Join-In

Senior Citizens Overcoming Barriers by Joining Fun Activities

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1 Executive Summary

Many elderly people live alone and many of those suffer from social isolation. Social isolation is a major health challenge. Yet, elderly individuals affected are difficult to reach.

The Join-In Consortium developed a **comprehensive social networking platform for elderly citizens** to encourage and support communication and socialising in elderly. Connected to the integrative platform and its portal are

- ”**Memofix**”, a computer game aimed at the older generation to maintain and enhance cognitive abilities and facilitating socialising, which is responsive to different hardware platforms;
- a **biking exergame** that enables users to take part in multi- or single player online biking trips using a home stationary exercise bike;
- **exercises** including a framework to allow elderly people to perform virtual moderated exercises;
- **video conferencing** that allows bilateral or group conferences; it has been linked to the Memofix and provides the basis for activities which involve a moderator.

All of these support communication and were built to meet the requirements of a target group that often is little familiar with computers and internet, and who's physical limitations ask for special requirements concerning usability. The applications can be accessed via PC, or via TV and a set-top box, and some also by tablet. The social and gaming (social, cognitive and exergames) platform for the elderly is extensible and holds an infrastructure to extend and enhance the ecosystem, allowing game providers to register additional games.

As many seniors find the use of off-shelf controllers difficult, Join-In developed and prototyped **senior-friendly controllers**. Moreover, demonstrator versions of two more exergames are available, a **walking exergame**, which trains coordination and a game fostering age-specific exercises integrated in a realistic story called "**AntiqueHunt**".

The Join-In social portal and its applications were prototyped and tested by over 100 seniors (aged 70 - 94, many of them older than 80 years of age) in Hungary, Germany, Ireland and Norway. Join-In was received very well by computer-illiterate elderly persons. This group perceived the applications as useful. Join-In got the highest ratings from individuals who felt socially isolated and were longing for more contact. These are the users Join-In was designed for!

Though the involvement and training for this clientele is fairly time- and personnel intensive the benefits clearly outnumber the efforts.

The prototypes will be further used in elderly care, e.g. as part of an integrative social care system in Hungary. This could pave the way for a longitudinal study on the effectiveness of Join-In in elderly care.

More information on the processes and results from the project can be found at the Join-In blog[1], the portal[2] and in the project publications[3].

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[1] http://joininproject.wordpress.com

[2] http://www.join-in-for-all.eu

[3] http://www.helmholtz-muenchen.de/en/join-in/publications/index.html

2 About Join-In

2.1 Background

The United Nations (UN) estimate that by 2050 one out of every five people will be older than 60, and by 2150, one third of the people in the world are expected to be 60 years of age or older [1; 2]. The EU-25 countries will experience a demographic shift from 2000 when 15.7% of the population was over 64, to an estimated older population of 17.6% in 2010 and 20.7% in 2020 [3].

Also the number of the "very old", 85+ will rise continuously. Thus it is expected that, in the EU the number of 85+ will triple from 23.7m to 62.4m by 2060 [4]. This will have a major impact on public expenditure. The 2012 Aging Report [4] forecasts a rise of 4.1% of GDP of high-age related costs. Also the European labour market will be affected. The demand for nurses and nursing homes will grow. In Germany the demand is expected to more than double - from presently 845.000 places to around 1.95m [5].

Many of Europe's elderly citizens live by themselves. In Germany, for example, social analysts estimate that more than 40 percent of elderly people live alone [6], and even in Ireland a third of the people aged 65 years and over lived by themselves in 2009 [7]. Many of the people living by themselves suffer from loneliness and social isolation [8].

Loneliness and social isolation in the elderly are major problems. Activities offered by social services do often not reach those most in need. Reasons for this are: social deprivation, low self-esteem or physical inability. Studies show that people lacking social contacts are more susceptible to diseases, to infarction, stroke and the onset of Alzheimer's disease, and that they carry a higher health-risk than smoking 15 cigarettes/day [9, 10, 11]. At the same time it is true that loneliness leads to social isolation and to lack of exercising, which itself delays healing processes and speeds up aging.
For these reasons but also because elderly people want to remain in their own homes, solutions enabling them to do so, are needed. Social Networking is a means of using the internet to make connections with individuals who share the same interests. It has become very popular in the past years for setting up private (e.g. Facebook) and business connections (e.g. linkedIn). For a long time private networks have been a domain for young people. However, social networks are more and more opening up for the elder generation, too. Very elderly people (75-100) are so far hardly addressed. This group find the use of on-the-market social networks difficult. The 70+ generation did not grow up with computers. They do not know how to use a computer nor do they "think digitally". "Making friends on the internet" has no meaning to many of them. Join-In addresses particularly this target group and its needs in the design of the Join-In network and its components.

2.2 The project results

Join-In tackles a problem -social isolation- that clearly affects a large amount of the population. Social networks can help the elderly to socialise. Join-In provides tools and activities for social networking specially targeted at the elderly non-experienced computer user. Attractive senior-cut activities address the user and help him/her to socialise, to share activities with others and to meet others. The activities offered motivate the senior citizen to stay fit; thus reducing costs for treatment by supporting prevention.

Join-In developed an extensible social and cognitive (exer)gaming platform for the elderly. Additionally, our solutions are low-cost, thus seniors of different economic backgrounds can afford these. Activities offered are a memory card game, called "Memofix", a biking exergame and exercises. To enforce communication "Memofix" is connected to the Join-In videoconference system which can be turned on and off individually. Besides typical social networking features, like sharing content with friends and setting up interest groups, the platform holds an emailing and a videoconferencing system. A moderator modus allows the presence of a person to help connect the seniors and to offer special services like live exercises.

Demonstrator versions of two more exergames are available, a walking exergame, which trains coordination and a game fostering age-specific exercises integrated in a realistic story called "Antique Hunt". On top of that Join-In developed and prototyped a senior-friendly controller.
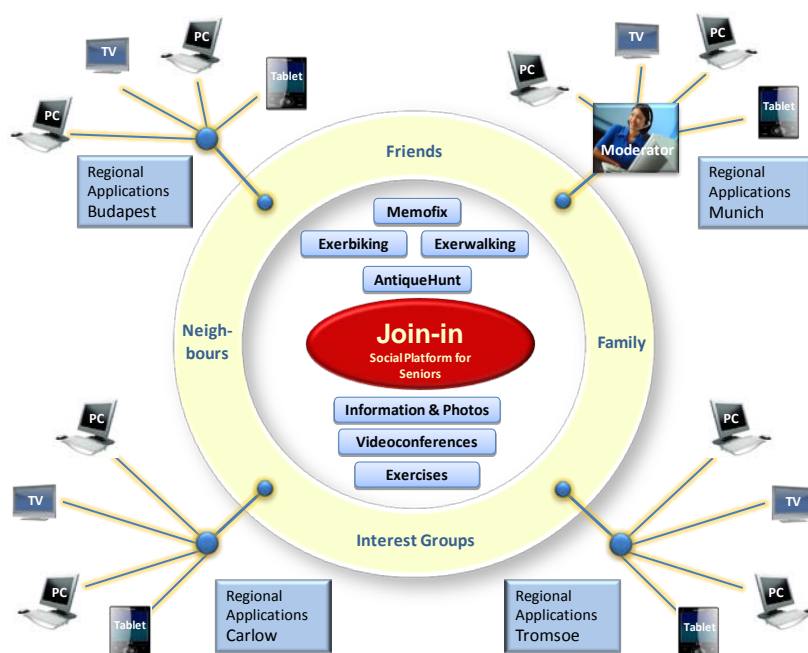
Fig. 1 Join-In Social Network

Users were involved in project development right from the start of the project; user groups were established in Germany, Hungary, Ireland and Norway. They helped define the social platform and its contents. The Join-In platform and its applications were tested by over 100 senior users in the partner countries.

The Join-In web-based platform can be accessed from any computing device that supports a web-browser (so far Chrome and Firefox are supported), allowing the users a broad range of usable devices. The social network is based on the Open Source Framework ELGG. The games and exergames are programmed in the web standard HTML5. The Social Media Connector (SMC) API was developed within the project to enable linking other applications, e.g. games to the Join-In platform and to provide an interface to other social networks.

2.3 Structure of the report

The report describes the work, results of the Join-In project and conclusions drawn. It covers the aspects

- user requirement analysis

- developments

- piloting & evaluation

- dissemination

- exploitation and commercialisation.

3 User Requirements

3.1 Background and Methodology

Join-In solutions were developed on user-centred design. A thorough user requirements analysis helped define the outcomes that the target group would accept and use, therefore, the target users were involved in the project development at all stages. All developments were completed in close co-operation with the users as especially older elderly people are neither the main target group of social networks nor of game developers. User groups in Germany, Hungary, Norway and Ireland supported the project.

Scenarios, persona descriptions and literature reviews helped us to gather initial information on the user group's interests. Using a mixed methods approach (focus groups, round table discussions and questionnaires) the users' interests and expectations, but also fears and anxieties were further assessed.

Research Questions included

- day-to-day activities of the users

- attitudes towards exercising

- favourite activities and games

- everyday living, hopes and fears

- anxieties that might hamper the acceptance of the developments

- technical requirements and usability requirements

- methods to attract senior citizens to digital media

Where possible key persons were identified; and regular activities with the users were organised, e.g. regular "board gaming sessions" in Germany and Nintendo Wii exergaming sessions in Norway, Germany and Hungary. The sessions offered the opportunity to assess the gaming preferences of the users, to introduce Wii and Kinect and later in the project the social networking approach/concept of "Join-In" and the cognitive game "Memofix".

Altogether 134 persons were involved in the user requirement analysis: 39 senior citizens in Germany, 45 in Hungary, 28 in Ireland and in Norway 22.

3.2 Results

Quality-of-Life

Being able to participate in social life is one of the most important things throughout all ages. During the research process the users underlined, that the quality of life is reduced when the possibilities to communicate and to share daily experiences with other people are not given.

Staying in contact with other persons is the most important thing for most of the elderly people asked. They like feeling connected and being able to share. Many of the seniors are regularly meeting friends for lunch, coffee or for playing games. The aspect of sharing time with one another proved to be the most important issue throughout.

Maintaining mental and physical health ranges high on the agenda. Mobility, being able to stay in one's own house and self-sufficiency are important. The interviews in Germany also showed that the high aged elderly adjust well to changing health conditions. They mostly accept these and adapt their activities.

Hobbies preferred activities

The information on hobbies and preferred activities provided important background information on the content of the Social Network but also to the type of game to be used.

Hobbies and preferred activities differed widely between the participating countries.

Though communication ranged high other activities stated were

- in Ireland besides sports, gardening was found to be the second most popular activity;

- in Germany playing board and card games, community activities, and culture ranked highest;

- in Norway walking, exercising, handicraft and cooking were favorites. Surfing on the computer was also mentioned as a favorite pastime. Also several cultural activities were important to the respondents.

- in Hungary the participants mentioned only their favourite sport activities which are cycling, tobogganing, athletics, ball-games (mainly football, handball and basketball) and hiking.

Fig. 2 Users playing cards in the user session

Exercising

In the Join-In project one of the major goals is to activate elderly people to do more exercising in fun activities to prevent them from social and physical deprivation. For that we asked the participants to tell us if they do any kind of exercises regularly.

In order to keep fit most elderly people exercise and they enjoy it. The older the people are the more they appreciate any activity they are still able to do. Our user analysis showed that most of the users exercise on a regular basis; 18 out of 22 of our Norwegian user group, 26 out of 30 of the German one, 26 out of 36 Hungarian users and 20 out of 26 in Ireland. However some users considered "going to the shops" to be exercising and a lot of the participants' exercising was done in connection with rehabilitation and only trained a specific part of the body, e.g. the back.

