, participation in SIBAs will be highlighted along with how to develop evidence-based occupational therapy interventions focusing on SIBAs.

To promote healthy ageing in an Internet-based society

In line with global demographics showing increasingly ageing populations (WHO, 2002), the number of seniors in the Swedish population is increasing. This demographic change comes from prolonged life expectancy, advancement in health care, and lifestyle changes (Statistics Sweden (SCB, 2013). Thus, additional life years without being restricted by disease can be achieved (Atchley, 1997; Baltes & Smith, 2003). However, this growth of the older population implies a future scenario where fewer persons in the population are of working age, and a larger part of the population will need support from others or from health care services (Suzman & Beard, 2011). It is recognized that methods to promote healthy aging have to be advanced in order for people to maintain their independence for a longer time. One way to ease the demands on health care might be by identifying beneficial factors that support healthy aging (Paúl, Teixeira, & Ribeiro, 2015).

The need to address the global demographic shift by promoting healthy ageing is recognized by the WHO (2013) and the European Commission (2013). The definition of healthy ageing used in this thesis was introduced by the European healthy ageing project (PHA, 2007). The definition originates from the definition of active ageing by the WHO (2002) that also includes the important aspects of providing opportunities for health and participation. In this thesis, healthy ageing is defined as: *“The process of optimising opportunities for physical, social and mental health to enable older people to take an active part in society without discrimination and to enjoy an independent and good quality of life”* (p16.) (PHA, 2007). The European

definition was chosen due to its similarity to the aim of this thesis, which is to support opportunities for social activities and participation, aspects that might contribute to mental health (by decreasing loneliness) and thus contribute to healthy ageing.

The need to promote healthy ageing is also acknowledged on a national level, and the Swedish government (Government Offices of Sweden, 2011) has recommend that public health care should be agencies for individuals participation in society and provide them access to social opportunities. Despite the national and global recommendations that actions to promote healthy ageing are needed, such actions have only been taken to a limited extent (Wood, Fortune, & McKinstry, 2013). In the European region, the need to promote healthy ageing is partly met by introducing citizens to the beneficial use of new technologies (European Commission, 2015). The introduction of new technological and Internet-based solutions in health care can be referred to as E-health. E-health is an overall concept that includes different types of technology and processes for improving health care services and for supporting the further development and usability of technology in clinical practice (Eysenbach, 2001). The Swedish national strategy for E-health (Hägglund & Larsson, 2011) indicates that several groups with different perspectives should be considered when developing secure, user friendly, and beneficial technological solutions for the health and social care services. These groups include those working in health and social care, policy makers, and the individuals who are receiving care.

The use of E-health in society might provide additional ways of coming into contact with health care services and alter the places where care can be received (European Commission, 2013). The costs for health care might also be reduced if technology-based tools can be used to meet clients remotely (Charness, 2014) and provide care from a distance (Nilsson, Öhman, & Söderberg, 2006). E-health might also include SIBAs such as online social forums, blogs, and online video-calls. SIBAs might be useful in social interventions and/or as alternative methods for social group meetings, social contacts, and social participation (Korda & Itani, 2013; Leist, 2013). The use of SIBAs to promote healthy ageing has not yet been fully realized, partly due to the limited research into the benefits and barriers of SIBAs. The potential use of SIBAs will be further explored in the later part of the introduction. Drawbacks to E-health interventions can include reluctant and/or novice users, problems with access, or problems related to the technology (Charness, 2014), security, and privacy issues (Yuan, Hussain, Hales, & Cotten, 2015).

Due to the limited knowledge of how E-health interventions (especially IBAs and SIBAs) can be used in occupational therapy and in health promotion, its applications need to be explored further.

To promote healthy ageing in occupational therapy

Previous research (Turcotte, Carrier, Desrosiers, & Levasseur, 2015) indicates that health promotion in general is limited and not applied in occupational therapy (OT) practice. Health promotion activities could be used to meet the demands on society from the demographic shift to ageing populations (WHO, 2013), and the use of IBAs in daily activities could be an important aspect of this (Charness, 2014; Verdonck & Ryan, 2008). The potential of activity-based interventions in health promotion has been explored to some extent among seniors, which is described below.

The Well-Elderly study (Lifestyle redesign) (Jackson, Carlson, Mandel, Zemke, & Clark, 1998) conducted in the US indicated that individually adapted health promotive interventions might support healthy aging (Clark et al., 2001; Jackson et al., 1998). One of the subsequent evaluations of the Well-Elderly program (Clark et al., 2012) indicated that seniors experienced improved mental health, social functioning, life-satisfaction, and vitality and that depressive symptoms and bodily pain were reported as reduced. The Well-Elderly program was also indicated to be cost-effective when used in a community-based setting. Aspects from this intervention, like the potential to support social connections through activities, and improve mental health, and indications of its cost-effectiveness, are important to explore further because the results are still explorative. A similar intervention has been initially explored in a Swedish setting, where a group-based intervention with a few individual sessions was tested (Johansson & Björklund, 2015). That study indicated that vitality and mental health could be positively influenced by the intervention. Also, the seniors incorporated strategies in their daily life that supported their participation in meaningful activities, and they were given the power by the occupational therapists (OTs) to manage their participation in the activities.

However, this introduction of health promotion shows that the use of similar actions are limited and still in an explorative phase (Johansson & Björklund, 2015; Orellano, Colón, & Arbesman, 2012). The limited focus on health promotion in OT practice can be due to a lack of resources (Matuska, Giles-Heinz, Flinn, Neighbor, & Bass-Haugen, 2003), a lack of awareness of potential gains, or insecurity in one's professional competence (Wood et al., 2013).

Finally, the responsibility for healthy ageing lies both on society and the individual (WHO, 2002). Therefore, this societal perspective is followed by an elaboration of participation and health on an individual level.

Health and participation in meaningful activities

This thesis is grounded in the belief that participation in meaningful activities can contribute to the individuals' health through interactions with others and the skills and experiences that are obtained (Law, 2002). In OT, the essence of "participation in meaningful activities" suggests an understanding that the activities are chosen by the individual due to a subjective meaningfulness (Hinojosa, Kramer, Brasic Royeen, & Luebben, 2003). Moreover, participation is influenced by multiple complex factors (Law, 2002) such as interests, habits, roles, performance capacities, and environment (Kielhofner, 2008). To only know the type of, or amount of, activities is not enough to understand the meaning of the activities for the individual (Jonsson, 2008) because such meanings are highly individual and diverse.

The International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001) provides an interdisciplinary and worldwide description of functioning and health, and it exemplifies the interaction between individual and contextual factors. Activities are defined in the classification as "tasks or actions executed by a person", and participation is defined as "involvement in life situations" (WHO, 2001). However, accounting for participation in meaningful activities using the ICF might not be completely rewarding in practice, as it does not address how to measure the subjective feature of participation (Hemmingson & Jonsson, 2005). The complexity in measuring participation is implicitly supported by the notion by Kielhofner (2008), who states, "*Because each person organizes his or her occupational participation into a unique overall life pattern, a useful approach in practice is to pay attention to how the client defines and enacts participation*" (footnote 2, p. 102).

In this thesis, Kielhofner's (2008) definition of participation will be emphasized, implying that participation is the engagement in daily activities (within a social and cultural surrounding) that are needed or wanted with respect to the individual's health. Also, the different levels of performance, interactions between several components (i.e. volition and environment), and processes of change are aspects that might alter the participation in activities throughout one's life. Participation in meaningful activities is an overarching description of what people are engaged in, and participation can be experienced even without active performance.

In occupational therapy both “participation in meaningful activities” and “occupations” have been used synonymously to describe activities that humans participate in that are related to health (Hinojosa et al., 2003; Pierce, 2001). For other professions, “occupations” might be more related to the work environment and employment (Moll, Gewurtz, Krupa, & Law, 2013). Therefore, the term “participation in meaningful activities” has been used in this thesis instead of “occupation” so as to create a shared understanding between different professions and to highlight the purpose of OT.

It is important to support participation as society changes and because seniors might face barriers to participating in meaningful activities and experiencing the benefits of healthy ageing. The barriers and risks for seniors related to the increased use of IBAs in society will be explained below.

Occupational justice in an Internet-based society

In a changing society, seniors can be at risk of exclusion, in example due to socially constructed norms or age-related expectations. OTs can identify such injustices and work to change them (Townsend & Polatajko, 2013). One way to change the risk for injustices is by using client-centered actions; based on the clients’ choices and desires for meaningful activities that are shaped in collaboration with the OTs. Within the framework of occupational justice (Stadnyk, Townsend, & Wilcock, 2010), individuals’ rights and opportunities are viewed from both an individual and global perspective. It is recognized that there are societal barriers that should be eliminated in order to support one’s rights to activities, participation and health (Hammel Whalley & Iwama, 2012).

Some seniors experience feelings of exclusion from parts of society due to recent technological developments (Digidel, 2013; Nilsson & Townsend, 2010). The consequences of this exclusion are described as occupational alienation, marginalization, imbalance, and deprivation (Stadnyk et al., 2010). Seniors might experience occupational alienation if they are restricted from participation in meaningful and needed IBAs (Nilsson & Townsend, 2010). In addition, seniors might experience marginalization if they are hampered in choosing and decide for themselves which IBAs they want to participate in. If they experience restricted participation, their chances to be an actor on the Internet and to influence societal movements and events will also be limited (Blank & Reisdorf, 2012). Feelings of exclusion might also be evident for seniors that already are actors on the Internet due to the rapid technological developments (Yuan et al., 2015) and the widespread use of the Internet in daily activities (Office for National Statistics, 2015).

From a societal and international perspective, it is indicated that the digital divide needs to be closed so as to include seniors as equal citizens in society (Digidel, 2013; European Commission, 2013). In Sweden, the age-related digital divide has been on the agenda for the Swedish government since the beginning of 2000 (Government Offices of Sweden & Ministry of Justice, 2004). Despite initiatives to explain and reduce the digital divide, it still exists (Digidel, 2013; Findahl, 2014a; Vroman, Arthanat, & Lysack, 2015). The age-related digital divide will be explained below and in terms of how seniors' use of IBAs differs from younger generations'.

Facilitators and barriers for Internet-based activities

In this part of the introduction, I will describe facilitators and barriers for IBAs in general; SIBAs will be described more deeply further below. IBAs are used by many people on a daily basis to access and participate in needed and wanted daily activities (Office for National Statistics, 2015). IBAs can include online banking, online shopping, and giving and receiving information about health and public events. The use of IBAs and other daily activities outside the Internet are intertwined with each other, and nowadays it is often difficult to separate the online and offline activities from each other (Digitaliseringskommissionen, 2015). In this section I will describe the age-related digital divide in which seniors do not participate in IBAs to the same extent as younger generations.

The age-related digital divide seems to be evident in divergent regions of the world, such as in the US (Perrin & Duggan, 2015) and in Europe (Demoussis & Giannakopoulos, 2006). For example, in England and Sweden seniors above 65 years of age are less represented as users of IBAs (Findahl, 2014b; Office for National Statistics, 2015). Over time seniors have been increasing as participants in IBAs (Findahl, 2014a; Perrin & Duggan, 2015), but they are still not participating in IBAs to the same extent as adolescents and younger adults. To further exemplify the digital divide in Sweden, in younger generations (12–65 years old) a majority (88%) are active participants in IBAs (Findahl, 2014a). Among the younger seniors (66–75 years old), 57% still experience restricted participation in IBAs although 79% are users of the Internet. Among the older seniors (above the age of 76), 81% percent experience restricted participation, and only 34% are users of the Internet. Some of the reasons why seniors are excluded from participation in IBAs more than other age groups are introduced below.

Several aspects influence seniors' participation in IBAs (Epstein, Nisbet, & Gillespie, 2011; van Deursen & van Dijk, 2015), and seniors who are interested in participating but who experience that they are excluded should be sup-

ported to participate and to overcome barriers. Present barriers often come from limited previous experiences or knowledge because seniors have not grown up with the Internet or other technical solutions as a practical part of their daily life (i.e., at work) (Findahl, 2014a). Such a lack of experience might lead to insecurity in how to use IBAs. Other barriers to using IBAs can be functional limitations, such as those associated with an aging body (Smith, 2014). Socio-economic factors such as education (Smith, 2014; White & Selwyn, 2013) and resources (i.e., money and access to the technology) (Demoussis & Giannakopoulos, 2006) also affect participation in IBAs. Though, some seniors simply have no interest in or need of IBAs or new technical solutions (Smith, 2014).

The Internet has become mobile in recent years, and it is now possible to participate in IBAs via a smartphone or tablet. These new technologies have been adopted to a limited extent by younger seniors (Office for National Statistics, 2015; Smith, 2014), and only rarely by the older seniors (above the age of 76) (Findahl, 2014a).

From this viewpoint, the Internet-based society might influence and challenge seniors in their adaptation to changes during aging. Adaptation might be needed to achieve vital and meaningful goals in life. In addition, the seniors might also be challenged to adapt by social transitions, which is further described below.

Social changes and transitions during aging

Changes during aging can hamper seniors' participation in social activities and in other societal settings due to a lack of opportunities to meet others as well as to personal preferences for social contact (i.e., a wish for high-quality social contacts). In this section, seniors' needs to adapt to changes will be introduced, and this will be followed by the societal view of seniors' social transitions. Finally, the end of this section describes one perspective and understanding of social activities and the consequences of limited participation in social activities.

Changes and adaptation during aging

As indicated earlier in the introduction, healthy ageing might be supported by participation in meaningful activities (World Federation of Occupational Therapists (WFOT), 2011) and by adoption of a structure in daily activities that facilitates participation in activities (American Occupational Therapy Association (AOTA), 2008a, 2008b; Baltes & Smith, 2003). The ability to adapt to changes during aging are described as multifaceted, and adaptation

can be achieved by adjusting to a context or situation (Atchley, 1997), altering activity patterns by prioritizing the use of time (Mosey, 1986), or having the competency to fulfill roles in life (Schkade & McClung, 2001). When seniors are introduced to new activities or to activities that are performed in a different context (e.g., Internet-based), a multitude of influential aspects can challenge their performance in the activity. Kielhofner (2008) describes adaptation as a process in which a person's occupational identity (their volition, habituation, and roles) and occupational competence (their ability to meet expectations and to participate) influence adaptation. For some, adaptation to new or alternative ways to participate in activities will occur without difficulty (Åberg, Sidenvall, Hepworth, O'Reilly, & Lithell, 2005). For others, support might be needed to overcome barriers to adaptation and to promote participation in meaningful activities (Stanley et al., 2010). Challenges in meaningful daily activities naturally influence individuals to change and to adjust their roles in life (Schkade & Schultz, 2003).

From a social perspective, seniors as an age group can be divided into different phases of life (Atchley, 1997), here the third and fourth phase is described. The third phase is expected to be entered around 50–60 years of age (Baltes & Smith, 2003), but this is not bound to chronological age, but rather by the characteristics of the phase. It is a phase in life where it is likely that activities and social relationships are actively maintained (Atchley, 1997; Baltes & Smith, 2003). The transition from work to retirement often takes place during the third phase, and this influences daily habitual activities and social contacts. For some, retirement might add more free time and the chance to participate in meaningful activities, while for others the days might become more about killing time due to a lack of engaging activities (Jonsson, 2010). The retiree might experience a need to fulfill demands from others or themselves to be active and engaged in activities (Jonsson, 2011). With the transition into retirement, a loss of roles connected to one's employment might also follow (Tornstam, 2011). Roles are constantly shaped by the individual and society (Kielhofner, 2008), and they are important for one's personality and for how daily life is structured based on one's purpose in life.

