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End-User Requirements

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Abstract: Collection and analysis requirements from end-users, with respect to the envisaged applications and services of the Elder-Spaces platform, as well as will incorporate relevant research. Establishment of a set of comprehensive end-user requirements associated with the use of social networking by seniors.

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Table of Contents

List of Tables

List of Figures

Glossary

AAL	Ambient Assisted Living
APP	Application
BYTE	Byte Computers S.A.
CAPTCHA	Completely Automated Public Turing test to tell Computers and Humans Apart
DoW	Description of Work
DSL	Digital Subscriber Line
ES	Elder Spaces
FAQ	Frequently Asked Questions
FB	FaceBook
F1	Functional key No1 (PC-keyboard encoding)
GUI	Graphical User Interface
GSM	Global System for Mobile Communications
HUF	Forint (Hungarian national currency)
ICT	Information and Communication Technology
IP	Internet Protocol
iWiW	International Who Is Who
KAPI	Open Centre for Elderly Protection
ISO	International Organization for Standardization
MS	Microsoft
PC	Personal Computer
RFID	Radio Frequency Identificator
SIM	Subscriber Identification Module
TV	Television
WiW	Who Is Who
WP	Work Package

Executive Summary

Social Networking is an emerging trend of the last few years, which mostly affects relatively younger ages. This project tries to change the aforementioned correlation, engaging more people over fifty five years old. In this document is analyzed a first effort to declare and analyze the requirements of the end-users.

At first, the methodological approach of the users is discussed. The scope of the project is to identify the users who will be the actual pilot test people. The proper methodology is displayed and the expected outcomes are outlined. The method is separated in distinct parts, such as preparation, conduction and reporting.

Next, the results of the conducted survey are presented. The proposed user groups are separately displayed and the findings are further analyzed. The questionnaire that was given to the users is also presented, as source for the comments and conclusions.

In the next chapter, there are recognized specific requirements. Some of them have functional and other non-functional characteristics. The identified requirements for the end-users are usability, validity, need for control, technology level awareness and social background. Consequently, the equipment that is to be used is discussed.

The existing platform iWiW is briefly presented, on the scope of the current document. The existing infrastructure is displayed and the methodological approach with consequent results are also extracted.

A set of existing European projects has been analyzed, so as to adopt any positive impact in the current project. A small comparative analysis summarizes the best aspects that should be followed during the conduction of the project.

Finally, it is stated the general framework of the legal issues that must be followed during the conduction of the project, and especially during the process of analyzing the requirements. For this reason, there is also depicted a consent form, which should be signed from all users joining the pilot phase of the project.

1. Introduction

1.1 Overview

As set out in the Description of Work (DoW), a dedicated work task (T 1.1) in the overall project is directed towards the establishment of a set of comprehensive end-user requirements associated with the use of social networking by seniors. Additionally, this task will collect and analyse requirements from end-users, with respect to the envisaged applications and services of the Elder-Spaces platform, as well as will incorporate relevant research. In this perspective, the following are described:

- The methodological approach which illustrates how from generic user stories the consortium defined concrete user and system requirements,

- The indicative services lists evaluated from the users and the user requirements derived from this analysis.

As further specified there, this document is intended to support the pilot sites in carrying out this strand of work through the provision of high level guidance on how the methods and techniques set out in the DoW may best be applied, thereby leaving room for customisation as deemed necessary at end-user level.

1.2 Relation with other WPs

The current document (D1.1) has impact to other WPs and tasks. It can be considered as the basis of the project, as it defines the end-user requirements that should be met throughout its lifecycle.

The remaining tasks of WP1 (T1.2 to T1.5) may use data that are included in the current document, as there are discussed requirements from other perspectives and are proposed real life use case scenarios. Section 2.3 lists concrete requirements which should be taken into consideration throughout the whole implementation of WP1.

This impact is also obvious in WP2, where the specification of the network services and the applications are to be thoroughly discussed. In section 2.2 are listed some proposed services, which can form the basis for the further development of WP2, and specifically for tasks T2.1, T2.3 and T2.4. There is also a first attempt to encode functional requirements for better handling and further reference.

Regarding WP4, T4.1 can be based on the usability explained in the current document and T4.4 should consider the expected functionality of the users, as clearly stated in section 3.

In general, it is assumed that either directly (aforementioned WPs and Tasks) or indirectly, the current document affects in great rate the project as a whole.

2. User Interrogation and Requirements Analysis at e-Trikala

2.1 Methodological approach

According to the project's aims to enrich and expand the state-of-the-art and state-of-practice of social networking for the elderly in Europe, the main user groups that are going to be approached in order to attain specific aims could be divided as follows:

- People from 55 years old to 70. This user group is consisted from people that are close to their retirement but remains essential to them to enrich their work with positive impacts that will be gained from a technological perspective. They have the chance to exchange the knowhow and experience gained so long. Besides the aforementioned user group, there are also people that are retired and search ways to spend their time creatively. There is the chance for them to practice their favorite hobbies and get in touch with other people that have similar preferences.

- People from 70 years old to 80+. It is statistically considered that this user group is the least relevant to new technologies. Most of the people belonging to this group are not used to internet usage and are ignorant on the various applications that have been developed. It could be a great apportunity for them to use the platform and communicate with their relatives and friends, improving their quality of life and avoiding psychological disorders like depression and mild dementia.

- In addition to the main user groups there is a prediction for intergeneration activities that are going to take place between elderly and younger people. During this procedure, young individuals will help the users of the platform to get accustomed to the new technologies used. This is a chance to reciprocate experience from one part to the other and get significant advantages.

2.1.1 Aims and expected outcomes

The user groups and sessions are primarily intended to provide general feedback on the experiences and opinions of the users of the ELDER-SPACES technical systems – e.g. elder end-users – in respect of relevant services as they are currently provided. This would in turn shape the general assessment of expectations, needs, most common situations and problems that the users face, creating the basis of the user related requirements. Another aim is to collate – as far as this is possible at this stage – direct feedback on the ELDER-SPACES service scenario in relation to preferences and expectations the users may have.

2.1.2 Methodology

Different service scenarios are envisaged to be tested across the ELDER-SPACES, and the user groups that may need to be involved in requirements elicitation may vary accordingly. Key user groups that are of relevance to the particular service in question need to be identified at each case. The question how best to gain access to individual users may deserve particular attention.

It may also be worth considering re-engaging with individual users at later stages of the project. User groups include for instance:

- Healthy adults aged over 55 years old

- older people affected by general age-related decline

- older people at risk of social exclusion

- people engaged in voluntary social work

An appropriate recruitment strategy needs to be developed at pilot site level on a case by case basis. Recruitment of elder end-users may for instance rely upon sampling from client databases typically maintained by service provider organizations. With a view to reaching homogeneity, certain selection criteria can be applied to such participant pools. Such criteria can for instance be applied either before a random sampling or afterwards – depending on the level detail provided by the information stored in the available client records.

2.1.2.1 Preparation

Preparatory work should also include the formulation of a set of research questions, with a view to guiding user group discussions and/or interviews of individual users. Clearly, the research questions to be developed will need to take account of the characteristics of the particular service ultimately to be tested, and of the user groups to be addressed respectively. Some analytical dimensions that may potentially be relevant when it comes to the formulation of concrete research questions presented in a generic manner below. Again, these are intended to serve as "food for thought" rather than as a definite set of issues to be addressed in any case.

End-users

- Social and economic background of the users (e.g. connectedness with others such as family and friends, personal/family income, educational attainment)

- Personal needs that could potentially be addressed by means of the envisaged ELDER-SPACES services (e.g. social related needs, social inclusion related needs,)

- Current access to and use of ICT (e.g. mainstream services/equipment)

- Perceived advantages/disadvantages of ICT currently used.

- Desire to use new ICT in general and/or ELDER-SPACES services in particular

- Factors hampering/facilitating the utilization of (new) ICT in general and/or ELDER-SPACES services in particular

- Perceived advantages/disadvantages of ICT in general and/or ELDER-SPACES services in particular

- Perceived potentials for improving the envisaged ELDER-SPACES services

2.1.2.2 Conduction

It has proved useful in comparable research contexts to compose user group sessions of a group discussion on topics set out in a dedicated list of research questions together with an individual

questionnaire. It has further proved useful that focus groups are organized and led by a suitable and experienced professional, together with an independent observer who should be capable of assessing implication of the interventions made by the participants in relation to service-related requirements and feasibility related aspects. Video/audio recording of the user group session may be useful as well. If this is deemed inappropriate the session should at least be documented in writing by a dedicated rapporteur.

In procedural regard, it may be worth paying attention to a number of aspects:

- It was essential to enable a round of introduction involving all participants. Additionally, it was necessary to make sure that the roles of the participating project team members are known to the participants (e.g. moderator, rapporteur, technical expert).

- Other critical point was to obtain consent about participation/recording (if ever possible in written form). An exemplary consent form is annexed to this document in English language. The consent form ultimately to be used should be translated in national language. Any additional requirements on obtaining consent from the participants that may be imposed by national regulation/legislation should be covered by the consent form ultimately used as well.

- Participants were briefly introduced at the ELDER-SPACES project (e.g. aims, funding context, participants, expected outcomes and envisaged utilization beyond the project duration). It was important to make sure that all participants share a good understanding what the project is about.

- Explanation of the user group session's rationale and the way the participants' contributions would be further utilized within the overall project. It was essential to make sure that participants understood why they were asked to participate and what we expected to learn from their contribution.

- Participants were encouraged to make an intervention, ask questions at any time and create an open discussion atmosphere.

- When participants were asked to complete a questionnaire, people who had difficulties in reading or filling in the questionnaire got personal assistance.

2.1.2.3 Reporting

The involvement of different types of users at this early stage of the project is intended to guide the further process of use case development and service specification internal to the project. Outcomes should therefore be reported in a clearly structured and concise manner, whereby reporting should aim at covering all aspects that may be of relevance in relation to further use case development and service specification. Thus, there was extracted a synthesized list of requirements on the envisaged service.

A list of requirements on the envisaged service should be derived from the group discussions/ questionnaire. Again, reporting may take the form of bullet points. Depending on the service in question and the user groups involved requirements may concern a number of analytical dimensions such as:

- Impact of the service on the users, e.g. in terms of quality of life of users, security, health status and the appeal of the services,

- Access to / usability of services by the users,

- Services quality/efficiency,

- Ethical aspects,

- Regulatory/legal aspects.

<u>Summary profile of the event</u>

The event took place at KAPI's salon for general use on 21st of June, 2011. The event's duration was approximately 3 (three) hours. There were 14 participants in total. Specifically, the meeting was attended by 10 elderly, 3 technical experts and one psychologist. There was an introduction in order that every participant understands their role. Technical experts explained the aims of ELDER SPACES project to participants and psychologist helped mentally and emotionally in case needed.

2.2 Results

2.2.1 Profile of the users / main results from the analysis

From the feedback by the audience, there was given the chance to form a more concrete profile of the users. These users were allocated between the two aforementioned groups, the first one is 55-70 and the second is 70+. Specifically according to the recording that was realized, the two thirds (2/3 or seven people) of the participants belonged at first user group and only the one third (1 / 3 or three people) belonged in the second one. Furthermore, people from the second user group were elderly between 71 to 79 years old.

It was quite obvious that people from the first user group were more willing to participate in the process. Most of them still work (five out of seven still work and only the two are retired) so they are involved with the technology directly or indirectly through their job or their children. Consequently, it is easier for these people to get accustomed with new technological procedures like social networking. On the other hand, this user group, which has not been retired yet, does have limited time to dedicate to the project. Obviously, this user group could be handled in such a way in order to help the rest of the users to get involved. Additionally, in the first user group there were a number of people that had been recently retired. Although, this part of the group was older than the previous one, they seemed quite optimistic and willing to get involved in the social networking procedure. They seem to have hobbies and are occupied with several tasks in order to remain active and useful.

Continuing with the second user group that was consisted of older people aged between 71 and 79, there was greater difficulty in explaining the role that they would have in the project. Although it was clear that they keep on being socially active and having quite lots of interests, neither of them had any computer skills. Nevertheless, it is a challenge to get this user group involved with technology.

2.2.2 Indicative services list

While interacting with the users, they were informed on a variety of potential services that might be applied for the scopes of the project. The following list contains indicative services, which may attract as wide audience as possible.

- Members of the same group exchange multimedia content from participation in common activities / events. Through the platform, they can upload photos from a social event they were participating, exchange music or video files and talk in groups of two or more about it.

- Members of the same group (professional group) exchange experience and discuss different opinions. In this service, professionals may exchange emails concerning their job, chat about how they can overcome difficulties or bureaucratic procedures concerning their profession, exchange ideas on how to improve their working routine or even to locate new partners.

- Intergenerational activities. Users over fifty five may have the opportunity to express their concerns and life experiences to students during school events. They will be officially invited to attend and describe their personal experience on specific matters (professional experience and know-how, participation in social groups and clubs and the way they function). Furthermore, this procedure may be reversed, having the students make the lecturers and people over fifty five to pose the audience. This way, students may help the seniors with technological issues (explain how to perform on simple computer tasks or solve confusing mobile phone issues), express their own ideas on specific subjects of interest and even propose ways to interact intergenerationally, for example on volunteering activities and social events.

- For the relatively older users, there could be a service "rate your doctor". With this self-explaining term, all participants will be able to exchange views about their doctors. They can either propose a health professional accompanying with compliments or even express any documented criticism regarding the way they treated them. This kind of service may end up in closer groups of people having the same treatment, who can exchange their everyday experience and propose to each other ways to improve their routine.

- e-KAPI. With the term KAPI, it is meant an open center for taking care of elderly people (in Greece). The conventional KAPI is a building with social care givers where seniors gather and exchange views and socialize in general. This service will give the opportunity to seniors to overcome transport difficulties. While they will not be able to visit a conventional KAPI (weather, transportation or health causes), they will be able to 'attend' to its 'electronic' version, which is available at all times in daily basis. This is not meant to substitute the conventional KAPI, but act subsidiary in specific cases. This way, even more seniors will be able to attend (one way or another), increasing the KAPI's community in numbers, giving the opportunity for socialization to even more people.

- Organization of events. The proposed platform may give the opportunity to people over fifty-five attend social or charity events. With the help of already existing widespread software tools (skype, MSN, doodle, etc), the most functionalities of which will be adopted to the new platform, they will be able to easily organize and perform events of variable size and subject, depending on the participation and the expressed interest.

- Learning and Training activities. The envisaged schema is to provide through the platform lifelong learning and structured training activities. Potential subjects may include recipes for cooking, technology know-how issues, dynamic activities proposed by the users etc, which all may be implemented by a customized e-Learning platform.

- Search. This service will pose an effective tool for searching whatever content may be part of the platform. From searching a friend or group to a past event, or even from a past sent message to a game application, this service should be as easy as possible, using ontological search features. A potential extension of the service might be an augmented social cognition tool which will be based on each user's interests and propose activities according to one's profile.

2.2.3 Services per user group

The ElderSpaces services were ranked regarding our user groups:

- User Group 1 (55-70)

- User Group 2 (70+)

They are both part of a super category (55+), but are distinguished in order to better analyze basic characteristics they may have. Especially for user group 2, most of the users were aged a bit above seventy, as the difficulty in finding such target audience with for the pilot phase of the project is increasing exponentially.

The users ranked the service as "very important", "important", "not so important", "irrelevant" for the different user groups. They also had the possibility to add a new service not foreseen by ElderSpaces. In the "expected functionality" field they discussed how they expected each service to function. Ranking was filled out by the interviewer based on the conclusions of the interviews with the users.

