

# Developing the ‘mStick’ concept: experiences and impacts

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**Purpose** The small-scale pilot study focuses on the memory and reminiscence stick (*mStick*) concept. It is a biographical memory store; personal documents, like family photographs, texts, audio and video clips, as well as materials linked to the owner’s hobbies and interests, are stored on a USB stick. The stick is a concept with a background philosophy focusing on reminiscence; the essence is not the technology itself, and future platforms may well be different. The stick concept provides meaningful entertainment to independent elderly people and those living in residential care or long-term care and suffering from memory and communication problems. Narrative gerontology and reminiscence studies over the years have shown that memories and personal life stories are important resources in the later life. **Method** Nine pilots were launched in Lahti Region, Finland in 2010 and 2011 to examine user experiences. The pilots have been investigated throughout their implementation to assess impacts and usability of the sticks. Qualitative data were collected in 2010-2011 by means of interviews (33 end-users, 29 workers/students), learning diaries, photographs, memos, and participatory observation diaries (about 200 pages and over 200 photos) in the process of co-creation of the innovative concept. In this study, experiences gained during the development of the mStick are analyzed with the help of ‘Gerontechnology’s Five Ways’: prevention, enhancement, compensation, care, and research. **Results & Discussion** According to the results, the mStick prevents the world from becoming narrower, which easily follows, as health and functional abilities deteriorate. Reminiscence work enables people who are confined to bed to be connected to other places and times. The stick concept creates ‘generational intelligence’, an ability to put oneself in the position of age-others by increasing intergenerational interaction and transmitting family history to younger generations. It also acts as an assistive device for care workers who organize reminiscence sessions and alike. It helps to see patients as whole human beings and facilitates communication between them and care personnel – thus potentially renewing the care culture. The contribution of this study is to bring forth experiences of ‘hybrid care’, a combination of services and products. The results are encouraging, as they show that the mStick causes positive impacts at many levels. There seems to be potential for cultural change in care practices, highlighting the need for a biographical approach in care work.

**Keywords:** *health & self-esteem, memory support, gerontechnology, quality of life*

## INTRODUCTION

Technological solutions designed for the elderly too often replace human work and human contacts. The stick technology, presented here, rather increases human interaction, empowers senior citizens and enriches the quality of care work.

The mStick that has been developed in a Finnish research and development project is a biographical memory store. Personal documents - like family photographs, texts, audio and video clips, as well as materials linked to the owner’s hobbies and interests - are stored on an ordinary USB stick. The stick can also contain non-personal material related, e.g., to local history. The stick provides meaningful entertainment to active elderly people living independently as well as to those living in residential care or long-

term care and suffering e.g. from memory and communication problems<sup>1,2</sup>.

The philosophy behind the mStick concept is that a human being is a biographical creature, whose memory never disappears completely – let alone memories. Narrative gerontology and reminiscence studies have shown that memories and personal life stories are important resources in the later life. The mStick represents simple, user-driven, personalised technology that empowers rather than labels; it implies proactive and tailor-made rather than reactive and standardised solutions; and its focus is on quality of life rather than on health alone.

Material requirements in the stick system are modest. Novel technological inventions are not needed.

Ordinary USB sticks and similar gadgets function as devices for information storage. The development work is not locked into single technical solutions or methods of use; rather, 'pluralism of artefacts'<sup>3</sup> and various usages are implemented. The emphasis is not on physical artefacts as such, but on know-how and 'gerontological imagination' related to them<sup>1</sup>.

The message of gerontechnology is that ageing people should be actively involved in shaping the technology that affects their lives<sup>4</sup>. Active participation of the end-user characterizes the stick construction, because designing this type of "biographical technology" is actually impossible without the knowledge that the end-user (or sometimes her/his relatives) brings forth.

#### **REMINISCENCE AND THE BIOGRAPHICAL APPROACH**

The philosophy behind the mStick is based on the ideas of life review and reminiscence research<sup>5,6</sup> and on narrative gerontology<sup>7,8</sup>. Age is seen as cumulative rather than cross-sectional. Memories and personal life stories are seen as important resources in later life: they help to achieve ego-integrity and a sense of coherence, a sense that one's own life has a meaning and significance which, in turn, helps with acceptance of finitude<sup>9-11</sup>.