The transition to the fourth phase is also defined by the characteristics of the phase. In the fourth phase, it is expected that functional decline becomes more prominent and that participation in activities might become restricted (Atchley, 1997; Baltes & Smith, 2003). Social contacts tend to be reduced in this phase, in example due to family and friends who have died. It is acknowledged that the time one enters the fourth phase can be delayed by a healthy lifestyle, which indicates that seniors might enter the more fragile and dependent life stage later in life (Christensen, Doblhammer, Rau, & Vaupel, 2009; Suzman & Beard, 2011). However, this perspective is also

criticized for lack of evidence, meaning that humans might live longer, but they still enter the fourth phase around the same age and consequently spend more time suffering from disease and being dependent (Suzman & Beard, 2011). The characteristics of the third and fourth phase are influenced by societal expectations and individual needs, and it is indicated that the individual variations during aging are more extensive than described in the literature (Atchley, 1997). In this thesis, the target group is community dwelling, retired seniors from both the third and fourth phases. They live without extensive need of help from others (without home care). Among this target group are both those who were recently retired and those who have been retired for a longer period of time.

Seniors as social beings

Societal expectations and norms constitute what to expect from humans as social beings at different ages. It is described from a social gerontology perspective how seniors change during aging and how it is expected that our social lives will develop based on a predestined activity pattern (Atchley, 1997). The following three main perspectives are frequently used to explain social and activity transitions during aging: the activity theory, the continuity theory, and the disengagement theory (Utz, Carr, Nesse, & Wortman, 2002). These perspectives are partly divergent with respect to how social roles, contacts, and activities are understood and designated (Atchley, 1997). I will focus the descriptions of the theories on how social roles and contacts are selected or narrowed. Disengagement theory (Cumming & Henry, 1961) describes how seniors will inevitably withdraw from society, and society will withdraw from the seniors, as they age. This withdrawal suggests a change in the purpose of the social interaction with fewer social contacts and reduced roles. In contrast to this theory is activity theory (Havighurst & Albrecht, 1953). In activity theory, it is believed that as seniors age they will attempt to actively compensate for lost roles and social contacts (Utz et al., 2002). According to this theory, seniors will strive for more activities and will internalize the roles and interactions that come with these new activities. Interactions can support activity-based roles and thus improve self-esteem (Reitzes, Mutran, & Verrill, 1995).

The Continuity theory (Atchley, 1989) describes how individual patterns are shaped during aging by internal desires and external opportunities. These patterns are used when performing and participating in activities (Atchley, 1997). Seniors internalize and maintain the roles and social contacts that reflects the internal desires. However, seniors might be conflicted and hindered in fulfilling their ambitions due to limited external opportunities, i.e., when they cannot use IBAs (or computers in general).

These divergent perspectives imply that seniors might choose or are forced to choose different pathways for their social transitions and changes during aging. To understand an individual's need and desire for social participation, it is important to recognize the senior's individual life structure and how they respond to changes in social activities, contacts, and roles (Atchley, 1997). In this thesis, the seniors' perspectives and prerequisites for social contacts are emphasized and form the basis for adapting their social activities and participation to suit their individual needs.

I would like to continue to describe the components of social activities and why they might be of importance for seniors. In the social gerontology theories, roles and social contacts are constantly highlighted and used to explain prominent changes during aging; therefore, the negative consequences of these social changes need to be described. I will start with a description of social activities and end up with an explanation of the consequences of reduced social contacts.

Understanding of social activities and contacts

The focus on social activities in this thesis derives from research that indicates that participation in social activities is beneficial for health (Maier & Klumb, 2005) and for reducing the risk of other functional declines, like cognitive decline and dementia (Wang, Karp, Winblad, & Fratiglione, 2002). Also, seniors highly value participation in social activities (Nilsson, Löfgren, Fisher, & Bernspång, 2006). In a Swedish context, social activities and meeting places are highlighted as one of the four important factors for health (PHA, 2005). The other three factors are physical activity, nutritious food, and participate and contribute to society. To be able to support participation in meaningful social activities, it is essential to understand what constitutes a social activity and what individual social skills are required to participate in it.

Social activities are a natural part of human life, and humans strive to belong to different groups, constellations, and societies during the course of their lives (Christiansen & Townsend, 2010). Social activities take place in interactions with others (with at least one additional person), and social groups are shaped when people are gathered with joint purposes, which influences the activities and roles that are shaped within the groups (Kielhofner, 2008). In this thesis, social contacts are used to describe either the amount of contacts or the presence of others who provide satisfactory social contact, based on emotional or practical support (Dunér & Nordström, 2007).

Different professions and research fields use different terms to explain and define participation in social activities, and several different definitions are available (Levasseur, Richard, Gauvin, & Raymond, 2010). Therefore, a taxonomy to understand the different levels of social activities (and participation) has been proposed by Levasseur et al. (2010). The taxonomy has six levels for visualizing participation in social activities, and thus the level of social participation. According to Levasseur et al. (2010), the six levels are “1) *doing an activity in preparation for connecting with others*, 2) *being with others (alone but with people around)*, 3) *interacting with others (social contact) without doing a specific activity with them*, 4) *doing an activity with others (collaborating to reach the same goal)*, 5) *helping others*, 6) *contributing to society*” (p. 2146). To view social activities from these different levels and in different contexts might indicate that the goals for seniors’ social activities and participation can be divergent. For example, one might strive towards collaboration with others, while another might want to contribute to society by giving social support to a friend. It can also be assumed that different levels of social activity require certain skills.

The need for certain skills in order to adequately engage in social interactions has been shown previously (Fisher & Griswold, 2013; Kielhofner, 2008). Social interaction skills are based on the smallest observable actions used to transmit messages between at least two individuals, either spoken or by using body language. To understand some of the basic verbal and non-verbal components in social contact and interactions, the ICF classification (WHO, 2001) is illustrative. To summarize, it is understood that social activities and contacts can be valued by seniors and are potentially beneficial for healthy ageing. Based on this, an understanding of the consequences from reduced social activities and contacts is explained below.

Consequences of reduced social activities and contacts

Maintaining social activities and social contacts is crucial for seniors’ health and independence (Forster & Stoller, 1992; O’Luanaigh & Lawlor, 2008), and restraints in social activities and social contacts can lead to experiences of loneliness (Drageset, 2004) and to more severe conditions like depression (Djukanović, Sorjonen, & Peterson, 2015) and cognitive deterioration (Cacioppo & Hawkey, 2009). Such conditions might require extensive support from health care services and others (Hawkey & Cacioppo, 2010; Savikko, Routasalo, Tilvis, Strandberg, & Pitkälä, 2005).

The prevalence of seniors who report experiences of loneliness rather often differs to some degree between countries. In Sweden, the reported prevalence of loneliness is 7% (Yang & Victor, 2011), and other western countries

report proportions from 5% to 15% (Pinquart & Sörensen, 2001). There are many aspects that cause seniors to experience loneliness, and I will describe some of these below. Studies have shown that loneliness increases with age (Pinquart & Sörensen, 2001; Yang & Victor, 2011) and is most prominent among the oldest seniors. Other factors causing loneliness can be the transition into retirement (Mullins, Sheppard, & Andersson, 1991), widowhood (Dahlberg, Andersson, McKee, & Lennartsson, 2015), living alone (Savikko et al., 2005), having limited contact with others in the neighborhood (Adams, Sanders, & Auth, 2004), and geographical distances (Smith, 1998). Moreover, women report loneliness to a higher extent than men (Dahlberg et al., 2015; Djukanović et al., 2015 ; Pinquart & Sörensen, 2001), and seniors with lower education and lower income appear to be more vulnerable to loneliness (Pinquart & Sörensen, 2001; Savikko et al., 2005). Experiences of loneliness can also be influenced by cultural differences and societal norms (De Jong Gierveld & Havens, 2004), for example, if it is considered normal to be living alone. Certain times of the day or the week can also generate experiences of loneliness, which is described as temporal loneliness (Ballantyne, Trenwith, Zubrinich, & Corlis, 2010).

The definition of loneliness has been debated by many (De Jong Gierveld, 1998), and in this thesis I will consider loneliness to be a subjective experience where the amount or frequency of social contacts are not the main characteristics. Therefore, the definition of Perlman & Peplau (1981) will be used, which describes that loneliness can develop if there is a difference between the individual's expectations of desired social contacts and the reality of their existing social contacts. Loneliness is usually separated into social and emotional loneliness when described in the research literature. Social loneliness refers to limited participation in a larger social network, and emotional loneliness refers to the lack of social confidants who are experienced as high-quality contacts (Dahlberg & McKee, 2014). These high-quality social contacts can provide emotional support even during times spent alone (Pinquart & Sörensen, 2001).

Interventions have been developed to reduce loneliness among seniors, but none have yet become well established (Cattan, White, Bond, & Learmouth, 2005; Masi, Chen, Hawkey, & Cacioppo, 2011). It is indicated in research that the Internet could be used more extensively in interventions to support social activities and interactions with others and could potentially support reduced experiences of loneliness (Cattan et al., 2005). In line with the use of E-health in interventions to develop actions to promote healthy aging, I will introduce SIBAs as one tool for this purpose. SIBAs might be useful in reducing seniors' experiences of loneliness by supporting social contacts and activities.

Social Internet-based activities

Social activities have developed in recent years, and now many traditional activities are also available via Internet (Taipale, 2015). The idea that SIBAs can be used in interventions for seniors is based on the possibilities to have social contact as well as the fact that seniors often express an interest in participating in SIBAs (Nyman & Isaksson, 2015; Sundar, Oeldorf-Hirsch, Nussbaum, & Behr, 2011). Seniors have begun to use SIBAs more and more, and to support their participation it is beneficial to develop an understanding of benefits and barriers to the use of SIBAs (Leist, 2013; Nef, Ganea, Müri, & Mosimann, 2013). In this thesis, SIBAs include activities involving communication, interaction, and participation via the Internet, i.e., Facebook, Skype, MSN, blogs, photo and video sharing websites, and online communities and discussion forums. When using SIBAs, the online content is partly generated by the users (Kaplan & Haenlein, 2010). Among the younger generations (below the age of 65) in the Swedish population, about 68% are partaking in SIBAs (Findahl, 2014b).

Nowadays a majority of the seniors who are using IBAs in Sweden are also using e-mail to communicate with others, but they are not frequently using other social media (Findahl, 2014a). Among seniors who are online, 50% of the younger seniors are participating in SIBAs occasionally, and for the older seniors the percentage drops to 28%. In other parts of Europe, more specifically UK only 15% of the seniors online also use SIBAs (Office for National Statistics, 2015), and in the US 46% of the Internet users are also SIBA users (Smith, 2014).

While some seniors are not interested in participating in SIBAs, others want to participate but experience limitations such as a lack of skills, privacy issues, or limited access to the Internet (Sundar et al., 2011). Before SIBAs can be used to facilitate social activities and participation, existing barriers to participation by seniors need to be overcome and there needs to be an increased understanding of the seniors experiences of potential benefits from participating in SIBAs (Yuan et al., 2015).

From the seniors' perspective, the encouragement from close social contacts is important when using SIBAs, and this can be the motivation to become a participant (Sundar et al., 2011). Seniors can experience worries when using SIBAs, and more knowledge of this is needed because the research is limited and potential risks for seniors when using SIBAs are still under exploration (Nef et al., 2013). For example, seniors often express a need for increased knowledge about how to handle the limited privacy online (Xie, Watkins,

Golbeck, & Huang, 2012) and how to manage and behave appropriately in online interactions (Yuan et al., 2015), as social cues can be more subtle and harder to interpret via internet. Seniors might also fear that SIBAs can lead humans to engage less in social activities outside of the Internet. Nevertheless, many studies (Ballantyne et al., 2010; Leist, 2013; Nef et al., 2013) strengthen the assumption that participation in SIBAs can support social activities and contacts and feelings of belonging to the society. SIBA participation might also increase the frequency of interactions between the seniors and their family and friends (Cotten, Anderson, & McCullough, 2013; Hogeboom, McDermott, Perrin, & Osman, 2010) and support the quality of these interactions despite significant geographical distances (Yuan et al., 2015). In recent years, positive indications that SIBA interventions might reduce loneliness have begun to emerge, though these interventions are still in a developmental phase. The evidence to date is presented below.

Interventions to support the use of social Internet-based activities

In line with the development of SIBAs (Stroud, 2008), studies have begun to explore interventions that include such social media (Berkowsky, Cotton, Yost, & Winstead, 2013; Tsai & Tsai, 2011) among seniors in independent living facilities or in nursing homes (Berkowsky et al., 2013). One study (Fokkema & Knipscheer, 2007), which did not have a randomized control group, explored the benefits from a supportive learning program for using the Internet among older seniors with physical limitations and illnesses. The results of that study indicated that loneliness was reduced and that social contacts and self-confidence increased, which also had an impact on other daily activities. Seniors' experiences also showed that the positive effects of the intervention were tempered by a lack of motivation, undesirable life-events, or a lack of computer or interaction skills.

Another intervention study in nursing homes in Taiwan (Tsai & Tsai, 2011) with a non-randomized selection of participants (only the nursing homes were randomized) showed that social support, loneliness, and depressive symptoms were improved through the use of Skype or MSN (online video - phone calls) and that social interaction with family members was facilitated. As another example, an intervention was explored qualitatively in an Australian context (Ballantyne et al., 2010) using an in-home, individual learning situation for SIBA usage. The results from that study showed experiences of reduced loneliness, a connection to others and society, experiences of the possibilities with the technology, and that individual support was essential for learning about SIBAs. Although these studies are commonly based on smaller samples and with explorative designs, they still indicate that the interventions provide social benefits or seniors. However, the descriptions of

the intervention programs or of the support structures are not always provided in sufficient detail to allow for further development of the interventions. Nor is it known if similar interventions using SIBAs are applicable in a Swedish context, especially for OT interventions.

The need of individually adapted (Ballantyne et al., 2010) and directed interventions (for certain groups) are highlighted in existing research (White et al., 2002) and are believed to facilitate improved outcomes. These preliminary findings are sometimes in conflict with each other, and some studies have indicated that no relationship exists between SIBA usage and reduced loneliness (when measuring the frequency of going online) (Aarts, Peek, & Wouters, 2014). Therefore, it is important to support further understanding of how SIBAs can be used in interventions to support certain aspects that might promote healthy ageing (like decreased loneliness and increased social activities and participation).

Brief introduction to the social Internet-based intervention

Because results showing beneficial effects of seniors' SIBA usage are still partially inconclusive, it is important to continue the development of SIBA interventions that can be used to facilitate goal-directed and individually adapted actions by OTs. This thesis addresses this need by exploring and evaluating an intervention that has the potential for future implementation in health-promoting actions for seniors. This evaluation has examined the evidence base of the intervention so as to create a solid foundation for this early intervention and to support its future development. The main description on the OT SIBA intervention can be found in the method section.

OT theory states that successful interventions should be based on clients' goals and individual adaptations of the intervention processes (Kielhofner, 2008). The theoretical guidance of this intervention is the individual and client-centered approach described in the Occupational Therapy Intervention Process Model (OTIPM) (Fisher, 2009) The OTIPM is an intervention process model that can be used for different clients or client groups, and states that the OTs should establish a collaborative relationship in the beginning of the intervention to support a positive outcome of the intervention. The model also emphasizes that individuals with their own strengths and limitations (in this case seniors) are intervened in a larger performance context, as the social and physical environment, that can support or hinder participation in meaningful activities.

Moreover, in the OTIPM (Fisher, 2009) there are different paths to choose when the intervention plan is established depending on the clients' goals. The paths to choose between include the pedagogic (educational) model, the model for activity training, the compensatory model, and the model for improvement of personal factors or bodily structures. For the intervention studied in this thesis, the model for activity training or the compensatory model may be appropriate. The learning feature is an integral part of the intervention due to the fact that the intervention involves learning to use SIBAs. Learning in older age might place additional demands on the support and adaptation of the technology to suit the needs of seniors due, for example, to age-related functional declines (i.e., hearing or vision impairments) and limited previous experiences (Charness & Boot, 2009; Rosenthal, 2008). Required adaptations of the technology might be to increase the text size and to reduce the amount information shown in the web browser (Curran, Walters, & Robinson, 2007). Also, more time can be given to support the seniors' abilities and to make them feel confident (Boulton-Lewis, Buys, & Lovie-Kitchin, 2006; Rosenthal, 2008) and to allow them to accomplish tasks on the Internet and reduce typing errors (Hanson, 2010). In the introduction to IBAs (including SIBAs), seniors might also benefit if education on basic Internet skills is included in the process, for example, how to use a search engine most effectively because such knowledge can support effective usage of IBAs (Nahm, Preece, Resnick, & Mills, 2004).