The importance of exercising is very clear to all involved users.

The interviews showed that the elderly adjust to their health situation and to their possibilities. Their attitude towards exercising is somewhat similar to the one towards gaming: elderly people do not want to be overstrained or see where they fail, they want to see their progress and what they are capable of doing.

When asked for the most popular exercises in younger years or which activity people would like to do -if they could- people stated

- walking and swimming in Ireland
- cycling, hiking and gymnastics in Germany
- cycling, tobogganing, athletics, ball-games (football, handball, basketball) and hiking in Hungary
- skiing, swimming, cycling, hiking and skating in Norway.

Exergaming

As we were planning to develop an exergame within the project, exergame sessions were organised with the senior users in all partner countries. We assessed the Wii + controllers as well as the Xbox +Kinect.

The participants tried different games. The setting and English language instructions of the Wii console proved difficult. In addition to this, due to arthritis, German and Hungarian users found it very difficult to grip the Nintendo Wii Remote and to use the front and rear buttons at the same time. Also the Irish users thought the Wii Remote was too fast to control and required too much precision movement. In Norway the users were quite fond of games that required the balance board and found the board very good for the balance. Some, however, had a chair close by to prevent falling. An assistant was required to set up the Wii games.

Contrary to the German and Hungarian users - who had difficulties with the sensors, as they were not always able to hold their hand still for the time needed to select an option with the Kinect - the Irish user group found the Kinect to be an intuitive controller.

It needs to be noted that the exergaming sessions became -after overcoming the first mental burdens- a big favourite with the users and turned out to be vastly entertaining.

Computer Games

The Consortium had viewed **gaming** as a communicative activity that makes socialising easy. This needed to be assessed also in addition to the requirements of the older generation on a computer game. From the participants around 57% (36% of the Norwegian, 75% of the Irish, 26% of the Germans and 57% of the Hungarian users) owned a computer. The official statistics of internet access at home of the age group 65 – 74 also varies between countries (Norway 75%, Germany 41%, Hungary 31% and Ireland 20%)[4]. As expected, elderly people using computers and being aware of computer games are mainly younger than 75 years. According to statistics elderly above the age of 75 rarely own a computer and even less play or know computer games. Even though the elderly aged 75+ vary depending on age, health status and their social network, statistics do not distinguish. However, all our users felt that the access to new technologies is a major benefit.

Board and computer gaming sessions in the different countries were set up to ascertain which type of games the users like and what their requirements for the NEW game would be. This showed that usefulness, i.e. training the brain, was one of the most important criteria. The following other conclusions could be drawn:

- communication is more important than the look of the game, though the graphics need to be clear

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[4] Cp. Statistisches Bundesamt 2011

- the game should be cooperative as well as competitive

- the rules of the game should be simple

- visual and verbal explanations of the rules would be appreciated

- the speed of the game should allow an opportunity to correct bad moves

- the game must be fun.

Motivation to play

The following **motivational factors in playing** could be observed in the user sessions

- understanding - once the participants understand the new game it becomes fun;

- recognition - known elements ease the access to new games;

- communication - this is the medium for fun, exchange, instructions, etc.;

- reassurance, e.g. by showing achievements – this help elderly people to overcome lack of confidence and makes them less afraid of embarrassing themselves.

Requirements on the social network technology

Social networking was a new concept to many of the users -especially in Germany- and difficult to grasp. The requirements of the users on the social network can be summarized as follows

- the new technologies must be beneficial

- the new technologies must be easy to use

- the user interface has to be clearly arranged since the actual generation of elderly is not used to a "windows menu structure

- age related limitations, e.g. hearing/vision/movement impairment, have to be taken into account

- the exercises should not be too fast or too difficult

- different levels of difficulty make the applications (exercises, game, exergames) suitable for a wider range of people and more interesting for each participant

- things that relate to real life ease access to new technologies

- local references should be given

- data protection is very important to the German and Irish users.

3.3 Conclusions

We found that **a social network** offering meaningful content which would facilitate exercising and brain training and other content that could also be generated by the elderly themselves (information on cultural and local issues, calendar functions) would engage the interest of the target group.

Maintaining mental fitness is a major requirement with the elderly and this reflects in the user groups' choice of game. From a selection of games the users picked a **memory card game** which was named "Memofix".

Keeping healthy is another major interest of the target group. We felt that offering an **exergame** which would motivate the users to exercise would be a big asset to the users. Join-In, therefore, decided to test exergames concerning their usefulness and applicability for elderly users. All users thought exergames fun. The exergames which are on the market were found to be unsuitable for the elderly. As cycling, exercising and walking had been named as favourite past times we decided to design and develop a **cycling exergame, a walking exergame** and AntiqueHunt which offers a number of suitable exercises. On top of that **exercising videos** were developed that are specially targeted at the user group. .

Many senior testers found the Wii Remote unsuitable for the target group. On request of the users Join-In developed **new controllers**.

The results of this work with the users are presented in the project deliverable D 2.1 Report on User Requirement Analysis. You can further find more information on how to motivate elderly users for social networking in project deliverable D 2.2 Social Networking Methodology of Homebound Elderly Persons.

4 Design and development of the prototypes

4.1 System Platform

4.1.1 System Platform – Requirement Analysis

In Join-In we designed and implemented a social network and portal, and developed computer games and exercise games that can be accessed through the social network.

We identified low-cost technologies for the home, open-source social networking frameworks, and various gaming technologies that can be used when creating games for Join-In. We initially collected more than 120 requirements related to the Join-In platform, and were left with more than 60 after removing overlapping requirements. These were again sorted into 8 different categories (overall, senior, social tool, game, user environment, operability, documentation, security), and then prioritized based on the MoSCoW methodology; categorising the requirements as Must Have, Should Have, Could Have and Won't Have. The outcome was 17 important requirements categorised as Must Have or Should Have.

A full overview on the available low-cost technologies, open software systems that were analysed for use in Join-In and a user requirement analysis on the platform is presented in "D 4.1: Report on low-cost solutions for developing home-based platforms adapted to the elderly".

4.1.2 Development of the System Platform

The technical platform provides the backbone of Join-In. It aimed to be both easy to use and low-cost while adressing the special requirements of the elderly. The users are able to use a PC, tablet or a TV via a settop-box as the Join-In platform was built using web technologies. This makes it accessible from standard web browsers and facilitaties the incorporation of additional web-based applications like videochat.

Join-In offers various user-device options (see User Environment in Fig. 4) depending on the requirements of the end-users. Users can utilise a simple-to-use set-top box and a robust controller, while more experienced user can access the Join-In social network using a multi-touch All-in-One PC, a tablet computer, or a PC. However, it has to be considered that some game controllers and motion sensors have special requirements on the user-device and the corresponding software drivers.

The social network portal is accessible via the internet and provides interlinked webbased services (see System Environment in 4) for the various applications and the games. The

portal is built on top of the open-source ELGG social networking framework
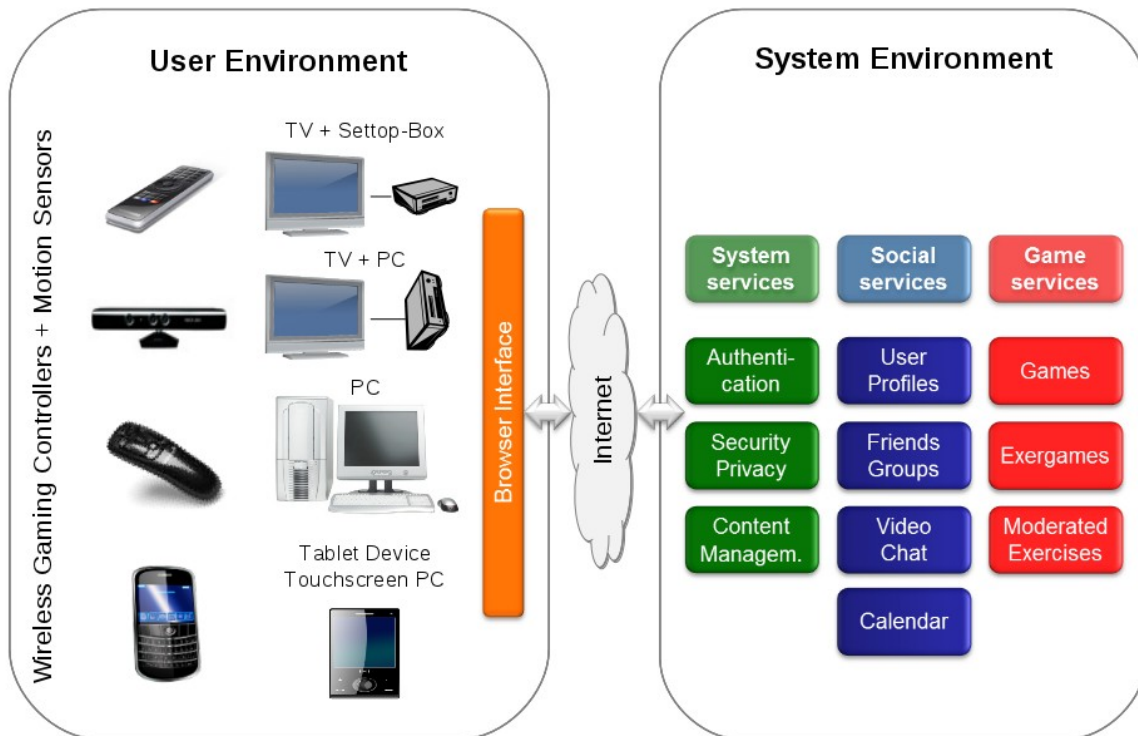
Fig. 3 Join-In System Platform

The OpenTok (www.tokbox.com) videochat was integrated as a communication facility. It can be used for multiuser sessions e.g. serving for moderated exercising sessions as well as for bilateral chat sessions e.g. during a game session. The Social Media Connector (SMC) (http://esmc.codeplex.com), developed within the project, is used to provide games with an interface to be interlinked with the Join-In social network.. Deliverable D" 4.2 Design and Implementation of the Platform" provides more details.

4.2 Join-In Portal for Senior Citizens

4.2.1 Social Networks

For many years young people have been using social networking to stay in touch with friends. Now it is also becoming popular with older users. According to Ofcom [13] "35% of 55 to 64 year-old British Internet users became social networkers in 2012 compared to only 24% in 2011". They also state that the number of 65+ social networkers has been rising to 25%, though we may assume that this is mainly due to the young old.

Looking at a trend for the elderly users is quite difficult. Even though by 2025 more than 20% of Europeans will be 65 or over, with a particularly rapid increase in numbers of over-80s [14], there are hardly any figures available on computing beyond the age of 74 and often the elderly are covered by one age group (65+).

The main target group of the Join-In service/product are the 70-85 years old people. The user requirement analysis showed that some of the Norwegian, Irish and Hungarian users knew about social networking; while many of the German trial group users were not familiar with the concept of social networking. Many of the German users had heard of "Facebook", but had a very negative attitude towards it, especially concerning data protection and privacy, a topic that proved to be vital specifically in Germany.

The social network has to handle the different "social contact functionalities" (e.g. user communication and profile setting), and to provide an easy way for adding or linking to the applications (computer games, exergames, exercising, video conferencing).

4.2.2   Join-In Social Network

The special needs of the target group and of their requirement are described in 3.2. For security reasons and by special request of the users the network is private and can only be entered by registered users via user id and password.