According to a heuristic model of reminiscence, people have a capacity, perhaps even a need to retrieve, articulate and disseminate self-narratives<sup>12,8</sup>. Memories can be seen as building blocks of these narratives<sup>13</sup>. Triggers like photographs, sounds or smells are sometimes needed to initiate the reminiscence process.

Reminiscence may have a powerful influence on identity maintenance of older people. It has been used with different goals, including the stimulation of cognitive functioning in older people with dementia and improving life satisfaction, quality of life and meaning of life among elderly.<sup>14</sup>

Frail older people can offer up a past, preferred identity that has significance and richness, in contrast to their current identity which may be weak and fragile due to the loss of functional capacities. Activities encouraging meaningful linkage of the past with the present are essential in order to provide a sense of continuity to an older person's life course<sup>15</sup>.

Studies have shown that sharing past and present lives through talk is a central aspect of building relationships between residents and care staff in residential care. Reminiscence is important for care receivers but also for care givers. It can lead to greater satisfaction with work, including more positive attitudes towards the clients.<sup>16</sup> In addition, it may

offer intergenerational benefits. Through transmitting family narratives to children and grandchildren, an older person can again demonstrate the significance of past events and memories<sup>15</sup>.

Three types of reminiscence interventions have been distinguished in the literature: simple reminiscence, life review and life review therapy<sup>17,12</sup>. Simple reminiscence, for example conversations about autobiographical memories or the use of personal recollections, has social functions; it stimulates social reminiscence and bonding and promotes positive feelings<sup>18</sup>. Life review is more structured focusing on the integration of both positive and negative life events and helping, e.g., people with a mild psychological distress to restore a positive self-identity. Life review therapy is an intervention applied in a psychotherapeutic setting.

The mStick concept is mainly based on simple reminiscence with life review implications. However, the principal focus of the mStick is on its social implications: interaction and communication in different environments; between care receivers and caregivers, between customers and public authorities, and between people of different generations.

#### **FIVE WAYS OF GERONTECHNOLOGY**

Known as Gerontechnology's Five Ways, gerontechnology offers five key approaches to assist elderly people in continuing to lead healthy, active lives: prevention, enhancement, compensation, care support and research<sup>4,19,20</sup>.

Prevention refers primarily to the use of technology in early detection and prevention of illnesses, and in support of healthy life styles. Prevention includes monitoring of an older person's health and well-being, and preventing problems from occurring through interventions such as those that improve nutrition, increase physical strength, and encourage healthy habits.

Enhancement alongside with satisfaction refers to technology that increases the potential for self-expression and education. Methods and devices are developed in order to reach a wider benefit from ageing people's strengths at work, in leisure time, in learning and social interaction.

Compensation refers to methods, devices and products which compensate for age-related functional decline. This is the most developed approach so far; it applies technology to compensate for declining physical, perceptual and cognitive faculties through the use of assistive devices.

Care support aims to enhance the work of caregivers by means of developing products that facilitate the care of elderly people, e.g., ergonomically-designed equipment.

The fifth way of gerontechnology helps ageing people indirectly by supporting scientific and clinical research. Sometimes only the first four ways are listed, and research is not included as an approach<sup>4,20</sup>.

Through these five ways, technology can be used to prevent problems, enhance experiences, compensate for declining capabilities, assist caregivers and conduct research to improve the lives of elders. The mStick functions in all of these five roles.

### RESEARCH DESIGN AND METHOD

The data for the study were collected in a research and development project called 'Sticks – innovative approaches to ageing people's health promotion and memory support'. In the joint project of University of Helsinki and Lappeenranta University of Technology, two concepts – the health stick (hStick) and the memory and reminiscence stick (mStick) – are being developed with a user-centred approach in multi-actor innovation processes and networks. The mStick – which is the topic of this study – is a concept with a background philosophy focusing on reminiscence, as described earlier. The essence is not the technology itself, and future platforms may well be different from USB sticks. The concept is being co-created with end-users, care workers, teachers and students of health care.