Table 1: User Group 1 (55-70)

Service Type	Rank	Expected Functionality
Group for Activities	Very important	- Possibility to create clubs for playing cards, backgammon or chess, - Talk exclusively for gardening, - Express interest in cooking and exploring new recipes, - Perform common hobbies with others easily (stamp collection, bird watching, hunting).
Professional Group	Very important	- Exchange ideas on how to improve their work, - Explore the way other colleagues overcome difficulties (bureaucratic, law issues, procedural ones), - Find more suppliers or partners,

Service Type	Rank	Expected Functionality
		• Advertise their profession or products easily, • Search through internet international references approximating their case.
Intergenerational Activities	Important	• Visit schools and lecture on their field of expertise, • Participate in charities in co-operation with schools.
Rate your Doctor	Not so important	• Propose a specific health professional to others, • Criticize the work of a health professional with documented points of view.
e-KAPI	Important	• During summer when it is extremely high temperatures the socialization will not stop (the same applies for snowy or rainy days), • Find and socialize with more people who did not attend the conventional KAPI for their own reasons.
Organizing Events	Important	• Possibility to organize national or international excursions, • Participate in charity events, • Organize 'book evenings' with specific subject (literature, poetry), • Organize music events, either by listening to music or by performing as a band, • Organize excursions to the sea for swimming, • Organize sport events (basketball, football), • Organize national tours for sightseeing.
Lifelong Learning & Structured Training	Very Important	• Find new recipes for cooking and sweets. • Learn about technology 'know-how' issues (how to navigate through internet, how to write a text, how to use a mobile phone etc). • Be trained on performing exercises for staying fit. • Learn valuable 'tips and secrets' for

Service Type	Rank	Expected Functionality
		several professional aspects. • Learn mind games (chess, checkers, memory games etc).
Search	Very important	• Search past uploaded content (multimedia files). • Search a friend. • Search a previous event. • Search an existing group. • Search a post. • Search a game/application. • Search general content.

Table 2: User Group 2 (70+)

Service Type	Rank	Expected Functionality
Group for Activities	Very important	• Possibility to create clubs for playing cards and backgammon, • Talk exclusively for politics, • Perform common hobbies with others easily (stamp collection, bird watching, coin collection).
Professional Group	Irrelevant	• Search through internet international references approximating their former professional state, to monitor the progress of the field.
Intergenerational Activities	Not so important	• Visit schools and lecture on how to prevent wars and try to live peacefully.
Rate your Doctor	Important	• Propose a specific health professional to others, • Criticize the work of a health professional with documented points of view.
e-KAPI	Very important	• During summer when are extremely high temperatures the socialization will not stop (the same applies for snowy or rainy days),

Service Type	Rank	Expected Functionality
		• Find and socialize with more people who did not attend the conventional KAPI for their own reasons, • When they will be sick, they will still be able to socialize with their friends.
Organizing Events	Important	• Possibility to organize national or international excursions, • Participate in charity events, • Organize 'book evenings' with specific subject (literature, poetry), • Organize music events, either by listening to music or by performing as a band, • Organize excursions to monasteries, • Organize excursions to therapeutic spas, • Organize national tours for sightseeing.
Lifelong Learning & Structured Training	Important	• Find out new recipes for cooking and sweets. • Learn about technology 'know-how' issues (how to use a mobile phone etc). • Learn card games. • Learn mind games (chess, checkers, backgammon etc.)
Search	Very important	• Search a friend. • Search a previous event. • Search an existing group. • Search a post. • Search a game/application. • Search general content.

2.3 End-User requirements

The requirements for the end-users are the requirements that can be extracted from the social background and everyday life of people, in particular the social interaction between people and their relationship with ICT. In order to define such requirements, it should be taken into consideration what a user expects from a social network application (user requirements) and what can be extracted from the overall environment in which they interact with other users (context requirements).

2.3.1 First level categorization

In order to present requirements for the 'elderly' as end-users, there is an effort to list them in the following general categories (Amela Karahasanovic, 2009)[1].

- Usability

- Validity

- Need for control

- Technology level awareness

- Social background

Those requirements may either meet functional (e.g. usability) or non functional (e.g. social background) needs and are separately explained in detail in the following sections.

2.3.1.1 Usability

Usability is always an important issue, when referring to ICT projects. We might even say that simplicity and user friendliness are even more important for people over fifty five than for other age group users.

Such target audience is more prone to have friends and (younger) family members explain to them what a technological term or application or issue might be. Having this attitude in mind, the proposed service should be as easy as possible in its use, trying to approximate the previous trend. The final application should consist of self-explaining compartments throughout its implementation. The GUI should be quite friendly and the colors used should not be intense at all, as some of the seniors might already have problem with their eyesight. Of course, any implementation should comply with the international W3C accessibility standards[2].

2.3.1.2 Validity

The validity of the service should also be taken into consideration. The service should not contain any inconsistencies or misleading parts. Senior users are expected to use the service with no upcoming confusing questions of type "what does it mean by that, should or shouldn't I proceed with the confirmation?", but have the whole working schema clear in their mind. In fact, there should be thorough explanation in a tutorial format, both as a separate file and as part of the application (e.g. by pressing F1 key).

Attention should be given on the impact of the new application on everyday life. The proposed

integration should consider lots of aspects of the users' routine and try to simulate the way of a conventional social community. Thus, the users will feel safer using the platform, consider it a helpful tool while conducting their daily social activities and consider that it makes their life easier.

2.3.1.3 Need for control

The members of the target audience need to feel that they are in control of the technology. This is linked with the need to feel safe and secure. If they are not comfortable and feel they are not in control, they will not interact and share any personal information or multimedia content with others. More concretely, they want to be able to choose whether or not their interaction will be kept private or made public, in terms of access rights. It should be possible to choose which people can see what content, not only regarding the proposed community to be created, but also within the outside world. Moreover, it has to be very transparent which messages or comments can be seen by everyone and which ones are only viewable by the person they might address.

2.3.1.4 Technology level awareness

As a general admission, it is not easy for seniors to keep up to date with technological innovations. The key to getting senior citizens to come to enjoy technology is to remove the fear which comes about through lack of understanding. It is advisable to teach them small skills at a time. Some of them, once they find the courage to start, find it hard to stop. For others it is a question of small steps – learning how to key in words in a PC's text editor at first, before trying to send an email, could pose an example.

In order to join this project, it is not necessary to have previous computer knowledge. Of course, if one is already accustomed to such systems is most welcome, but not a requisite. For the cases where users are not aware of how computers/mobile devices work, this technology gap should be strongly considered and make effort to initiate them to the technology world with simple words. Thus, when approaching the users it is advisable to be diplomatic and explanatory, trying to answer any arising question.

2.3.1.5 Social background

Social background plays an important role in the implementation of the current project. This 'personal type' requirement takes advantage of any already registered social behavior of the user. Any potential participation in social meetings and events might pose an ally in the recruitment of users for the pilot phase of the project.

More specifically, the membership in social groups, clubs or societies increase the possibility to attract users. Being motivated with the social impact, they will be prone to increase their social bonds either with their existing membership or create new ones. In the same time, it is an extra motivation for people who are not yet socialized in 'real life', to provide an opportunity to boost their socialization. For the latter group of people, it is proposed to rely on their experiences and collective memories, in order to attract them and ask them join the project. They are expected to become potential users, even though they have been absent from any conventional social activities of the community they were part of.

2.3.2 Second level categorization (functional vs non-functional requirements)

In this second level are distinguished practical functional requirements, prerequisite for the technical implementation of the pilot. The functional ones are based on the technical procedures to be followed by the potential users, while the non-functional ones are more abstract in content.

2.3.2.1 Functional requirements

This category of requirements is displayed in a standardized manner, for easy reference and use for the technical implementation from this point on. For this reason for each requirement there is displayed a descriptive code and title, the level of importance and a brief description, in the following table.

Table 3: Functional requirements

No.	Title	Code	Importance	Description
1	Login	FR_Log_001	High	The most important requirement, as it is the necessary step to initiate the proposed platform.
2	Create Content	FR_ContCr_002	High	Users should be able to create content throughout the software platform (posts, news, proposals etc).
3	Search Content	FR_ContSrc_003	High	Users should be able to search content (multimedia content, friend, group, event, etc) throughout the platform effectively.
4	Edit Content	FR_ContEd_004	Medium	Users should be able to edit content throughout the software platform.
5	Upload Content	FR_ContUp_005	High	Users should be able to upload multimedia content on the software platform (photographs, video files, documents).
6	Send Text / SMS	FR_Text_006	Medium	Users should be able to send short text messages to selected people (friends, groups).
7	Add Friend	FR_Add_007	High	Users should be able to add a friend.
8	Create Group	FR_GroupCr_008	Low	Users may create a group for a specific topic.
9	Manage Group	FR_GroupMan_009	Low	Some users could be given the role of a moderator and manage

No.	Title	Code	Importance	Description
				an existed group.
10	Edit Properties	FR_Prop_010	Low	Users may be able to edit properties from their profile or from own content uploaded on the platform.
11	Use Application	FR_App_011	High	Users should use applications (games, training or learning applications, etc) effectively.
12	Create Events	FR_Event_012	High	Users should be able to create events (excursions, charity, volunteering, social events, etc).
13	Create Calendar Entry	FR_Calend_013	Low	Users may use calendar entries in order to effectively manage their time schedule and create automated reminders throughout the platform.

2.3.2.2 Non-functional requirements

In this category belong requirements which are considered necessary and supportive for the ones of the previous category. So, their main role is to set a framework which should set in turn the operational boundaries. The main categories which have been identified with a brief explanation are displayed in the following section;

- Supportability
  All indirect actions aiming at each functional requirement should have a set of supportive actions. They may involve a wide range of minor tasks, which may differ for every requirement and even for each user.

- Reliability
  Each functional requirement should function indeed with no problems and do the work they are initially designed to do at first.

- Usability
  The requirements should be in accordance with their scope without causing extra burden from the user perspective.

- Performance
  The proposed services should be running continuously, setting high performance standards.

- Security and Legal
  The implementation of each requirement should comply with all regulations concerning legal matters (national and international) and security protocols.

2.3.3 Equipment needed

Regarding the implementation requirements for the end-user, there should be declared the framework of the proposed equipment to use. A user must comply with two general directions. They should have the means both for running the proposed application and communicating with others.

Due to recent advance in the ICT field, there is a variety of such 'hosting means', starting from the conventional PC to end up in smart phones or TV/PC combinations. The most common solution would be a PC (either laptop or desktop). It is considered to be more feasible for seniors above fifty five to possess a PC rather than a smart phone device, which are statistically used more from relatively younger ages.

Especially when designing applications for elderly people, one should bear in mind that different age groups have significantly different preferences for entertainment. Television plays an important role in entertainment among elderly people (mostly people a lot above fifty five years of age). It seems that to a large degree, television satisfies their social integrative needs. Thus, it would be easier if it were possible to use a TV/PC device, in order to use the proposed internet application, send e-mails or browse through the internet for sites of personal interest, probably with the help of a remote control joystick or similar device.

When it is assumed that the end-user is a holder of any of the aforementioned devices, the next key 'component' in order to communicate and socialize with other people is to have the ability to connect with them. In the most conventional way of 'connection', this would engage a xDSL connectivity, which would serve the PC solution. Alternatively, a GSM data SIM card would be essential for the connection through a smart phone, or a kind of pre-paid card for the third TV/PC alternative. All previous cases involve the subscription to an internet, mobile or satellite provider, with fixed or flexible monthly costs.

Of course, it is assumed that all end-users have their own personal account. Either on the proposed platform or on FaceBook, their account is the final pre-requisite for the project to be able to initiate its pilot phase.

3. User Interrogation and Requirements Analysis in the iWiW Platform

3.1 Methodological approach

Before starting the development, when the further directions of the development can still be influenced and the final features of the product can be parameterized, it is highly important to have feedback from potential users that can particularly help the work of ES product developers and thereby decisively impact the market success of ES.

- Is it important to know how users would welcome a new social website? What would bring actual value for us? How much is it held competitive against the current offering?
- How could the introduction of ES influence current usage patterns, vendor or brand preferences?
- Which service concept is the most viable, which should be introduced on the market?
- How should we define service parameters in such a way that it can meet the ES user's expectations in the best possible way?
- Which are the technologies and applications that should not be introduced yet, because the market is not mature yet for them?

The most suitable method for finalizing the product and service scenarios being elaborated and clarifying even less mature concepts and ideas is the qualitative method that was presented on the previous chapter, concerning the ES project.

3.1.1 Qualitative research: e-Trikala

Qualitative research is a non-structured explorative research method that is based on a small sample and contributes to understanding the nature of the problem. Since sometimes people are not ready or cannot answer certain questions because they get embarrassed or feel their sensitivity hurt (e.g. delicate issues), or people are often not aware of the drivers of their own acts, have subconscious motivations, they cannot answer the question even having the best intention.

Qualitative research can help reveal concealed or unconscious information, since it sheds light on such phenomena and their reasons. Quantitative research shows how much the given needs are characteristic and what is their distribution in the target group. Qualitative methods are less structured, are rather aligned with the interviewee's person and group, use creativity of the consumers that can often act as a rich source of ideas for the creative groups of market and advertising activity.

After the closure of e-Trikala's research, the next phase of the research is to be processed: quantitative analysis that quantifies and confirms the phenomena revealed by the qualitative procedures.

3.1.2 Quantitative research: iWiW social network platform

With the quantitative research on iWiW, confirming by quantifying the facts qualitatively researched by e-Trikala, using statistical analysis, it provides a large representative sample that

is based on the iWIW user base. Mathematical and statistical methods were used for data collection and data analysis. Certain operations of quantitative methods are easier to standardize, the answers obtained can be classified in types – some of the data processing techniques use software support –, thus results and conclusions depend less on the skills or approach of the person directing the research.

3.1.3 Aims and expected outcomes

The expected outcome from the research would be to prove how iWIW as a social network ensures for the target group, that is people aged 55+

- to live more actively, enjoy life, bridge distances and prevent loneliness and isolation,
- to minimize social exclusion, isolation and loneliness, depression, self-neglect, malnutrition, emotional distress, illness and higher mortality rates (due to suicides),
- to have applications achieving to boost senior's social activation on the basis of games, utilities and events that bring older people closer,
- to bring older people closer to the young generation based on activities that boost inter-generational relationships, like exchanging experience about group activities, events, trips, memories.

3.1.4 Methodology

First iWiW is presented as a social website and which functions are used, then is analyzed the usage patterns of the project target group, i.e. iWiW users aged 55+. Visit, UP and PI data show what functions and sub-pages users aged 55+ use, and reveal PI/UV, PI/visit rates.
Additionally, it is found out how the number and rate and activity (PI rate) of users aged 55+ evolved over time by comparing current month figures with previous years.

3.1.5 Introduction of iWiW

In this section a brief history of the iWiW platform over time is presented.

April 4, 2002: WiW starts, still without own domain name, is accessible from a single IP address, the system is running on a 486 PC. In the very first year the user base grew to 16,000; at that time having access meant a privilege, because only members could invite new users to the system. By 2004 the user base reached 50,000.

On October 26, 2005 WiW was transformed, made available in more than ten languages with the new name iWiW, with new design and extended functions. That year already 100,000 people used iWiW.

April 28, 2006: iWiW is acquired for almost HUF 1 billion by Magyar Telekom owned T-Online, the earlier editor of [origo], the website reaches one million visitors. As a result of unpredictable potential growth, temporarily the sending of invitations needed to be restricted early that year. The foreign languages interfaces were gradually removed, the social website continued as a Hungarian website.

In 2007, on the fifth anniversary already two million people joined the website, six thousand new users registered on an average day.

**2008:** A new feature was introduced for organizing clubs.

2009: Message board is developed for iWiW, and applications can be developed for the site.

2010: The site at its peak undergoes a major redesign, chat function is launched, 4,6 million users.

In 2012 registered iWiW users reach 4.7 million, a social news recommendation service is launched on the site with high popularity, as reflected by the number of comments. Currently 150,000 clubs are operating on the site, 86 million photos have been uploaded to the site servers by the users.