The content of the Join-In social network aims at making socialising and communication easy for the elderly adult. It covers

- profile setting including the possibility to choose an avatar;
- social contacting by emailing, by videoconferencing -bilateral or in a group for up to 5 people-, by videoconferencing or text chatting while playing Memofix, by searching or by linking to friends;
- tools for communicating and sharing
    - o emailing for sending and receiving messages to and from other Join-In friends;
    - o video conferencing allowing the users to have live video and audio chat. The user is able to invite his/her friends to a bilateral videoconference, making it more private. It allows the user to play a game while videoconferencing, adding a new social value to the game;
- tools for adding content, for sharing common interests (setting up groups, entering information, up- and downloading of photos);
- calendar;
- access to games and exergames. Currently there are available
    - o Memofix, a memory training card game for a single player or for two players with special functionalities (see **);
    - o a biking exergame that enables users to take part in multi- or single player online biking trips using a home stationary exercise bike;

- exercising videos -designed and performed by physiotherapists- offering different levels of difficulty to be safely performed by users at home (chair gymnastics);

- help functionalities and a user manual.

A moderator mode allows a trainer to invite other users to an exergaming or exercising session, and to guide and moderate the different activities. Moderators may initiate an exercising session and connect users to jointly take part in an exercise session.

Fig 4 Entry to the Join-In Portal

Fig 5 Join-In Portal

For building the social network platform, the ELGG framework was used. ELGG is an Open Source and free project, based on a modular structure, allowing for the addition of new plug-ins on demand. Another reason for choosing this framework was the extensive library of add-ons and plug-ins that had already been developed by the ELGG Community. Plug-ins for an event calendar, a photo gallery, notifications and user roles were installed in addition to the default configuration. Several additional components were added to the standard ELGG framework, like the balloon home page, the balloon menu bar and help. New plug-ins for administrating activity sessions and sending invitations were developed. As the support of multilingualism in ELGG proved to be inadequate, a second independent Hungarian portal was developed. The Join-In portal is now available in German, Hungarian and basic English. Hungarian and the German user groups are clearly separated facilitating local references. The videoconference system was developed using the Open Source platform OpenTok.

4.3 Join-In Controllers - JoiCo

4.3.1 Remote Control

Sitting in the living room and enjoying TV using a remote control is familiar to all. Web access and applications that have come with smart TVs require new concepts for their operation. These concepts relate both to the user interface and to the remote control. In addition motion detection by camera and speech recognition, gyro and motion based control functions are more and more becoming part of a remote.

The elderly often find such devices -containing number and cursor keys, motion control and sometimes a tiny keyboard on the bottom side- difficult to handle. As Join-In applications can also be used via the TV a controller especially suited for the elderly was found helpful and was designed and developed

4.3.2 JoiCO Design

The following graphics describes the different steps taken in the design of the Join-In controllers

| **Clay models** | Foam models | Design models |

Fig. 6 Design steps

Works like
left mouse
button

Works like
right mouse
button

Disable / enable
mouse activity

Adaptable to
hand size with
silicon coats

Easy to grip

Few buttons
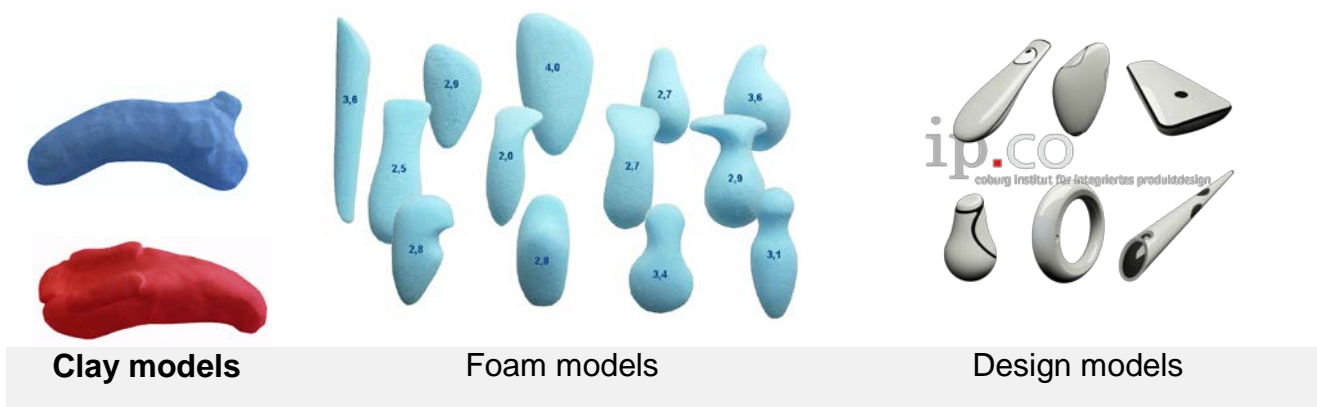
Few parts
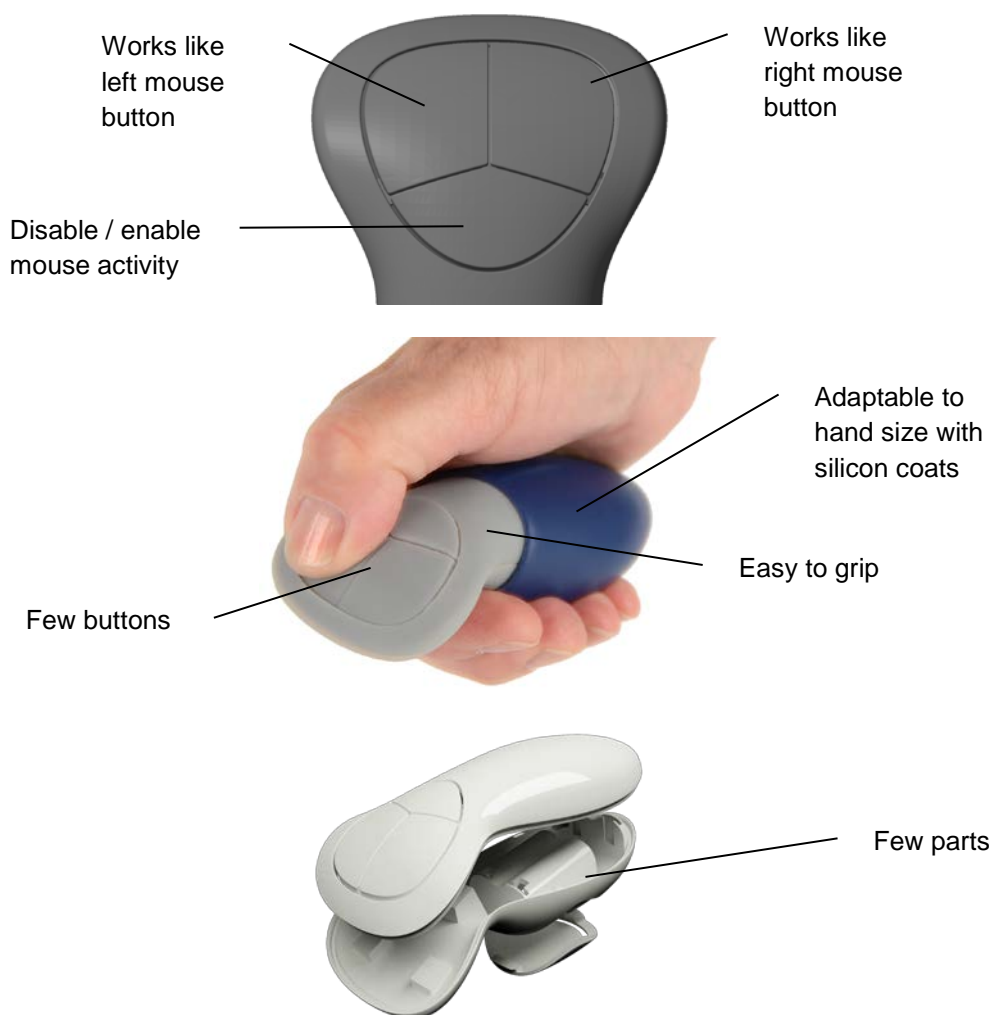
Fig. 7 Join-In Controller

A websocket manager, developed for Join-In, makes 3D motion and angular data available for browser games. The simple browser game "Nail hunts Balloon"' with large menu items for up to two JoiCo's was used for testing.

4.4 Join-In Games

4.4.1 Digital video gaming

A game is a structured activity with the emphasis on fun and enjoyment, and may sometimes include a problem solving dimension. A digital video game is comprised of many elements that include story and theme, mechanics, user interface, game balancing and experience, goals, challenges and feedback. Some elements have more importance than others in the design of games for the Join-In project which seek to enhance the social, cognitive and physical skills of the senior players. For example, a scripted and

narrative story is not so important, as we wanted the players to socialise and perhaps tell stories through the act of participation in the gaming sessions.

Games can improve general life skills such as problem solving, motivational, cognitive and even physical skills [15]. Different game genres offer different benefits, for example a flight simulation game might train and instruct the player in the art of flying various aircrafts, while an exercise game (exergame) might try to measure and improve the player's cardiovascular fitness over time. These two examples may be considered to fall under the umbrella of *serious games*, i.e. games developed more so for training and educational purposes than solely for entertainment. *Age Invaders* [16] is a serious game that focuses on the elderly to encourage inter-generational interaction through the use of a touch sensitive floor as a means of controlling the game.

4.4.2   The principles of game design

Game mechanics are at the heart of gameplay and form a system by which a game is progressed. Mechanics are often grouped into categories such as *space*, *objects*, *attributes and states*, *actions*, *rules*, *skills* and *chances*. One of the prototype games developed for Join-In was a multiplayer walking game that takes place inside a 3D maze (the game *space*).
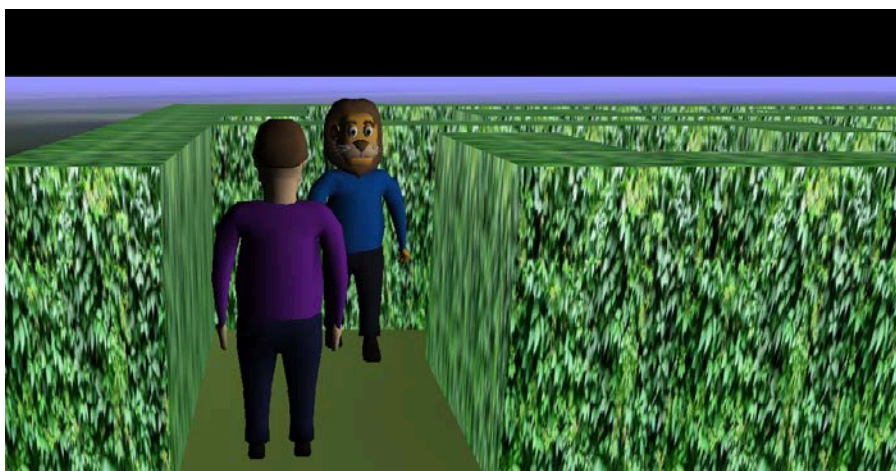
Fig 8 The Join-In Walking Game

The user walks on the spot and their movements are captured by a Microsoft Kinect camera which directs an avatar (a game *object*) around the maze. The avatar has built in animations (*states*) which reflect the users' *actions*. The goal of the game is to reach the exit point of the maze, with optional assistance from a walking partner who has their own avatar. The game enforces simple *rules*, such as the player cannot walk through walls.

The primary actions the player must be able to perform are to walk and make a gesture to turn the avatar left or right. The *skills* the game addresses are both physical (action of walking) and cognitive (navigating the maze). *Chance* is used to introduce an element of

unpredictability, so the game does not become repetitive and offers a fresh challenge each time. For example, the configuration of the maze in the walking game could be randomised so the path to the exit point is varied.

A **user interface** is what allows a user to interact with a game. A core element of a UI is the menu system; it is typically the first controllable element of a game. In general, senior computer users can be expected to have reduced visual acuity and/or degradation of fine motor control. Font sizes should be larger than the fonts typically used for a younger audience, have sufficient contrast and the right colour scheme to ensure readability and to make them prominent targets for selection. Moving interface elements such as pull-down menus or hierarchically walking menus should be avoided. Static user interface widgets such as large command buttons are well suited as they do not require pixel-perfect selection.