The mStick has been piloted in Lahti Region, Finland. Nine pilots in public and third sector organizations operating in the field of elderly care or citizen activity were launched in 2010 and 2011 to examine user experiences. With researchers and developers' support, the pilot groups produced various kinds of mSticks with the aim of responding to the specific needs of the stick owners. The pilots have been investigated throughout their implementation to assess impacts and usability of the sticks. The research has been conducted with an explorative approach: the question is about the process of co-creation of the innovative concept and collective knowledge creation from different perspectives.

Qualitative data were collected in 2010-2011 by means of interviews (33 end-users, 29 students/workers in elderly care, both from management and employee positions), learning diaries, photographs, memos, and participatory observation diaries (about 200 pages and over 200 photos) in the process of co-creation of the innovative concept. The data were analyzed according to the principles of

qualitative content analysis. Contents of the interviews and other data were categorized and classified according to the 'Gerontechnology's Five Ways': prevention, enhancement, compensation, care, and research.

### RESULTS

As concrete results of the piloting phase a rich spectrum of different mSticks were created, mirroring their creators, the pilot organizations and their customers. In addition to the contents of the sticks, which are naturally unique in each case, there were differences concerning, e.g., the target group, the technical platform, the structure and the actor network around the sticks. Table 1 summarizes the contents, outputs and participants of the nine pilot cases.

Pilot no.	Aim/contents of the pilot case	Form/output of the pilot case	Participants in the pilot case
1	A personal mStick as a medium of communication to tell about the cultural and educational background of immigrants	Digital life stories (Windows Media File) Diplomas (translated and scanned into a digital form)	Group of highly educated immigrants + the group leader
2	A personal mStick for independently living elderly people	Photographs, written stories in a digital form	Three independently living elderly persons, their group leader and assistant
3	A personal mStick for customers of senior homes	Photographs, oral stories in a digital form	Four elderly persons, students of social and healthcare and their teacher, a service consultant
4	A collective mStick for a senior activity centre with a special theme: from sheep to wool, from wool to sweater	Photographs, oral stories in a digital form as well as concrete, touchable material (wool)	Customers in a senior activity centre and group leaders
5	A collectively compiled structure for a personal mStick for	Central contents and a structure for an mStick which were	A group of men with early stages of dementia and their group

	people with early stages of dementia	visualized in the form of an interface	leaders
6	A collective mStick about the history and activities of a handicraft group of seniors	Photographs, video clips, audio clips in a digital form	A group of seniors and their group leader
7	A personal mStick for customers of a senior activity centre	Written life stories, photographs, audio clips, other personally important documents in a digital form	Four seniors and their group leaders
8	A personal mStick for customers of senior residential services and a collective activity stick	Digital life stories (Windows Media File), photographs with texts, oral and written stories, personal biographical information in a semi-structured form Digital photo frame	Four elderly persons (some of them with dementia), their near relatives, students of healthcare and their teachers, care personnel, a service manager
9	A personal mStick for patients with Parkinson's disease	Digital material in various forms	Patients with Parkinson's disease and their near relatives, a group leader

Table 1. The contents, outputs and participants of the mStick pilots.

The research results are reported in greater detail in the following, categorized according to gerontechnology's five ways.

### The mStick as prevention and engagement

According to the experiences gained in the pilots, the mStick causes positive effects on the quality of life by offering meaningful contents to life, increasing the feeling of coherence of life, facilitating social contacts and increasing appreciation, which all have a role in prevention of illnesses and social isolation.

The concrete experiences gained in the process of producing the materials for the mStick have shown that the mStick might help to prevent memory diseases. The simple process of selecting the photo-

graphs with an elderly person, to be stored on the stick may serve as a memory exercise in itself:

*"Yes, it became a true memory exercise, when we went through these photos and tried to remember what happened and when." (an elderly man who took part in the mStick pilot)*

For a person with memory problems watching the photographs of relatives caused anguish at first, because she didn't remember their names, but finally the effort was rewarded:

*"I noticed her anguish when she didn't remember who the man was in the picture [...] but after we had circulated the same photo series four times, I guess – she remembered – 'Hey, it is Pentti, wonderful, it's Pentti!'" (a student who made an mStick with a woman with memory problems)*

The process of making the mStick increased social contacts and human interaction. Some tentative observations were collected that indicate that this might contribute to delaying the progression of long-term illnesses, like the Parkinson's disease.