3.1.6 iWiW status in numbers

iWiW has 2.7 million active users, 40% of Hungarian internet users can be reached.

- **4,66 million registered users** – 15,000 new users every month
- **86 million photos** – 20 million comments related to photos
- **150,000 pages** – 10,000 commercials
- **2.7 million active users**
- **700,000 public profiles**
- **940,000 social news readers**

iWiW has 450,000 daily visitors, 800,000 – 1.2 million visitors use the most visited functions every week.

Weekly audience of iWiW nodes
w2-w5 average, Webaudit, Jan 2-29. 2012
■ weekly UV..

|	
login	1 201
main page	1 121
messages	872
profile pages	815
photos	812
logout	598
notifications	472
friends	390
news	385
public profiles	364
events	344
personal profile	331
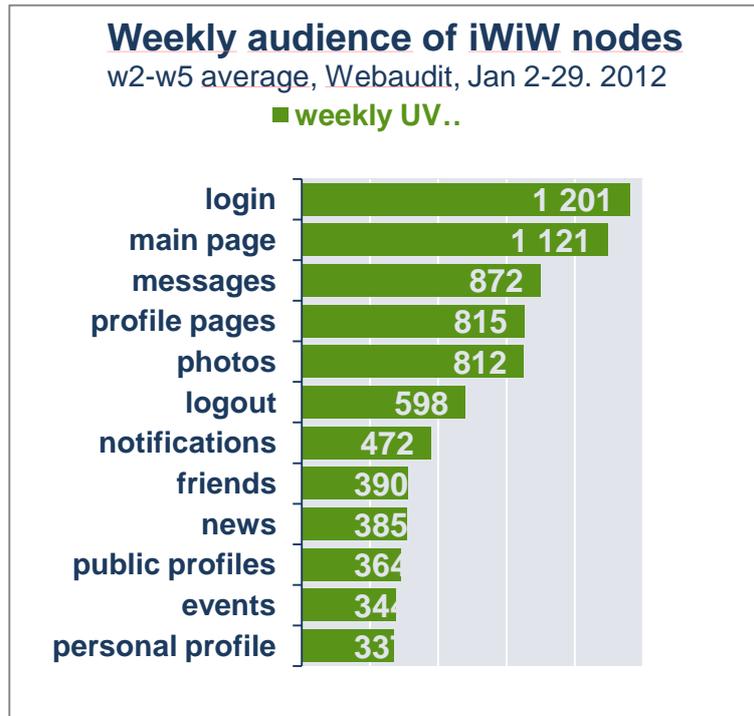
A recent comparison of audience to earlier general mass audience reach shows that several user groups became overrepresented significantly**.**

iWiW target group affinity change
gemius Explorer, Dec 2011/2011
basis: internet users

■ affinitás 12.2011   ■ affinitás 12.2010

	12.2011	12.2010
nő	106	105
30-39	115	104
35-44	114	105
35-44 nő	118	107
30-39 férfi	124	101
aktív nők	113	105
18-59 HW	110	102
30+ anya	108	96
diplomás	99	89
van autója	107	99

iWiW target group reach
gemius Explorer, Dec 2011
monthly unique visitors
■ reach

	0% 50% 100%
female (f)	42%
30-39	45%
35-44	45%
35-44 f	47%
30-39 m	49%
female, em..	45%
18-59 HW	44%
30+ mother	43%
college..	39%
car owner	42%

The most active users stayed with iWiW, average activity rates rise in most functions.

Activity rates change by iWiW functions– avg PI/visit
daily Webaudit, Jan 2012/2011
■ **2012. jan**   ■ 2011. jan

pages	messages	events	friends	profiles	photos

2011: 4,4 / 2012: 4,3 (pages)
2011: 4,4 / 2012: 4,8 (messages)
2011: 3,4 / 2012: 5,6 (events)
2011: 2,9 / 2012: 5,9 (friends)
2011: 4,5 / 2012: 6,3 (profiles)
2011: 14,7 / 2012: 13,6 (photos)
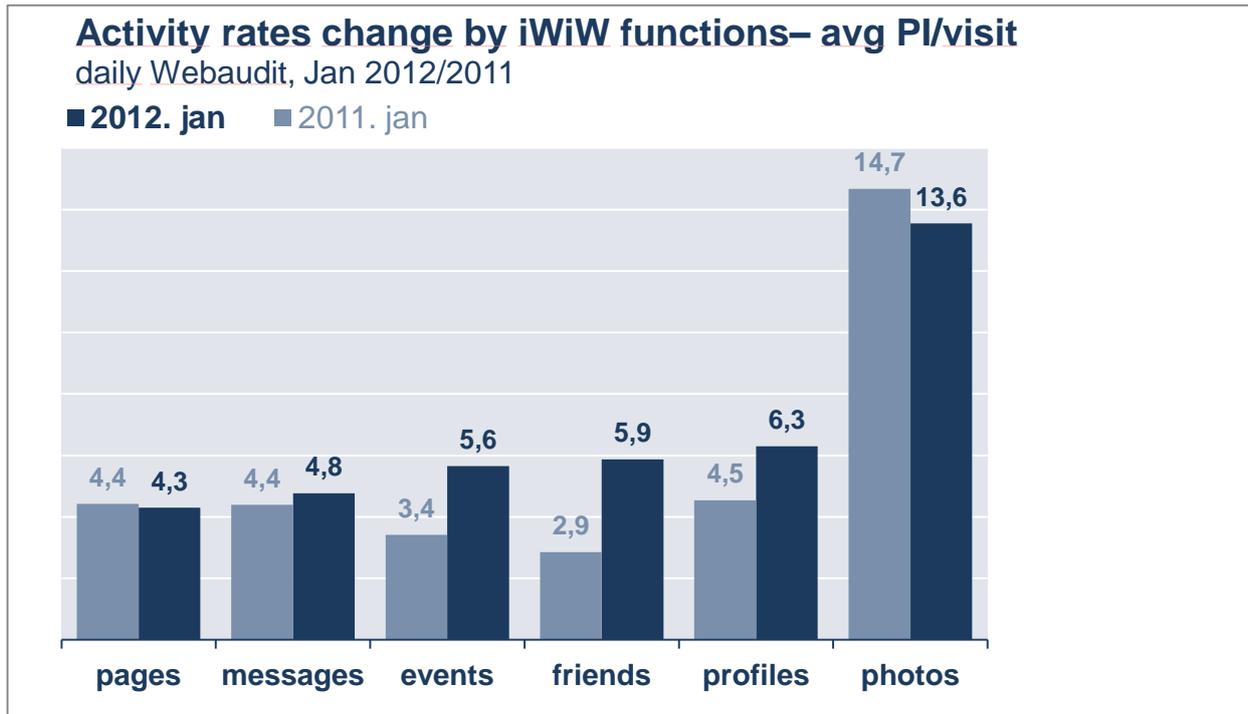
Every third iWiW visitor checks frequently his/her own personal profile page, 700,000 public profiles were made, visiting rates of these pages increased by 40%.

iWiW public pages
monthly unique visitors
Webaudit, 2011.07-2012.01
—◇— **monthly UV (.000)**

jul	aug	sep	oct	nov	dec	jan
648	617	635	801	932	867	905

Mobile audience is rising day after day. 175,000 users visited "m.iwiw.hu[3]" in January, and 80,000 have downloaded the mobile APP.

iWiW mobile audience
monthly, Webaudit, 2011.04-2012.01

◇ **m.iwiw.hu monthly UV**

174 838

117 572

2011.04 2011.05 2011.06 2011.07 2011.08 2011.09 2011.10 2011.11 2011.12 2012.01

iWiW APP downloads
Origo app stat, 2012.02

■ **total no. of downloads**

iPhone	37 756
Android	34 351
Symbian (Nokia/Ovi Store)	11 139
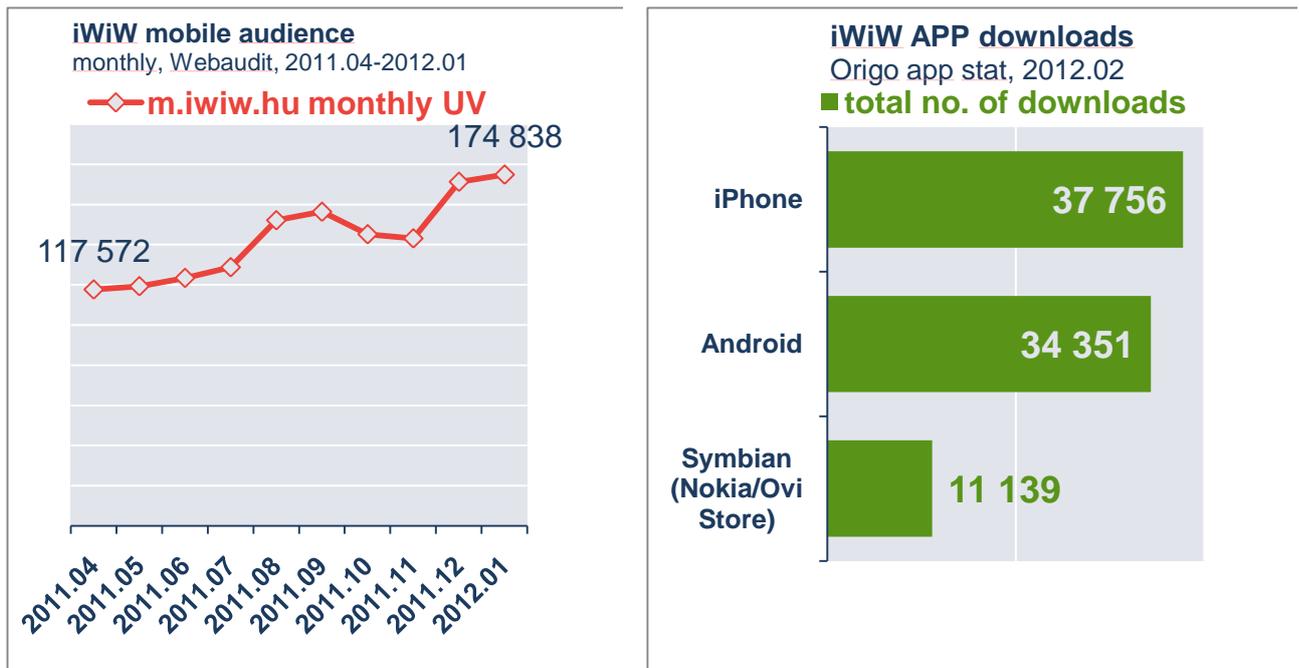
It is interesting that the internet connection in the target group +55 decreased sharply between 2009-2011 from 60% to 40%, which if true, it would mean that during these years many new Internet users began to be over 55, or even masses of Internet users aged into the age group.

iWiW 55+

■ Visitors (real users)   ■ Internet-users

62%

51%

40%   41%

236.835   282.898   273.800   268.605

01.2009   01.2010   01.2011   01.2012
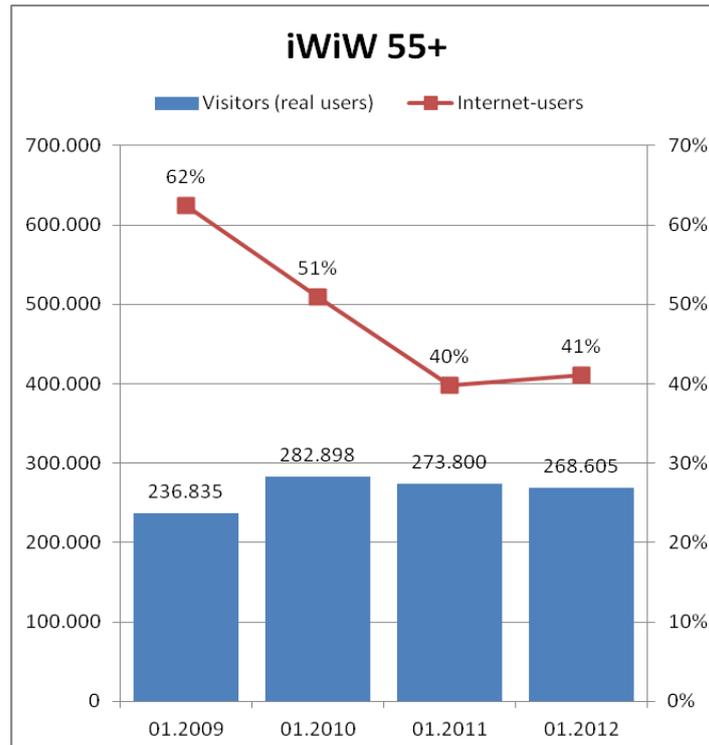
The measured audience of IWIW began a steep rise in their share last year , the same number of +55 visitors , 10% instead of 15% , represents 30% of their total audience shrank. Even steeper increase in the PI target was measured by time spent and share (16% or 23%) respectively.
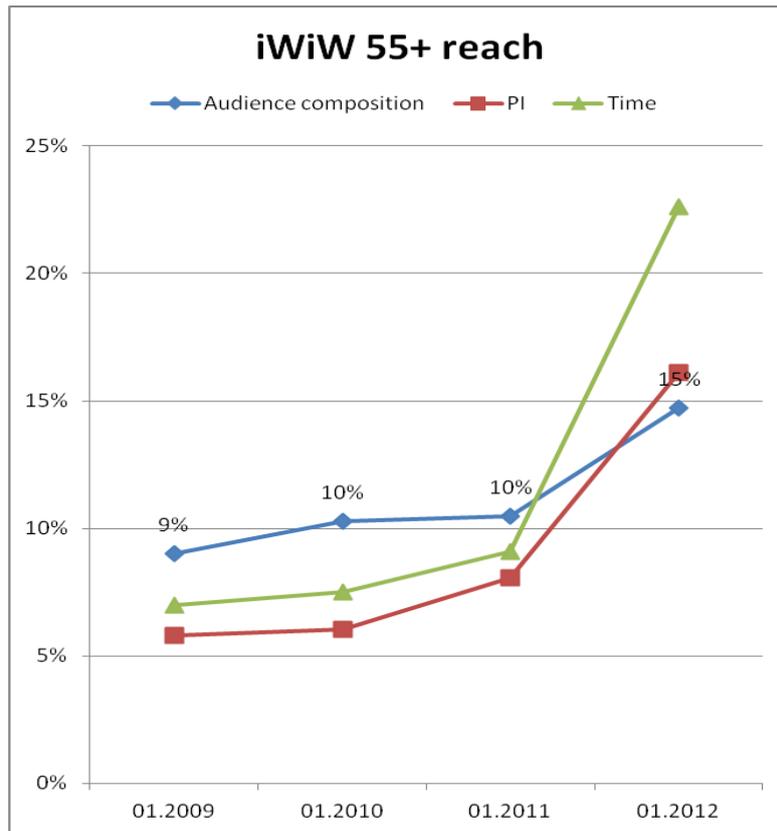
### 3.1.7 User of social site functions: iWiW vs Facebook