Before interventions are offered to clients (in this case the seniors), they should have a solid evidence-based foundation (The National Board of Health and Welfare, 2009). Transferring research-based knowledge into practice can be challenging and requires that the research is well grounded in the context in which it is to be applied and that it has a basis in real-life issues experienced by the target group (Kielhofner, Hammel, Finlayson, Helfrich, & Taylor, 2004). The target group should also be invited to provide input into the development of interventions. Seniors' experiences have been an integral part of the development of the intervention presented in this thesis. Also, an effort was made to create an evidence-based intervention following the guidelines described below.

Development of interventions and evidence

The medical research council (MRC) (2008) provides a model that can be used as guidance when developing and evaluating complex and non-experimental interventions outside of health care. The use of this model might support the foundation of evidence-based interventions. In practice, evidence-based knowledge can guide professional decisions and actions (Taylor, 2002) in combination with best clinical knowledge, the clinical setting, and the clients' needs, expectations, and preferences (Straus, Scott Richardson, Glasziou, & Brian Haynes, 2005). This approach will ensure that the evidence is suitable for a particular practice setting and client group.

The MRC model (2008) describes how the development of interventions starts by exploring the research question and identifying preliminary evidence and theories that are useful to build the intervention. The intervention should then be tested repeatedly, both explorative and to evaluate the effects, to be sure that the proper procedures and assessment tools are being used and that the proper sample size is chosen to support the statistical power of the study. This process can go back and forth, as theory might need to be further explored or understood during the intervention's development process. The content of the intervention and appropriate frequency of the intervention need to be clearly defined before it can be put into practice (Straus et al., 2005). To continue the development of the intervention, an understanding of the participants' experiences of the processes needs to be added along with knowledge about the effects of the intervention (MRC, 2008). These steps have been acknowledged in this thesis and will be further explored in the forthcoming sections. The later step of implementation of the intervention has not been evaluated in this thesis.

Rationale

This introduction highlights how the societal demands of an aging population require that actions to promote healthy ageing are developed. OTs have the knowledge and ability to develop their interventions to support healthy ageing. Seniors might be facing changes in social activities and roles during ageing that require them to adapt, and the increasing use of the Internet in daily activities places seniors at risk of social injustices and reduced participation in society that might negatively impact on their future health.

It is not thoroughly understood how OTs can support seniors to experience participation in IBAs and to reduce their exclusion from society. It is also not known how SIBAs can be used by OTs to possibly reduce experiences of loneliness and increase social contacts and activities. To increase this knowledge, more empirical studies are needed, and both subjective and objective aspects need to be explored and evaluated. The increased knowledge of a potential format of a client-centered and individually adapted OT intervention might be useful to support social activities and participation for seniors, and such an intervention could be implemented and validated for use in practice within society and/or health-care.

Aims of the thesis

The overall aim of this thesis is to increase the knowledge of how Internet-based activities influence seniors' participation in society, how seniors experience and are influenced by support from a social Internet-based occupational therapy intervention, and how different aspects of this intervention can contribute to healthy ageing.

The specific aims are:

1. To explore and describe seniors' experiences of IBAs (study I).
2. To explore how client-centered occupational therapy intervention processes for participation in meaningful Social Internet-Based Activities (SIBAs) can be designed, and to explore the influences of participation in SIBAs on seniors' social activities and social contacts (study II).
3. To evaluate the effects of a social Internet-based intervention for older adults who are vulnerable to loneliness (study III).
4. To explore seniors' experiences of the intervention process after participation in a social Internet-based occupational therapy intervention (study IV).

METHODS

Design of studies I–IV

The order and design of the studies in this thesis were intended to support the knowledge and development of an evidence-based intervention (figure 1; table 1), influenced by the recommendations from the MRC model (2008). Initially, a qualitative interview study was performed to capture the participants' experiences. The seniors' use of IBAs was explored, and the research area was identified from seniors' experiences of performing IBAs or not performing and from the consequences of such performance or lack of performance (study I). The results indicated that the seniors needed support to use IBAs and that their participation in society could be influenced by their use of IBAs. This knowledge was used in the development of the internet-based intervention program that combined knowledge about loneliness (Cattan et al., 2005) and client-centered, individually adapted intervention processes (Fisher, 2009).

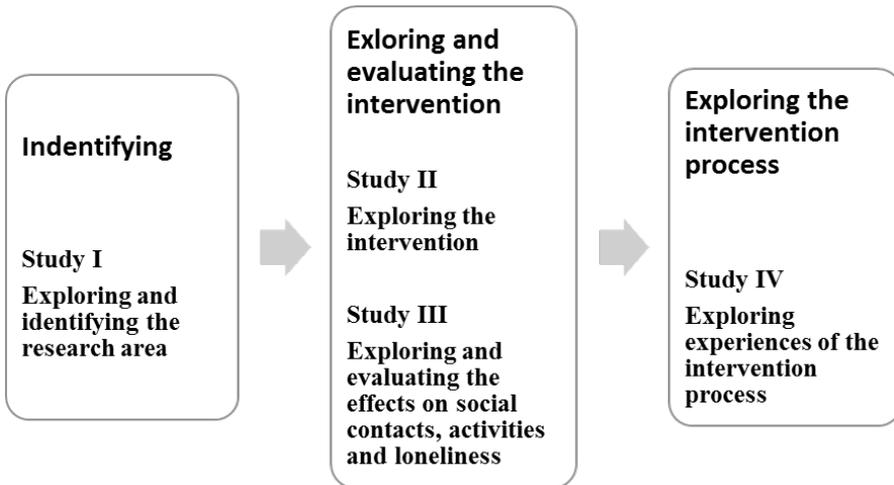


Figure 1. An overview of the studies included in this thesis (I-IV) as well as the development process of the occupational therapy social Internet-based intervention.

The OT SIBA intervention program was then explored with a qualitative, descriptive multiple case study design (Yin, 2009) in study II. Both qualitative and quantitative data were collected with several methods to describe and explore the intervention program and the participants' processes during the entire intervention, and the measurement tools were used in three phases; before, during, and at the end of the intervention period. The intervention was explored for a smaller group of seniors. The case study design is appropriate for use in exploring OT interventions and especially when studying evolving processes (Colborn, 1996; Fisher & Ziviani, 2004). Based on the experiences from study II, the intervention program was slightly modified. For example, the content of the group meetings was enhanced by adding assignments for the participants to prepare for the next meeting.

In study III, the modified intervention program was evaluated for its effects on seniors self-reported experiences of loneliness, reduced social contacts and social activities in an explorative, single-blind randomized controlled trial (RCT) with an AB/BA crossover design (figure 2).

When the study was initiated, all participants participated in the pre-tests (baseline measurements, T1), (figure 2 and 3). After the initial baseline measurements (T1), the sample was randomized to one of the following sequences: 1: I/C (intervention period/control period (including follow-up)) or 2: C/I (control period/intervention period). Group 1: I/C received the intervention for the first 12 weeks and then crossed over to the control group for 12 additional weeks. For group 2: C/I, the periods were reversed. Measurement point two (T2) followed the first 12 weeks for both groups, and measurement point three (T3) followed the final control and intervention period. The study lasted 34 weeks (eight and a half months), including the measurement points T1, T2, and T3.

During the control periods, no additional intervention was offered to the participants in the study. An external rater who was blinded to group allocation collected all the data (of the primary and secondary outcomes) during the measurement points.

AB (group 1: I/C)	T1 -----A ¹ ----- T2 -----B ¹ ----- T3
BA (group 2: C/I)	T1 -----B ² ----- T2 -----A ² ----- T3
Weeks	0-2 -----12-14----- 14-18- -----18-30----- 30-34

Notes. A¹ = intervention period, B¹ = control/follow-up period, B² = Control period, A² = Intervention period.

Figure 2. The set-up of the AB/BA crossover design. The AB and BA periods are initiated and evaluated at the same time points.

The crossover design usually includes a washout phase in which the participants are observed until measures equal to baseline values are reached (Wang, Lorch, & Bakhai, 2006). A washout period was not applicable in this study due to a lack of research regarding the estimation of the correct washout period length, previously applied by Prosperini, Fortuna et al. (2013), as well as due to the educational feature of the intervention, in which the knowledge was expected to be sustained. Despite the exclusion of a washout period, the crossover design was chosen due to its ethical benefits because all participants were offered the intervention.

To further understand the seniors' experiences of the OT SIBA intervention program, a qualitative interview study design was undertaken (study IV). This study sought to capture the experiences of the participants from the SIBA intervention program and especially to explore and understand the seniors' experiences of the intervention processes. The individually adapted OT SIBA intervention program is described further below.

Table 1. The design, sampling, inclusion criteria, participants, and methods used for studies I–IV.

Study	I	II	III	IV
Design	Qualitative interview study	Multiple case study	Randomized controlled trial Crossover design	Qualitative interview study
Sampling method	Purposeful, snowball sampling	Purposeful sampling	Consecutive sampling	Purposeful sampling
Inclusion criteria	65 years old and above Users and non-users of the Internet	65 years old and above Living without home care Internet access at home No regular use of SIBAs	60 years old and above Living without home care Retired Experiences of loneliness, a decrease in social contacts and/or social activities Internet access at home No regular use of SIBAs	Participated in the RCT (study III) Variation of age, sex, experiences, knowledge, and goals with SIBA participation
Participants	10 seniors 6 women, 4 men	5 seniors 3 women, 2 men	30 seniors 24 women, 6 men	15 seniors, 12 women, 3 men
Age, years (mean)	66–82 (74.4)	65–85 (75.2)	61–89 (71.2)	66–87 (72.5)
Data/ Outcomes	Semi-structured, open-ended interviews	Interviews Field Notes Self-report: Loneliness, social network online and offline, goal achievement	Observation: Social interaction skills Self-report: Loneliness, social network online and offline	Semi-structured, open-ended interviews
Analysis	Constant comparative method	Pattern matching	Parametric and non-parametric statistics	Constant comparative method

Procedure studies I-IV

Participants and recruitment

Study I

In study I, potential participants were informed about the study at a senior meeting place where the first initial contact with the participants was made. Snowball recruitment was then used in the enrollment after the first interview was completed. The informants were asked to suggest others who used IBAs or did not use them. The seniors whose names were suggested were then contacted by telephone and given information about the study. They were also informed that participation was voluntary and that they could withdraw at any time. All participants that were contacted and received information gave their informed consent. A total of ten seniors aged 66-82 years (six women, and four men) were included (inclusion criteria are shown in table 1). Four of them were Internet users and six were non-users.

Study II

The recruitment to study II was done both by advertisements and by e-mail to members of a seniors' organizations in a middle-size city in northern Sweden where the study took place. Any interested seniors were asked to contact the research group. Thirteen seniors were interested in participating, and five were selected according to the inclusion criteria (table 1) and to provide a variety in ages and from both sexes. The five participants were between 65 and 85 years old (two men and three women), and they were Internet users (including e-mail) but not regular users of SIBAs. Three were living with a partner, and the other two were living alone. Four of them had a university degree.

Study III

The enrolment to study III was done through advertisements in daily newspapers and in public places. Seniors interested in participating could contact the research group via e-mail or telephone. During the recruitment period, 48 seniors announced an interest in participating in the study, and from those 30 seniors were enrolled based on self-reporting of the inclusion criteria (table 1). The 30 participants were 61–89 years old (6 men, and 24 woman). The participants were Internet users (including e-mail) but not regular users of SIBAs.

The majority were widowers/widows and/or single living. Exclusion criteria included inability to receive individual support in their homes due to geographical distance and/or inability to communicate in writing and/or verbally.

Power analysis

Before study III began, a power analysis was done based on the Evaluation of Social Interaction Skills (ESI) measurement (Fisher & Griswold, 2013) because the ESI provides standard error (SE) and mean values for a normal sample of older adults. The pre-post mean value in a group of adults was 0.34 logits (Simmons & Griswold, 2010), although two SE values were used to minimize the risk of errors, resulting in a mean difference of 0.30. Using the standard deviation (SD) of the sample of older adults in the ESI database (equal to 0.38) provided an effect size of 0.79 ($0.30 / 0.38 = 0.79$). With a power of 0.8, a sample of 25 participants was estimated to be sufficient for the statistical analysis (Lipsey & Hurley, 2009).

Randomization

A computer program was used to randomize the 30 participants into two groups. The sequence boundaries for randomization were 1–24 and 25–30 and were stratified according to sex. The numbers were then randomly assigned into two groups by one employee who worked at the same department as the research group (not otherwise included in the study). A pre-set list was then obtained from a second employee in the research group with a number for each participant that revealed the participant's group enrolment.

Drop-outs

Two participants dropped out during the intervention study, including one woman from group 1: I/C and one man from group 2: C/I (figure 3). They explained their withdrawal as a lack of time and no need for the intervention. One woman did not participate in the last month of her intervention period, and one man participated only in the measurement periods but not during the intervention period. These two participants were not considered as drop-outs, thereby supporting future comparisons to studies in which not all participants fulfill the intervention plans.

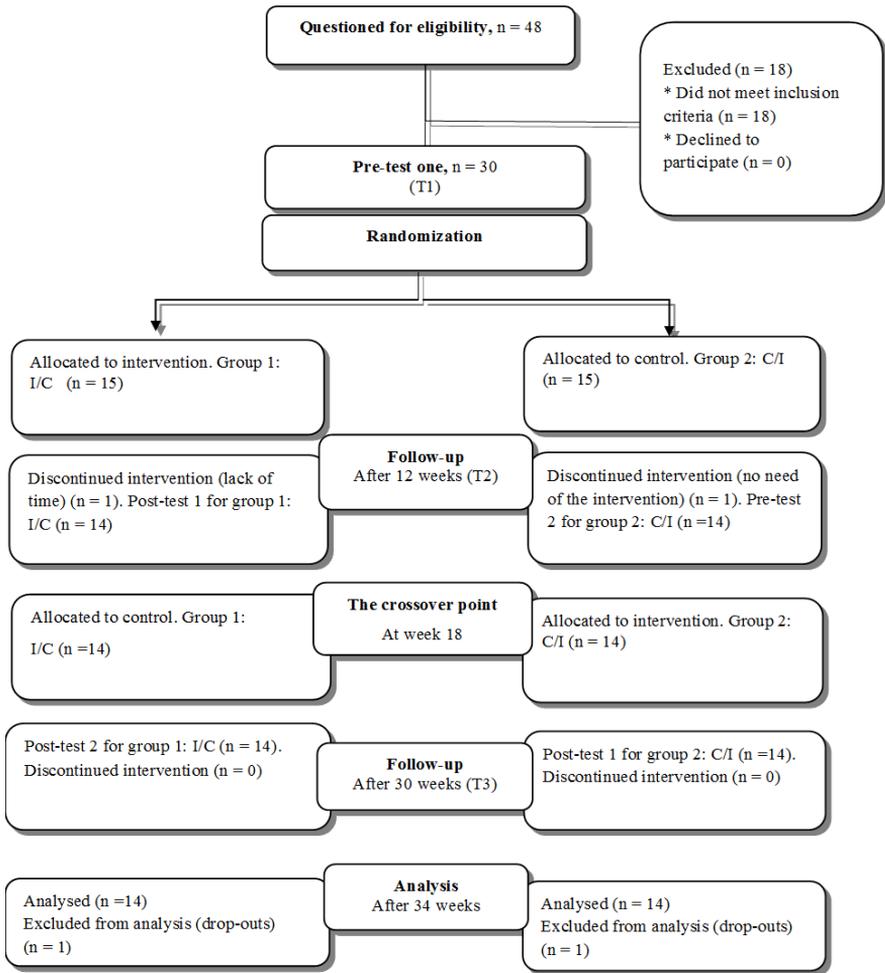


Figure 3. The flow chart visualizes the enrolment of the participants to study III. The randomization into Group 1: (I/C) Intervention period/Control period and Group 2: (C/I) = Control period/Intervention period. The measurement periods T1, T2, and T3 are also visualized as well as the final analysis point.