### The mStick as enhancement and satisfaction

Enhancement and satisfaction are related to the potential which the mStick has: as self-expression and in highlighting and utilizing the resources that elderly people possess.

According to the data, looking back to childhood memories has brought joy to life after widowing. Older people have experienced both the reminiscence and the preserving of memories as meaningful entertainment which has brought novel contents to life.

*"It has been fun to share memories with outsiders, as there have been some unusual incidents in my life." (an elderly man who took part in the mStick pilot)*

*"Also my children have noticed that now this grandpa has got some new power." (an elderly man who took part in the mStick pilot)*

From the life review perspective<sup>5</sup>, reminiscence may also function as part of a person's identity work, helping to build a feeling of coherence in life:

*"Writing the life story helps you find something that maybe indicates that the chosen direction has been a good choice and you can accept the decisions you have made." (a woman taking part in an mStick pilot)*

Memories are an important resource for an older person. 'Living in the past' should not be regarded as regression, but as a crucial part of human essence

as a biographical creature and as a way to build one's identity. Nostalgia can be a reflexive, not necessarily regressive sentiment<sup>21</sup>. Elderly people can perform meaningful 'identity work' or accomplish 'mature imagination'<sup>22</sup> by reflecting their biographies. Identity work is an everlasting task for a human being, according to modern identity theories<sup>23-24</sup>.

The stick functions in an important role in the empowerment of older people. Quite an enthusiasm has been prevailing in the development phase of the sticks, and this indicates that the sticks are one way of preventing older people from being left aside from the information society.

*"I have noticed that the fear towards technology has already turned to curiosity."* (a service consultant in senior residential services)

The mStick offers opportunities for lifelong learning. Preserving the life story and other biographical documents into a digital form and utilizing opportunities offered by information technology (IT) have evoked a new kind of interest to learn computer skills among the elderly. Third sector educational organizations have taken an interest in the matter, too. There are plans to organize 'Stick courses' for seniors. In these courses, the aim will be to build illustrated digital life stories and simultaneously to learn IT skills in a personally meaningful way.

A very essential function of the mStick is that it increases intergenerational interaction and transmits the family history. Young people are not always eager to listen to old people's stories, but through new technology they may well become interested in the lives and experiences of their older relatives. The stick can build a bridge between generations, as told by an over 80-year old lady, who recorded her greetings to her great-grandchildren:

*"So now this whole life of mine is there on one tape, and then at the end, I gave my regards to that fourth generation – of them, tomorrow, the fifth of the fourth generation turns one year old. So this is left for them, the bigger ones remember me all right, but these little ones will not remember me anymore, so they will see from photos what the great-grandmother was like and she even gave her regards to them – so that's a nice thought."* (a woman taking part in an mStick pilot)

The mStick creates 'generational intelligence'<sup>25</sup>, an ability to put oneself in the position of age-others. It offers a possibility to collect generational memories. The society is changing rapidly, and, e.g., stories concerning the everyday rural life a few decades ago

are regarded as very important.

*"The children of today have no idea about how the life was in that time."* (a man taking part in the mStick pilot)

### **The mStick as compensation and assistance**

The mStick compensates weakening abilities from the social perspective. The mStick prevents the world from becoming narrower, which easily follows, as health and functional abilities deteriorate. Reminiscence work enables people who are confined to bed to be connected to other places and times. Reminiscence through the mStick also enriches social interaction by building bridges between people. People living in care institutions can acquire a status of a recognized individual, not only that of a patient, in the eyes of care personnel and other patients.