The figure below shows the functions most frequently used on social websites. For each function the upper line shows iWiW figures, the lower line shows Facebook figures. The figure enables analysis of association with the site and of usage on the site. Most people use viewing and messaging functions. The least frequently used function is small ads.
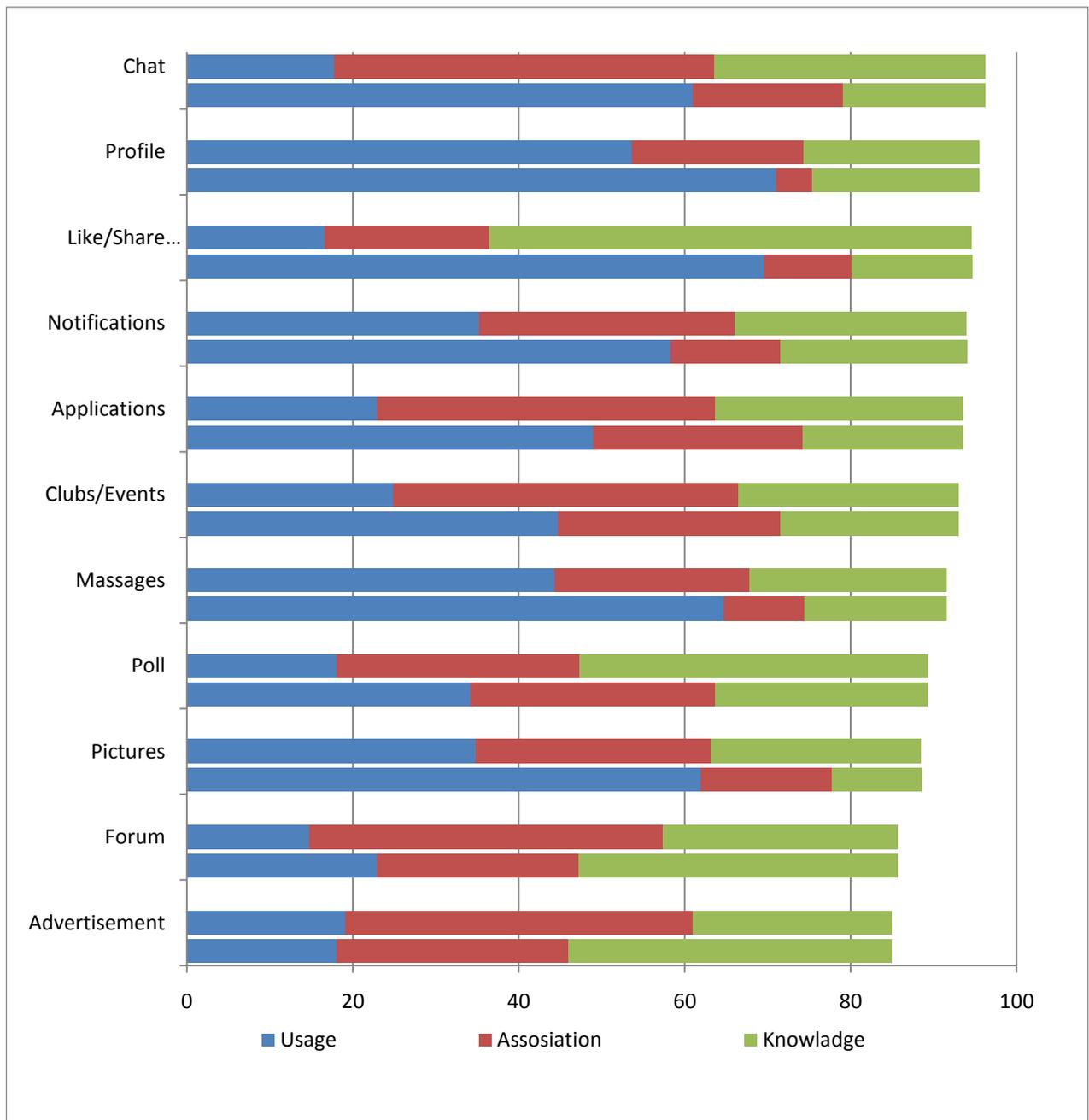
## 3.2 Results

3.2.1 Key results of the analysis (iWiW 55+ visitors)

Share of users visiting major functions decline also among 55+, while using messages and photos seems to be more stable.

Users of functions per total users
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
□ 2012
■ 2010

User share decline per functions
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
□ SHR 2012/…
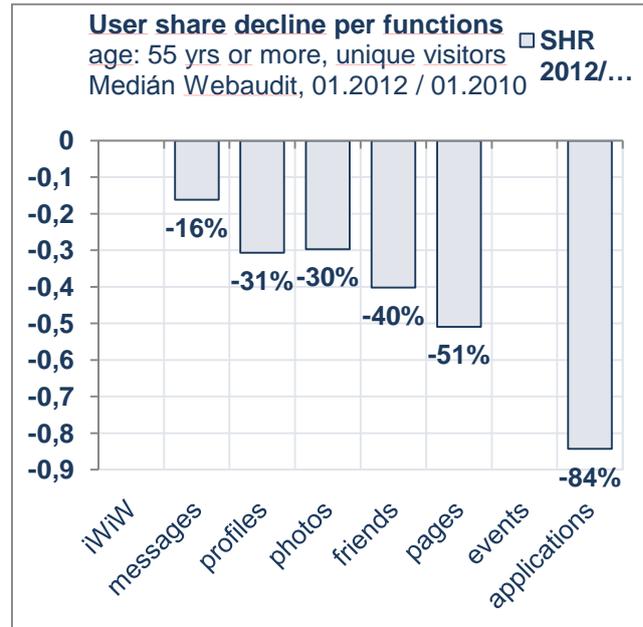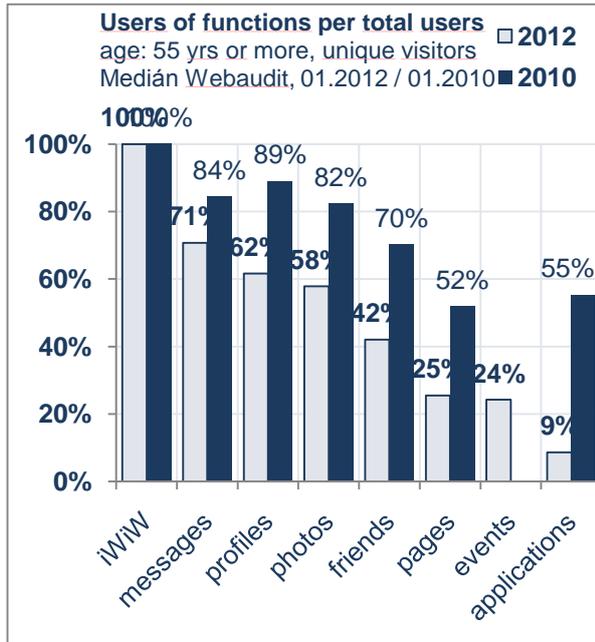
Share of 55+ users in pages (clubs) and friend list audience grew above the average.

Audience share of 55+ users per functions
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
■ 2012
■ 2010

Affinity index of 55+ users per functions
basis: share in total 55+ iWiW audience
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
■ 2012
■ 2010

Activity of 55+ users in pages (clubs) and friend list audience grew above the average, users are still more active in messaging.

PI share of 55+ users per functions
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
■ 2012
■ 2010

Activity index of 55+ users per functions
Basis: PI share in total 55+ iWiW PI
age: 55 yrs or more, unique visitors
Medián Webaudit, 01.2012 / 01.2010
■ 2012
■ 2010
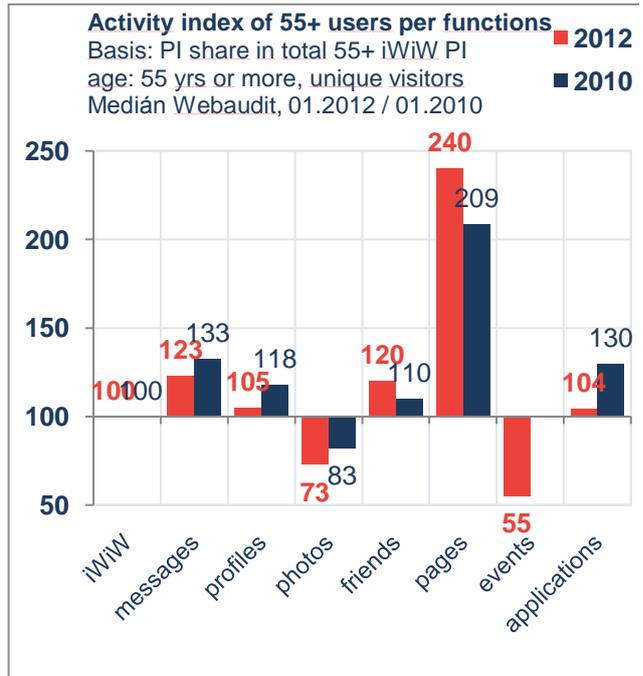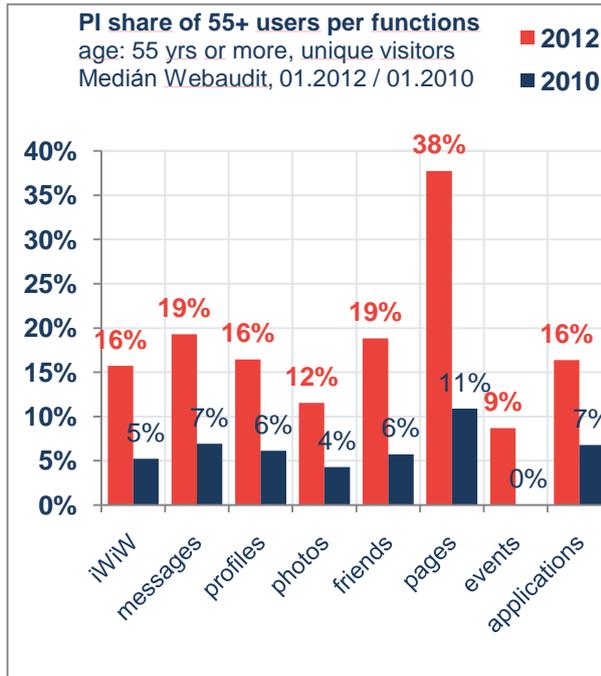
Participation of age groups in events, clubs and iWiW
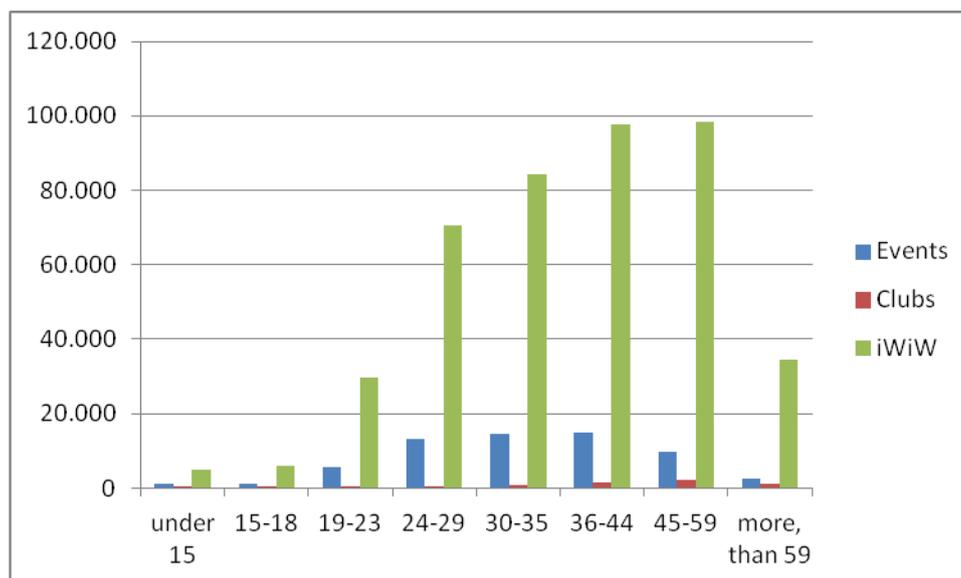
3.2.2 Indicative services list

For a 55+ user it is easier to use one platform to send messages, collect friends, join to clubs and events, use applications. 55+ people have rich memories about the past, like to talk about old times, and share the memories with each other and with families and friends. They need features which engage elderly people in online social activities. They like to share photos, videos, music, or any other multimedia content. Data analysis resulted in the following service list that contains indicative services, which may attract the widest possible audience:

- Messages,
- Profiles,
- Photos,
- Friends,
- Clubs/Events,
- Applications.

3.2.3 Functional requirements

In line with e-Trikala's research, the quantitative research on the basis of iWiW data confirms the usage of such requirements, as they have been used in the implementation of the iWiW platform.

Examining more thoroughly practical aspects, the necessary data for one's registration in the platform are the following;

- First name,
- Last name,
- Nickname,
- Country,
- City,
- Sex,
- Password,

- FAQ,
- E-mail,
- Captcha.

The core functions of iWiW include the following;

- Personal profile page (personal),
- List of friends page,
- Who may I know?
- Built-in messaging system,
- Clubs & Events,
- Classidied ads,
- Forums,
- Pictures,
- Applications (API),
- Newsfeed,
- Poll,
- Toolbar,
- Chat.

Focus should be on communication, and its attractiveness to them to share knowledge and memories about the common past. User-friendly design, big letters are very important for them.

4. User Requirements Derived from European Research Projects

4.1 Methodological approach

Complementary to the investigations inside the ELDER-SPACES consortium, user requirements for the elderly people already investigated by related European research projects have been collected and summarized.

The following section gives a concise report on those user requirements.

Selection criterion

European research projects had to meet two prerequisite conditions in order to be considered in the investigation. They should be related to

- research on ICT,
- elderly people,
- web-based social networks.

Most of the investigated projects have been supported within FP6-ICT and FP7-ICT programmes. A lot of other projects are part of the Grundtvig programme and only few are nationally funded.

Focus has been on end-user requirements especially for the creation of reasonable user interfaces.

4.2 User requirements from European projects

4.2.1 Elder Games project

The **"Elder Games"-project**[4] provides a lot of hints regarding user requirements of elderly in the field of ICT. In the "*Report on priority parameters to measure through the game in order to monitor variables related to the quality of life and scientific instruments for data collection*" it is pointed out "… that something we must take into consideration during the development of the contents is the level of education of end-users. In this way, it is essential to allow self-control of levels of difficulty and preferred topics."

Within the "*2nd Annual Public Report*" the "… following objectives were achieved from the Users Requirements Definition:

- Identification of the priority intervention areas and fundamental cognitive variables to be monitored and targeted in ElderGames.

- Definition of instruments for measuring cognitive skills and quality of life in old age.

- Definition of the types of games that creates and atmosphere of high motivation and contributes to the improvement of selected variables.

- Selection and proposition of the most appropriate communication system to integrate into Eldergames

- Identification of the most appropriate advanced visualisation and interaction technologies to ensure both ease of use for the elderly and appropriate implementation in recreation centres."

Within the document "*D1.2 – Annex 3 Usability criteria for advanced technologies for the elderly*" statements of Fisk et al (2004)[5] are listed, that "identify five usability dimensions with related measures:

- Learnability: difficulty in learning to use a device; it can be measured by the time needed to correctly complete a task, or by the results obtained within a prefixed amount of time.

- Efficiency: the extent to which the device enables users to accomplish their actions without waste of resources. We can measure efficiency by comparing a user with experienced users in a specific task;

- Memorability: the ease with which users remember a function of the device, also after a period of non-use. Measures should be restricted to users who expect to use the product with low frequency and consist of the time they need to perform a specific task already executed in the past.

- Errors: the ease with which a product can induce usage errors and allow users to fix them. Measurement consists in identifying classes of errors (harmless and severe errors, mode error, slips and mistakes…) and in counting the frequency of their occurrence and of repairs.

- Satisfaction: the pleasantness derived from the usage of the technical device. They are usually checked with questionnaires and interviews."

The delivery "*D2.3 – Report on ergonomic evaluation*" provides detailed conclusions of a usability test about well designed user interfaces for the elderly:

Contrast

"From the previous font size, font color, and background color combinations, the following conclusions can be derived:

- The combination of font color and background color that can be distinguished best is the combination Black/White, given that even with a relatively small font size, such as 10pt, the reaction time is adequate. Any increase in the font size within this color combination will be adequate.

- The color combinations Yellow/Purple and Orange/Blue will only be used with font sizes of 14pt or greater. Smaller font sizes with these font and background color combinations would not be recommendable.

During the sessions with users, the following was observed:

- Within color contrasts, there exists a greater ease of word perception in contrasts of the magenta-yellow continuum. To that end, it's interesting to include the said combination in the future design given that it will be a guarantee of comfortable use.