Study IV

The participants in study IV were included about two weeks after the completion of the intervention (study III). A purposeful sampling method was used to explore the potential differences in the seniors' intervention processes; thus participants from both sexes and a variation of ages, experiences of Internet and computers, and those who were reported achieving their goals with the intervention or not were recruited.

The sampling was done by me and based on additional information from the OTs who conducted the intervention.

The recruitment was done in five sequences, and four seniors were asked to participate in each sequence. At each sequence, an information letter with information about the study purpose and voluntary participation was sent out to five selected seniors. These four were then contacted by telephone (about one week later) and asked to give their consent to participate. If they approved, the seniors could choose a time and place for the interview. Interviews were conducted during the continued enrolment. In total, the invitation letter was sent to 20 out of the 30 available seniors from the earlier intervention study (study III). Five declined participation, reasons for declined participation included sickness, lack of time, and not being interested. Finally, 15 seniors were included, aged 66–88 years old (12 woman, 3 men) (table 1). Ten of them had participated in the intervention in the fall and ended the intervention six months prior to study IV, and five participated in the spring group and ended the intervention two weeks before study IV.

An overall description of the participants in the thesis

The participants (studies I-IV) consisted of community-dwelling, retired seniors who were participating in different activities in society. Many were participants in retirement organizations or sports or cultural organizations. The majority were users of the Internet. All seniors were recruited from a middle-size city in northern Sweden during the years 2008–2012. The participants lived in (or nearby) an urban environment where daily transportations were available and it was possible to take the bus or walk to nearby shops and public events. A few of the participants were living more distant from the urban environment, and they depended on their ability to drive a car to be able to access services available only in the city (e.g. the hospital or certain social events). In study III the participants were vulnerable to loneliness, which means that they reported that they experienced loneliness and a decrease in social contacts and/or social activities. In studies II and III, a majority had a university education.

The individually adapted social Internet-based occupational therapy intervention program, studies II and III

Foundation of the intervention program

The OT SIBA intervention program is based on a client-centered, individually adapted intervention process (Fisher, 2009) that uses group and individual meetings. The individual approach is indicated to be beneficial for learning (Ballantyne et al., 2010), and the group meetings have been shown to be beneficial for social interactions and the possibility to develop social contacts (Cattan et al., 2005). The overall aim with the intervention is to support socially vulnerable seniors in the process towards achieving satisfactory participation in SIBAs and society, to reduce experiences of loneliness, and to support satisfactory social contacts and social activities.

Before the intervention program was explored, security issues related to seniors' integrity and personal information when using SIBAs were considered. An informative document was created through inspiration from the Swedish Data Protection Authority (DPA) (2015). The document contained information about security and privacy settings on different social media sites and information about the seniors' responsibility to not reveal sensitive information on the Internet. Before the intervention, the participants gave their written consent that they had received the information. The seniors were also informed and educated by the OTs on how to manage and change security settings during the intervention processes.

As a part of the introduction for the intervening OTs in study III, all educational material was available in a binder that they could use during the intervention. The education material was based on experiences and results from studies I and II. The educational material included the intervention program and scheme and information about 1) the importance of identifying the clients' goals, 2) how to create a supportive environment, 3) how to find suitable SIBAs and to match those to the seniors' goals with participation, and 4) security, privacy, and technical issues. The intervening OTs were also educated in commonly used SIBAs and were given ideas for different blogs or websites that could be useful to support the seniors' introduction to and use of SIBAs. Furthermore, the educational material also included measurement tools that the OTs were instructed to choose from. These included the Goal Attainment Scaling (GAS) (Lindstedt & Ivarsson, 2008), the Canadian Occupational Performance Model (COPM) (Law et al., 1994), the Occupational Circumstances Interview and Rating Scale (OCAIRS) (Haglund, 2010), and the Occupational Self-Assessment (OSA) (Sjöberg, 2012). A collection of

additional OT tools that could be useful in the intervention – like the social network map (Swedhem, 1985) and the MNPS interest check list (Nilsson & Fisher, 2006) – was included. The OTIPM (Fisher, 2009) was also included in the material. In addition, an informative document was developed to provide solutions to technical issues that might arise during the intervention. This information was given to the intervening OTs before study III.

The intervening occupational therapist

In study II, the intervention was provided by myself with previous experiences from working with computer and Internet use among seniors (Forsberg & Nilsson, 2008; Nilsson, Lindgren, & Forsberg, 2009), from working as an occupational therapist with seniors, and from being educated in how to administer the measurement tools. Before study III, two OTs were recruited for the fall period, and an additional one was recruited to the spring period because one had to leave the study due to other obligations. The OTs were given a two-day educational course based on the prepared educational material. The intervening OTs were selected to provide the intervention, and they all had experience working with seniors in clinical practice.

Application of the intervention program, studies II and III

The intervention period lasted three months (described in study II and III), and the individual meetings were limited to 1 ½ hours per occasion (but not in study II where the intervention program was explored and the time frame was not set). The group meetings (with 4 or 5 seniors/group) took place five times with about two weeks between meetings. The OTs were also available for remote support via e-mail, telephone, or online video-phone calls (summarized in table 2). In their homes, the participants used their own computers and were provided with a headset and web-camera if needed. The OTs were also in charge of solving technical problems during the intervention.

Table 2. Describing the frame of the intervention

Frame of the intervention	Pre-set educational group meetings offered every 2nd week	Individual meetings offered weekly, or more frequently if needed or requested
Time	1½ hour/occasion	1½ hour/occasion
Place	Remotely via Skype	In the participants' homes
Additional support (to accomplish the tasks or for participation in SIBAs)	Remotely during meetings	Remotely or in their homes when needed or requested

When the intervention was initiated with the seniors, the OTs created a collaborative relationship (described in the OTIPM) by meeting the clients' prerequisites and by using therapeutic strategies to adapt and maintain the collaboration during the intervention process. Using measurement tools, interviews, and observations, the OTs identified activities that the seniors had difficulties performing as well as those they handled independently. In addition, strengths and shortcomings in their environment were identified (such as lacking computer hardware or lacking support from others). Based on that information, the goals were formulated in collaboration between the OTs and the seniors. The goal-setting process and the prioritization of goals were dependent on the seniors' needs and requests. As the goals were set, individual actions were planned in relation to the goals. At half time in study II, and more often in study III, an evaluation was performed by the OTs to identify the progress towards goal-achievement and if there was a need to establish new goals for the later part of the intervention period. The content of the intervention is exemplified in table 3.

Table 3. Examples of the content of the intervention program.

The content	OTs' pre-determined actions	Participants' pre-determined tasks	Participants' individual and goal-directed tasks
Initially	Establish collaborative relationship and support goal establishment with interview and measurement tools Initiate the collaboration at an individual meeting	Identify and define goals for participation in SIBAs Learn about security settings	Upload pictures to, for example, Facebook and 60plus profiles
During	Provide education (verbally, in writing, and using manuals) on how to use chosen SIBAs in accordance with the participants' goals Inform about blogs, debates, forums, and different communities	Contact another known or unknown person using SIBAs	Search for relatives using SIBAs
	Adapt the working environment, e.g., keyboard, seating position, lightning Provide education (verbally, in writing and/or using manuals) on how to connect the web camera and headphones to the participants' computers	Use one social media platform instead of another approach (i.e., instead of using the regular telephone)	Write a comment in a forum and press 'like' on another comment on Facebook
	Prepare the participants for the Skype meeting Prepare and initiate discussions and act as a group leader in the meeting	Participate in the group meeting	Prepare to participate in the group meeting via Skype by reading a blog post and formulating questions to discuss

In study II, the group meetings did not include assignments to prepare before the meetings. Based on the participants' requests in study II for more organized and satisfactory discussions, the content of the group meetings was developed further for study III. The OTs were given pre-decided themes and assignments to introduce to the seniors before the group meetings (table 4). The seniors should, for example, choose a topic they want to discuss by reading blogs or visiting other informative websites. The OTs presented the overall discussion theme at the group meeting and it was debated based on which information the group members had found online. The participants were also educated on how to use the online video-phone call before the first group meeting as well as during the process if needed.

Table 4. An overview of exemplified assignments and themes discussed in the online group meetings in study III.

Examples of pre-decided themes and assignments for the group meetings online
1. Reflections about the potential benefits of participating in SIBAs
2. Assignment: Read a post on a blog and prepare questions to discuss. Participate in the discussion: <i>Contemporary debates in society</i>
3. How can social media be used in combination with your other daily activities? Are social activities on the Internet and outside the Internet experienced as equivalent?
4. Assignment: Independently read a post on a blog and prepare questions to discuss and participate in the discussion: <i>Contemporary debates in society</i>
5. Which SIBAs am I using today, and will I continue using them?

Data collection, studies I-IV

Qualitative research interviews, studies I and IV

Qualitative interviews with a few open-ended questions (Kvale & Brinkmann, 2009) were used for data collection in studies I and IV. Interview guides were prepared before the two studies. The interviews in study I were conducted by me as the first author and by the third author. The participants decided the place for the interviews. Two interviews were conducted at the research groups' workplace, and the rest took place in the participants' homes. The question areas in study I covered the seniors' previous and present experiences with IBAs, if they had plans of IBAs to try in the future, and their experiences with hindrances and opportunities in performing IBAs. In study IV, the interviews were conducted by me as the first author and information was gathered after the seniors had ended their participation in the intervention process (study III). All interviews took place in the participants' homes. The questions in the interviews covered the participants' reasons for being interested in SIBAs and their experiences from participating in the intervention process. The questions also aimed to understand the seniors' experiences of the support from the OTs during the intervention process and how their activities and social contacts were influenced by their participation. Finally, the questions sought to understand how the participants were presently using SIBAs and their future plans to use SIBAs.

Field notes and interviews, study II

In study II, the intervening occupational therapist wrote field notes to capture the events during the five seniors' intervention processes. The field notes for example described aspects in the intervention that were discussed together with the participants in the process and actions taken to solve activity-related barriers. In addition, notes were taken in relation to the unstructured observations of participant's performance in the computer-related activities, for example, if they were hesitant when participating in SIBAs or if they became tired. After the intervention process was ended, semi-structured qualitative interviews were used to understand the seniors' experiences after the intervention process as well how they had used and planned to use SIBAs.

Loneliness and social assessments, studies II and III

UCLA Loneliness Scale, studies II and III

The participants' self-reported experiences of loneliness were measured with the UCLA Loneliness Scale (Russell, 1996). The measurement includes 20 statements, such as "How often do you feel alone?" (question #4), that are rated on a four-point scale of never (1), rarely (2), sometimes (3), and always (4). The scores are summed into a total score ranging from 20 to 80 points. Four preliminary levels of loneliness have been documented (Perry, 1990), where a total score of 20–34 points indicates low levels of loneliness, 35–49 a moderate degree, 50–64 a moderately high degree, and 65–80 a high degree of experienced loneliness. The measurement has been used with groups of older people (Russell, 1996) and has frequently been used in intervention studies (Cattan et al., 2005; Masi et al., 2011). For studies II and III, a Swedish version of the UCLA Loneliness Scale that was previously translated by Engelberg & Sjöberg (2005) was used.

Social Networks Online and Offline, studies II and III

A questionnaire was developed by the research group prior to study II to explore and evaluate seniors' social contacts, named Social Network Online & Offline (Larsson & Nilsson, 2010). The questionnaire is based on self-reported data and includes 12 questions with pre-defined response choices. The questionnaire comprises questions about the participants' social activities, social contacts (number of contacts and frequency in the social contact), and use of IBAs. In addition to these questions, two visual analogue scales (VAS) were included to evaluate seniors' satisfaction with their social net-

works on the Internet and off the Internet. The satisfaction was rated on a scale from 0 to 10, where 0 is 'not satisfied' and 10 is 'very satisfied'. In study III, only the VAS were used (as secondary outcomes) and not the other questions in the questionnaire.

Evaluation of Social Interaction skills, study III

The ESI measurement tool (Fisher & Griswold, 2013) is based on observations of the quality of social interactions when participating in social activities outside the Internet. The measurement tool has been previously used in other populations, including seniors, with valid results (Simmons, Griswold, & Berg, 2010). The measurement tool describes 27 social interaction skills that are measured on a scale from 1-4. Where 1) represent severely limited, 2) ineffective, 3) questionable, and 4) competent social interaction skills. Examples of social interaction skills from the instrument include; *approaches* (*initiate an interaction*), *looks* and *discloses*. Before the measurement tool can be used, the OTs need to take a course to learn how to administer the measurement and to standardize their evaluations. A computer software is available (ESI, 2015) to transform the ordinal data into linear data using Rasch measurement (Linacre, 1993). The computer software provides reports of the seniors' skills in logits. Adequate social interaction skills for a healthy population is suggested to be 1.0 logits or greater. The age normative limits (± 2 SD) for seniors are somewhat different at 1.3 logits for those 60–69 years old, 1.0 logits for those 70–79 years old, and 0.8 logits for those 80 years old and older (Fisher & Griswold, 2013).

Changes in activity performance and goal achievement, study II

Canadian Occupational Performance Model, study II

The COPM measurement tool (Law et al., 1994) was used in study II. The COPM is a client-centered measurement tool that aims at collecting information about the client's subjective view of whether activities are performed in a satisfactory manner or not (Law et al., 1994). In this thesis, the three VAS measuring meaningfulness, performance, and satisfaction in the COPM were used. The goals and ratings were focused on performance with SIBAs, not daily activities in general. The VAS are rated from 0 (not important/cannot perform/not satisfied) to 10 (extremely important/extremely well performed/extremely satisfied). A change of two points in any of the scales indicates a clinically significant change (Johnsson et al., 2012; Wressle, Samuelsson, & Henriksson, 1999).

Goal Attainment Scaling, study II

The GAS measurement tool (Kiresuk & Sherman, 1968; Lindstedt & Ivarsson, 2008) is used to identify, define, and evaluate goals. The measurement is suggested to be used in mental care and in rehabilitation (Lindstedt & Ivarsson, 2008) and with seniors (Hurn, Kneebone, & Cropley, 2006). The manual (Lindstedt & Ivarsson, 2008) provides information on the process of goal setting and goal evaluation. For example, it describes how to identify and define the goal and how to establish the time, ability, and need of support and the frequency and/or duration of the goal achievement. The manual also suggests that a defined number of intervals should be used when evaluating the goals, these are then given an additional value based on a statistical formula. To evaluate the goal achievement in study II, five steps were created (-2, -1, 0, +1, and + 2) where 0 indicates that the goal was achieved, and the other steps indicate that achievement of the goal was below or above the expected outcome. Based on the statistical formula for GAS (Kiresuk & Sherman, 1968) 40.00 was set as the baseline value, 50.00 as the expected outcome, and 60.00 as one step above the expected outcome.

Computer-related skills, studies II and III

Assessment of Computer Related Skills

In studies II and III the Assessment of Computer-Related Skills (ACRS) (Fischl & Fisher, 2007) have been used. This observational instrument is based on Rasch measurement (Linacre, 1993) where ordinal data is transformed into continuous data. The instrument has been tested in initial studies (Fischl & Fisher, 2007) and is under development to be validated for seniors and other client groups. In the initial case study (study II), an unstructured observation was performed to describe the participants' computer-related skills using inspiration from the verbs in the observational tool ACRS. In study III, a structured observation was undertaken according to the ACRS manual of two IBAs performed by the participants. The information from the observation was used to describe the participants' baseline characteristics. The participants' computer-related skills were scored based on the pre-defined steps in the ACRS manual. The four-step scale range from the lowest score, 1 = deficient, 2 = inefficient, 3 = questionable, and 4 = competent performance of computer activities.