*"This illness (dementia) makes you somehow more blank, and if at this stage the customer is 'faceless', there are many things that the nurse doesn't understand. But if the customer has a face and a past, he or she is a person and can be regarded in the right way."* (the responsible nurse of a dementia unit)

The mStick may function as an instrument to express oneself and tell about one's life and wishes, even if a person is not able to speak. Tools for this are being planned in a new pilot. The mStick also helps the communication of those who have memory problems, functioning as a memory support. A group of men suffering from early stages of dementia, together with their group leader, planned the contents of their mStick, with the aim of telling what things are important to them and what they wish when the disease progresses. They came up with the idea that the mStick might function as a kind of "mental testament" for people with incurable illnesses.

The mStick also offers an instrument to immigrants and other minorities, who have problems in getting heard in the society, for telling about their background and storing the official documents needed in the complex process of integration.

### **The mStick as care**

The mStick is an example of 'hybrid care', where the core of the supply is a combination of service and product<sup>2,25</sup>. Technology and the related services form an intertwined entity, where technology is an enabler of new opportunities for care services. The memory stick is 'just' a piece of technology, but it becomes part of a service act when it is loaded with biographical contents and utilized.

An important factor related to care support is that the

mStick does not replace but rather promotes and enriches human contacts and mutual communication. The role of the mStick is not replacement of human workforce in the care work, but rather enrichment of the work. The benefits are especially great if a person has communication problems which easily lead to misunderstanding.

*"This is great – here you can really see that this person likes that the hair rollers are put into her hair after the sauna or shower. When you concretely see it, you'll remember it better."*

(a nurse who was shown an mStick of an elderly woman)

The mStick enables care workers to see the patient as a holistic creature with a biography and a past. It facilitates communication between patients and the care personnel - if names of the relatives are saved on the photographs, for instance.

Televisions with USB ports are used as mStick platforms, if computers are not available or if they are felt to be aversive. A simple platform is a digital photo frame, which is rather cheap.

*"If you think that this resident does not remember the names of relatives or mother or sisters, for example, so if the names have been recorded here, the care worker can utilize them – see, here is this 'Elma'."* (a student who made sticks with elderly customers in residential services)

*"If she talks about her son Mikko who lives in Australia and is not keeping in touch... the care personnel does not have to wonder who is that son who comes up there all the time. He is not an illusion but he is real, her son Mikko."* (a student who made sticks with elderly customers in residential services)

Even though 'holistic care' is desirable, the way in which the healthcare professionals often talk reveals that the 'basic work' consists only of the medical and practical treatments. The students of healthcare and their teachers in the pilots emphasized that "stick tailoring" and the related biographical approach as part of studies and curricula would be an important step towards a change in job descriptions and the care culture. The use of the mStick is a step towards holistic care, where a person is seen as an entity, not just a patient with certain illnesses. There seems to be potential for a cultural change in care practices, highlighting the need for a biographical approach in care work, where getting to know the customer more deeply is not felt as extra work but as an internal part of basic care. The mSticks are concrete tools for applying this kind of a holistic approach. A biographical approach may also raise social appreciation of

elderly-care work.

One of the pilot organizations set the aim of making an mStick for every new resident:

*"In this way we get to know something very essential about the resident. The life history is very important. It is related to the autonomy of the person, which is an essential part of the care work."* (a service manager in third sector residential services)

The mStick can also act as a new kind of tool and service product for care workers organizing reminiscence sessions and other joint programmes, for instance in institutions for seniors. The sticks that are produced within one reminiscence group can be shared and used also in some other group, if appropriate. For instance, a group of seniors from an activity centre visited a sheep farm, and then participated in the whole process of producing a sweater from wool in the traditional way with several phases (dyeing, spinning, knitting...). Visits and conversations were videotaped. The video will be used in several senior activity centres as part of activity programmes and reminiscence sessions.

### The mStick as research

The mStick is being developed with a strong connection to research. The impacts of the mStick are examined at many levels; the findings presented here have just 'scratched the surface'. In the future, the mStick may, e.g., play a role in memory research. Its memory test and game applications can be based on personally relevant and meaningful material.

Table 2 summarizes examples of the impacts of the mStick according to Gerontechnology's five ways.