Fig 9 Home page for the Join-In social network – target selected

The home page for the Join-In social network used a series of static coloured balloons for the different activities. When a target is selected with the mouse (red balloon), it is enlarged.

Game balancing is an important part of game design so that the difficultly threshold is lowered for players who perform poorly and raised to present a challenge for those players who perform well. Games can use adaptive difficulty systems that perform this function transparently without the knowledge of the user. For example, in the walking prototype, the game could place constraints on the number of steps the player could take to exit the maze and vary this number depending on their previous performance.

Feedback informs users of the progress they have made. The primary types of feedback are immediate and long term. Immediate feedback is presented to the user continuously and is an important part of making a game accessible. This includes context relevant information such as the number of steps taken so far in the walking game. Long term feedback is used to show user progress over time such as a chart illustrating the number of daily or weekly steps taken.

User requirements inform the game design and are continuously evaluated as development proceeds. A list of prioritised requirements was gathered during the user requirements analysis stage of the project and some examples follow.

- *The ability to play competitively and cooperatively*. The walking prototype supports two players who may compete to exit the maze in the least number of steps or who may cooperate to find the exit together.
- *Simple to follow rules (that do not cause trouble for elderly users)*. The concept of a maze puzzle is well known and the simple act of walking on the spot controls the avatar movement.
- *Fun to play.* A fully rigged 3D model of a Lion was chosen as the avatar for the game to add to the 'fun' factor for the game (the avatar was chosen after consulting widely with the various user groups).

Fig. 10 Avatar designed in Join-n

Game design is an iterative process where the final product takes shape from prototypes that are refined through play-testing sessions with the user groups. When designing for an elderly audience, particular attention must be taken of the requirements of the players to ensure the usability and acceptance of the end product. More information on the gaming requirements and the game development can be found in D 3.1 Comprehensive report on Computer Based Games for Adaptation/ Development and in D 3.2 Technical design document.

4.4.3   Join-In's computer game "Memofix"

Memofix is a two player turn-based game based on the traditional card game known as 'concentration'. The game consists of ten pairs of cards arranged in four rows of five cards. Initially, the cards are all placed face down. Each player takes turns to try and match pairs

of cards by selecting the two cards they wish to turn over. When two cards are matched, they remain drawn in a face up position and form no further part of the game. A player is rewarded for a successful match by getting another turn. The game ends when all ten pairs have been matched and the winner is the player with the most matches.

Game setup

A game is started from the Join-In portal by one user inviting another to play. For example, player 'Daire' is logged in and can see his friend 'Ross' is currently online. Clicking on the 'Memofix' button will send an invitation to Ross.
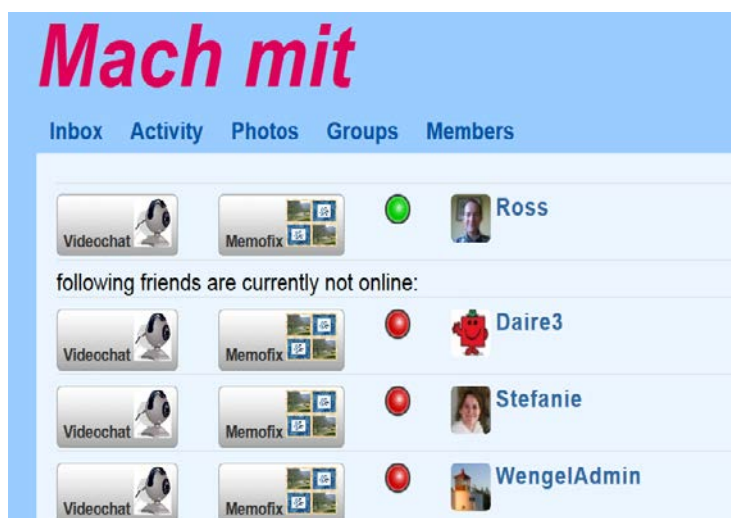
Fig. 11 Invitation System

Players may upload their own picture files to their Join-In account and can choose to use these images in the game. The purpose of this feature is to provide opportunities for storytelling and to offer a compelling reason for seniors to engage with the game on a recurring basis.

When one player accepts an invitation, the inviting player can now select a particular card deck to play with.
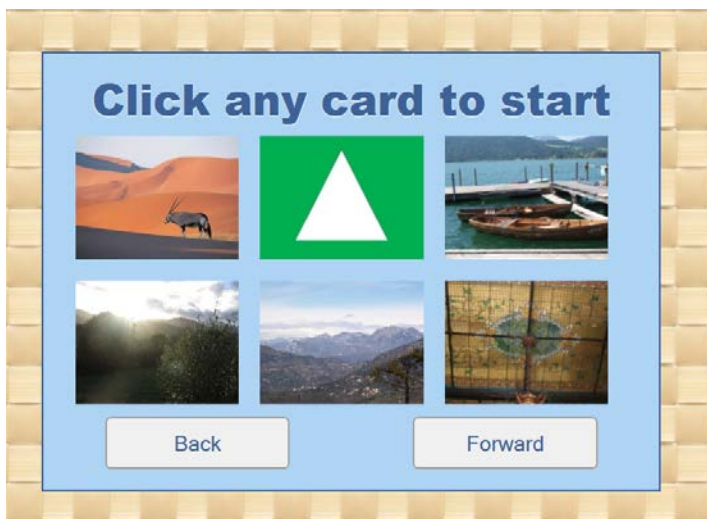
Fig. 12 Choosing a Card Deck

Gameplay

Once a deck is selected, the game starts and each player takes turns. The player who must wait his turn (Ross) sees his profile picture crossed out:

Fig. 13 Memofix Game in Action

During play, a simple feedback system displays short-lived notifications to the players. These notifications appear occasionally and praise successful card matches or offer encouragement when no matches are made. Daire gets a 'Congratulations' message after matching a pair.

Fig. 14 Approval in Memofix

When the game ends, the loser receives a consolation prize in the form of a random scenic image from various natural parks.
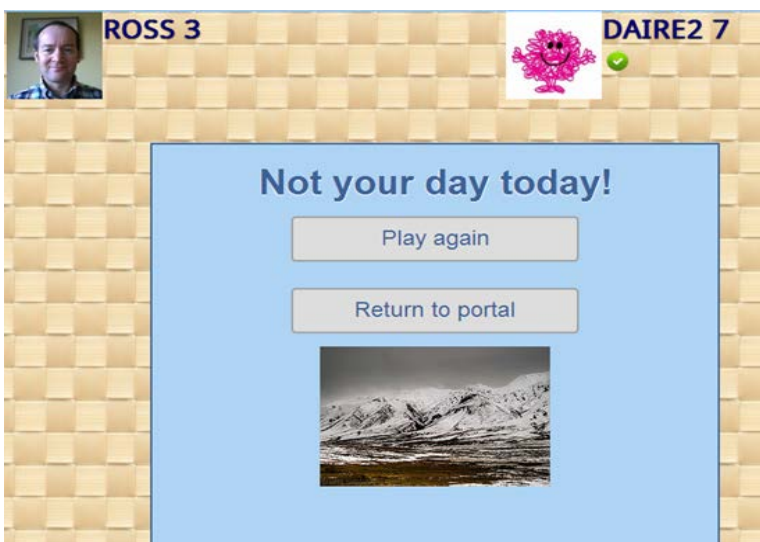
Fig. 15 Consolation in Memofix

Memofix also supports a single player mode with three adjustable levels of difficulty, which enables players to practice before playing against another user.

4.5 Interactive Applications for Physical Exercises for the Elderly

4.5.1 Exergames for the elderly

An exergame is a video game used in an exercise activity [17]. In an exergame movements are usually tracked by a set of sensors, embedded in the device, in handheld controllers, floor mats or by using video cameras with which the user controls the game. Exergames can be used for senior citizens to exercise in a fun way and thus stay physically active.

Originally, the focus of exergames was on motivating children and younger adults to move more, partly because of the obese epidemic [18]. In recent years, exergames for elderly and older adults have received attention [19, 20, 21, 22, 23]. However, there are not many exergames made particularly with elderly users in mind, we are only aware of one [24]. When we get older, our fine motoric skills decrement, our balance weakens, and both our sight and hearing become impaired. We also see a decrement in episodic memory and a reduced attention span.

4.5.2 User requirements for the Join-In exergame

The Join-In exergames for the elderly should be social, motivating, as well as fun, with exercises and movements both beneficial and tailored to the health of the target group and the individual. Useful exercises for the elderly include balance, muscle strength, endurance and flexibility.

An exergame for elderly must satisfy requirements in several dimensions

- a good exergame should also be a good game;
- different age related constraints should be taken into consideration;
- should give good and balanced exercises;
- should be safe to use.

In an exergame for elderly, speed, the amount of simultaneous information on the screen, and the amount of tasks to handle at the same time, should be reduced compared to one made for a younger audience. Keeping the interfaces simple and easy to use is important, so that the users can handle the Join-In exergames at home on their own, without technical assistance.

Motivational aspects to be taken into consideration when making exergames for elderly include:

- flow: One of the basic properties of a good game is the ability to reach a state called "*flow*". This is a state of total engagement in an activity, used in the video game domain [17, 25].

- fun: Challenge, curiosity, and fantasy are three factors influencing how fun a game is perceived [36].

- a social dimension: A group can stimulate the participants to put extra effort into exercising compared to exercising alone, and it can also influence the sustainability of exercising over time [26].

- goal setting: It is important to exercise more than once a week if exercising are to have a health effect;

- handicaps: The concept of handicap is a way to avoid unfair competition since the best, with respect to his abilities, should win. Introducing handicap in exergames could be a way for people with different physical capabilities to play exergames together.

- health benefits: Health is an important aspect for our target group, and exergames that provide health benefits could be important for the motivation;

- familiarity, approachability, accessibility, adjustability, usability.

The motivational aspects are partly the same as for younger users, but age specific tailored adoptions are often required.

Figure 16 A senior trying a game called Table Tilt on Nintendo Wii standing on a balance board

As part of the exergame requirements' phase, commercial exergames were tested by senior users in Join-In. Existing games are often too fast; they have too much information at the same time and on several places on the screen; there is often not enough contrast for seniors to see details, and many games require movements that can be too challenging for seniors. Nonetheless, our test with some carefully chosen commercial exergames indicated that seniors really enjoyed this type of fun exercise given that they did not have

to tackle too much technology. Existing studies in the field support and add to our results [18-23].

You will find more details in D.5.1 Report on requirements and state of the art in exergames for the elderly, low-cost motion tracking and as well as on HCI for elderly.

4.5.3   Join-In Exergames

Three different exergames were designed in Join-In based on the need for variation, the need for different kinds of exercises, use of different exercise equipment, and different physical and cognitive disabilities. The games were also designed based on present and previous preferred activities. One of the games has so far reached pilot testing, but the lab tests of the two others show that the concepts are well received.

Many of the seniors who tried Wii liked the walking/jogging games, and they also liked to walk, so the design of the Join-In walking game was based on this fact, and the game was adjusted to elderly in user interface and walking speed. The Wii players had also asked for variation. The exerbiking is making stationary biking fun. The AntiqueHunt is set in several game scenes with different exercises particularly focusing on arm strength and flexibility, but also on balance.

When we use images or landscapes, we tried to find something that recalled positive memories, and we also tried to enable regionalisation or personalisation. For instance in the game "AntiqueHunt" the items can be well known designs from back then in a specific country. Pictures on the walls could even be local or personal, meaning that you might be able to see an image of your own childhood home on the wall in a game scene. The sound and music can also be adjusted to suit an older audience. Also there is no background music when oral messages are given, to make what is being said easier to hear.