Qualitative analysis, studies I, II and IV

Grounded Theory

The constant comparative method (Strauss & Corbin, 1998) was used in the analysis of the interviews in studies I and IV in order to reveal the processes described by the individuals. The constant comparison is used in the analysis process where the results are derived from the events that are explored. Open coding is used in the analysis process to detect codes with meaning based on the aim of the study. The codes with similar meaning are then combined into preliminary categories. The analysis process then continues to axial coding where similarities and differences in the categories (which in example constitute descriptions of events or issues) are further explored and related to their subcategories. The subcategories that evolve in the process should explain and answer questions like when, where, why, who, how, and what the consequences were. In the analysis, an iterative process is used to shift the focus from the interviews, and the emergent categories to capture an understanding that is well grounded in the collected data.

The constant comparative method in study I

In study I, the constant comparative method (Strauss & Corbin, 1998) was used to reveal differing and common aspects in the participants' experiences of IBAs. The transcribed interviews were read several times to get an overall understanding of the participants' experiences with performing IBAs. The texts were then read systematically to identify sections that were related to the aims of the study. The highlighted sections of text were coded and divided into preliminary subcategories describing the experiences of each individual in detail. These descriptions reflected the conditions under which IBAs were performed, the performance itself, and the consequences of the performance. The subcategories were grouped based on similarities and differences in the participants' experiences of IBAs, and three preliminary main categories were generated. The analysis continued by constant comparisons of the transcribed interviews, codes, and subcategories, and certain properties were identified within the three generated main categories. The analysis process continued until consensus was reached between the authors. Peer-review was used to increase the credibility in the results (Lincoln & Guba, 1985)

The constant comparative method in study IV

After all the interviews had been conducted, the constant comparative method (Strauss & Corbin, 1998) was initiated by repeatedly reading the transcribed texts to get an overall understanding of the participants' processes. Then open coding was used to identify pieces of the text with meaning related to the study's purpose. Codes with similar content were merged into preliminary categories to reflect the participants' intervention processes. For each preliminary category, memos were written to support the further categorization. The first author did the initial preliminary analysis that was discussed with the third author. From those discussions, ideas on how to develop and structure the preliminary categories were formed and changed and then reviewed by the second author. The first author continued on to axial coding where similarities and differences in the processes of the participants were combined into preliminary sub-categories. Later in the analysis, the second and the third authors contributed with deliberations about the preliminary categories and sub-categories. In addition, a comparison of both the preliminary and the established categories (with sub-categories) was undertaken with the content of the interviews to make sure that the results were well grounded in the data. The analysis process continued until consensus was reached between the authors and peer-review was used to increase the credibility in the results (Lincoln & Guba, 1985). Two categories with sub-categories were generated in the analysis process.

Pattern Matching

The Pattern Matching (Yin, 2009) is used as an analysis method to compare empirical data with the purpose of a study in order to find similar or divergent patterns in data (within and between cases). The research question should aim at understanding a phenomenon in society by using the questions of how and/or why when analyzing the data. In the pattern matching several resources of data sources are included, both qualitative and quantitative.

The Pattern Matching in study II

In this study, the Pattern Matching (Yin, 2009) was used when analyzing the qualitative and quantitative data from study II as one unit. All collected data, including the results of the measurement tools, the field notes, and the interviews, were considered the unit to be analyzed. The measurement tools used for pre-post comparisons of goal achievements included the GAS (Lindstedt & Ivarsson, 2008) and the COPM (Law et al., 1994). For the COPM, the measurement points before, during, and at the end of the intervention pro-

cess were compared. For the number of social contacts and the satisfaction with social contacts, pre-post comparisons were made with the Social Network Online & Offline measurement tool (Larsson & Nilsson, 2010). Changes in the UCLA Loneliness Scale (Russell, 1996) were also evaluated by pre-post scores.

The data were initially sorted in chronological order into five cases and then qualitative descriptions in the form of stories of each participant's intervention process were created. Then, individual patterns were sought and identified in each case and compared with the other cases to find similar or altered events that had occurred during their intervention processes. To strengthen the validity of this analysis, all authors took part in the analysis process, and the second and third authors compared the data that were summarized with the created cases. All the authors discussed and reflected upon the generated patterns, and the analysis continued until consensus was reached.

Quantitative analysis, study III

Baseline characteristics

Descriptive statistics were used to describe group characteristics (education, gender, age, living condition, computer-related skills, social activities, and use of e-mail) at baseline.

Analysis methods

Chi-square tests and t-tests were used to identify potential statistically significant differences between the two groups (1: I/C and 2: C/I) at baseline. The pre-post intervention analysis aimed at evaluating the effects of the intervention for the main outcome of loneliness and the secondary outcomes of satisfaction with social contacts on the Internet and outside the Internet and scores on the ESI. The non-parametric Wilcoxon signed-rank test was used for the loneliness scale and satisfaction with social contacts on the Internet and outside the Internet (based on the VAS scores). The parametric paired t-test was used for the continuous ESI variable.

Repeated measures analysis of variance (RM-ANOVA) was used to detect differences within and between subjects when comparing measurement points T1, T2, and T3 and group allocation (1: I/C, 2: C/I). A time \times treatment interaction analysis was applied to assess the treatment effect at T3 for both groups to determine whether the groups were equal over time or if one group significantly differed from the other. Possible covariates of the main outcome (age, educational level, and living condition) were included in the

RM-ANOVA. The sustainability of the intervention was tested with the Bonferroni post hoc test for Group 1: I/C at follow up. All analyses were performed using SPSS, version 22 (SPSS, 2013). A significant difference was set to $p \leq 0.05$.

Ethical considerations

In all studies, the ethical guidelines for research with human subjects (Gustafsson, Hermerén, & Petersson, 2006; Vetenskapsrådet, 2015), have been carefully considered. Ethical approval was given by the Regional Ethical Review Board, Umeå University, Sweden: Dnr: 2010-181-31M (study II), dnr: 2011-109-31 M (studies III and IV).

In accordance with ethical guidelines, it was carefully considered in all studies (I–IV) that the participants received information about the study content and the purpose of the study. They were also informed about their right to withdraw from the study at any time, and gave their informed consent to participation verbally or in writing. The participants were also informed that they could choose the place for the interview (studies I and IV), and they were clearly informed that the interviews were being recorded. In the qualitative studies (I, II, and IV), the collected data were used carefully to ensure that the voices of the participants are being truly reflected. In addition, for study III it was ensured that the statistical analysis reflected the raw data. In all four studies, the personal information was limited with respect to the small number of participants and the risk of being recognized in the material.

The potential harm and benefits for the participants were considered before the studies commenced. Because the OT SIBA intervention is of an explorative nature, a limited number of participants have been exposed to the intervention, thereby reducing the risk of potential harm. In study II, the participants were protected in that their names were fictive and personal information was limited in the article. The crossover design (study III) was chosen with respect to ethical guidelines because this design ensured that all participants received the intervention and were not left with revealed but untreated feelings of loneliness. To reduce the risk of potential harm when using SIBAs in the intervention program, privacy and security issues were carefully considered. The benefits for the seniors from participation in the intervention were assumed to be reduced loneliness and increased participation in activities and society. The contributing authors have shared information from the studies in scientific and public events so that the seniors' contribution to the studies is rewarded and acknowledged.

RESULTS

The results are structured from studies I–IV and provide examples of how the process evolved in developing evidence for the OT SIBA intervention described earlier in the methods section.

Exploring and identifying the research area

The initial exploration of the research area was done by collecting the participants' experiences from performing IBAs or not performing them (study I). The results from this study revealed a continuum of performers of IBAs – from seniors who were established performers of IBAs, to those entering the role of a performer of IBAs or the nonperformers of IBAs. In each category, it is described *how* the seniors were performing the IBAs, *why* they were performing them, and the *consequences* of the performance (table 5).

To begin with, the nonperformers described how they could access IBAs by asking others to perform the needed IBAs for them. They had not identified the meaningfulness for the IBAs or any reasons to start performing IBAs themselves. The ones who were transitioning into the role of a performer had identified IBAs that could be meaningful to them, and they were encouraged to participate by others in their social environment. They had started to prepare for Internet access and had ideas about which activities they would perform. The already established performers were also encouraged and supported by others in their performance but had already reached habitual performance of IBAs in their daily lives. For the different roles, shaped by the seniors' performance of IBAs, the meaningfulness of the IBAs was the most prominent aspect and the individuals need to understand and experience the meaningfulness of performing IBAs.

The different roles that were shaped by their performance of IBAs also influenced the different performer's participation in society. It became evident that the seniors who were nonperformers of IBAs felt pressure from others and from society that they should become performers so as to avoid the risk of hampered participation in society. However, this external pressure had not yet led them to become performers.

Table 5. The performance of and conditions for the performance of IBAs according to the three main categories to be a non-performer, to enter the role of a performer, and to be an established performer.

	<i>To be an established performer</i>	<i>To enter the role of a performer</i>	<i>To be a non performer</i>
Description of the performance	Continuously developing the performance of meaningful IBAs	Prepare for the performance of IBAs considered as meaningful	Contacting others to perform the requisite IBAs
Conditions for the performance	Encouraged to perform IBAs by others and access to meaningful activities	Encouraged by others and meaningful IBAs to potentially perform IBAs	An unidentified meaning associated with performing IBAs
Consequences of the performance	Participate in society in accordance with own preferences	Experience restricted participation in society	Feel pressure to increase participation by use of IBAs

The experiences of the ones that were entering the role of a performer of IBA revealed that the restricted participation had become too prominent and they wanted to increase their participation. They described feelings of alienation and being left out of groups, for example, because e-mail had become a requirement for receiving information. The established performers described how they could choose how to participate and could develop their performance of IBAs more independently. The opportunity to choose activities to perform on the Internet supported their feelings of participation.

It was recognized that the communication with family and friends across significant geographical distances that IBAs offered was valued. The established performers used for example e-mail and discussion forums. In addition, the support (from others and society), as well as access to the technology and their experiences and knowledge, were found to be valuable for satisfactory participation, although participation was heavily influenced by the meaningfulness that the seniors attached to participation in IBAs. Moreover, it was also reflected in the seniors' experiences that at certain levels of performance of IBAs, seniors could benefit from receiving support in developing their performance, especially those with the motivation but who were lacking external resources.

Implications from the results and the aspects to include in the development of the intervention

The results from study I were further explored, and the OT SIBA intervention program was created. The knowledge of supportive aspects in the seniors performance context and that social benefits from performing IBAs could be attained was combined with research about SIBAs (Ballantyne et al., 2010), a client-centered intervention process (OTIPM) (Fisher, 2009), and research about loneliness (Cattan et al., 2005). The intervention program was explored in study II, and the results are described below.

Initial exploration of the social Internet-based intervention

In study II, the five seniors' intervention processes were explored before, during, and at the end. Their processes were followed up in interviews after the intervention. From the analysis it became evident that the seniors experienced an iterative goal-setting process, during the process they were supported by the occupational therapist in the client-centered and individually adapted intervention process to; *managing their introduction to different SIBAs*, *managing their appearance on the Internet*, and *managing the lack of privacy*. The participants have been given fictive names. One occupational therapist provided the intervention in study II, and therefore the abbreviation (OTs) is not used in this section.

Participants' initial participation in activities. The seniors' computer-related skills – based on the unstructured ACRS observation – revealed that two of them (Ann and Sven) had limitations in for example independently navigating on the Internet and had difficulties using the mouse and keyboard. All except Greta performed the activities in at a slower pace, and all except Sven were identified as being tired after the session in which computer-related skills were observed.

The goal setting-process and individual intervention. The process of identifying and establishing goals took several weeks, and during the process the participants reevaluated which activities they wanted to focus upon. The goals could, for example, be to learn to use SIBAs, to find a new friend, or to become more independent in their use of SIBAs. In the intervention process they needed different amount of support from the occupational therapist. In the beginning, their working environment could be adjusted, and they received support, for example, to install the headset and web camera. Based on the seniors various confidence in their performance of SIBAs, skills, knowledge and their goals of the intervention, the pace and time of the individuals meetings was planned in collaboration with the seniors. The seniors

encountered challenges during the intervention process, for example lack of friends to contact using SIBAs and lack of computer skills, and individually adapted and repeated support from the occupational therapist was needed to overcome these challenges.

Managing their introduction to different SIBAs. The occupational therapist suggested appropriate SIBAs to the seniors based on their goals such as if the social media allowed international contacts or if it was to be used between generations and/or with friends in of the same age. During the intervention, the participants expressed that SIBAs were useful in making contact with others and in following events in society. The SIBAs could also be accessed throughout the day and whenever it suited their needs. All five participants expressed a desire to find forums that provided in-depth interactions with less superficial communication.

One finding from the online group meetings was that technical issues became a limitation. These negative experiences also influenced the seniors' individual processes towards SIBA participation, and the occupational therapist had to develop technical skills and knowledge to better manage such issues. The content of the group meetings were also adapted during the process to suit the needs of the seniors.

Managing their appearance on the Internet. The seniors' expressed uncertainty how to behave appropriate on Internet, when writing messages and interacting with others. This matter was addressed and assuaged by the occupational therapist during the intervention process by supporting the seniors to become familiar with participation in SIBAs and strengthen their belief in their skills to use SIBAs.

Managing the lack of privacy. The participants agreed that they preferred to interact with a smaller and more familiar group online. They were supported by the occupational therapist in managing security settings and in determining the amount of information they shared. They also needed support to deal with unwanted events such as friend requests from people that they did not know.

Evaluation of goal achievement, social activities, and social contacts at the end of the intervention. The goal evaluations were performed at two times with GAS (before and at the end) and three times with COPM (before, at half-time, and at the end). Two participants, Sven and Marie, had reached their goals according to the GAS measurement at expected outcome or higher, and the other three remained at the same level as before the intervention (and did not reach expected goal-achievement). The findings showed that the

meaningfulness with the prioritized activities (from the COPM VAS scores) had not clinically changed before and at the end of the intervention process. According to the COPM measurement, three participants (Ann, Bengt, and Greta) reported that their skills had improved, and for satisfaction with performance four seniors (Ann, Marie, Bengt, and Greta) increased their satisfaction with the activities (table 6).

Table 6. The results from Goal Attainment Scaling (GAS) (before and at the end of the intervention) and the Canadian Occupational Performance Measure (COPM) (before, during, and at the end of the intervention).

		GAS		COPM		
		Differences in goal attainment		Meaningfulness of activity	Skills for activity performance	Satisfaction with activity performance
Participants	Phase for evaluation	Before	At the end	Before, during, at the end	Before, during, at the end	Before, during, at the end
Ann		40.00	40.00	7,5,7	2,6,7*	3,7,5*
Sven		40.00	60.00**	2,2,2	2,5,3	2,5,3
Marie		40.00	50.00**	8,7,7	3,4,4	2,5,6*
Bengt		40.00	40.00	7,8,6	4,8,9*	3,7,9*
Greta		40.00	40.00	6,6,7	4,4,7*	4,4,9*

Notes. ** Indicates goal achievement using GAS.

*Indicates a clinical significant difference on the COPM VAS between the rating before and at the end.

The results for the seniors' online social networks (the offline results were not reported in this study) indicated that Marie had gained social contacts but was less satisfied with them, while Sven had the same number of social contacts but was very satisfied with these in the end. Two participants, Ann and Greta, had gained more social contacts and were also more satisfied with these. Bengt decreased the number of social contacts but was more satisfied with these. For the UCLA Loneliness Scale, Ann and Sven reduced their experiences of loneliness, Marie and Bengt reported an increase in experiences of loneliness, and Greta remained at the same level of loneliness (table 7).