- The contrast that has presented the greatest reading and word perception difficulties has been the red-green and green-red combinations, being reflected in the users moving closer to the screen and their movement in order to obtain a better angle of vision. To that end, it is not convenient to include the combination of red with green because it will make perception more difficult for the elderly, thus causing them problems.

- In order to read comfortably, elderly people need high contrast material, sharp black letters on a white or pale yellow page.

- The user's ease of perceiving the black on white contrast, and/or white on black, with respect to the use of other types of contrasts, allows us to use any type of letter and size format inside of this combination, thereby permitting greater use of the future screen's space. Nevertheless, it is worth mentioning that the font size 14pt and 18pt, for the most part, makes perception easier than any other font size.

Focalization and Visual Accommodation Capabilities

In all cases, the font size corresponding to the identification time has been equivalent to 14pt. As such, the minimum font size used in the ElderGames application will be 14pt.

Brightness and Saturation

It can be observed that as far as saturation is concerned:

- High or medium: no preference

- Medium or low: They prefer medium

- High or low: They prefer high

As far as brightness is concerned:

- Medium or low: They prefer medium

- High or low: They prefer low

- Medium or high: They prefer medium

As such, as far as saturation is concerned, low color saturation will be avoided. High brightness levels will also be avoided, trying to work only in the medium levels of both variables.

Visual Keenness

From the analysis of the times employed and from each of the displayed images, we arrive at the following conclusions:

- We must not work with elements of a reduced size when they are combined with other elements inside of the same image. As such, the density of objects in images must be as low as possible.

- The elderly display difficulties when it comes to finding elements situated on the image's periphery. As such, it is convenient to situate the elements to be displayed as close to the center as possible.

- An important aspect is that the elements contained in the images are distinguished better and faster when they are on flat backgrounds and their outline is well defined.

Depth perception

Consequently, we can say that care must be taken in the design of the three-dimensional scenes, making an effort to clearly differentiate the depth of objects while achieving the greatest level of realism for the objects to be incorporated.

It has also been observed that the use of projected shadows, despite the fact that it provides greater realism and dynamism to the image, makes depth perception more difficult, in some cases causing confusion for the elderly between the identification of the shadow and the object itself.

From the observation of the test, it can be derived that putting 3D objects on the borders of a three-dimensional setting is not recommendable since the visual angle diminishes with age, and that is clearly noted in exercises of this type. By using the center of the 3D scenes, we ensure the perception of the objects to be displayed."

4.2.2 e-com 45 project

The document "*How can Member States conciliate active ageing, employment and ICT?*" of the "**e-com 45"-project**[6] provides an overview of the "state of the art" on demographic changes and active ageing strategies particularly in Spain, Italy, France, Bulgaria, Hungary and Estonia. It shows trends in European demographic and policy guidelines and analyses the employment and ICT strategies that are promoted regarding active aging.

Regarding the need for a more active working life the paper provides information about every involved country: "**What do the older people need to have a more active working life:**

Bulgaria:

The needs of the elderly:

- Assertiveness training
- Appropriate training
- Study of individuals' strengths and needs
- Job search skills
- Encouragement and support
- Development of individual action plan

Types of skills required:

- computer skills
- leadership and communication skills

- time management, numeracy and presentation skills

Estonia:

Interested in how to get information about available job offers (74%). 26% feel the need for retraining and 23% for finding a suitable job.

France:

The older people in France need:

- Training to update skills and capacities

- Developing one's own business, yet with a real viable strategy

- To think about ICTs as ways of innovation support for existing activities

Hungary:

On the other hand it creates a special requirement for improving possibilities provided for elderly in education and in ICT-skills development in order to enable them to achieve active longevity and well-being through the facilities and within the circumstances of the 21st century.

Italy:

The main lines of interventions are:

- re-integration of unemployed or inactive elderly people with associated social security cushions

- central and local governments policies aiming at granting tax relief to the companies that employ these people

Spain:

Mostly in Spain they need motivation and re-training to have a more active working life. However, older people in Spain do participate in social life by doing volunteer work. Ensuring access to knowledge, education and training, is not merely a statement of intentions but the realization of equal opportunities throughout life, training, guidance and retraining. It also involves the recognition of the potential and expertise of older people in education by providing opportunities for exchange of knowledge and experience among generations."

Within the presentation "*HU-Aprender_ict*" of the same project it is stated that "… insert of forms, pictures and colours play a deciding role in the teaching of every day applications for youth and the elders, too. I can teach MS Word, Excel and Power Point – of course – more successful, if we use rich colour and imagery."

4.2.3 MPOWER project

Within deliverable "*D8.2 - Socio-economic, regulatory and policy studies*" the **"MPOWER"-project**[7] **-** Middleware Platform for eMPOWERing cognitive disabled and elderly brings together standards and guidelines associated with end-user requirements.

Regarding accessibility, the following section provides a lot of useful information and standards:

ACCESSIBILITY STANDARDS

For accessibility standards, there have been deployed many collective compilations of the most important standards in all technical and non-technical areas of e-health[8].

One can also "find some guidelines explaining how to make web content accessible to people with disabilities. These guidelines are intended for all web content developers and for developers of authoring tools[9].

ISO Standards Guides regarding elderly and disabled

Regarding elderly and disabled, one can get accessibility and usability standardization guidelines through ISO website[10]. Once there you select the subject needed and then you can download the document by paying the required amount. Aids for disabled or handicapped persons (Including aids for elderly people)

ISO/IEC Guide 71:2001

- Guidelines for standards developers to address the needs of older persons and persons with disabilities

- This Guide provides guidance to writers of relevant International Standards on how to take into account the needs of older persons and persons with disabilities. Whilst recognizing that some people with very extensive and complex disabilities may have requirements beyond the level addressed in this Guide, a very large number of people have minor impairments which can be easily addressed by relatively small changes of approach in standards, thereby increasing the market for the product or service.

- This Guide aims: to inform, increase understanding and raise awareness about how human abilities impact on the usability of products, services and environments,

- to outline the relationship between the requirements in standards and the accessibility and usability of products and services, and

- to raise awareness about the benefits of adopting accessible design principles in terms of a wider market.

- This Guide applies to products, services and environments encountered in all aspects of daily life and intended for the consumer market and the workplace. For the purposes of this document, the term 'products and services' is used to reflect all these purposes.

- This Guide: describes a process by which the needs of older persons and persons with disabilities may be considered in the development of standards,

- provides tables to enable standards developers to relate the relevant clauses of a standard to the factors which should be considered to ensure that all abilities are addressed,

- offers descriptions of body functions or human abilities and the practical implications of impairment,

- offers a list of sources that standards developers can use to investigate more detailed and specific guidance materials.

- This Guide provides general guidance. Consideration should be given to the development of additional guides for specific product or service sectors.

- While it is recognized that accessibility and usability are important for both products and services, international work on services standards is at the preliminary stage. At present, this Guide contains considerably more guidance on products than on services.

- This Guide is also available as a Braille version. Copies may be obtained through the ISO Central Secretariat.

ISO 9999:2007

- Assistive products for persons with disability - Classification and terminology

- ISO 9999:2006 establishes a classification of assistive products, especially produced or generally available, for persons with disability.

- Assistive products used by a person with disability, but which require the assistance by another person for their operation, are included in the classification.

The following items are specifically excluded from ISO 9999:2006:

- items used for the installation of assistive products;

- solutions obtained by combinations of assistive products which are individually classified in this International Standard;

- medicines;

- assistive products and instruments used exclusively by healthcare professionals;

- non-technical solutions, such as personal assistance, guide-dogs or lip-reading;

- implanted devices;

- financial support.

ISO 16201:2006

Technical aids for persons with disability (Environmental control systems for daily living).

ISO 16201:2006 specifies functional and technical requirements and test methods for environmental control systems intended for use to alleviate or compensate for a disability. Such systems are also known as electronic aids to daily living.

The aim of ISO 16201:2006 is to provide safety requirements and recommendations for manufacturers of such environmental control systems.

Target devices are not covered by ISO 16201:2006. Technical requirements for items of equipment connected within the system are to be covered by their own specific standards, e.g. adjustable beds."

The same document contains a broad collection of usability guidelines and standards as following:

"USABILITY STANDARDS

ISO standards reflect product-and process-oriented approaches to usability discussed above.

Process-oriented standards consider the whole cycle of activities and appropriate techniques associated with the development of usable systems. Product-oriented standards are concerned with a set of measures for defined usability features.

Process-oriented ISO standards

In accordance with the information provided, process-oriented standards can be ranged from very general, providing main principles to more concrete, describing certain tools, as following:

ISO 9241-11: Guidance on usability (1998).

ISO 13407: Human-centred design processes for interactive systems (1999).

ISO/TR 18529: Ergonomics-Ergonomics of human-system interaction. Human-centred lifecycle process descriptions (2000).

ISO/TR 16982: Ergonomics of human-system interaction. Usability methods supporting human-centred design (2002).

ISO 9241-11: Guidance on usability. ISO 9241-11 provides a basic usability framework and emphasizes user goals and context of use components that give direction to any usability evaluation activities. User goals of interaction with technology-based products are crucial to determine system boundaries and even more concrete functions matching user needs. Context of use implies user, task and environment components. Appropriate user characteristics such as physical attributes, knowledge, experience, education, age and others are necessary to distinguish different types of individuals interacting with the system and to predict their behaviour. Tasks show a sequence of specific actions necessary to reach user goals. Description and analysis of user tasks helps to map the ways users achieve goals and provides valuable information for defining overall system requirements. Environment encompasses external factors surrounding the user and system interaction that may affect usability. Environment factors are divided into technical (e.g. what other software and hardware products are used), physical (e.g. workplace characteristics), ambient (e.g. humidity), social and cultural (e.g. organizational work practices, attitudes) environments. User goals and context of use are evaluated against effectiveness, efficiency and satisfaction criteria and appropriate measures.

Besides valuable notions of user goals and context of use, ISO 9241-11 states that activities designed to create a usable product are an integral part of any software and hardware product development process and contribute to its overall quality.

The standard does not provide any concrete information on how to develop a usable technology-based product but rather aims to inform developers about general usability concerns.

ISO 13407: a Human-centred design processes for interactive systems. Based on the ISO 9241-11 philosophy and definition of usability, ISO 13407 provides a human-centered perspective on the software and hardware design processes. Human-centered design is a multidisciplinary field designed to support the development of usable systems and employing ergonomics and human factor knowledge. ISO 13407 further develops the idea of usability-related activities as complementary to the general product manufacturing process and organizational context and reveals management aspects of human-centered design.

Human-centred design is based on the four general principles derived from the statements of ISO 9142-11:

The active involvement of users and a clear understanding of user and task requirements – user participation in all stages of the development process assists in formulating and later refining detailed scenarios of user and system dialogue, identifying and preventing emerging problems, and adjusting the system to users' environments and routine work.

An appropriate allocation of function between users and technology requires meaningful division of tasks between the system and its users, based on diverse factors such as the possibility of automating certain tasks, user features, capabilities and limitations.

Iteration of design solutions points to the essence of the usability-based approach that requires continuous system improvement by collecting and reacting to user feedback. Iteration is an effective means of revealing hidden problems that can be clarified and eliminated when users are actively involved in design processes.

Multi-disciplinary team principle highlights organizational aspects of human-centered design. The development of the technology-based product involves a range of stakeholders not limited only to users and system developers but embracing business analysts, user instructors, experts in human factors and technology etc.

The idea of usability as an integral part of organization performance expressed in ISO 9241-11 is emphasized by ISO 13407 in its description of human-centered design processes. Organizations that intend to implement principles of human-centered design should accomplish preparatory tasks and plan future activities that should include:

- Human-centered design activities.

- Procedures for integrating these activities with other system development activities.

- The range of skills necessary for human-centered design including responsible members of staff.

- Effective means and procedures for user feedback, communication and documentation of human-centered activities.

- Milestones of human-centered activities.

- Time management.

Planning activities are described as preliminary tasks and are not included in the list of human-centered design processes. However, this does not diminish their importance and shows that organizations undertaking a human-centered design project should incorporate the main usability principles into their overall practices. Sufficient managerial support should be provided to allocate resources for usability tasks and to respond to emerging challenges such as change management, multi-disciplinary teamwork and so on.

The preliminary planning stage is followed by four human-centered design phases:

Phase I: Understand and specify the context of use. As prescribed in ISO 9241-11, this stage concerns with collecting detailed information on all components of the context of use. This information is crucial to support primary modeling of the system corresponding to user needs and requirements.

Phase II: Specify user and organizational requirements. The organization developing the system operates in a complex environment and should consider various factors such as legislation,

finance etc. Therefore, user demands should be tuned to organizational objectives and the reality of operation, otherwise the organization risks experiencing financial losses or a lack of human and material resources for project implementation. This phase should be finalized by setting project objectives based on an appropriate balance of user and organizational requirements.

Phase III: Produce design solutions. Employing existing multidisciplinary knowledge, involving potential users, concrete models and prototypes of the future systems are generated and tested iteratively until set objectives are reached.

Phase IV: Evaluate designs against requirements. Evaluation activities take place at all stages of design and serve several purposes. First of all, evaluation is the way to obtain user feedback and so improve the prototype of the system. Other important functions of evaluation are to monitor compliance with organizational goals, legislation, standards etc. Evaluation is an effective means of identifying problematic areas in the interaction of users with the system. Finally, evaluation is applied for long-term observation of the product life-cycle and use when design is accomplished and the system is being sold.

In ISO 13407 extended principles of ISO 9241-11 take the shape of general guidance for organizations incorporating usability as an objective in the development processes of the technology-based products. However, details and actual methods for implementation of proposed activities are still unclear.

ISO/TR 18529: Ergonomics. Ergonomics of human-system interaction. Human-centered life-cycle process descriptions exploits ISO 13407's established framework, providing further details of human-centered design activities and offering seven processes and underlying actions corresponding to the main phases discussed above. This technical report takes a closer look to human-centered design and even determines the output documents of each phase. All design processes and related actions provide a guiding grid for the developers to manage their usability projects.

ISO/TR 16982: Ergonomics of human system interaction. Usability methods supporting human-centred design complements all documents with a selection of methods appropriate for implementation of usability projects. The technical report highlights the importance of active user involvement, but considers situations when the opportunities to cooperate with users are limited and supplies appropriate solutions. All methods are classified according to the level of user involvement. A short definition, and advantages and disadvantages of each method are given together with recommendations on which stage they should be applied to. The report bridges usability techniques with the software life cycle provided by ISO/IEC 12207:1995 Information technology (Software life cycle process).

The ISO standards and technical reports briefly described above are complementary and reveal various aspects of usability implementation differing by the abstractness of provided information. These documents form a solid usability framework, but for users of the standards provide a lot of "noise" embedded in repetition and overlapping of statements explaining activities and processes dispersed throughout the standards.

Product-oriented ISO standards

Product-oriented ISO standards concentrate on concrete models for establishing rigorous usability metrics. Extensive metrics are based on the usability model provided in ISO/IEC 9126-

1 (2001) that offers the following set of definitions related to the quality of the technology-based product:

- Internal quality

- External quality

- Quality in use

These are main interdependent features of software (the standard does not cover hardware usability issues) that contain a set of parameters (one of which is usability) that can be expressed as quantitative indicators.

The following standards reveal the model for usability metrics based on the inter-relation of internal quality, external quality and quality in use:

- ISO/IEC 9126-1: Software Engineering. Product Quality. Part 1: Quality model (2001).

- ISO/IEC TR 9126-2: Software Engineering. Product Quality. Part 2: External metrics (2003).

- ISO/IEC TR 9126-3: Software Engineering. Product Quality. Part 3: Internal metrics (2003).

- ISO/IEC TR 9126-4: Software Engineering. Product Quality. Part 4: Quality in use metrics (2004).