Way	Examples of the impacts of the mStick
Prevention	Cognitive impacts: memory exercise
Enhancement	Increases intergenerational interaction, transmits the family history
Compensation	Enables people who are confined to bed to be connected to other places and times
Care	Helps to see patients as whole human beings; facilitates communication between patients and the care personnel
Research	Memory exercises and tests

Table 2. Impacts of the mStick analyzed with the help of Gerontechnology's Five Ways.

### CONCLUSION AND DISCUSSION

The experiences gained in pilots in the development process of the mStick have been encouraging. Many of the elderly people were first little suspicious about new technology and this kind of a working method,

but in the end, most of them got the feeling that it was more than worthwhile to 'jump into the unknown', and they expressed their thankfulness in many ways. Also the care workers regarded the mStick as a useful tool in their work and were willing to develop it further in order to implement and adapt it as permanent practice in their organizations.

Maybe the most important and valuable function of the mStick is the role of memories in social contacts: building bridges between generations and facilitating the communication in care contexts.

Some suspicions and barriers have naturally come along, too. Even though people like to tell about their lives, they may be a bit shy to tell about themselves – a typical Finnish feature perhaps. Thus, to begin is often the most difficult thing, but after one finds the courage to reminisce and has a receptive listener, new paths are found all the time. The next challenge, then, is to find a structure for parsing your biographical data.

Also technology-related problems have been met. Even though the mStick is rather simple as technology, its idea may be difficult to understand for persons not familiar with computers, and it may be confused with the internet, for example. The mStick, however, is easier to understand as compared to the alternative that the personal information were stored in the "cloud".

The questions of when and how to make an mStick have to be pondered individually in different situations. For instance, for some persons, it may be inconvenient to do the reminiscence work when she or he is moving from home to a dementia unit, for instance, because the current life situation may be stressing and confusing. In this case, an option could be to use generalized reminiscence material instead of personal material. For some other persons, however, looking into the past may build integrative bridges in the phase of change.

The study showed that there is a need for a service which we like to call "stick tailoring". Tailoring the mStick takes time, especially with people suffering from memory diseases. Some active seniors may be able to collect and store the material to the stick themselves, either independently or in courses and groups, but in most cases, some extra help is needed. The role of near relatives may be crucial here. Tailoring of sticks is a job that requires - not only IT and information-related skills but also - a humanistic approach, gerontological knowledge and social skills. When producing an mStick, a stick tailor interviews the ageing person and/or her/his near relatives concerning the owner's interests, obtains family

photos and other materials for scanning, and produces the prototype of the mStick – the contents of which are always possible to develop further and expand. Good experiences have been gained of having social and healthcare students as stick tailors; in the pilots they have found the work very inspiring and useful.

Tailoring of mSticks is also a question about job descriptions in elderly-care, and a possible shift towards a care culture where getting familiar with the customer and the biographical approach is an integral part of the care work.

So far, the experiences mainly concern the development phase of the mStick, choosing the material, producing and storing it on the stick. The concept itself is still under development, and results concerning, for instance, the long-term use of the mStick are still forthcoming.

## References

1. Karisto, A., Melkas, H., Kempas, K., and Salminen, J., "Sticks – Innovative Devices and Concepts for Health Promotion and Memory Support," paper presented in AALIANCE Conference, Malaga, Spain, 11-12 March, 2010.
2. Pekkarinen, S., and Melkas, H. (forthcoming), "Novel e-service concepts for ageing people's health promotion and support: from potholes to innovation opportunities", Submitted to *Journal of Service Research*.
3. Bijker, W., *Of Bicycles, Bakelites and Bulbs: Toward a Theory of Sociotechnical Change*, 3<sup>rd</sup> edition. Cambridge: MIT Press, 1995.
4. Fozard, J.L., "Gerontechnology: Optimizing relationships between aging people and changing technology", in: Coulson, I.C., and Minichiello, V. (Eds.), *Contemporary issues in gerontology: Promoting positive ageing*. Sydney, Australia: Allen and Unwin, pp. 241-268, 2005.
5. Butler, R., "The life review: an interpretation of reminiscence in the aged". *Psychiatry*, Vol. 26, pp. 65-76, 1963.
6. Gibson, F., *Reminiscence and Life Story Work: A Practice Guide*, London: Jessica Kingsley Publishers, 2011.
7. Ruth J. and Kenyon G., "Biography in Adult Development", in: Birren, J., Kenyon, G., Ruth, J., Schroots, J., and Svendsson, R. (eds.), *Ageing and Biography: Explorations in Adult Development*. New York: Springer, 1996.
8. Kenyon, G., Clark, P., and Vries, B. de, *Narrative Gerontology: Theory, Research and Practice*, New York: Springer, 2001.
9. Erikson, E., *Childhood and Society*. New York: Norton, 1950.
10. Elford, H., Wilson, F., McKee, K.J., Chung, M.C., Bolton, G., and Goudie, F., "Psychosocial benefits of solitary reminiscence writing: An exploratory study",