Table 7. The results of the number of contacts online (not offline contacts) and satisfaction with these online contacts before and at the end of the intervention. The score for the UCLA Loneliness Scale is shown from before the intervention and at the end.

		Social Network Online & Offline				UCLA Loneliness Scale	
		Number of contacts *		Satisfaction with social contacts on the Internet **		Self-reported loneliness	
Participants	Phase for evaluation	Before	At the end	Before	At the end	Before	At the end
Ann		1-2	5-6	2.0	7.1	33	32
Sven		1-2	1-2	1.1	9.2	38	37
Marie		1-2	5-6	5.2	3.9	36	40
Bengt		11-12	7-8	2.6	6.9	37	41
Greta		3-4	7-8	3.4	7.7	44	44

Notes. * The question 'Number of contacts' comprises eight pre-defined response choices from 0, 1-2, 3-4 and so on up to 13+ **Satisfaction is rated on a VAS from 0-10 (0 = not satisfied and 10 = very satisfied).

Experiences of participation in SIBAs at follow up. After the intervention, the seniors participated in interviews where they shared their experiences from participating in the intervention. From their experiences it was learned that they had incorporated SIBAs into their daily lives, and they were certain that they would continue to participate in such activities. The SIBAs were a way to contact friends and relatives and to be a part of society (i.e., they could take part in their grandchildren's lives, be a part of social movements, and feel included because they knew what others were talking about). The time allowed during the intervention to accomplish tasks was valued, and this gave them the chance to try the activities themselves while at the same time receiving support. They also felt that SIBAs could become a complement to other activities if they should become hindered by physical limitations.

Implications from the results and the aspects that were developed before further evaluation of the intervention

From the results of study II, it was implied that it could be beneficial for the intervention process to develop the technical support for the OTs. This was done before study III, by the educational material that was developed includ-

ing technical solutions. Moreover, it was indicated that the seniors valued a clear structure for the group meetings, and they wished to be provided with examples of themes and assignments to support the group discussions. This knowledge was used to develop the content and structure of the group meetings prior to study III. The results also implied that the OTs need to be aware that others and society influence the individual intervention processes. To overcome negative or hampering influences during the intervention processes, such aspects need to be dealt with by the OTs and discussed with the seniors.

Evaluating the effects of the social Internet-based intervention

Study III evaluated the effects of the intervention on seniors' experiences of loneliness, their satisfaction with social contacts on the Internet and outside, and their social interaction skills. Intervention effects were revealed after the initial baseline data were analyzed.

Baseline characteristics

Descriptive data showed that 87% of the participants partook in social activities offline once per week or more frequently and that 70% used e-mail once per week or more frequently. From the ACRS observations at baseline, the most challenging skills for the participants (as indicated by inefficient and/or deficient skills for 93% of the participants) were modifying their behavior and adapting their performance while using computers and the Internet.

When controlling for baseline differences between Group 1: I/C and Group 2: C/I, no significant differences were found for the outcome measures of loneliness ($p = 0.464$), ESI score ($p = 0.285$), satisfaction with social contacts on the Internet ($p = 0.705$), or satisfaction with social contacts outside the Internet ($p = 0.273$). Among the demographic characteristics, no significant differences could be found for living condition ($p = 0.690$) or education level ($p = 0.512$), but there was a significant effect for age ($p = 0.047$) where Group 1: I/C had a higher mean age, including participants above the age of 80 years.

Pre-post intervention effects

After participating in the intervention, a significant reduction in experiences of loneliness (Group 1: I/C, $p = 0.003$; Group 2: C/I, $p = 0.049$) was revealed. For satisfaction with social contacts on the Internet, the results were inconclusive. Group 2: C/I increased their satisfaction with social contacts on the Internet ($p = 0.05$), while no change was detected for Group 1: I/C ($p = 0.266$). For satisfaction with social contacts outside the Internet, no significant difference was detected post-intervention (Group 1: I/C, $p = 0.451$; Group 2: C/I, $p = 0.074$). Based on ESI score, the participants' social interaction skills were significantly lower for Group 1: I/C ($p = 0.007$) post intervention, but no significant change was detected for Group 2: C/I ($p = 0.210$) (table 8). Further exploration of the ESI data was undertaken due to the negative results, and outliers in the data were found. The outliers were not removed due to the already limited sample.

The Bonferroni post-hoc test was used to test the sustainability of these variables three months post-intervention. The results were sustainable as indicated by a lack of significant difference at follow-up (post-test 2) for Group 1: I/C for loneliness ($p = 1.000$), satisfaction with social contacts on the Internet ($p = 0.499$), outside the Internet ($p = 0.165$), and ESI score ($p = 0.393$).

Effects between T1, T2, and T3

RM-ANOVA was used to compare the different time points (T1, T2, and T3) for changes over time for the group in total (time effect), and showed a significant treatment effect for all variables (experiences of loneliness, $p < 0.001$; satisfaction with social contacts outside the Internet, $p < 0.001$; satisfaction with social contacts on the Internet, $p < 0.001$; ESI score, $p = 0.050$). Anticipated covariates (living condition, educational level, and age) did not change the main findings. No interaction between the intervention and group allocation (1: I/C vs. 2: C/I) was detected (table 8).

Table 8. The results of the outcomes in study III according to the UCLA Loneliness Scale (UCLA), Satisfaction with social contacts online and offline, and the Evaluation of Social Interaction skills (ESI). The T1 raw values are based on 30 participants, and the other values are based on 28 participants.

	T1 raw value Mean (SD), n = 15/ group	T2 raw value Mean (SD), n = 14/ group	T3 raw value Mean (SD), n = 14/ group	Comparison of pre-and post-intervention scores	% change T2-T1 Mean (SD)	% change T3-T1 Mean (SD)	Interaction between intervention and period (1: I/C vs. 2:C/I)	Time effect among T1, T2, and T3
UCLA							F = 0.755 p = 0.475	F = 13,156 p < 0.001*
Group 1: I/C	45.53 (7.41)	42.43 (7.44)	42.00 (7.34)	p = 0.003*	-0.07% (0.07)	-0.08% (0.08)		
Group 2: C/I	43.93 (8.61)	41.93 (8.82)	39.50 (10.42)	p = 0.049*	-0.045% (0.09)	-0.090% (0.13)		
Satisfaction with social contacts online							F = 2.267 p = 0.125	F = 13.159 p < 0.001*
Group 1: I/C	3.62 (2.94)	5.24 (2.64)	6.14 (2.82)	p = 0.266	6.12% (19.58)	8.1 0% (24.56)		
Group 2: C/I	3.11 (3.00)	3.52 (2.80)	6.39 (2.51)	p = 0.05*	1.4 2% (3.11)	7.30 % (10.16)		
Satisfaction with social contacts offline							F = 0.334 p = 0.717	F = 11.723 p < 0.001*
Group 1: I/C	5.84 (2.13)	6.29 (1.72)	7.20 (1.39)	p = 0.451	0.28% (0.68)	0.46% (0.64)		
Group 2: C/I	4.23 (2.41)	5.63 (2.40)	6.62 (2.56)	p = 0.074	1.23% (2.90)	0.96% (1.52)		
ESI							F = 2.371 p = 0.114	F = 3.375 p = 0.050*
Group 1: I/C	1.02 (0.32)	0.81 (0.22)	0.91 (0.21)	p = 0.007*	-0.20% (0.3)	-0.74% (0.3)		
Group 2: C/I	0.79 (0.33)	0.79 (0.26)	0.85 (0.20)	p = 0.210	-0.24% (1.1)	-0.06% (2.5)		

Final deliberations

Study III indicated that the intervention could reduce experiences of loneliness among seniors who were vulnerable to loneliness. This intervention might also increase satisfaction with social contacts on the Internet for this group of seniors. In the development of interventions following the MRC model (2008), the processes experienced by the participants in intervention studies should be explored and understood for further development of the intervention. Thus a qualitative approach was used in study IV, which is presented in the next section.

Exploring the intervention process in the social Internet-based intervention

Social decline and societal digitalization evoke a need to change. The results from the qualitative follow-up evaluation (study IV) showed that the participants had a similar outlook prior to the start of the intervention, and they were all interested in SIBA usage and had the idea that increased knowledge could help them to stay up to date with the increasing digitalization in society. The seniors' experiences reflected that SIBAs might be useful to overcome a lack of social contacts and activities as a consequence of changing life-events such as widowhood, retirement, or a change of residence. They felt that they were required to participate in SIBAs to be able to interact with others. The seniors' experiences also reflected uncertainties about how to properly initiate social contact via SIBAs, including what to write and how much they should reveal about themselves. The seniors' experiences of their intervention processes reflected two divergent processes towards enhancing satisfactory participation in SIBAs (figure 4).

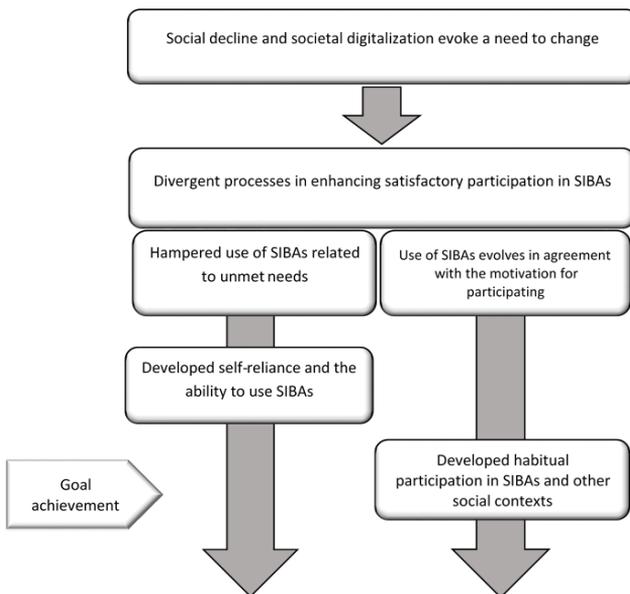


Figure 4. Shows the seniors' divergent intervention processes towards goal achievement. Both directions supports the development of the ability to use SIBAs and self-reliance. The second direction, though, goes even further to lead to goal achievement and habitual participation in SIBAs and social contexts on internet and offline.

Hampered use of SIBAs related to unmet needs. One direction of the intervention process was characterized by seniors' experiences of being hampered in their process of learning to use SIBAs, and these seniors experienced barriers caused by the technology, lack of potential social contacts, and personal limitations (e.g. memory loss and sickness). They spoke of themselves as being too occupied and having a lack of time, and they expressed that they felt they should have contributed more to their own intervention process. The group meetings were also described as hampered by technical problems or by difficulties in finding appropriate friends online. The seniors who developed in this direction were not completely confident in how to handle the lack of privacy online.

Developed self-reliance and the ability to use SIBAs. The seniors' experiences revealed that they had still developed during the process even though they did not achieve all aspects related to their goals. Their experiences reflected increased self-reliance and the ability to use SIBAs such that they now had the power to decide if they wanted to participate. However, they still told of aspects that hampered them in using SIBAs as they needed to and wanted to, for example, that they needed to change their previous habitual ways of doing activities. They also described how they were hampered by limited numbers of friends or relatives online. It was also indicated in the seniors' experiences that the social contact outside the Internet differed in some sense from the online contacts.

Use of SIBAs evolves in agreement with the motivation for participating. The seniors in the other direction in the intervention process described how their use of SIBAs evolved throughout the process in accordance with their goals and motives for using SIBAs. They felt that they could work at a pace that suited their needs, and they tried to do tasks on their own and to repeat the tasks between the meetings with the OTs. The seniors experiences reflected that they could easily participate in the group meetings (despite the technical problems), and they appreciated meeting the others online. The assignments that they had to prepare for the meetings were experienced as enjoyable. The seniors compared this way of learning with previous courses they had taken, and they said that the previous course formats were not suitable to their needs because the other participants often learned faster or were already more skilled.

Developed habitual participation in SIBAs and other social contexts. The seniors in this direction of the intervention process also developed beyond just the ability to use SIBAs, and they reached their goals of being able to use SIBAs for social interactions and social contact both on the Internet and outside the internet. They were satisfied with their social contacts, and SIBAs

had become a habitual activity into their daily lives. They could use SIBAs to meet others online and to decide when and where to meet outside the Internet. They had been meeting others after the intervention, for example, to go for coffee or to go dancing together. The SIBAs were described as activities that brought them together. They could also use the SIBAs at times when loneliness could be more prominent, for example, during the holidays. In this direction, the social contacts made offline were also described as something different in relation to the interaction that occurs during online meetings. These seniors felt more confident in how to handle the lack of privacy online, and they told how they could now reach the entire world and had gained a wider perspective of the world.

Main findings

The main findings of this thesis are the aspects that influence satisfactory use of IBAs and the individually adapted OT SIBA intervention (study numbers are in parentheses). The seniors' performance of IBAs is influenced by the combined aspects of knowledge, previous experiences, and accessibility to a computer and the Internet along with support from others and society and a motivational force, for example, to access certain meaningful activities online (I). In the intervention process, SIBA usage is influenced by an interest in the use of SIBAs and in increasing one's technological competence (II, IV). Seniors were also motivated by the desire to make new social contacts and to access these online (II, IV). A shifting goal-setting process took place during the intervention process, and the seniors needed time to identify their goals (II). The seniors also had divergent goals and needs that required the intervention to be individually tailored (II, IV). To facilitate SIBA usage, the OTs needed to support the seniors in managing the introduction to different SIBAs, managing their appearance on the Internet, and managing the lack of privacy online (II). The OTs also needed to support social restraints (such as a lack of others to contact), technical problems, and individual needs (such as hearing difficulties and a need for more time) during the process or else the seniors intervention process might be hampered (II, IV).

Participation in IBAs might support satisfactory participation in meaningful activities and society (I). The results also indicate that participation in the OT SIBA intervention can be beneficial, as the client-centered and individually adapted OT SIBA intervention is indicated to support increased self-reliance (II, IV), abilities to use SIBAs (IV), a reduction in loneliness, a potential increase in satisfaction with social contacts on internet (III), increased social activities on the Internet and offline (II, IV), and ultimately participation in additional social contexts (IV) and society at large (II, IV).

DISCUSSION

Aspects that influence satisfactory participation in Internet-based activities and the social Internet-based intervention

How to support meaningful activities online

The components found to support performance of IBAs (study I) – including social support, encouragement, access to technology, and previous experiences – can provide an understanding of why some seniors remain as non-performers. It has not been previously described how these aspects influence the performance and participation in IBAs on different levels and how the meaning associated with the IBAs can support or hamper the performance and participation. The results add knowledge about the need to identify meaningful online activities that originate from the seniors. It is indicated that the motivation to learn and be a part of new activities emanate from the individual's positive experiences and enjoyment of the activities as well as from the knowledge of what the activities can contribute with in the seniors' lives (Boulton-Lewis & Buys, 2015; Kielhofner, 2008). In study I, the non-performers did not know in what way they could benefit from performing IBAs themselves. This unawareness, or attitude towards the Internet is also evident in other groups of seniors (Findahl, & Davidsson, 2015; Berkowsky, et. al., 2013), and even though a majority of the Swedish population has access to the Internet in their homes this is not always enough to become a participant due to a lack of interest and/or support. Around 200 000 people in Sweden have access to the Internet at home but still do not use it, and the majority of that group is seniors (Findahl, et. al., 2015).

Once seniors are introduced to satisfactory use of the Internet, it is indicated that IBAs and SIBAs are often integrated into daily life (Smith, 2014). This knowledge supports the idea that by introducing seniors to the meaningful use of activities online they can be given the opportunity to be in charge and to choose how they want to participate (study I). In study IV, it was indicated that life-changing events and the need to keep up with the digital development in society were the primary motivational forces to start using SIBAs. In studies II and IV, the participants also indicated that they wanted to develop the number of, or the quality of, their social contacts, which might have motivated them to identify and learn about SIBAs that were meaningful to them.