When adapting the games to an older audience, we were careful not to make the games boring, that is they had to be challenging, for instance. We know that screens with much information are more difficult to get a grasp on when we get older (whereas children love them) and pressure on doing things within a short timeframe can lead to frustration. Also the taste of music and graphical appearance differ with age.

4.5.4   Join-In Walking Game

The walking game is a low intensity exercise game which encourages users to walk together. Walking was identified by the German, Irish and Norwegian user groups as an activity that they enjoyed. The walking game makes use of the *Microsoft Kinect* camera to track the user's body. This allows the game to be controlled without requiring the user to familiarise him/herself with a complex game controller.

The walking game aims to make walking a more engaging activity by giving users the opportunity to walk around a 3d hedge maze with their friends, and to encourage social interaction by enabling users to chat to each other as they play. It is an online cooperative

multiplayer game designed to provide a method of social interaction and low intensity exercise.

The player's goals include getting out of the maze in fewest steps, walking at least a set number of steps during each play of the game, and also walking at a suitable steady rate (not too fast and not too slow). That is, the player who gets to the end first doesn't necessarily win (as we do not wish to encourage the players to go at a dangerous speed and risk injuring themselves).

Fig 17 Scene from the Walking Game

4.5.5   Join-In AntiqueHunt (walk and stretch exercise) game

The game AntiqueHunt is using game elements to hide the fact that the player is exercising, but instead gets the player involved in the search for antiques. The game design has different types of exercises for warm-up, flexibility, balance, endurance and stretching. This game is based on some common exercises that are used in training sessions for the elderly, and will also be suitable for the oldest ones.

The design of the game was based on several scenes or where each scene has a different type of exercise. In this project only a couple of test scenes were implemented, but it is playable. The game is, however, developed in such a way that new scenes with other (search for antique) exercises and tasks easily can be added. Since both the walking game and exerbiking application are good for leg strength, the AntiqueHunt starts with arm exercises that are also good for the balance while standing.

Fig 18 The house where antiques can be collected - from AntiqueHunt

The game can be played simultaneously by a group of players, and then they meet in the first screen (in front of the house) where they can see each other's avatars and wave at each other..

Each player can play at his/her own pace, and the design defines several levels (speed / number of items / how far to stretch etc.) that are both taking into account the abilities of the players and the possibility to level up. After each game, a scoreboard appears. It is also be possible to follow the scores during gameplay. The design and implementation of the AntiqueHunt game is described in D5.2.

4.5.6 Join-In Exerbiking

Many elderly people have happy memories about outdoor biking at an earlier age, but do not bike much anymore. This may be due to age related functional limitations, increased road traffic, or their easy access to convenient motorised transport.

Indoor stationary bikes can be used for exercising by elderly people, providing a convenient way of keeping fit without having to leave home. However, biking alone indoor can be quite boring, and resembles in no way a scenic outdoor cycling trip with a group of friends. We aimed to recreate for indoor biking some of the positive aspects of outdoor biking.

The biking exergame enables users to take part in multiplayer online biking trips using a home stationary exercise bike. The biking exergame run in a web browser on a handlebar mounted tablet computer.

The players are able to bike together through nice outdoor sceneries, such as biking virtually through a park or along a coastal route. Exerbiking stages are also available for users who would like to do solo exerbiking.

The biking exergame is integrated with the Join-In social portal, and includes language support. Group exerbiking stages can be scheduled for Join-In users in the portal, and users can access the exerbiking stages by logging into the Join-In portal.

You will find more information on the developments of the exergames prototypes in D.5.2 Design and implementation of the prototype.

Fig. 19 A stationary bike with the rack and the tablet installed ready to go exerbiking

4.6 Exercising Videos for the Elderly

Many studies [27, 28] have shown the benefit of exercising in the elderly. It lowers the risk for health conditions such as Alzheimer and dementia, heart disease, diabetes, and osteoporosis. Epidemiological studies show that 72 % of falls in the elderly are due to reduced coordination (2). Coordination can be vitally improved by regularly repeating the same course of movements -even at a very high age.

An inactive lifestyle makes older people loose strength, balance, flexibility and endurance. All of these areas can be improved by physical activity. Any form of exercise helps

maintaining or improving the range of motion even for those elderly that suffer from conditions that make moving difficult.

Exercising has also been shown to be beneficial for maintaining mental health [29, 30, 31].

In Join-In two physiotherapists developed a number of videos with chair exercises for the elderly. Chair exercises help elderly citizens to exercise. The individual can move without putting strain on her/his body. Movement helps to increase blood circulation and to stabilize muscles. They also support the flexibility of the joints. The exercises increase the seniors' ability to better accomplish day-to-day tasks.

The exercises offer different levels of difficulty. Each exercise is first demonstrated without music, so the senior can learn the course of movement. Each movement is explained and its specific benefit is pointed out.

Fig. 20 A scene from one of the exercising videos

The exercises start with training the muscles of the arm and the legs, muscles that are being used for a number of daily activities such as climbing and descending stairs. Next there are diagonal exercises which improve the interaction between or right and left brain hemispheres. Some exercises strengthen the back and abdominal muscles; others train co-ordination, stamina and concentration. There are lessons that deal with the breathing, train the conscious perception of breathing and help deepening the senior's breath. The physiotherapists constantly remind the user to sit in an upright position.

The set of exercises is well-balanced and tries to support the most import muscles of an elderly person.

5 Piloting and Evaluation

5.1 Evaluation plan and guidelines

The final goal of the Join-In project was to introduce the project to the target group and to prepare the ground for long-term use of Join-In. Evaluating the developments in field tests provides first hand information on the benefits and limitations of the final products. It gives feedback on the usability and on the target group's expectation. It is important for further work and exploitation.

Pilot studies were performed in Norway, Ireland, Hungary and Germany. The following application were evaluated

- The Social Network
  - o including the video conference system in Germany
  - o excluding the video conference system (due to the missing broadband access) in Hungary
- Memofix in Germany, Hungary, Ireland and Norway
- exercising in Germany and Hungary
- exerbiking in Hungary and Norway.

Lab tests were performed with a small group of potential end-users to try out the technology. The results of these were integrated into the developments.

The pilot trial involved 135 persons, most of them older than 75 years and with little or no computer experience.

Study teams were set up in the participating countries. Support was provided by personnel training units, a training video, hotlines, and a user manual. When the elderly users felt confident enough they were asked to test Join-In at home. Test equipment was provided and set up in the homes of those who did not have the necessary equipment at home. Alternatively, they could test in "Join-In test areas".

75 elderly persons decided to pilot test the applications either at home or in the test areas. Data protection and ethical issues were considered at all stages.

A mixed method approach was used for evaluating the test results. Besides questionnaires to be answered by the users, the instructors gathered information by observation, interviews and group discussions. Detailed protocols for performing the pilot tests were followed. The main evaluation topics concerned usability, usefulness, and acceptability of the social portal, Memofix and exerbiking and motivation to exercising and socializing. Details on the evaluation setup can be found in D 6.1 Evaluation plan and guidelines.

5.2 Results

5.2.1 User Involvement and Motivation

A key person was found very helpful for addressing and attracting target group users. Many of the elderly persons, especially in Germany, were scared of the technology; security and data protection were immensely important to them. Many elderly persons lacked self-confidence. Therefore, learning to use Join-In and being able to handle the computer gave the senior users a sense of success and added to their quality of life.

Join-In was found best suited for the highly aged computer illiterate seniors. Convincing the 'younger' senior of the Join-In project and its benefits was rather difficult. Most of them are still very active and do not feel isolated or in need of help. They do not want to buy a computer in order to be able to play games or to chat with others but prefer other activities. More features which specifically address 'young' seniors, for example more features in holistic mnemonic training might help to attract this target group. Prototyping and integrating the exergames which are so far only available as demonstrators also seems promising. Persons who stated that they "would like more company", "would like to leave the house more often" and "felt lonely sometimes" were those who gave the highest ratings to the network. This shows that Join-In can benefit people threatened by loneliness and help them to socialise.

5.2.2 Join-In Social Network

Most of the 94 pilot trial users who tested the Join-In Social Network received it well. Most users found it easy to learn and easy to use. They thought it beneficial and stated that it would be a good means for staying in touch.

The development of the social portal showed the importance of user-centred design. The German users liked the design of the Join-In entrance page and found that it made it easy to distinguish between the different features, and they did not at all experience the balloons as stigmatizing. The meaning of "ease-of-use" for the elderly non-computer experienced users had been underestimated and in the course of the pilot some features had to be taken away. Meeting the physical handicaps of the elderly proved challenging because of their variety and their specific characteristics; but also because very often the user had to deal with a multitude of limitations.

The final results showed that the Join-In Portal offers too little variety and possibilities for the experienced computer user. This user can choose from a multitude of social networks and games.

The "computer-illiterate" elderly person liked the portal once they had learned how to handle the computer and how to handle the Join-In portal. Learning took some time and the senior users tended to learn one activity at the time. Favourites with the users were emailing and the exercising videos. In the accompanied user sessions the users liked to

play Memofix but few users felt confident enough within the limited piloting phase to do this by themselves, the limited number of users made it difficult to meet a co-player when being online. Also the exerbiking was only used in the user sessions in Germany -one reason was the extra equipment required. The users also liked "news" and loved new content but hardly entered any content -apart from some comments on new content- themselves.

Fig. 21 German user during a training session

5.2.1   Join-In Memofix

Memofix was tested by 114 users. This virtual memory game was preferred over the board game and received good ratings concerning usefulness and usability especially with the highly aged users. Computer experienced users found it less interesting than computer illiterates. Users enjoyed talking and watching their opponent while playing. .

Results from the project suggested that participants enjoyed playing Memofix, more so than the physical game of concentration. Although the participants were in separate locations, this did not have a negative effect on the participants' enjoyment of the game. As this is the context for which the game was designed (users playing at home by themselves with other users), this is an extremely positive result.

5.2.2   Exercising Videos

The exercises were a favourite with a lot of the users concerning their usefulness. Some thought that the exercises were too short, others found them quite challenging. They appreciated being shown the series of motions beforehand. It motivated them to know why they were doing the exercise and which part of the body they were training.

The users liked the idea of having an instructor in front of them. Most users stated that the exercises were very valuable to them because they had been designed by professionals.

5.2.3 Exerbiking

The exerbiking game has been trailed both at senior centres, and it has been validated in real conditions by seniors at home. At home, the participants could do individual exerbiking or participate in online group exerbiking sessions. The group exercise programme was individually tailored and the group had both weekly and overall goals. The typical length of a session was 20 minutes.

The duration of the home biking pilot was from three weeks up to eight weeks. The participants found the exerbiking application easy to learn and to use, and it was well accepted. They found it enjoyable and motivating, and that the game was beneficial for their physical condition.

5.2.4 Join-In Controller

Gyro based controllers were well accepted by the elderly as long as the following prerequisites were fulfilled

- easy to catch user interface items;
- all menu items to be accessible by a 2-button mouse.
- enough mobility of the fingers
  (Users with arthritic fingers often hold the controller with one hand and press the buttons with the forefinger of the other hand; this causes a tilt)

Knowing how to handle a computer mouse was found to be helpful.

Further developments should deal with limited mobility. The tilt could, for example be avoided by restricting the sensibility to a certain part of the controller's body thus enabling smooth switching not only by thumb but also by the other fingers

6 Marketing

6.1 Final prototypes

The Join-In Consortium developed the following prototypes

- an extensible social and gaming (social, cognitive and exergames) platform for the elderly, with the infrastructure in place to extend and enhance the ecosystem, allowing game providers to register additional games;
- comprehensive social networks demonstrated for German and Hungarian elderly citizens;
- ”Memofix” - a computer game aimed at the older generation to maintain and enhance cognitive abilities and facilitate socialising – which runs on different hardware platforms;;
- a biking exergame which makes the use of the home trainer fun;
- senior-friendly controllers;
- exercises including a framework to allow elderly people to perform virtual moderated exercises;
- a methodology on how to motivate the target group to using the above mentioned products.