*Aging and Mental Health*, Vol. 9(4), pp. 305-314, 2005.

*vice Science, Management, Engineering, and Technology*, Vol. 1(4), pp. 53-70, 2010.

11. Coleman, P., "Uses of reminiscence. Functions and benefits", *Aging & Mental Health*, Vol. 9(4), pp. 291-294, 2005.
12. Webster, J.D., Bohlmeijer, E., and Westerhof, G., "Mapping the future of reminiscence: A Conceptual Guide for Research and Practice", *Research on Aging* Vol. 32(4), pp. 527-564, 2010.
13. Bluck, S., "Autobiographical Memory: Exploring Its Functions in Everyday Life", *Memory* Vol. 11, pp. 113-123, 2003.
14. Bohlmeijer, E., Valenkamp, M., Westerhof, G., Smit, F. and Cuijpers, P., "Creative reminiscence as an early intervention for depression: Results of a pilot project", *Aging & Mental Health*, Vol. 9(4), pp. 302-304, 2005.
15. McKee, K., Downs, M., Gilhooly, M., Gilhooly, K., Tester, S., and Wilson, F., "Frailty, identity and the quality of later life", in: Walker, A. (Ed.), *Understanding Quality of Life in Old Age*. Maidenhead: Open University Press, pp. 117-129, 2005.
16. Gudex, C., Horsted, C., Jensen, A.M., Kjer, M., and Sørensen, J., "Consequences from use of reminiscence - a randomised intervention study in ten Danish nursing homes", *BMC Geriatrics*, Vol. 10(33), pp. 117-129, 2010.
17. Westerhof, G., Bohlmeijer, E., and Webster, J.D., "Reminiscence and mental health: a review of recent progress in theory, research and interventions." *Ageing & Society*, Vol. 30, pp. 697-721, 2010.
18. Cappeliez, P., O'Rourke, N., and Chaudhury, H., Functions of reminiscence and mental health in later life. *Aging and Mental Health*, Vol. 9(4), pp. 295-301, 2005.
19. Graafmans, J., and Taipale, V., "Gerontechnology. A sustainable investment in the future", Graafmans, J., Taipale, V., and Charness, N. (Eds.), *Gerontechnology. A sustainable investment in the future*. Amsterdam: IOS Press, pp. 3-6, 1998.
20. Dara-Abrams, B., *Toward a Model for Collaborative Gerontechnology: Connecting Elders and Their Caregivers*, 6<sup>th</sup> International Conference on Creating, Connecting and Collaborating through Computing, c5, pp.109-114, 2008.
21. Johannisson, K., *Nostalgia. En känslans historia*. Stockholm: Bonnier, 2001.
22. Biggs, S., *The mature imagination. Dynamics of identity in midlife and beyond*. Buckingham: Open University Press, 1999.
23. Giddens, A., *Modernity and Self-Identity: Self and Society in the Late Modern Age*, Stanford: Stanford University Press, 1991.
24. Beck, U., Giddens, A. and Lash, S., *Reflexive Modernization*, Cambridge: Polity Press, 1994.
25. Biggs, S. and Lowenstein, A., *Generational intelligence. A critical approach to age relations*, London: Routledge, 2011.
26. Pekkarinen, S. and Melkas, H., "Safety Alarm Systems and Related Services: From potholes to innovation opportunities," *International Journal of Ser-*