Identifying the individual's motivational forces is essential for supporting participation in meaningful activities in OT practice. The individuals' moti-

vational force is shaped and inhibited by internal factors such as previous knowledge, preferences, habits, and roles in relation to external aspects like one's social and physical environment (Kielhofner, 2008).

The established performers of IBAs in study I described how they had established a social and environmental support network that was important for their participation. Several aspects also needed to be supported in the SIBA intervention process to facilitate the seniors' use of SIBAs, and both social, technical, and individual aspects were identified (II, IV). The OTs' use of process models, like the OTIPM (Fisher, 2009), supports them in identifying the multitude of aspects in the seniors' environment that might hamper or support their use of IBAs and SIBAs. Therefore, the OTs should use their unique professional knowledge, when supporting seniors in performing such activities. By understanding the aspects that are influencing the seniors' intervention process, the OTs' ability to support them during the intervention might be enhanced.

How to establish activity goals for the intervention process

The shifting goal-setting procedure was highlighted in study II, meaning that the seniors needed time to identify their goals and that their goals sometimes shifted during the process. The seniors' activity goals guided the media that were chosen in the intervention (study II and III). The fact that some seniors could not identify their goals immediately might be related to a lack of knowledge of the potential with SIBAs (Sundar, et.al., 2011), just as it is for IBAs in general (Smith, 2014). The seniors might need an introduction to SIBAs and the opportunity to try them. By receiving information, they can be given the power to identify their activity goals (Wilkins, Pollock, Rochon, & Law, 2001). From this thesis it is indicated that when working in a client-centered manner, it is important to find meaningful online activities and certain SIBAs that relate to the seniors' activity goals and thereby enhance their motivation, which is supported in previous research (Aarts, et.al., 2014; Sundar, et.al, 2011). When matching the social media to the individual's goals, it should be considered whether international-intergenerational media, national media, and/or age-adapted media should be used or whether one should use social media that give access to a large number of contacts in a wider network or social media that supports deeper discussions with a few chosen friends.

Social contact and online interactions

It is indicated that social contact and social interaction via SIBAs are a useful complement to social activities outside the Internet (Study II, IV). Even in study I, it was shown that the established performers used e-mail and certain forums for social interactions. Many of the seniors in studies II and IV were optimistic about the idea of social interactions on the Internet; however, some still remained doubtful after the intervention process. Previous research has indicated that the quality of online social interactions and contacts can be questioned by the seniors (Nyman & Isaksson, 2015; Yuan et al., 2015). The seniors also revealed insecurity in how to behave and make contact in an appropriate manner when using SIBAs (Study II, IV). From these studies, it is not known if the social interactions on the Internet require certain skills and if they differ from interactions outside the Internet. It can be assumed that the interaction is experienced differently as indicated by the participants (study II, IV) and the fact that both the environment (Forsyth, 2010; Kielhofner, 2008) and the participants will influence the interactions and group dynamics (Forsyth, 2010).

To establish a deep friendship or to find an appropriate friend was indicated to be a challenging part of the goal-related actions to reduce loneliness. The challenge differed among the seniors and was related to their goals with SIBA usage, for example, establishing a deep friendship (compared to a superficial contact) or finding an appropriate friend based on individual preferences (study II, IV). This finding can be understood in light of the definition of loneliness used in this thesis and indicates that the quality and not the quantity of the social contacts is highly important for reducing experiences of loneliness (Perlman & Peplau, 1981). Supporting seniors in acquiring deeper social contacts and in reducing loneliness can also require time (Schoenmakers, Van Tilburg, & Fokkema, 2014), therefore, the OT SIBA intervention should be individually tailored including the time needed to achieve satisfactory social contacts.

Identifying potential social contacts is indicated to be important, and not having anyone to contact online can hamper the experience of satisfactory use of SIBAs (Yuan et al., 2015). Different approaches might also be needed for seniors to identify suitable friends because they have different goals for using SIBAs (study II, IV). It is also assumed that SIBAs can be used to support both social loneliness (a lack of participation in societal networks) and emotional loneliness (a lack of close friends) (Dahlberg & McKee, 2014).

To further enhance the intervention, the group meetings could be developed in terms of content. Some seniors valued the group meetings and also continued to have contact with others after the intervention (IV). However, the group constellations (IV) and content (II) did not always correspond to the seniors' needs or prerequisites for group activities or participants (II, IV). Once again the divergent and individual processes were prominent. The creation and content of the group meetings should be developed further to better adapt the groups and to overcome technological barriers. Knowledge on how to create activity groups is previously described in the literature (Finlay, 1994; Forsyth, 2010; Savikko, Routasalo, Tilvis, & Pitka, 2010), and this could be used to enhance the group content within this intervention. To improve the group meetings in this intervention program, it is suggested that clearer goals for each session should be described and that the assignments should require different levels of skills. The intervention should be flexible in terms of adapting the levels of demand to the ability of the participants and adapting the content to meet the needs and requirements of the participants.

A number of aspects were identified that influence seniors' use of online activities (study I, II and IV), and these might interfere with or support the process of becoming a user of IBAs and SIBAs. This knowledge also provide an idea of what the OTs might be facing when introducing seniors to the use SIBAs. If the OTs can create ways to overcome restraints in social contacts and activities through the use of SIBAs, the outcome of the intervention might be satisfactory and support the seniors in reaching their goals (IV). Participation in these new activities might also be influenced by the seniors' ability to adapt to new activities (like IBAs or SIBAs), or to demands in the environment (Schkade & McClung, 2001). Individuals create an occupational identity and competence during their life-course that will affect how and why they participate in activities (Kielhofner, 2008). From their shaped identity and competency, the individual can adapt differently to activities that are presented to them, and this should also be considered in similar interventions.

To develop digital competence

From studies I, II, and IV, it can be understood that the majority of the seniors who participated in the studies were trying to keep up with the digital developments and were interested and wanted to learn. Continued learning during aging can have positive aspects (Purdie & Boulton-Lewis, 2010), for example, acquiring new knowledge and finding opportunities for continued participation in society. Nowadays, lifelong learning is emphasized by the digital commission in Sweden (Digitaliseringskommissionen, 2015), in its aim to improve the digital competence of all citizens, including seniors. Sen-

iors who are excluded from the use of IBAs and SIBAs are one group that not have reached the digital competence that is needed to participate in meaningful online activities. Digital competence is essential to be able to understand the possibilities and barriers that come with the digital advances in society, to be motivated to keep up with these changes, and to have the knowledge and skills to use the technology (Digitaliseringskommissionen, 2015). The seniors expressed that they needed technical support for their use of IBAs (study I) and for the individual use of SIBAs (study II and IV), and in the process they could be hampered both individually and in the groups due to technical problems. Professional technological support could be beneficial to include in the intervention to help the OTs and the seniors overcome such problems.

The results from this thesis also indicate that the lack of privacy on the Internet needs to be dealt with in order to support the intervention process and to facilitate independent performance and participation in SIBAs, which is supported by previous studies (Leist, 2013; Nef et al., 2013). The strategy in this intervention was to provide education and written information to support the seniors manage online security and privacy settings during the intervention. It is indicated that some of the seniors became independent in their use of SIBAs and gained increased confidence in how to manage security and privacy issues (study IV), which is another essential part in reaching digital competence (Digitaliseringskommissionen, 2015).

Benefits from participating in Internet-based activities and the social Internet-based intervention

Participation in IBAs and SIBAs can be beneficial for seniors. This thesis adds knowledge of the positive consequences for seniors and how such participation might positively influence healthy ageing.

In study I, it was indicated that the seniors could experience different levels of participation in society related to their use of IBAs. The results from study III indicated that loneliness could be reduced and satisfaction with social contacts on the Internet could potentially be increased. Also, in studies II and IV the seniors reported increased self-reliance and abilities to try SIBAs after participating in the OT SIBA intervention. To gain trust in one's capabilities might strengthen the seniors to feel that they can manage and have control over their lives (Savikko et al., 2010), and such trust can be achieved through social interactions and by participating in activities together with others. Increased self-reliance might also contribute to active participation in different groups and society and help maintain independence in daily activities (Siebert, Mutran, & Reitzes, 1999). Therefore, reduced loneliness, poten-

tially increased satisfaction with social contacts on internet, and increased self-reliance and abilities to use SIBAs are beneficial aspects of this OT SIBA intervention. It is also previously indicated that interventions to reduce loneliness can be more beneficial for the seniors if the interventions are tailored to each seniors' individual needs (Fokkema & Knipscheer, 2007), as this evaluated OT SIBA intervention.

Moreover, it was indicated that the OT SIBA intervention supported participation in new social settings and experiences of increased participation (studies II and IV) and to a wider perspective of the world (study IV). Furthermore, the OT SIBA intervention gave the seniors the opportunity to meet potential friends, which likely increased the probability of finding satisfactory social contacts (Nef et al., 2013; Savikko et al., 2010) and support the seniors in maintaining or developing social activities, roles, and contacts (Atchley, 1997). The seniors also expressed how their competence in using both SIBAs and IBAs in general could become useful in the future when physical capacities or other external factors might inhibit their possibilities to participate in society (studies I and II).

Influences on seniors' healthy ageing

The seniors who volunteered to participate in the intervention in study III had experienced changes in social contacts, activities, and participation. The reasons for such changes were identified in study IV and included their transition into retirement, the loss of close confidant, or other transitions in social activities and roles. The intervention might make it possible to enhance social activities and social contact (study III), and these can be essential elements that can influence individuals' health (The National Board of Health and Welfare, 2015b). It is indicated that interventions to reduce loneliness should be introduced early before loneliness and other negative consequences for health become prominent (Schoenmakers et al., 2014). Study III gave very preliminary indications that the effects of the intervention can be sustained over time, positive results in relation to health promotive actions, and this deserves further explorations in future studies.

The use of the OT SIBA intervention might also be useful to meet seniors' needs of increased participation in a changing, digitalized society (studies I, II, and IV) and thereby increase the seniors' digital competence (Digitaliseringskommissionen, 2015). In addition, the individuals' responsibility to be an actor in society can be supported by opportunities to participate in online activities and the possibility to contribute with material online (Kaplan & Haenlein, 2010).

Thus, supporting seniors in their active participation might be one way to overcome the digital divide (Digitaliseringskommissionen, 2015) and possibly influence health in a positive direction (Kielhofner, 2008; Law, 2002).

Future development of the intervention and implications for practice

The increased digitalization of society, including the development of E-health interventions and tools, places new demands on OTs to manage the demands from the digitalized society and when working with elderly generations. Nowadays development of E-health foremost consists of tools to help health-care personnel interact with their clients and to develop secure and user-friendly solutions (Bäckström, 2015). This could be further developed to also include client-centered and goal-directed interventions that are based on use of the Internet in everyday life in a similar manner to the OT SIBA intervention presented here.

Developing professional competence to support social contacts, activities and participation among seniors

OTs have the possibility to support opportunities for participation in meaningful activities of the individual's choice and thereby prevent injustices in society (Townsend & Polatajko, 2013). As indicated in the introduction about occupational justice, the OTs need to identify the aspects that contribute to injustices and from that work for change. The explorative studies presented in this thesis have contributed with knowledge of a target group, among seniors with limited participation and/or with social vulnerability that can benefit from this OT SIBA intervention (study III). Multiple aspects need to be addressed and handled in the intervention process (study II, IV), which has shown promising results (III). Therefore, the OTs' skills in adapting and making changes in meaningful daily activities (Townsend & Polatajko, 2013) are valuable in this intervention process. That this SIBA intervention is beneficial for seniors' social activities and contacts, also indicates that OTs have the opportunity to introduce the use of SIBAs or IBAs at the time of retirement (or even earlier). Supporting seniors' ability and competence to manage social transitions and to identify opportunities to maintain or increase social contacts and activities. Thus the seniors can be empowered to manage social activities (Savikko et al., 2010) and experience healthy ageing (The National Board of Health and Welfare, 2015a).

The OTs also need to keep up with changes in society, both to provide clients (including seniors) with beneficial interventions but also to strengthen their professional skills and knowledge. Many professions will need to change

their ways of working to keep up with societal changes and to remain as an indispensable profession (Digitaliseringskommissionen, 2015). To handle the development of E-health tools in practice, the professional technical competence might have to be supported and/or enhanced (Bäckström, 2015).

Improving OTs' professional understanding of online activities might help them to offer up to date interventions, and also, to focus on client-centered and individually adapted interventions (Fisher, 2009). From studies I, II, and IV, it is indicated that the use of IBAs and SIBAs requires several different skills on the part of the senior (like social interaction and computer skills) and the ability to perform tasks (e.g., paying things online or replying to a friend request) and to participate in meaningful activities (e.g., to plan a group dinner by using an online video-call). These are all actions that need to be identified, analyzed, and individually adapted in the intervention process so as to individually tailor the OT intervention.

Participation in activities always take place in an environmental context (Kielhofner, 2008), and barriers, demands, and opportunities in the context (i.e., the online environment) should also be identified. IBAs and SIBAs differ from each other in characteristic and they are both linked to a greater system of websites (Hanna, Rohm, & Crittenden, 2011). A description of available SIBAs is possible, but challenging to obtain, because social media undergo rapid development (Kaplan & Haenlein, 2010). I suggest that OTs should become familiar with online activities by exploring, practicing, and describing these and by finding formats and opportunities to do this. For this purpose, professional collaborative forums might have to be created.

Furthermore, to improve the OTs' abilities to support the use of SIBAs, it could also be beneficial to more deeply describe the seniors' different levels of participation in social activities – by inspiration from (Levasseur et al., 2010). Social participation includes social skills, interactions, preparations for social activities, and social support (Kielhofner, 2008; Levasseur et al., 2010), and it would be beneficial to understand how these are influenced by the online environment and especially for seniors.

Contribution to health-promoting actions for seniors

The Swedish health care system seeks to promote health by targeting alcohol use, smoking, drug abuse, overweight, and lack of physical activity (The National Board of Health and Welfare, 2015a), and less often are increased psychiatric and social initiatives targeted. To support seniors' use of IBAs and SIBAs and to promote healthy ageing, it is indicated that the OTs could

be actors for beneficial initiatives for seniors, like increased social participation. The OTs could also identify potential partners to cooperate with in order to realize the change (Townsend & Polatajko, 2013). Therefore, cooperation between several actors in health care and society, both nationally and in local contexts (PHA, 2007), might be one solution to the lack of social initiatives for seniors and limited use of interventions to promote healthy ageing. The results of this thesis suggest that this OT SIBA intervention might be one way to improve social activities, social contacts, and social participation and thus potentially ease the demands of health care in managing the demographic shift in society towards an ageing population.

To realize new OT practices, it is important to expand and challenge traditions and to begin working in less traditional settings (Moll et al., 2013). Daily activities that are directed in OT practice are often of more traditional character, including activities of daily living, work, self-care, and play (Kielhofner, 2008), and IBAs are rarely considered or used (Verdonck & Ryan, 2008). To highlight nontraditional but meaningful activities for seniors, the categorization and naming might have to be broadened. For example, it might be important to highlight the individual's experiences of the activity and to shift the focus more directly onto the meaning of the activities for the individual (Hammel Whalley, 2009), for example, engaging occupations, basic occupations, social occupation, and time-killing occupations (Jonsson, 2008). Despite the societal expectation of the purpose for participating in a certain activity, the intended meaning of participating in the activity can only be known by asking the individual (Hammel Whalley, 2009; Jonsson, 2008).