On top of that demonstrators were developed for two exergames, one called ”AntiqueHunt”, which promotes senior exercising, and another one, a ”Maze/Walking” exergames, which trains orientation and coordination while walking.

6.2 Marketing for the elderly population

6.2.1 The Key Characteristics of the Senior Market

Demographics

Our ageing society has become the social and economic challenge of the 21st century: the amount of elders in the European population is increasing. This new generation of seniors differs from previous ones and thus the senior market has changed dramatically over the last decades [32].

The ageing population is a very heterogeneous group: while some 70 year olds are active travellers, others might be hospitalised because of hip fractures, several other illnesses and poor condition. The elders' interest, needs and desires vary a lot within Europe, between different countries and even regions [33].

The elderly market can be segmented in different ways, such as age, behaviour, consuming habits and health care needs but no classification grasps the whole complexity and heterogeneity of the market [32].

Health and living conditions

Less than 4% of people over the age of 65 live in nursing homes in Europe, but the need for long-term care increases with age. Moreover, there is an increasing desire of the elderly population to continue living in their own homes, independently and autonomously [32, 35]. The most common hindrances in the partner countries for doing so seem to be social isolation and health issues.

Common barriers to this seem to be health issues. Thus hip fractures through falls -the typical accident among Finnish elderly- are the most common causes in addition to dementia and stroke that lead to hospitalization [34]. Social isolation and lack of exercising are closely related to falls, dementia and stroke.

6.2.2 Barriers to entry

Technological barriers

The ageing population has the lowest adoption rates in computer usage among the European population. Without skills to use computers and internet, the seniors are excluded from the society.

In the Join-In project we were facing high user expectations towards the technologies themselves and towards the abilities of the technologies, but also fear of the technology and cyber illiteracy. To overcome the technological barriers, the product / service should be easily understandable, easy-to-use, fully functional, and it should take into consideration the age related usability requirements. The product / service should also include training and technical support.

Social isolation and diversity

Loneliness among the elderly is a major problem. Studies in Britain show that more than half of the people over the age of 75 live by themselves. Many of these suffer from loneliness and social isolation [34]. Socially isolated senior citizens are difficult to reach. There are no one-stop-shops, where seniors could get information about suitable and available products and services, not to mention the missing information on the purchasing process and where to buy the products. Seniors do not have the knowledge or skills to look for the information themselves.

In Join-In the social isolation and challenge of information flow was solved by targeting the product to the senior centres, who deal with elderly. Also other healthcare professionals deal with isolated people and should be aware of the solutions that could ease or aid the individuals.

As mentioned earlier seniors are a very heterogeneous group with different needs and desires. To please them all is very difficult. In the Join-In project we considered the heterogeneity of the target group to be a real challenge. Some users found the games fun, others found them boring. For a Join-In portal the solution would be to provide different kinds of content for different users in the future.

In addition to convince and engage the users and ambassadors for the product, the Join-In portal should be seen as beneficial and fun in the eyes of senior centre staff and elders' children. Both of them are considered trusted and reliable and the elders listen to them.

6.2.3   Target audience of Join-In products and services

Elders, senior centres and institutions working with elders

The main target group of the Join-In service/product are 70-85 years old people. The target group consists of seniors who have retired and are eager to learn and use the internet portal to socialize and exercise. Many elderly know that strength and performance often decline. Frailty has a major impact on health, increasing the risk of falls and other adverse health outcomes and it may easily lead people to being confined indoors [12]. Seniors who know the importance of regular exercise are interested in maintaining their well-being and preventing illnesses. The primary user group are home-bound or socially isolated elderly persons, with a lack of social contact and activities. They have to meet minimum criteria in health conditions so that they are able to use the platform. This means average visual, mental and a minimum sensor-motoric ability.

Pilot testing showed that in Germany especially digital illiterate senior citizens were attracted to the network. They felt comfortable within the closed network environment and appreciated the senior-friendly interface. They found it a good tool for learning how to use the computer.

Senior centres work with the elderly providing day care, daily activities, care services as well as retirement home services for seniors. The senior centres and other institutions enable Join-In an easy, centralized access to the target group, and the cooperation is beneficial in both ways. The senior centres are provided with a new activity to their seniors complementing their service package and adding value to their customers.

There are plenty of institutions, associations and volunteers working with the elders. For example church institutions, patient and senior associations, ambulatory care and rehab centres as well as social clubs or council-run senior service centres. From a marketing perspective those institutions are easier to reach than individual elders. In co-operation they can help Join-In to build a trustworthy brand for the portal as well as inform the elders about the portal.

Health care professionals and ecosystems

Join-in project's outcomes re also targeted towards health care professionals, for example, nurses and doctors working with elders and those who are interested in new studies.

There are also companies working within the healthcare sector who are interested in seniors as a target market and who would be interested in the information gained during the project.

The scientific audience

Research centres, universities and scientists who are interested in the research results related to gaming, elders and well-being are also a valid target group for Join-In.

6.3 Marketing results from Join-In

The lack of technical knowledge emphasises the need for high quality

In senior markets the first impression is very important. Functionality and usability issues are not tolerated. In the Join-In pilot tests the need for user friendly technology was clearly demonstrated. The insecurity with their own technical skills cannot be questioned with bugs. The pilot tests also demonstrated the need for support services such as teaching how to use the product and a customer service for technical problems. In addition to the technical platform, the product / service should provide high quality content. After all, the users are after the interesting and beneficial content.

Easy to understand message stating clearly benefits of the product

When it comes to marketing of technologies the elderly want to know the advantages the products add to their lives, but also if the product provider is reliable.

A product / service needs to be advertised to seniors in a way that they understand and get excited about. Therefore, it must be useful, beneficial, attractive and easy to understand.

Target group challenging to reach

The seniors 75+ stay more at home than younger ones, they might have illnesses that restrain them from seeing their friends and being as active as they used to earlier. They need help to stay active. However, they are not as easily reached and also due to their lack of technical skills, they might even be inactive and isolated.

In the Join-In project we found out that there are not many technical and game products / services available for the elder target group, even though the elderly individuals could profit from these services.

Collaborate for stronger reach

The marketing is most effective if you can convince and engage elders, their children and health care professionals about the excellence of the product.

A small company or research institute alone cannot launch the product. We must find partners that can provide trust and visibility to the product / service. It could be a health care service provider such as a senior centre, a church organisation working with elders or it could be a private product/service provider that can add extra value to its customers with its products.

Project Portal

The http://www.join-in-for-all.eu – website is targeted to all of our target audiences from the users (including user groups during the project) to scientists and healthcare professionals as well as the partners themselves.

The project holds information about the results and outcomes of the project and all the publications. The public project reports can be downloaded.

The http://www.join-in-for-all.eu -website is the main source of information.

All the dissemination activities and supporting materials such as press releases, flyers, posters and social media content direct audience to the Join-In project website and the blog-posts, which are also accessible from the website.

Fig. 22 The Join-In Project Portal

6.3.1   Marketing Materials

6.3.1.1 Graphic guidelines and templates

Graphical guidelines were designed in the project to have a unique visual style throughout the project communication from internal reporting to marketing. The Graphic standard manual includes templates for Word, Power Point, brochure and poster materials as well as guidelines for the colours, logos and correct usage of the templates. The layout was designed by HappyWise and correlates to the design of the Interactive Join-In Portal for senior citizens.

6.3.1.2 Brochures and flyers

During the project one common brochure was printed. The brochure is in English and the purpose of it is to give the basic information of the project and direct target audience to look for further information from http://www.join-in-for-all.eu -website.

The brochure was used in trade fairs and events as well as in one-on-one networking situations. It is a good reminder of the project to those, who are interested in it and want to know more. The aim of the brochure was to increase awareness of the project.

Another brochure was designed for and in close cooperation with the German users to attract users to participate in the piloting. It is in German and underlines the engagement and responsibility of the German user organisation, the Diakonie München-Moosach.

The results of the project are presented in a new German brochure to make the social network known in the region.

Fig. 23 German Flyer

The Norwegian partners prepared a flyer on exerbiking in cooperation with the Norwegian Lung and Heart organisation to introduce exerbiking to potential users. The flyer is in Norwegian.

The Hungarian Johanniter developed a Hungarian Information leaflet to attract users to the Join-In Network and a guide for the Johanniter Charity Service volunteers.

ITC prepared a training video for their pilot users to teach them how to use Memofix.

6.3.1.3 New Media

Series of Blogs

HappyWise designed a blog-series describing the project results of Join-In and published them on [WordPress](#)[5]. The blogs link to the deliverables, so the interested reader can easily get more information. We expect that the results found in the project will be interesting to many readers who can also add there comments and questions. We thus hope to create interaction. The titles of the blogs are

- Introduction to the Join-In project and its goals

- Elders and their needs for the portal

- User requirements of the elderly

- Designing a game for seniors – general findings

- Technical platform – user requirements

- Introduction to Memofix

- Introduction to exergames designed in Join-In – Exerbiking, AntiqueHunt, Walking game.

- User requirements of the seniors for exergames

- Designing an exergame for seniors

- Low cost solutions for developing home based platforms

- Join-In Controllers

- Introduction to Join-In portal – Part 1

- Introduction to Join-In portal – Part 2

- Piloting test results

- Findings in marketing for the elderly population

- Conclusions – Results and further research

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[5] http://joininproject.wordpress.com

2. Elders and their needs for the portal

 February 14, 2014   Ageing population as target market, Product / Service design for the elderly, Social platform, Special user requirements   active ageing, Ageing population, digital gameing, games for the elderly, senior gamers, Social network

Elders, senior centres and institutions working with elders

The main target group of the Join-In service/product are the 70-85 years old people. They are the seniors who have retired from work and are curious to learn and use the internet portal to socialize and exercise.

Many elderly know that strength and performance often decline and that many seniors start getting frail. Frailty has a major impact on health. It increases the risks of falls and other adverse health outcomes and may easily lead people to being confined indoors [1].

Seniors who know the importance of regular exercises have interest in maintaining their well-being and preventing illnesses.

Fig. 24 Blog - Excerpt

Infographics

A series of infographs produced by HappyWise demonstrate the project results in order to promote the Join-In project. Infographs are the trend in social media and attract lots of attention also in other media. The infographics can easily be shared by users on internet.

The online infographics are linked to the Join-In portal.

The infographics can also be printed for tradefair stands in poster size, or they can all be gathered into one very visual and colourful brochure telling about the project.

The following infographs were produced by HappyWise:

- designing serious games for seniors

- designing exergames for elderly users

- age-related health problems in design and user experience

- designing a social nework for elders

- involving elderly persons in the research projects.

Designing serious games for seniors
What should be taken into account when designing a computer game for elderly?

Benefits of gaming

Improvement in well-being
Studies demonstrate the increase of cognitive skills, reaction times, self-esteem and the sense of well-being in the elderly when playing computer games.

Communality
Gaming is multigenerational enabling the elder generation to socialise with the younger generation, e.g. grandchildren.