ISO/IEC 9126-1: a model for quality of a technology-based product. The standard emphasizes that a technology-based product should meet user requirements and describes software attributes contributing to achievement of this goal as a part of overall product quality, which is understood as a set of product characteristics that enable it to satisfy implied user needs. A software product contains internal and external attributes that are interdependent. External attributes point to the way a system interacts with a potential user; internal characteristics are a necessary prerequisite to implement this interaction. Thus, if there are deviations in the internal parameters they will pre-condition anomalies in system responses during the interaction process that is determined by a set of external attributes. The third level – quality in use – describes the diversity of contexts in which a system can be exploited and a variety of user expectations based on specific conditions and intentions. Quality in use parameters are affected by overall software internal and external quality characteristics that provide a certain level of quality in user experience while exploiting the system. The standard proposes six parameters of software quality – functionality, usability, reliability, efficiency, maintainability, portability – that provide a framework for measuring internal and external quality characteristics. Quality in use is measured in terms of how effectively, productively, safely and satisfactorily users can achieve their goals when operating a software product with certain internal and external parameters. Six categories reflect the perspective of various users: customer-organization, end-users, persons responsible for maintenance the product etc.

Generally, the 'usability' concept is decomposed into the absolute software internal and external attributes and the case of real use in context. Therefore, two approaches to usability are identified: a broad one, considering use in context and defined by quality in use metrics, and a narrow one, placing usability as one of the parameters of internal and external software characteristics.

ISO/IEC TR 9126-2 and ISO/IEC 9126-3: usability in internal and external quality metrics. ISO/IEC TR 9126-2 (2003) and 9126-3 (2003) provide a quantitative metrics for six categories of internal and external qualities. In this context, usability is understood in a narrow manner, defining it as a set of internal and external attributes of the software that contribute to its quality. Usability contains the following parameters:

Understandability assesses software product characteristics enabling users to understand whether a product is suitable for his/her particular tasks and how it can be used.

Learnability evaluates how easily and effectively the user learns to accomplish tasks and what is the contribution of help documentation to learning processes.

Operability considers the extent to which the user can operate and control the software, paying particular attention to frequently used functions and anticipated usability problems.

Attractiveness evaluates the appearance of the software.

Usability compliance assesses how software meets the requirements of usability standards, guidelines and other regulatory documentation.

On the basis of five main usability measures a set of quantitative indicators is developed. Standards provide recommendations on measurement procedures and methods (user testing, observation, questionnaires, usage statistics is commonly mentioned).

ISO/IEC TR 9126-4: Quality in use metrics. Quality in use addresses specified users in specified contexts and measures how they achieve their goals in terms of effectiveness, productivity, safety and satisfaction.

Effectiveness metrics provide quantitative indicators to measure the extent of accuracy and completeness of goals achieved. The indicators are:

- Task effectiveness, that indicates which goals of the task were achieved in correct manner.

- Task completion, that evaluates how many tasks were completed.

- Error frequency indicator, that counts the number of errors per task.

Productivity metrics evaluate the resources that were consumed by the user (e.g. time, financial costs, materials etc.) to achieve the goal and relates it to the level of effectiveness gained by the user.

Productivity is expressed in a following set of indicators:

- Task time – time needed to complete a task.

- Task efficiency – the proportion of goals reached for a unit of time.

- Economic productivity – cost-effectiveness of tasks.

- Productive proportion – proportion of time when the user performs productive actions.

- Relative user efficiency – user efficiency compared an expert.

Safety metrics consider economic and physical risks and harm associated with software use including health issues:

- User health and safety – how often health problems occur when using the software.

- Safety of people affected by use of the system – incidence of threats to user safety when exploiting the software.

- Economic damage – incidence of economic damage caused by the software.

- Software damage – frequency of software corruption.

Satisfaction metrics are focused on user attitudes to the software, based on user perceptions about the software properties, its effectiveness, productivity and safety:

- Satisfaction scale – the extent of user satisfaction.

- Satisfaction questionnaire – user satisfaction with specific software feature.

- Discretionary satisfaction – the proportion of users choosing the software to use.

Many of quality in use measures and indicators are used in memory institutions and are incorporated in the standards on service quality assessment. The broad nature of quality in use makes it complicated to distinguish between usability and quality of services. However, the narrow usability understanding exhibited in internal and external quality metrics is insufficient to encompass a much wider scope of usability related issues.

Other Usability Standards

ISO standards are not the only guidance and reference material on usability. Examples of successful usability solutions come from corporate initiatives and international projects as well. Some of the ideas examined below had a strong influence on the ISO standards themselves.

- UsabilityNet[11] is a RTD project funded under EU Fifth Framework Programme completed in 2003. The project supports the needs of usability practitioners, managers, professional organizations and those launching EU projects and provides comprehensive information on all usability aspects.

- INUSE (Information Engineering Usability Support Centres)[12] was a RTD project that obtained funding under the EU Fourth Framework Programme and was accomplished in 1997. This project aimed to establish a European Usability Support Center and provides usability guidance for companies and projects within the information engineering industry

- RESPECT (Requirements Engineering and Specification in Telematics) was an RTD project funded under the EU Fourth Framework Programme (duration 1996–1998). The main goal of the project was to create a usability methodology as an advisory tool for Telematics Applications Projects.

This also includes:

Basic Characteristics of Users with Special Needs and their Telematics Requirements (October 1996) introduces the concept of universal design contributing to the welfare of all citizens in the information society. The document covers age (old, young) and disabilities (vision, hearing, cognition, mobility) parameters and offers appropriate solutions for technology-based products[13].

Requirements Specification and Evaluation for User Groups with Special Needs (25 August 1998) extends the topics discussed in the report on the basic characteristics of users with special needs and offers practical guidelines for conducting a usability evaluation[14]."

The MPOWER-studies not only provide information about more or less official standards. In

chapter 6.2.2 "*Usability good practices for the target end-users*" the document summarizes "Web usability good practices for elderly":

"Design adjustments according to the limitations related to ageing are the focus of most guidelines. Numerous recommendations on website design are published because of widespread usage of web-based services. Web usability guidelines usually present more or less the same guidance, which can be summarized as following:

Website layout and style elements:

Colours – while selecting colours for design it is necessary to avoid extremely bright colours that can be annoying or tiring, to maintain a distinction between colours of the text and background (light background and dark text are more relevant for the elderly users), balancing these considerations with colour-blindness concerns.

Text – larger font size is preferable, easy to read typefaces should be applied, and more space between paragraph and sections should be provided. When choosing the typeface and letter intensity it is important to note that some fonts become less readable when made bold or italic. Left justification of the text provides better readability, while centered text should be used only in case of titles. Full justification that creates large spaces between words reduces readability. In older age peripheral vision decreases and therefore for the elderly double-spacing is preferable.

Navigation – one of the important components for navigation is the menu that should be accessible for persons with limited ability for precise movement or with impaired vision. Menu sections are convenient if they are static (avoiding drop-down menus) and large enough to read. Error messages such as "page not found" may be frustrating. Therefore it is important to avoid multiple linking, or to provide more links to the home, or top level, page.

Frames and tables are not readable by all browsers and can prevent the use of assistive technology for visually impaired persons thus making a website inaccessible. Therefore, some experts argue that an additional version without frames and tables should be provided. Others would make the case for universal design.

Multimedia – animation elements could be distracting and even decisive element for non-use of the website in case of visual impairments. However, realistic illustrations that accompany text, or directions for e.g. filling forms or other actions, are helpful to assist users to comprehend the information. Illustration should have a textual description allowing assistive technology to recognize it for visually impaired users. When inserting audio files the problem of different additional software for playing it should be considered.

Content organization:

Memory cues – it is important to place some cues that will help the user to get oriented during the navigation. Site maps that structure the content provided can be a helpful orientation tool.

Language – clear, non-ambiguous language facilitates using the website. Professional or technical slang should be avoided. Summaries of the content at the top of the page are preferable to make browsing more effective.

Information arrangement – long documents should be avoided or structured to shorter sections. Clear content organization and avoidance of information and graphic overload facilitates

retrieval of necessary information and reduces frustration.

Help information should encompass both content and technical assistance. Providing alternatives for getting help information as, for instance, email, telephone or frequently asked questions, is important. Information about errors should provide some explanation of why the error occurred. Search engine hints that explain the system logic and suggest some recommendations on search improvement may be crucial.

Designers collaborating with older adults in the development process of ICT-based technology should be aware of certain peculiarities of such partnerships. Usually elderly people assign all failures of using the system to their own lack of skills or knowledge instead of assuming that the technology is at fault. Even if the system works badly they tend to find some positive aspects and rarely disclose negative ones. However, they won't use it again. Usability tests conducted by AARP Foundation (USA), which supports the elderly, reveal the common denial of being old among the elderly persons.

Invited to participate in usability test they assumed that it was performed to assess usability for their parents or older friends. Members of usability teams should also consider adult children of the elderly participants of usability projects as usually they assist their parents with ICT and can provide valuable information about problems encountered."

4.2.4 OASIS project

The "**OASIS"-project**[15] **-** Open architecture for Accessible Services Integration and Standardization aims to "revolutionise the interoperability, quality, breadth and usability of services for all daily activities of older people". The results of the conducted interviews regarding user requirements for the elderly are summarized in chapter 3.2. of deliverable D2.1.1 ("*Use Cases and application scenarios for independent living applications*") as following:

- "Designing for the elderly: Generally, the elderly interviewed were open towards ICT and available to use new devices / services. Nevertheless the older adults we interviewed indicated that they are facing problems in the use of ICT devices / services. The fast updating of S/W applications asking for continuous training, and the complexity of Graphic User Interfaces and in general of the interaction with the PC were the main barriers mentioned by the older adults we interviewed. Usability, personalization and adaptability to the characteristics of the older adults are key requirements in order to improve technology acceptance for this sector of the population.

- Personalization: Personalization will become a central component of future ICT devices and information access services; personalization can address three layers: interaction of disabled and elderly people with ICTs, provision of content and information search.- The role of ICT in the ageing process: On the basis of the outcomes of the two surveys (the survey involving the elderly and the second one with the carers) we can identify four clusters of needs as indicated in the following graph; for each of them, ICT services could have a relevant role.
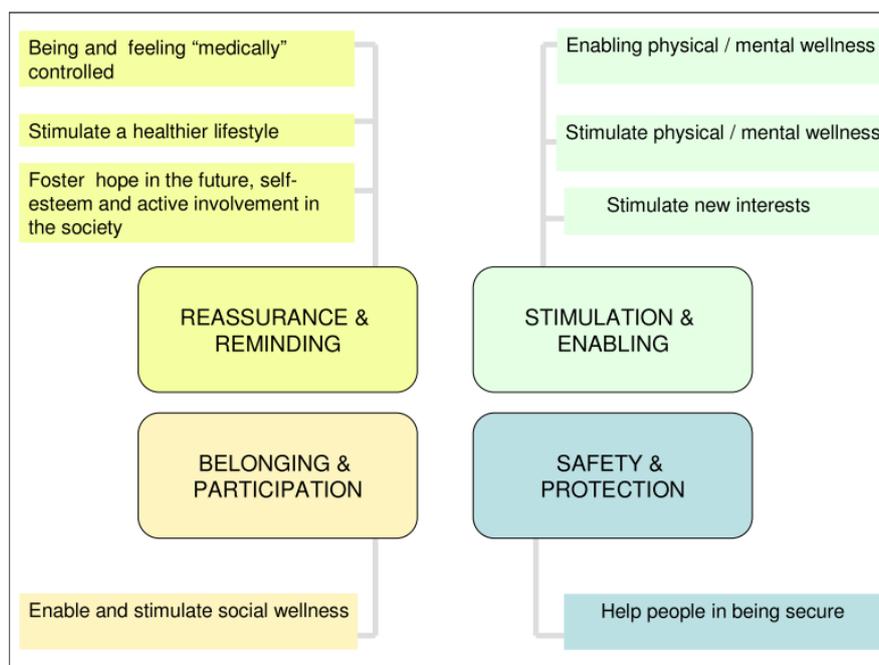
Figure 1: Cluster of needs according to OASIS project

- Consumer behaviour of the elderly: The consumer behaviour of the elderly can be predicted through a "gerontographic model" that combines physiological, psychological and social ageing variables. On the basis of this model the elderly population can be segmented into four groups according to two axes related to health status and to social mindset (see figure). Often the social mindset is linked to a positive approach towards technology so – regardless of the health status – the market potential for ICT assistive devices / services is larger when addressing the "healthy indulgers" and the "ailing outgoers" that jointly represent the 47% of the older population.

In this model, the older participants in our interviews can be classified mainly as "ailing outgoers" or "healthy indulgers", as their answers show a general positive approach towards ageing match these profiles.

"
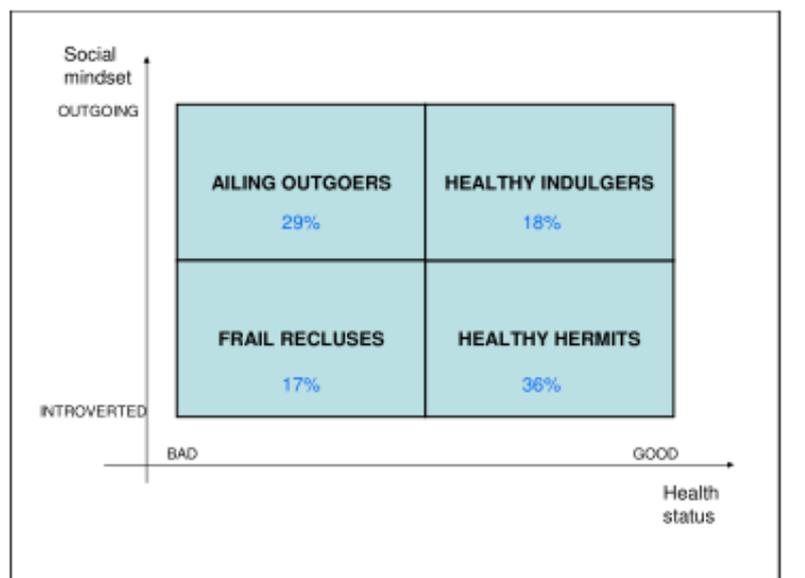
Figure 2: Categorisation of elderly users according to OASIS project

4.2.5 WAI-AGE project

The "**WAI-AGE" project**[16] - Web Accessibility Initiative: Ageing Education and Harmonisation focuses on:

- "Better understanding the needs of older web users

- Participation of older users in W3C standardization

- Development of educational materials and resources

- Pursuit of international standards harmonization"

The very useful project results regarding accessibility of websites for elderly users are provided by the project-webpage[17]:

"Perceivable information and user interface

- Text size – Many older people require large text due to declining vision, including text in form fields and other controls.

- Text style and text layout – Text style and its visual presentation impacts how hard or easy it is for people to read, especially older people with declining vision.

- Color and contrast – Most older people's color perception changes, and they lose contrast sensitivity.

- Multimedia – Because many older people's hearing or vision declines, they often need transcripts, captions, and low background sound.

- Text-to-speech (speech synthesis) – Some older people use text-to-speech (speech synthesis) software, which is becoming increasingly available in browsers and operating systems.

- CAPTCHA – Older people with declining eyesight may not be able to discern the characters in a CAPTCHA, especially because CAPTCHAs often have low contrast and do not increase in size when users have text sized larger. CAPTCHA stands for 'Completely Automated Public Turing tests to tell Computers and Humans Apart'. An example of CAPTCHA is:

Operable user interface and navigation

- Links – Many older people need links to be particularly clear and identifiable due to declining vision and cognition.

- Navigation and location – Many older people need navigation to be particularly clear due to declining cognitive abilities.

- Mouse use – It is difficult for some older people to use a mouse due to declining vision or dexterity.