To implement the intervention in a practical setting

In this thesis, the OT SIBA intervention is focusing on health promotion. It is implied that health promotion should become a natural part of ordinary treatments and care (The National Board of Health and Welfare, 2015a). The MRC model (2008) describes implementation as one phase in the development of an intervention. To be able to advance to that phase, the intervention should be further evaluated in a larger RCT. There is also a need to provide economic solutions that can turn beneficial interventions into prolonged and established approaches in clinical practice (PHA, 2009). When implementing an intervention, organizational barriers (in example, lack of resources or professional competence) in the real-life context can be encountered and these can make it challenging to isolate the effects of the intervention (Glasgow, Lichtenstein, & Marcus, 2003). Including participant's ideas and needs in the development of an intervention will strengthen the practical application of the intervention in real-life contexts (Kielhofner et al., 2004).

Another important aspect when implementing interventions is to consider how the results of interventions can be made accessible to decision-makers (MRC, 2008). One way to show the benefits with an intervention can be to add a cost-effectiveness analysis in the intervention studies (Zingmark, 2015). Such evaluations are rare within OT practice, but they have been initiated, for example, by Clark et al. (2012) and Zingmark (2015) with positive indications that activity-based and activity-focused OT interventions can be cost effective. The adoption of E-health solutions is also hampered due to limited evidence for the cost-effectiveness of such solutions, and the European Commission (2012) has called for more evidence of cost-effectiveness in the years 2012–2020. Evaluating the cost-effectiveness of the OT SIBA intervention was not within the scope of this thesis, but it is an important topic to address in future studies after further evaluation of the intervention.

Methodological considerations

This thesis combined qualitative and quantitative methods, and this combination is beneficial to highlight different aspects of the subject that was being explored (Strauss & Corbin, 1990). Hammel Whalley (2001), also states that qualitative studies are needed to strengthen the results when OT interventions are evaluated.

Selection of participants in studies I–IV

In studies I–IV, the participants were recruited by advertisements in the community. Therefore, the seniors that were included might have been more motivated to create a change in their life compared with the general population. The non-users of the Internet were a minority in these studies, and they were not included in the intervention studies (studies II and III) because the intervention was limited in time and the participants should be able to advance to using SIBAs directly without first having to learn how to use computers and the Internet in general. The majority were also women, and it would be highly interesting to evaluate this intervention with a larger number of male participants to be able to make comparisons between sexes and to generalize the results to a broader population. It is indicated, however, that a larger proportion of men above 65 years of age are already using the Internet compared to women of the same age (Findahl, 2014a). Also, women is indicated to be more vulnerable to loneliness than men (Dahlberg et al., 2015), and might for these reasons consider participation in the OT SIBA intervention to be meaningful.

The qualitative interview studies, study I and IV

In qualitative studies, it is important to recognize the different aspects of trustworthiness (Krefting, 1991). The qualitative data emanates from the informants' experiences and are obtained in interaction with the researcher, therefore, other criteria than in quantitative research should be used. In order to strengthen the results I have considered the dependability, credibility, confirmability and transferability (Lincoln, 1995; Lincoln & Guba, 1985). The qualitative interview study design used in studies I and IV made it possible to capture the seniors' experiences of meaningful IBAs and the similarities and differences in the meaning they associated with the intervention process. However, in study IV the design limits the understanding of the evolving process over time, and to capture that repeated interviews during the intervention process could have been beneficial. Such a design would probably have interfered with the objective ratings performed in study III and was therefore not applied.

In studies I and IV the dependability was supported by the use of an interview guide that framed the open-ended questions that were used. If any changes were made during or after the interviews, they were noted in the interview guide. The questions were created in discussion with the research group. The methods in the studies (I, II, IV) are described in detail to assure that the study can be replicated in terms of both design and method. The credibility was assured by discussions and collaboration between the authors in the analysis process and by the use of peer-review. The generated categories were constantly compared with the collected data to ensure that the categories were well grounded in the data. Quotations have also been used in the results to exemplify the seniors' wordings and thereby strengthen the credibility.

In qualitative research, knowledge about the subject can be important because the personal and professional experiences and knowledge of the existing literature can provide the researcher with a sensitivity for the data (Strauss & Corbin, 1990). In relation to this, I had experiences from working with seniors and from studying the literature on the subject, and this supported my ability to understand and interpret the meaning in the collected data in collaboration with the research group. In performing qualitative research, it is important to identify and be aware of one's pre-understanding and to try to be open to the data that are collected without over-interpreting them. Therefore, in order to support confirmability of the studies, the results have been peer-reviewed and my pre-understanding in combination with that of the co-authors who have been involved and collaborated in the process have been acknowledged.

When considering the transferability of the studies, the results from study I can be transferred to other seniors who are active and without prominent health declines and who are living in an urban area with access to activities nearby. The seniors in study I were both users and non-users of IBAs, but none expressed complete resistance towards the use of IBAs and they were all at least familiar with or had heard of such activities. The seniors in study IV were actively trying to change their present state due to social decline and the digitalization in society. Therefore, the results can be transferred to foremost active and motivated seniors, but also gives indications of the need to provide individually targeted support to the seniors that did not benefit from the OT SIBA intervention.

Study II used a qualitative, descriptive, multiple case study design. The dependability was supported by adhering to the description of the OT SIBA intervention program in the implementation of the study. I was involved as an occupational therapist in the intervention process in study II, and this might have hampered the objectivity of the outcomes of the study. However, the involvement of the researcher can also be beneficial for understanding all of the aspects that might influence the intervention (Yin, 2009). To strengthen the confirmability in the results, an objective rater was included in the final evaluations. The co-authors also took part in the analysis process to strengthen the credibility of the results of the pattern matching. Also, the use of multiple methods for data collection and the use of five different cases strengthened the results. The knowledge from this study can be used in similar interventions that target seniors who are already users of IBAs. The transferability of the aspects that have been identified from this explorative case study should be validated in other studies to develop evidence, for example, for the use of client-centered and individually adapted interventions and to support seniors to manage their appearance and lack of privacy online.

The quantitative evaluation of the intervention, study III

For this quantitative study, the internal validity, construct validity, and external validity need to be considered (Domholdt, 2005).

Design

In the MRC model (2008), it is stated that the main evaluation of the effects of a study should not be conducted before proper pilot testing of the intervention has been done or before effect sizes and a suitable study group have been established. Study III is exploratory and could be the foundation for larger studies, with randomized and controlled study designs (Nelson &

Mathiowetz, 2004) and appropriate sample size calculations (Devane, Begley, & Clarke, 2004). The CONSORT statement for non-pharmacological trials (CONSORT, 2010) was used in study III, as suggested in the literature (Persch & Page, 2013). Moreover, the groups were randomly assigned, which strengthens the statistical results and the internal validity of the study. The use of randomization ensure that potential differences in the sample are evenly distributed between groups (Domholdt, 2005). A limitation to the design is the use of a crossover design without a washout period and the lack of a follow-up period for Group 2: C/I, which is a threat to construct validity. The educational feature of the intervention means there is no possibility to washout the effects of the intervention between the intervention and control period. It also limits the statistical comparisons that can be made on a group level, and thus the design in study III primarily supports within-subject comparisons. The participants did not receive any other intervention within the frame of the study, and this supports the construct validity.

The occupational therapy social Internet-based intervention

The frame and content of the OT SIBA intervention program was described in study III to support generalizability. The OTs' compliance with the implementation of the intervention program was not evaluated in this study. Assessing the quality of the OT SIBA intervention could have strengthened the internal validity even further. Through the initial education course, the OTs received knowledge on how to implement the intervention and were given support from the research group if needed during the intervention. This might have enhanced the OTs' compliance with the implementation of the intervention program.

A benefit of the OT SIBA intervention is that the technology used in the intervention is available for everyone with a proper Internet connection and computer, and this leads to reduced costs and a lower risk that the technology will be out of date before the intervention has ended, which is one risk when working with technology-based tools (Blaschke, Freddolino, & Mullen, 2009). Ways to support the potential lack of security and privacy when handling sensitive personal information online could benefit from further research.

Participants

This exploratory RCT with a crossover design is based on a small sample, which limits the generalizability of the study and means that the conclusions have to be taken with caution. The enrolment of the participants to the study was based on self-reporting, and the use of self-reporting might risk that

seniors who do not really meet the inclusion criteria are included (Fokkema & Knipscheer, 2007). The percentage of dropouts was low in study III, and likely did not influence the results. In terms of external validity, this study reached seniors who were willing to change their present state of loneliness and reduced social contacts and/or social activities. Due to the use of SIBAs in the intervention and individual meetings in the participants' homes, seniors who could not use the Internet or who lived too far away from the urban environment have not been reached. This study is related to an area of research where technology advances rapidly, and the results of this study need to be interpreted from the society of today in which some seniors are experiencing a digital divide and are facing barriers to maintaining social activities, social contacts, and participation.

Outcomes

The measurement tools that were used in study III were initially explored in study II. Based on that, and the relevance of the measures for the intervention outcome, the most suitable measurements were chosen. The UCLA Loneliness Scale and ESI measurement have previously shown good validity and reliability when used with seniors, and the UCLA Loneliness Scale has been used in exploratory studies in relation to SIBA use (Cotten et al., 2013; Tsai & Tsai, 2011). It is indicated that the measurement tool Social Network Online & Offline (especially the VAS) evaluate important aspects of the OT SIBA intervention, although further validation of the measurement is needed.

The results of the outcome are strengthened by the use of a rater who was single-blinded to group allocation (Page & Persch, 2013) for the measurement periods T1, T2, and T3. During the measurement periods, the participants were instructed to not reveal their group allocation to the rater. In addition, the OTs prepared the participants' computer settings prior to the rating so that no information would reveal that they had received the OT SIBA intervention. An independent statistician was included in the statistical analysis, and none of the authors had any interaction with the participants during the intervention periods, which provided blinding of the principal investigator (Page & Persch, 2013), and strengthen the internal validity. The outcomes and might be biased by confounders that we have not yet identified. For example, in a social intervention like the SIBA intervention the social contact from the intervening OTs might influence the outcome of the study. To separate the emotions experienced outside the Internet from those experienced online is difficult and might need to be dealt with in future studies (Fokkema & Knipscheer, 2007).

FUTURE RESEARCH

- To address the identified components to start using Internet-based activities (IBAs) and to identify the meaningfulness, future studies could attempt to evaluate the effects of a supportive environment for the seniors and for their independent usage of IBAs and satisfactory participation in meaningful activities.
- Future research should continue the development and evaluation of the described social internet-based activity (SIBA) intervention for other groups of seniors with high levels of loneliness and who are novices but interested in using the Internet. These groups of seniors have not been reached in these studies.
- Future research should explore whether conflicting aspects in the intervention process can be reduced by enhancing the individuals' possibilities to choose the time needed for goal achievement as well as by limiting technical barriers by providing adequate technical support.
- The relationship between SIBAs and satisfactory social contacts (on internet and outside) and participation should be further evaluated, and also to explore the social skills that are required for the interactions that take place in SIBAs.
- Further development of measurement tools that can efficiently measure social-and health related changes among seniors when participating in IBAs and SIBAs is suggested.
- It would be highly interesting to perform a study with a long-term follow-up to explore and evaluate if seniors who start to use SIBAs through this occupational therapy intervention can be supported in healthy ageing more so than a group of non-adopters.
- It is suggested that the use of this occupational therapy SIBA intervention has the potential to be implemented in practice. A large scale RCT is needed to evaluate the effects of the intervention, as well as exploring if the use of the intervention is cost-effective, would be of great interest.

CONCLUSIONS

- Seniors' uses of internet-based activities (IBAs) are influenced by a multitude of aspects, including social support, encouragement, and access to technology, knowledge, and experiences. These aspects will support the use of IBAs in combination with a motivational force. The seniors must identify the meaningfulness for the IBAs in their daily life in order to achieve satisfactory performance of IBAs.
- The social Internet-based activities (SIBA) intervention program, led by an occupational therapist, can support seniors in managing the introduction to different SIBAs, their appearance on the Internet, and the lack of privacy online.
- The effects after participation in the intervention indicate that loneliness can be reduced and that satisfaction with online social contacts have the potential to be improved.
- The seniors' experiences of the intervention process indicate that increased self-reliance, abilities and habitual use of SIBAs can be achieved along with enriched social contacts and participation in social activities both on the Internet and outside the Internet.
- To achieve experiences of a satisfactory intervention process, a client-centered, individually adapted and goal-directed approach should be applied. In addition, to facilitate online activities that seniors consider meaningful, their motivation for participation should be targeted.
- This thesis provides early evidence for a potential intervention that can be further evaluated and implemented in occupational therapy practice. The benefits of the online activities (reduced loneliness, increased social activities, potentially increased satisfaction with social contacts online, and increased participation in society) should be embraced by a collaboration of actors to promote healthy ageing among seniors.

In the work to reduce the digital divide, increase seniors' digital competence, and include seniors in society, the described intervention should be further explored and further evaluated.

ACKNOWLEDGEMENTS

I would like to acknowledge everyone who has contributed to the completion of this thesis and supported me during the process.

First of all, I would like to show gratitude to all *the seniors* who have participated in the studies and contributed with their engagement, time, ideas, and experiences. Without you, this research would not have been possible.

I also would like to thank the *Department of Occupational Therapy at Umeå University* for providing me with the opportunity and support to achieve my PhD degree. Thank you!

My main supervisor Ingeborg Nilsson. You inspired me to start this journey, and you have supported me along the way. Your support has always been honest and you have cared for me in the process and contributed with a lot of joy! Also, your competence is striking and certainly “outside the box”. You skillfully supported me to become a researcher. I am grateful that we have shared this long period of time together!

My supervisor Maria Larsson-Lund. In our joint process, I have learned to admire your academic expertise, and you have supported me to improve my writing and analytical skills. I also would like to thank you for all the time you have devoted to reading my manuscripts and for inviting me as a colleague and friend to the department at LTU!

Anne Fisher. When I was an undergraduate Occupational Therapy student, you introduced me to the world of science. You have in many ways been my inspiration because of your devotion to the art of science and your contribution to Occupational Therapy research development.

Birgitta Bernspång. For supporting and encouraging me as a PhD student, by welcoming me to the department, and by giving me the opportunity to finalize this thesis from a distance.

Mojgan Padyab. For the great support as a co-author in study III. Your skills in statistics have been very valuable. Thank you for your time and engagement!

Maria Asplund. For your great support as a project assistant, and for being a good friend. Your enthusiasm for this research is highly valued. Also, to the

intervening Occupational Therapists in study III, your engagement is valued! Thank you!

Britta Löfgren. I would like to thank you for encouraging me to continue my studies after the graduation from the Occupational Therapy program and for providing me with great amounts of knowledge in my first year as a PhD student.

The PhD students at the Department of Occupational Therapy, Maria Sperens and Caroline Fischl, and the PhD students at the Department of Physiotherapy. I am grateful for all the support and discussions that we have had! Thank you.

The previous PhD students, Marine Sturesson, Magnus Zingmark, and Brigitte Gantschnig, for your support and enjoyable discussions. I wish you all the best as future researchers! A special thanks to Eva Tengman and Marlene Sandlund for support and encouragements.

To all my other colleagues from the Occupational Therapy and Physiotherapy programs, and the staff at the Department of Community Medicine and Rehabilitation in Umeå, a special thanks to Christina Lindberg, and Larry Fredriksson for practical support.

To all my colleagues at the Department of Occupational Therapy at LTU, for inviting me into your everyday working environment. To the friends and colleagues Ann-Charlotte Kassberg and Maria Ranner for being supportive during my later years as a PhD student, and Alexandra Olofsson for encouragements and practical support!

To all of my family and friends, who bring joy to my life! My friends have supported me along the way with encouragement and supportive pep talks. A special thanks to Linda and her family for giving me a place to stay in Umeå, and for a valued friendship. To my friends Anna and Maria for our family get-togethers, I value our time together highly. Thank you! To my parents and brothers and their families, for the get-togethers and fun in everyday life. Then, to the greatest, my closest family, my husband Andreas and our kids! This thesis would not have been possible without your love, humor, and maintenance of our shared, everyday life. Especially in the last months of my studies! I am so proud and grateful that you are my family!

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