Games for elders must be

4. Easy-to-learn.

6. Must give positive feedback - Both visual and aural.

7. Graphically suitable for elderly.

2. Perceived as useful.

3. Safe to use.

5. Must allow pauses.

8. Possible to play with limited fine motor skills.

Fig. 24 Infograph - excerpt

6.3.1.4 Videos

- Join In exergame 5 - film for a presentation[6] - posted by Ellen Brox

- Join In: preventing loneliness in the elderly through social networking[7] - posted by José López Bolós

- You tube: Demo on Valentia Kinection[8] – posted by David Burrows

- You tube: Join-In Exergame Kinect demo[9] – posted by Gunn Evertsen

- Norut's JoinIn Kinect exergame demo[10] – posted by Santiago Hors Fraile

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[6] http://www.aalforum.eu/video?v=8142
[7] http://www.aalforum.eu/video?v=8134
[8] http://www.youtube.com/watch?v=jG5bk-2Ejrc
[9] http://www.youtube.com/watch?v=MJx4H1Rbsu8

6.3.2   Publications

The following was published in the course of the project.

Papers

S. Hors Fraile, J. Browne, E. Brox, G. Evertsen; Suitability analysis of commercial open-source driven motion sensor devices applied to exergames for the elderly. AAL Forum Eindhoven 2012.

H. Demski, C. Hildebrand, J. Bolós López, W. Tiedge, S. Wengel, D.O. Broin, R. Palmer; Technical Requirements of a Social Networking Platform for Senior Citizens. Studies in Health Technology and Informatics. Volume 180: Quality of Life through Quality of Information. 2012: 818-822.

E. Brox, L. F. Luque, G. J. Evertsen, J. E. González Hernández; Exergames For Elderly - Social exergames to persuade seniors to increase physical activity. Pervasive Computing Technologies for Healthcare (PervasiveHealth), IEEE 2011, pp. 546-549.

Brox, E, Fernandez Luque, l, Tøllefsen, T, Healthy gaming - Video Game Design to promote Health, ACI - Appl Clin Inform. 2011 Apr 27;2(2):128-42. doi: 10.4338/ACI-2010-10-R-0060. Print 2011.

Book chapter

E. Johnsen, T. Burkow, L.K. Vognild: Den sosiale gruppa som motivasjon til fysisk trening. In: Helsesosiologi: Analyser av helse, sykdom og behandling. Gyldendal Akademisk 2012 ISBN 978-82-05-42414-2. pp 325-346.

Posters and Abstracts

T. Burkow, L. Vognild, E. Johnsen, P. E. Kummervold, B. Bjørnstad, M. Risberg, A. Bratvold: Teknologistøtte for motiverende trening i hverdagen; Rehab 2014, National conference. Trondheim January 2014.

S. Hors Fraile, J. Browne, E. Brox, G. Evertsen; Evaluation of sensors for inputting data in exergames for the elderly. Studies in Health Technology and Informatics. Vol. 192: MEDINFO 2013, Studies in Health Technology and Informatics; p 935.

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[10] http://www.youtube.com/watch?v=bAZoLjDxsI4

C. Hildebrand, H. Demski, S. Wengel, C. Duschl, W. Tiedge, Join-In - Ein interaktives soziales Portal für die ältere Bevölkerung. Tag der Telemedizin Ingolstadt 2013.

Join-In - AAL VDE Bavarian Research Alliance 6. AAL-Congress Berlin 2013.

T. Burkow, L. Vognild, E.Johnsen, P. E. Kummervold, B. Bjørnstad: Nettbasert spinning – motiverende og sosial sykkeltrening hjemme; Velkon 2013. National conference – welfare technology; Trondheim October 2013.

S. Wengel, C. Hildebrand, J. Balint, W. Tiedge, B. Wagner; Spielerisch und aktiv altern. Projekt EU-Jahr 2012 Landeshauptstadt München 2012

J. Lopez Bolos, C. Hildebrand, H. Demski; Join-In: Preventing loneliness in the elderly through social networking. Proceedings AAL Forum.2012, Eindhoven, Netherlands, Eindhoven; Smart Homes, 2012.

C. Hildebrand, H. Demski, C. Duschl, W. Tiedge, S. Wengel; Join-In – Poster; AAL Forum 2011; Lecce.

H. Demski, S. Wengel, C. Duschl, C. Hildebrand; Join-In - Ein virtuelles soziales Netzwerk für Senioren; GMDS-Jahrestagung 2011 Mainz. Abstract und Poster.

6.3.3   Presentations

T. Burkow, L. Vognild, Elin Johnsen, etal; Teknologistøtte for motiverende trening i hverdagen; Rehab 2014, Trondheim 2014.

C. Hildebrand, S. Wengel, Christoph Duschl, W. Tiedge, H. Demski; Ein soziales Netzwerk zur Verbesserung der Lebensqualität älterer Senioren. GMDS Jahrestagung 2013, Lübeck

T. Burkow, L. Vognild, E.Johnsen, P. E. Kummervold, B. Bjørnstad; Nettbasert spinning – motiverende og sosial sykkeltrening hjemme; Velkon 2013 Norwegian national conference – welfare technology; Trondheim 2013.

G. Avar; Join-In. Meeting of Hungarian speaking Ukrainians in Carpathian mountains in Ukraine, Nagydobrony, 2013

G. Avar; Join-In. Evita - National Technology Platform 2013; Budapest 2013.

Brox, E.; JoinGame workshop - National conference for game developers and game researcher, Tromsø, Norway 29.10.2013.

G. Avar; Join-In. @ITIM – International Institute of Telemedicine & PTUD – polo Technologico Universitario Desio, 2013.

CHT Forum, Oulu, Finland, Aug 14th, 2013

Z. Bertalan Avar; Preventing Social Isolation with enabling fun activities for Homebound Elderly. The Join In Project; eGovernment and eHealth 2013, Desio /Monza e Brianza.

D. Cantwell, D. O Broin, R. Palmer, G. Doyle; Motivating Elderly People to Exercise Using a Social Collaborative Exergame with Adaptive Difficulty. Proceedings of the European Conference on Games Based Learning; 2012, p. 615.

L. Vognild, TM Burkow, Workshop: Tromsø Telemedicine Laboratory, TTL research community, project marathon, Norway 2013. Two oral and video presentations by Norut and NST:

Welfare technology conference – Regional conference for decision-makers in the area of care in the municipalities; Tromsø Norway November 2013.

A series of Presentations in the framework of the Projekt EU-Jahr 2012 Landeshauptstadt München 2012

E. Brox: Sosiale treningsspill for eldre; Aktiv omsorg i Praksis; Oslo 23.10 2012

Z. Bertalan; Lengthening the active individual life with fun activities, TeleMedicine & TeleCare VI Workshop Italiano & International session, TeleMediCare 2012; Milano.

G. Avar; E-Participation Workshop,,Budapest Conference on Cyberspace 2012, Budapest

G. Avar, Join-In Projekt beszámoló, Hungarian Johanniter Charity Service – Annual Meeting 2012, Budapest;

Z. Bertalan; Join-In; Gaming Day – intergenerational gaming with Grandchildren, Parents and Grandparents on the Children's Day, Balatonalmádi, 27th May, 2012

E. Johnsen, T. Burkow, L.K. Vognild: Games and the Social Group as Motivation to Exercise. Trust and Social Change; the 26th Conference of the Nordic Sociological Association, Reykjavik, Island 15-18. Aug. 2012

Burkow, T., Brox,E, Join-In, Senior Citizens Overcoming Barriers by Joining Fun Activities, Tromsø Telemed Marathon 2012

Presentations for the Norwegian Hearth and Lung Association (LHL) Tromsø, Skibotn Rehabilitation Centre, Skibotn, Norway 3.-4. March 2012

G. Doyle Join-In: Ambient Assistive Living. Overview. 2011

Brox, E., Vognild L., Helse og morsom trim, et forskningsprosjekt, presentation at the senior day, 30.09.2011 Tromsø, Norway

Brox,E, Trim og spill for eldre, JoinGame workshop Trondheim November 2011

Others

- Evjeklinikken visits Tromsø 2012

- Diakonie München 2012

- Active Retirement Communication, Ireland, 2012

- Heracleum Communication Norway 2012

- Papers/posters 10-11/2012 ITC

6.3.4 Media Coverage

- Newspaper notice. Regional newspaper: Nordlys 01.06.2013

- ·Newspaper publicity. Regional newspaper Nordlys 11.12.2012

- Eldre har det gøy og kommer i form med TV-spill. Seniornett 19.02.2012. http://www.seniornett.no/Emner/Foto-video/exergaming (last accessed. 4-3-2014)

- Geriatric gaming. Science Nordic. 16.02. 2012. http://sciencenordic.com/geriatric-gaming (last accessed. 4-3-2014)

- Gaming for gamle. Forskning Norway:, 14.02.2012. http://www.forskning.no/artikler/2012/februar/313131 (last accessed. 4-3-2014)

- TV-spill for elder.Nordnytt, 13.02.2012. http://www.nrk.no/nordnytt/tv-spill-skal-hjelpe-eldre-1.7994884 (last accessed. 4-3-2014)

- Trønderavisa, Norway 18.02.2012

- TV report in combination with the visit of the Irish Prime Minster to ICT Ireland; May 2012

- TV spot Home Channel Olympiadorf, München

- TV spot Norway 1-12-2011

- Bayerische Telemedizinprojekte – Therapie: Join-In -Ein interaktives soziales Portal für die ältere Bevölkerung; (last accessed 4-3-14)

- Join-In - Bavarian Research Alliance Brochure: AAL Made in Bavaria page 12-13 (2013).

- AAL Project Portfolio: Join-In -Senior Citizens Overcoming Barriers by Joining Fun Activities; Catalogue of Projects, 2012: p. 44.

- Join-In: Senior Citizens Overcoming Barriers by Joining Fun Activities. IT Funk - IT for funksjonshemmede (2012). http://www.itfunk.org/docs/prosjekter/AAL-Join-In.htm (last accessed: 4-3-2014)

- ITC Press releases to the local papers 10/2011 Ireland.

6.3.5 Others

- Visit to ICT by the prime minister (Taoiseach), Sept 19th 2013

- Innovation Prize by the Johanniter Order Nov. 8, 2013. Leipzig Germany (+5000.- € for maintaining, supporting the project in Hungary)

Fig. 25 Certificate on Innovation Prize

More details on the project's exploitation and dissemination activities can be found in D 7.3 Project Exploitation Plan.

6.4 Business Model
6.4.1 Objectives

The European Union is facing an ageing population with low birth rates. In 2050 the proportion of people over 60 will be 37 percent. This new generation of seniors differs from previous ones and thus the senior market has changed dramatically over the last decades. This raises social problems but also economic opportunities. Changes in household compositions call for support to enable the elderly to remain safely and comfortably in their own homes. Decreasing work-force calls for innovative solutions – also for the elderly that

need to be supported. The developed product of the Join-In project is willing to enter into this market having in mind all the challenges of such a pathfinder initiative.

The overall objective of Join-In is to provide a return over the course of a business cycle. In order to achieve this objective the Consortium needed to create an added value for its target groups as well as to be unique in the ITC solution provided for elderly users. The Join-In Network adds value by focusing on the requirements of the elderly users and by reflecting these requirements in the applications. Join-In's strategy is to produce both for the elderly market but also for the care providers' market. Uniqueness of the developed product is the key factor in business opportunities.

The Join-In Interactive Portal for Senior Citizens with fun activities supports the elderly persons to lead an individual and active life within their homes. The main uniqueness of the product is the special design for the target customers and the openness of the product which enables the seniors to e low-cost or to use a familiar environment.

It is also important to provide a reliable support and training to the end-users. Our user requirement analysis showed that the target group is very sensitive concerning security and reliability and that this specific target group requires support to learn the use of Join-In. It may be a challenge but also an opportunity for the care-providers to provide training and support for the product.

6.4.2 Results

The Consortium found that our product, the Join-In Network, addresses two main target groups. The first one, the "Primary End-User", is the user of Join-In, the individual elderly user and his/her social network. The other one, the "Secondary End-User", are those, who are already in the elderly caretaking sector, and are possibly interested in a low-cost network to provide better and cost-effective service for their clients.