- Keyboard use and tabbing – Some older people cannot use a mouse well or at all and instead use a keyboard.

- Distractions – Some older people are particularly distracted by any movement and sound on web pages.

- Sufficient time – It takes some older people longer to read text and complete transactions due to declining vision, dexterity, or cognition.

Understandable information and user interface

- Page organization – Many older people are inexperienced web users without advanced browsing habits and therefore read the whole page, so good page organization is important.

- Understandable language – Many older people find it particularly difficult to understand complex sentences, unusual words, and technical jargon.

- Consistent navigation and labelling – For people who are new to the web, and older people with some types of cognitive decline, consistent navigation and presentation is particularly important.

- Pop-ups and new-windows – Some older people experiencing cognitive decline can be confused or distracted by pop-ups, new windows, or new tabs.

- Page refresh and updates – Some older people with declining vision or cognition can miss content that automatically updates or refreshes in a page.

- Instructions and input assistance – It is difficult for some older people to understand the requirements of forms and transactions.

- Error prevention and recovery for forms – It is difficult for some older people to use forms and complete transactions due to declining cognitive abilities.

Robust content and reliable interpretation

- Older equipment/software – Some older people will be using older browsers that might not be as capable or fault tolerant as current releases."

4.2.6 Senior Social Platform project

The national Austrian project "**Senior Social Platform**" – SSP[18], Social Network for Seniors aims to use social network applications, to reduce the social isolation and loneliness of elderly people and foster their participation in a nowadays steadily growing virtual society. A heuristic evaluation of a prototype of the platform was made by CEIT (Central European Institute Of Technology) and brings some useful advices even for similar projects. The following advices and revealed deficiencies are taken from the document "*Heuristic evaluation Social Senior Platform*":

"Navigation and Orientation

… → every screen should at least include a „home"-button to get back to the main menu. The user should always see at what hierarchical stage he is at the moment (e.g. using breadcrumb-navigation) Especially for our target group, there should always be a possibility to get help or information (using F.A.Q or an information-icon beside certain words people might not understand like „Benutzername", that the user can activate by clicking on it or moving the mouse over it).

So far all links are represented as buttons. So they should all follow a common style (slightly elevated appearance, etc.), to be recognized as clickable by the user. As it is hard to find icons that are always interpreted correctly, it would be useful to inform the user about what the button does by displaying a short text on mouse-over.

Interaction and Exchange of Information

There is no information what the site is about. This information should be given on the main page. It would be advisable to include a short guided tour through the website and its main functions (either by a short video or illustrated explanations or both)

Imprint and contact information are very important, giving the user the opportunity to get help directly and more confidence in using the website. A glossary – maybe included in the F.A.Q – for special expressions would be nice as many terms common to frequent internet users might be completely new to our target group.

Up-to-dateness and quality

It is very important to state clearly how the personal data is treated. Users should somehow be informed about changes on the website (Newsletter, e-Mail, ...)

Information and Text design

… there should be a possibility to easily enlarge both of them. (without having to use the browser's function to enlarge text and images)

In some cases the contrast has to be enhanced (e.g. blue characters on grey background are not

the best choice)

Every sub-site should contain a heading (e.g. „Messages" for Screenshot 3.1) Consistency throughout the whole (information) design is very important (using the same conventions for highlighting information, for forms, for listings, etc.)"

A lot of comments have been illustrated by screenshots of the website. These examples clarify the importance of a well designed user interface with a structured layout and a clear wording. Therefore this part of the evaluation will also be shown in the following section:

"Comments on current screens/GUI elements (wording, layout)

1. Main page

Starting point of the website.

As suggested above, there should be an introduction on what the website is about.

Wording:

- „klick hier zu fortfahren" → anmelden
- „klick hier zu register" → Neuen Benutzer anmelden

Layout:

It is a nice idea to use the green color to show that the 3 items „Benutzername", „Passwort" and „Klick hier zu fortfahren" belong together. To highlight this relatedness even stronger, we suggest to put those elements into one frame/rectangle and/or use a different background color for them.

"Passwort vergessen" should be placed closer to the input field "Passwort". Furthermore it cannot be recognized as clickable by a novice user, as it rather looks like a regular text than like the other buttons.

2. Registration

1st step: User can enter his/her personal details.

Wording:

- „Füllen Sie bitte einfach die Felder auf dieser Seite aus:" → „Füllen Sie bitte die folgenden Felder aus und klicken Sie dann auf ‚Weiter': "

- „Benutzername" is not a common expression, if you are a novice user → maybe add an „i"-icon that informs the user about the meaning of „Benutzername" by clicking on it/moving the mouse over it

- "Ihre Geburtstag" → "Ihr Geburtstag"

- "Land wechseln" → "Wohnort"

- "Klicken Sie hier zu wählen" → maybe use a dropdown-list instead

- „Klick hier zu fortfahren" → „Weiter" or „Weiter zu Seite 2"

Layout:

The heading „Registrierung" should not look like a button.

2nd step: User can enter his/her password for the SSP account.

Wording:

- „Klick hier zu fortfahren" → „Weiter" or „Registrierung abschließen"

Layout:

a bit confusing; better to put the 2 options „weiblich" and „männlich" above each other and the radiobuttons in general on the left side of the words

3. Main Menu

After the user logged in the main menu appears.

Wording:

- "Kontaktieren mit andere soziale Netzwerke" → „Mit anderem sozialem Netzwerk verbinden"

- „Meine Bilde" → „Meine Bilder"

- „Kontakte (Freunde, Familie)" → „Meine Kontakte"

Layout:

The notepad at "Meine Bilde" should be removed from the icon, because it doesn't make much sense here.

Icon missing at "Freunde suchen".

3.1 Messages

User can write new mails, read the mails or read the mails sent.
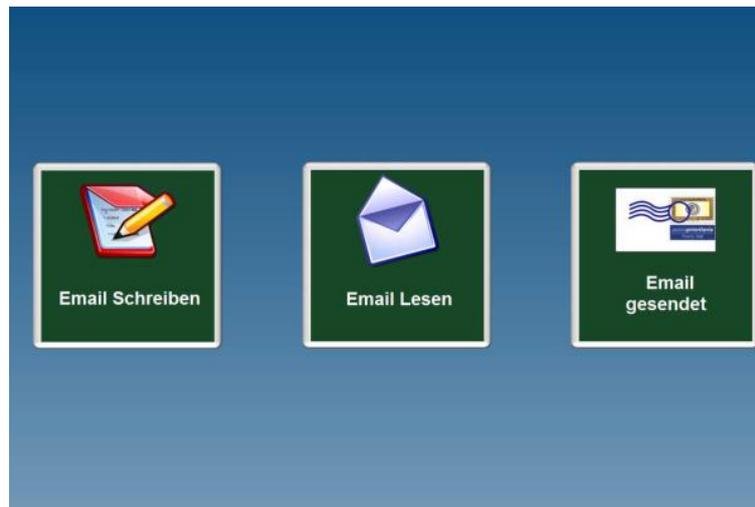
Wording:

- „Email gesendet" → „gesendete Emails"

Layout:

Heading missing. (e.g. "Meine Emails")

3.1.1 Write a mail

User can write a letter here.
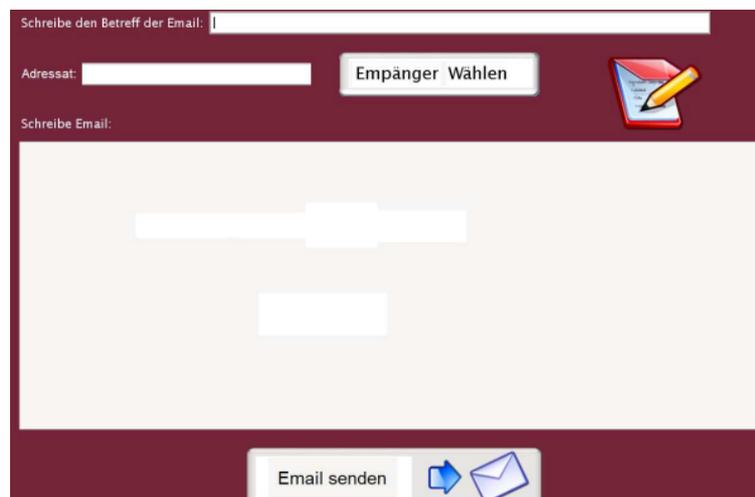
Wording:

Layout:

Heading missing. (e.g. "Neue Email verfassen")

It is advisable to arrange the different elements according to common (paper) letters → recipient first, then subject below, then message body

"Email senden" → By analogy with the other "iconed"-buttons, the icon should be placed on the left side of the label.

3.1.2 Read my mails

User can read letters here.
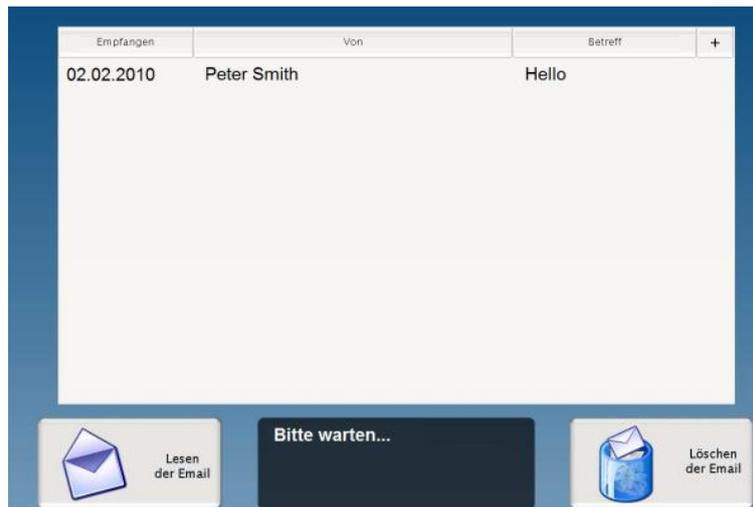
Wording:

- "Empfangen" → "Empfangen am"

- "Lesen der Email" → "Ausgewählte Email lesen"

- „Löschen der Email" → „Ausgewählte Email löschen"

Layout:

Heading missing. (e.g. "Empfangene Emails – Klicken Sie auf die Email, die Sie bearbeiten wollen")

The font size of "Empfangen", "Von", "Betreff" and the button labels is too small.

What does the "+"-sign stand for at the top right corner?

What happens in the "Bitte warten…"-area?

3.1.3 Mail Sent

User can read the mails sent.
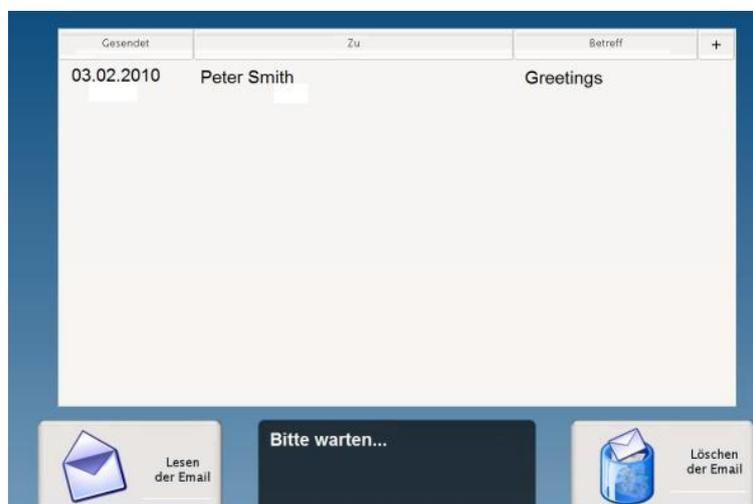
Wording:

- „Gesendet" → „Gesendet am"

- „Zu" → „Empfänger"

Layout:

see 3.1.1 Read my mails

Connect to other Social Networks

User can select a Social Network to connect to and get information like profile data from them. If user clicks on one of the logos below, SSP will forward the user to that Social Network for authentication.

Layout:

Heading missing. (e.g. ... – Klicken Sie auf eines der folgenden Bilder um sich …)

3.2.1 Connect to MySpace

Now user has to authenticate on MySpace to be able to get information from there. After the authentication, MySpace will forward the user back to the SSP website.

3.2.2 Connect to Facebook

Now user has to authenticate on Facebook to be able to get information from there. After the authentication, Facebook will forward the user back to the SSP website.
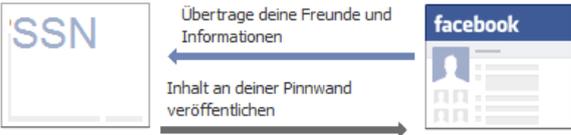
3.2.3 Connect to StudiVZ

This works the same way as in the case of MySpace and Facebook.

3.3 My Profile

User can edit their personal details here.
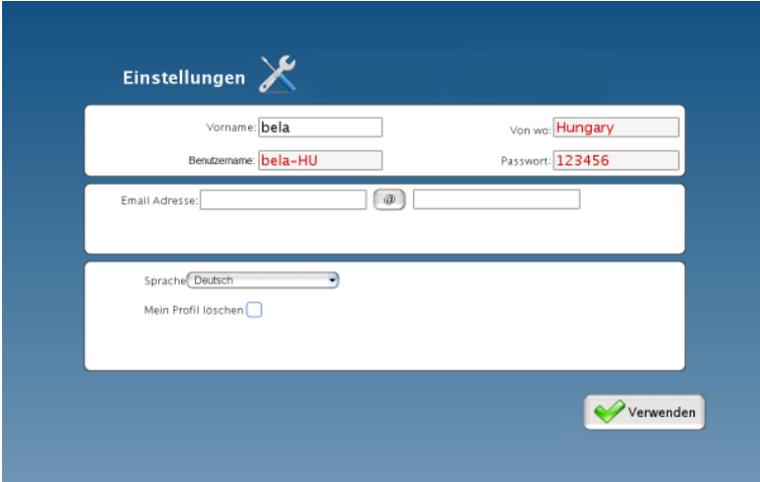
Wording:

- „Einstellungen" → „Über mich" (in that case the „tool"-icon doesn't fit anymore → use the "My profile-icon from Main menu instead)
- „von wo" → „Land"
- „Verwenden" → „Änderungen speichern"

Layout:

Font size is too small.

„Mein Profil löschen" has nothing to do with „Sprache", so there is no reason to group them together. "Mein Profil löschen" should rather consist of an own button e.g. at the bottom left side of the screen

The "@"-sign looks like a button. → doesn't need any extra design – just writing "@" would be enough

3.4 Contacts

With this menu item, user can see his/her contacts from the external Social Networks and from within SSP. By clicking on the pictures detailed information is shown (see 3.4.1).
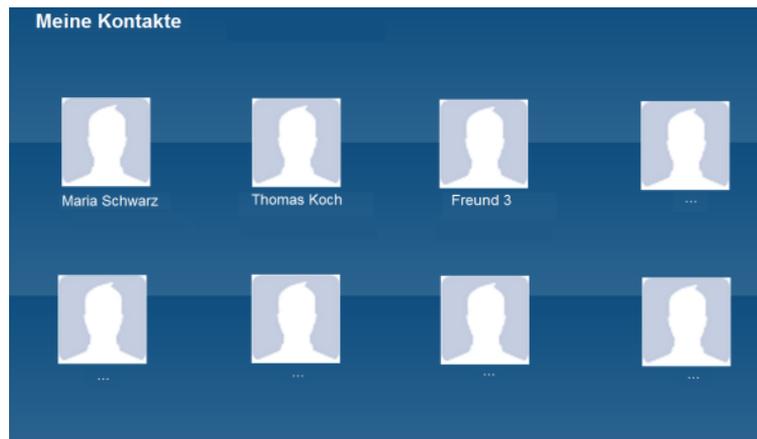
Maybe add a sub-heading „Klicken Sie auf ein Bild um mehr über diese Person zu erfahren"

3.4.1 Contact details

Detailed information about the selected Contact.
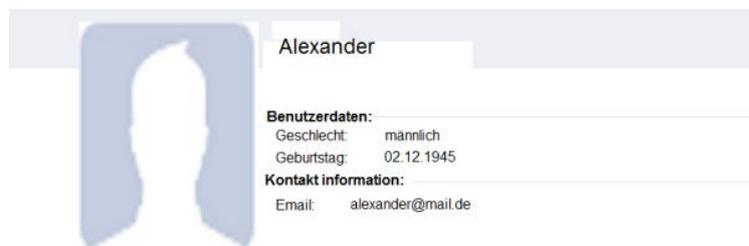
Layout:

Font size is too small.