The Business Model for Join-In is mainly based on a Subscription Model. Users are charged a periodic -daily, monthly or annual- fee to subscribe to a service. It is not uncommon for sites to combine free content with "premium" (i.e., subscriber- or member-only) content. In the subscription model both the homebound elderly as well as institutional careproviders can purchase the Join-In service. The revenue calculations showed that a subscriptional model can be profitable from just 6 EUR/month/user if it reaches a certain users mass (see detailed calculations in D7.2 document revenue section). The care-providers can include the price in their services.

Fig.25 Value Proportion Diagram for Join-In Services

In order to realize profit it is crucial for the partners to find key partners in the health sector to enter the elderly market. The individual costumers can be reached by key partners who are in contact with home-bound elderly or their families.

7 Conclusion – Results and further research

Social networking has become a favourite past time with the young people. Elderly, non-experienced computer users are not very familiar with social networking. Yet many people get lonely and are in need of contacts when growing older and becoming less mobile. Based on the assumption that social networking could provide a means for socialising elderly people, Join-In developed an interactive social platform which includes communicative social networking, video conferencing, and video exercises, a serious game for memory training ("Memofix"), and a bicycling exergame. All of these applications run on PC or on a TV and settop box and are integrated into the Join-In social platform. The Join-In connector facilitates the integration of further applications and enables the interconnection with existing social networks and AAL solutions. Based on user-requests controllers suitable for the elderly users were designed and prototyped.

The Join-In social portal and its applications were tested by over 100 seniors in Hungary, Germany, Ireland and Norway. Most of the senior users were older than 70 years; many of them had even passed their 80th birthday. It showed that regular computer users did not feel addressed by the features of the Interactive Social Portal, which had been adapted to the requirements of the elderly inexperienced computer users. They found the simple layout and reduced functionalities little challenging. Contrary to this user group computer-illiterate persons received the Join-In Social Network very well; they perceived the portal and its applications as useful and accepted them well. The applications were evaluated independent from the portal. It can be said that the target group users perceived all of the applications as benefiting health and as being fun. Thus the biking exergame also got good ratings from computer experienced users, and the Memory card game was thought to be socialising besides training the brain.

Loneliness and social isolation are prevalent in elderly citizens. Studies show the detrimental effect that it can have on health. Research indicates that interventions offering social activity, active participation and support within a group are most effective to counteract social isolation. Our evaluation results indicate that it was exactly this user group that was addressed by Join-In. Therefore, though the involvement and training for the elderly non-computer literate clientele is fairly time- and personnel intensive the users perceived the benefits to be very useful –even when taking into account the effort it took for learning the system. Further studies are required to assess the effectiveness of Join-In towards alleviating social isolation and loneliness in older people in more detail.

Join-In is a niche product for highly aged non-experienced computer-users and thus very valuable. It offers a secure and user-friendly environment and proved a good staring tool for to learning how to handle a computer. Knowing how to use a computer is important to the elderly – at any age. We learned that this added to the elderly people's quality-of-life. Some of the German users bought PCs at the end of the piloting phase.

All project partners benefited from the project. The results of the project are already being used in other projects, e.g. by the Diakonie München-Moosach In Hungary Johannita Segítő Szolgálat (Hungarian Johanniter Charity Service) has started establishing a country-wide social network for the elderly based on the Join-In Interactive Portal and its applications.

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Appendix A Consortium

The Consortium consisted of

Research Institutions and Universities

Helmholtz Zentrum München - German Research Center for Environmental Health, Institut für Biologische und Medizinische Bildgebung / AG Medis
(www.helmholtz-muenchen.de)

Helmholtz Zentrum München investigates important common diseases which develop from the interaction of lifestyle, environmental factors and personal genetic background, focusing particularly on diabetes mellitus and chronic lung diseases. It is a member of the Helmholtz Association of German Research Centers. The department of Medical Information Systems focuses on developing intelligent systems for integrated health care, on electronic medical records, and telemedicine.

Helmholtz Zentrum München was responsible for the coordination of the project, for the development of the Join-In Social Network, of the video system, and of the exercising videos. It supported the German piloting, the evaluation and dissemination.

Institute of Technology Carlow (www.itcarlow.ie)

The Institute of Technology Carlow (ITC), Ireland, is a higher education and research institute established in 1970 with considerable expertise and involvement in EU funded projects under the EU Framework programmes, Tempus and INTERREG. As part of its Strategic Plan 2009-2013, four key Centres Of Research and Enterprise (CORE) have been identified for development. One of these, GameCORE aims to be a national centre for excellence in Interactive Applications Software and Networking. The Join-In project at ITC was completed by researchers from GameCORE which is located in the new multi-million euro research development and innovation Dargan Centre at ITC and has extensive regional, national and international community, enterprise and academic collaborators.

ITC were responsible for the design, development and testing of the multiplayer Memofix game. ITC also designed and developed several demonstrators including a prototype based on the Sustained Attention to Response Task (SART), a multiplayer 'Maze' exergame and contributed to the development of the Antique hunt prototype. In addition to this ITC performed a laboratory test of the Memofix game with 8 users. ITC agreed to complete a pilot study with 20 elderly users while providing a comprehensive training video along with unlimited email and telephone support to users. Furthermore, ITC were responsible for the dissemination of news and information regarding the project in Ireland and further afield.

University Hospital of North Norway (UNN), Norwegian Centre for Integrated Care and Telemedicine (NST) (www.telemed.no)

NST is an interdisiplinary centre for research and development in telemedicine and e-health, situated in Tromsø in northern Norway. NST became a World Health Organization Collaborating Centre for Telemedicine in 2002. NST is also hosting a centre for Research based Innovation established in 2006 within telemedicine and e-health systems for chronic, age and life-style related diseases, funded by the Norwegian Research Council.

In Join-In the NST was responsible for "interactive applications for physical exercises for the elderly". Further, NST designed and developed, home piloted and evaluated the biking exergame in cooperation with Norut.

Norut - Nothern Research Institute Tromsø (www.norut.no)

Norut is a multi-disciplinary research institute, with applied research activities in technology, innovation and social science. Norut is currently involved in several Norwegian and European e-health projects related to ICT solutions for personal health care and home based rehabilitation, education, training, self-management and
following-up of chronically ill elderly. The e-health group works closely with the Norwegian Centre for Telemedicine.

In Join-In Norut was responsible for Work Package 4 "System platform" and several activities and deliverables in this and other WPs. Norut designed, developed, home piloted, and evaluated the Biking exergame, in cooperation with NST. Norut also designed and demonstrated the AntiqueHunt Kintect exergame.

During the project Norut learned how elderly seniors play available exergames, and used this knowledge to design and implement exergames specially tailored to their needs and capabilities.

SMEs (Small and Medium Enterprises)

Bull Hungary (www.bull.hu) is part of Group Bull. Bull develops and produces different scales of servers, security and management software, e-business and enterprise application integration technologies. Bull Hungary's main competitive market edges are: products and related services delivery, technology-integration within the frame of Central Public Purchase, and the successful implementation of IT solution-centric complex, result-oriented main-contracted projects. Bull Hungary has two dominant business units: Information Technologies and Business Solutions. It is active member of Hungarian Association of IT Companies.

Within the project Bull Hugary was responsible for quality assurance of the results (product and services) and also the implementation of the Join-In social network in Hungary. It supported the user evaluation in Hungary and was a contact point to

the industrial bodies, promoting the innovative results in the Hungarian eHealth sector.

HappyWise, Finland ((www.happywise.fi)

HappyWise develops tailored serious games and provides solutions for e-learning for companies and organisations.

HappyWise contributed to the project the analysis of user requirements as well as the concept and social network methodology. We helped identifying the games to be implemented in the project as well as developed avatars for the exergame and lead the workpackage on exploitation.

Valentia technologies, Ireland (www.valentiatech.com) develops leading-edge enterprise applications for community-based health and social care service delivery, based principally on mobile/wireless technologies. Their development focus reflects the changing nature of established healthcare services, arising from increasing patient empowerment, affordable personal medical devices, demographic pressures and budgetary constraints, all contributing to a substantial shift towards distributed managed care.

Their emphasis is on directly improving healthcare outcomes and quality of life by enabling improved condition monitoring, care management, proactive intervention and quality assurance. Uses for Valentia's solutions range from acute emergency management to chronic disease management. Our applications are designed to be deployed within conventional public healthcare settings as well as within private/personal healthcare. Valentia's development focus and expertise is underpinned by the significant health informatics and clinical medical experience of the company's founders and staff.

Valentia's applications can be used with various input devices, including mobile phones, PDAs, digital pens, medical devices and specialised electronic sensors.

Valentia's role in Join-In was to provide technical assistance such as developing social media connector APIs and assisting game developer partners in Kinect development. It designed and developed APIs for Join-in Partners to integrated games with Social Portal (ELGG).

Pasife GmbH, Germany (www.pasife.de)

Pasife has a long-term experience in TV software technology and integration of wireless sensor devices. The company is now focusing with its technical and business expertise on service solutions for the elderly. Based on own developments and available AAL solutions from partners, Pasife offers seminars, training and consulting for end users, institutions and companies.

Its Role in the Join-in Project was

- Controller design and development for motion sensing and menu navigation
- Supply of devices, installation and setup for end-users and project partners
- Testing of the Join-In platform including portal and games
- Onsite and remote support for end users and project partners
- Education and training of end-users

User Organisations

Diakonie München-Moosach – Verein für soziale Aufgaben, Germany (www.diakonie-moosach.de) has been providing social services in North-West Munich since 1965. Besides running institutions for children and young people, a Citizen's Social and Legal Advice Bureau Diakonie München-Moosach focuses on services for senior citizens. The largest department is the ambulatory nursing care unit. It runs senior clubs in the parish and offers health activities like gymnastics and dance for seniors. Moreover, our professional cultural and travelling programme addresses a totally different group of the elderly with great success. It cooperates with a variety of partners, for example three Protestant Church communities, the city of Munich and the city's social care centre ("Sozialbürgerhaus") Moosach.

Diakonie München-Moosach set up the contacts to different user groups, it performed the user requirement analysis and - in cooperation with the Helmholtz Zentrum München- the piloting and evaluation was done.

Johannita Segítő Szolgálat [Hungarian Association of the Johanniter Order] **(**www.johannitak.hu) is essentially consisting of volunteers, under the direct supervision of the Hospitaller and a dedicated team of senior knights, operating 11 regional centres staffed with volunteers, including 7 in Hungary, 2 in Romania, one in the Ukraine and one in Slovakia. Most of the local organisations focus on caritative needs of local parishes, with a stepped up emphasis on youth-oriented programs. They are supporting the protestant elderly houses and peoples in the needs. The Hungarian Johanniter are member of Evangelical orders of St. John active in Europe.

Johannita Segítő Szolgálat was responsible for the Hungarian user involvement, for making Join-IN known amongsts the user centres, for the user requirement analysis, for training the users, for piloting , evaluation and communicating the Hungarian user related results within the project.

Additional Supporters

We are grateful to the following organisations for supporting the project in the user requirement analysis and in the piloting.

Heracleum – a senior centre that organised a Norwegian user group as well as regular Wii exergaming for seniors started because of the project.

LHL, the Norwegian Heart and Lung Patient Organisation, local branch Tromsø, helped to set up a user group with seniors for the requirement phase, and in recruiting participants to the lab-trial and to the home exererbiking pilot.

Senior participant were also recruited from the rehabilitation clinic at UNN to the requirement phase.

IT Carlow Emeritus Association group consists of retired staff and friends of Institute of Technology Carlow, County Carlow, Ireland.

Active Retirement Ireland The New Ross seniors group are part of the Active Retirement Ireland group located in New Ross, County Wexford, Ireland.