3.5 Search for Friends

User can search for other people within SSP. The plan is to extend the search to other Social Networks as well. The result of the search is shown just as in the case of 3.4.
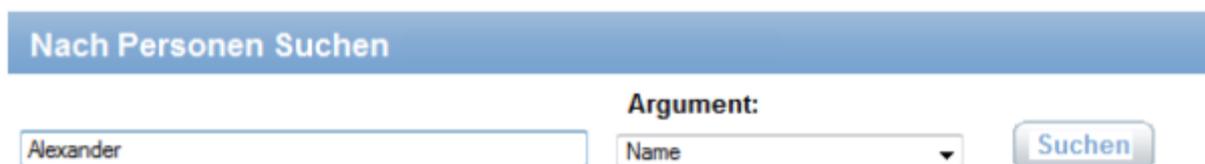

Wording:

- „Argument" → „Suchkategorie"
- Analogically with „Argument" the input field for the name could also use a caption like "gesuchte Person:" or "Suchbegriff:"

3.6 My Pictures

User can see her/his uploaded photos or new photos can be uploaded by clicking "add new

photos".

Wording:

- „Meine Bilde" → „Meine Bilder"
- „Neues Bild aufladen" → „Bild hinzufügen"

Layout:

There is no need to display pictures/folders that don't exist („leer")

As there is only one option, there is also no need for the "Option"-element surrounding the button "Neues Bild aufladen" (just the button is sufficient)

Maybe a caption "Klicken Sie auf das gewünschte Bild um die entsprechenden Fotos zu sehen" above the pictures would be helpful for the user to show him how to access the pictures.

3.6.1 Upload photos

Photos can be uploaded here.
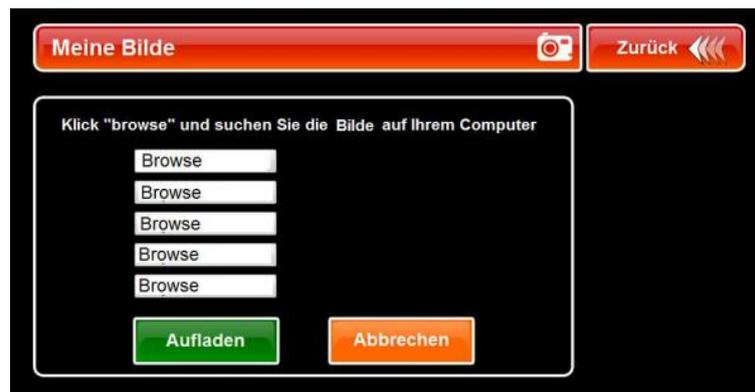
Wording:

- „Meine Bilde" → „Meine Bilder"
- "Klick 'browse' und suchen Sie die Bilde auf Ihrem Computer" → "Klicken Sie auf 'Bild aussuchen' und wählen Sie ein Bild auf Ihrem Computer aus"
- „Browse" → „Bild aussuchen"
- „Aufladen" → „Bilder hinzufügen"

Layout:

„Browse" doesn't appear to be clickable. (looks like an input field)

The contrast on the "Abbrechen"-button is pretty bad (white on orange background)"

The project website offers another interesting document at its research subsection. The title of this document is "*Usability Analysis on online Social Networks for the elderly*" written by Yu Chen of Helsinki University of Techonlogy. The paper provides a review "of social networks and its significance to senior citizens", analyses "usability factors associated with social networks for the elderly" and shows "several successful solutions to the usability problems faced by seniors". Especially in chapter 4.1 aspects of "User-friendly Interfaces" are discussed:

"Due to the physical and mental changes mentioned above, the elderly are slower than other age groups to adapt to new technology. If the user interface of an online social network is well-designed, the elderly will be more willing to participate in digital social communication.

According to the features of the elderly, user interface (UI) design should at least include the following principles. First, the elderly benefit most from a simplified and obvious UI, or in other words, less is more. Another important principle that should be taken into account is that linear progression of a task maximizes the efficiency. Parallel to this, simple as UI design should be, it would be better if less possibilities are offered (E. Romoudi and T. Fokidou, 2008)[19]. The more options there are, the more difficult it is for an old people to make a decision.

Many innovations are available to improve UI design for the elderly. Jive[20], a proof-of-concept for a range of user-friendly devices for the elderly who have little knowledge on how to use a computer and the Internet, is one of them. Three main components of a set of Jive device are friend passes, a tangible screen called 'Betty' and a router. A friend pass is a physical connection to the friend's online social world. The friend pass is linked to an RFID (Radio-frequency Identification) tag. When a user purchases a friend pass, the connection between the friend pass and the RFID tag is initialized, which helps to update online social information of the friend. The second component, Betty, is a tangible and elderly-friendly UI which mainly displays three types of service for a friend: showing updates of a friend, sending messages, and exploring the friend. It works together with a specified friend pass. The third component is a simplified wireless router which embeds all setup details of the Jive device. This integrates complicated device setup procedure to three steps: plugging the router to a telephone, plugging in the power and turning on the switch. It uses an ADSL modem with automated connection setup.

Grandparents begin their online social communication by placing a friend pass on Betty at three different places: the left, the middle or the right, which supports sending a message, showing general updates of the friends and showing specific details of the friend respectively. The elderly can send a message by an ordinary keyboard. The updates of a friend on Betty screen come from social network websites of the friend such as Facebook[21] and Flickr[22]. In this way, an elderly person is able to get in touch with his or her children, grandchildren and other friends with an easy-to-operate device, which does not even require using a computer. …"

Chapter 4.2 examines another important aspect on how to improve usability, the "E-ducation among the elderly":

"Based on senior people's learning process, it is essential that detailed educational instructions are included in online social network services targeted at the elderly with different level of network experience (Fu-ren Lin and Chun-hung Chen, 2004)[23]. For those who have experience with Internet technologies, it is necessary to give step-by- step knowledge to new features of

services. Meanwhile, for those who have little access to the Internet, basic education on the Internet is crucial to encourage participation in social activities. However, education methods for the elderly are different from those for young people. It was found out in a study (S. Sayago et al, 2007)[24] that the elderly learned mainly from their past experiences rather than from tests or instructional teaching. This indicates and recommends studying senior people's past experience to design effective education methods. Additionally, due to eyesight deterioration of the elderly, text-based instructions are far less useful than video-based ones. Another discovery is that the elderly learn more by communicating with others than by studying alone. Thus in order to help more elderly to join social network services, the designer should also develop elderly-oriented education methods and materials. Research also indicates that using easy to understand language instead of computer jargon enables the elderly to understand new technologies better. One case study by (S. Sayago et al, 2007)[23] looked at the subject of online picture sharing by studying the needs of the elderly. It was discovered that the senior people had interest in online sharing. The study carried out an experiment by organizing the elderly to study online picture sharing together rather than studying individually. The elderly students were expected to share their photos with each other online and discuss their difficulties in time. This experiment encouraged both interaction and discussion and generated promising results. The elderly learned more efficiently than studying alone. One spin-off of the experience of uploading and downloading files through this training is that the elderly would found it easier to use other various online file sharing services which are common in Web 2.0 services."

4.3 Comparative analysis

All previous projects deal with elderly and their requirements. Each from their own perspective proposes the best way to approach a new initiative for such a target group in relation to ICT development issues.

Starting from rather technical aspects regarding the user interface, there can be a thorough analysis on the best possible configuration of an elderly person's software platform so as to increase the potential of successful occupation with the project. It can refer to the quality of life and the level of motivation might offer to the elderly. In this category, there are identified five requirements which should be adopted by any new initiative; learnability, efficiency, memorability (easiness in memorising parts of the GUI flow procedure), error-handling and satisfaction indicator. In technical terms, the contrast to be preferred is black/white combination, visualization of text should be 14pt font-sized, brightness and saturation should be of medium intensity, visual keenness should use center-located objects and depth-perception should be generally avoided (not to use shadows for 3D effects).

Studies have shown that for several European countries the requirements could be differently prioritised. Depending on the elderly needs, it is proven that rich colours and imagery are helpful in general.

Another case study has explicitly analyzed the technical ISO standards that software for elderly people should follow. There has been a distinction on accessibility and usability standards, which both should undergo a human-centred design analysis. Six requirements regarding the software quality to be adopted are functionality, usability, reliability, efficiency, maintainability

and portability. This case-study proposes the following technical standards; light background and dark text for elderly, larger fonts and more spaces used between words and paragraphs, clear language and context to be used, short paragraph texts, memory cues, no frames or tables or error messages (as all three tend to confuse elderly people) and few animation used in the website, wherever it should be used to clarify ambiguous issues.

The fourth case study focuses on the fact that whatever design should be personalized for the elderly, as a consumer behaviour model.

The next case study poses several technical criteria for an effective 'elderly occupation'. Regarding the user interface, there should be taken into consideration the text size, style and layout, the colour and contrast to be used. All multimedia to be used should be simplified, maybe with text-to-speech specialized software and there should be wisely used any 'CAPTCHA' parameter. Regarding navigation of the elderly user in the envisaged platform, links should be used for easy navigation and for less distractions. The use of the mouse and keyboard should provide sufficient time in responding to the elderly person at all times throughout their navigation. As far as the GUI is concerned, the page organization should include understandable language, consistent labelling, instructions and input assistance and error prevention. Of course, it should be considered the fact that few elderly people might have relatively old equipment or software versions (eg browser), ending up in poor results while using the envisaged platform.

The final case study focuses on navigation and orientation issues, proposing the permanent existence of a 'home button' throughout the site. Any interaction and exchange of information should include either a glossary or a FAQ section. It would be preferable the user to have the ability to change text size and contract at will. Finally, this study offers a series of practical steps on how to implement such an initiative for elderly, while it concludes with the statement that elderly people learn more when they have been with someone else rather than by being alone.

Concluding, these case studies offer a wide range of requirements that is totally desired to adopt as much as possible from them in the current initiative of the ELDER-SPACES project, in compliance with the current technical constraints of the project and the functionalities the iWiW platform already offers.

5. Legal and Regulatory Frame

The collection, processing and management of sensitive personal data holds threats to the elderly who have the legal right to be protected according to the 9th Article of the Greek Constitution. In Greece, these people's rights are safeguarded by the Independent Authority of Personal Data Protection. For Greece, no ethical approval is necessary apart from the notification to data protection authority.

All the users have the right to be informed. Any participant in the ELDER-SPACES pilot has the right to know the purpose of the activity he or she is involved in, the expected duration, procedures, use of information collected, the participant's right as a part of the study and any risks, discomfort, or adverse effects. This information should be conveyed during the recruitment process and then reiterated at the beginning of the activity when the informed consent form is distributed and signed by the participant. The participant signs this form to acknowledge being informed of these things and agreeing to participate.

Permission to Record will be explicitly asked. Before recording the voice or image of any individual permission will be obtained. This will be accomplished with the consent form.

Anonymity of users. Participants have a right to anonymity. Their information will be kept confidential and participants' name will never associate with his/her data or other personally identifiable information. Instead a participants ID will always be used.

The right to withdraw. Participants should feel free to withdraw from any activity without penalty.

Valid and reliable data. In every activity, we will ensure that the data we collect are free from bias, accurate, valid and reliable. We will inform stakeholders about the limitations of the collected data.

Data retention and documentation. Collected original data will be retained only for as long as it is relevant for the project.

6. Summary of User Requirements and Conclusions

Taking into consideration the outcomes of the comparative analysis, we have included most of their positive parameters in our current ELDER-SPACES user requirements document.

At first we proceeded with the generic distinction of functional and non-functional requirements. The functional requirements were given a code name for easier and further technical reference, while the non-functional ones have been more abstract in context.

The main identified requirements have been the following; usability, validity, need for control, technology level awareness and social background. Some 'abstract' requirements identified are supportability, reliability, usability, performance and security and legal issues.

Most of the requirements analyzed in the comparative analysis are either identical or belong to a hyper-category of what has already been stated.

It was chosen not to proceed to a strict technical analysis in this stage, as it is assumed as preliminary stage and all technical aspects are to be dynamically shaped after this deliverable. Towards this direction, there has been a first approach in separating the user groups, one from ages 55 to 70 (55-70) and a second one above 70 (70+). For both groups there has been analyzed a series of proposed services that could be used by both categories, thoroughly examined at the same time the trend of each group.

Concluding, this document is shaped that way as to pose the basis of the current ELDER-SPACES project and trigger the conduction of all forthcoming deliverables and tasks, with the cooperation of the whole consortium.

Annexes

Questionnaires (general, specialized)

In the questionnaire that was given to the participants, there were more general and some specialized questions as well. Specifically, the structure of the queries is shown below:

General Questionnaire

1. Are you familiar with the use of mobile/smart phones?

2. Do you possess such a device?

3. Are you familiar with computer usage?

4. Is there a computer in your house?

5. Do you have internet access at home?

6. Are you familiar with the use of the internet?

7. Do you know what "social networking" is?

8. Have you ever used facebook/twitter?

9. Do you have an account on such a network?

10. * Do you visit often KAPI at your neighborhood? (Specialized for Greece) *

Specialized questionnaire for profiling the users

1. Which are your basic interests and hobbies?

2. Are there family members or friends that leave far from the city where you live? Do you communicate with them?

3. How frequently do you communicate? (Daily, Monthly, Once a year)

4. Would it be interesting for you to see him/her while speaking?

5. Do you read newspapers or books? Which are favorite ones? (Name 3 of them)

6. Do you watch TV or movies? Which are favorite ones? (Name 3 of them)

7. Where do you use to meet your friends or relatives? During festivals or holidays, where else?

8. What kind of services do you think that it would be convenient for you to exist?

9. Group of people having the same interests? (Yes or No)

10. Members of the group that can exchange multimedia content from participation in common activities or events etc. (Yes or No, Please state your opinion on each case)

11. Members of the same group can exchange opinions and experience based on common

profession. (Yes or No, Please state your opinion on each case)

12. Would you like to invite more people to assist this effort and organize intergenerational activities? (For example, 55+ citizens to give lecture to schools regarding their field of expertise or experience gained on historically significant events.)

13. Would it be interesting for you to have the chance to rate your doctor and give a chance to other people to do the same?

14. Would it be essential to construct framework services for organizing events?

Specialized questionnaire for Facebook use

1. How much time does it take you to connect to facebook?

2. How easy do you find the way to connect to FB (scale 1-5, 1: very difficult, 2: difficult, 3: nor difficult nor easy, 4: easy, 5: very easy)?

3. Do you need guidance from the moment when you are connected?

4. Do you communicate with your friends through facebook?

5. Can you search/add a facebook friend?

Exemplary Consent Form

Consent Form

I have spoken to……………………………………….about the focus group organised in the framework of the ELDER SPACES project.

This took place on ………………………………

(Tick one)	Yes	No
I have been informed about the project		
I have had the chance to talk about the project and ask questions		
I know enough about the project now		
I understand that it is my decision whether or not to take part in the focus group session.		
I understand that if I do not want to take part, or decide to stop, this will not affect any help I am getting		
I understand that the focus group session may be taped. I can stop this at any time		
I agree to take part in the user group session		

Signed .... Date...................................

Name (in block letters) ....

Signed (Researcher) .... Date...................................

Name (in block letters) ....

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