



Voice Controlled **Assistive** Care and Communication Services for the Home

D2.1 – User Requirements

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Abstract

This document describes the requirements activities and results for a speech controlled vAssist system focusing on tele-communication and tele-medical services for senior persons with (fine-) motor skill restrictions and/or chronic diseases. The resulting requirements serve as guidelines for the generation of business models, creation of scenarios and the development of a future vAssist prototype.

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1 Introduction

This deliverable describes the primary and secondary target user groups of vAssist, the user requirement activities and procedures in two partner countries (AT, FR) as well the results and conclusions for the further system specification. The structure of this deliverable is organized as follows: Section 1 gives an introduction and short background information about voice interaction systems. Section 2 focuses on the research goals. Section 3 defines the different target user groups and outlines the recruitment procedure. Section 4 specifies the timing of the requirements activities. Section 5 outlines the applied methods for collecting the user requirements. Section 7 includes the main results and section 8 provides a summary and chapter 9 the conclusion.

1.1 Background

Ambient Intelligence (AmI) is a paradigm within information and communication technology describing systems that accompany and support human beings in a digital environment. The precondition that such a system can be applied is an environment, which consists of various technical devices linked by network technologies, providing specific interfaces [1]. The latter can either refer to the connection of the hardware or to the user interface (UI) which is defined as the control mechanism of hardware devices or software applications. One of these control mechanisms is based on voice input the so called “spoken dialogue system”. A spoken dialogue or speech interaction system is defined as a computer system that interacts with human beings via spoken natural language on a turn-by-turn basis [6]. Such a system may include voice control, call routing, voice search and/or question answering [2]. Within these interaction possibilities the important difference is whether the system reacts on speech input, speech output, or interactively.

Results from experimental studies on browser tasks could show that voice input could be done faster than the keyboard input and furthermore achieved an input accuracy of 92% after sufficient learning [3]. Further, recent studies state that voice interaction show high acceptance as alternative input possibility for modern Information and Communication Technologies (ICT) among older adults with diverse capabilities [5].

This deliverable describes the user requirement activities and results for the future vAssist system that aims at creating natural language voice interfaces (and supportive graphical user interfaces) for telecommunication and tele-medical applications for older persons with (fine-) motor restrictions and/or chronic diseases.

1.2 Scope of the deliverable

The major goal of D2.1 is to give a summary about the definition of the target user groups and their requirements related to speech controlled tele-communication and tele-medical services that will be provided through already existing devices in the home of the users. User requirements were analyzed from different point of views involving primary users (seniors) and secondary users (formal caregivers: family members, informal caregivers: health professionals). Results are translated into a requirements

table highlighting the major requirements of the future vAssist system for the following technical development phases.

With the intention to deliver state-of-the-art knowledge in senior's speech interaction with telecommunication and tele-medical services the research area was narrowed down and precise research questions were defined. Moreover, methodological guidelines were developed for all partners to deliver reliable results for the vAssist system and service requirements in all involved partner countries.

2 Focus of Research

The focus of research in Austria and France dealt with various research questions which are described in the following section.

2.1 Goals

The main objective of vAssist is to develop VUIs for already existing hardware (e.g. TV, PC, mobile devices, tablet PCs, etc.), software and services for seniors focusing on tele-communication and tele-medicine applications. In specific, vAssist addresses older people (the primary target user group) suffering from (fine-) motor skill impairments and/or chronic diseases. Seniors with specific cognitive impairments (e.g. Alzheimer`s, Dementia) other than age related memory loss – so called “AAMI” (Age Associated Memory Impairment) are excluded. The latter (AAMI) is defined as a slight memory loss that does not affect other cognitive areas. Consequently, AAMI does not have an effect on the activities of daily living (e.g. self-care, hygiene, dressing etc.), but influences older persons remembering of daily information. This limitation is often self-reported by seniors and sometimes confirmed by other informants.

The requirement activities of the vAssist project focused on the following research goals that are related to task 2.1. (User Requirements):

- **Gain awareness:** about the needs of older adults with (fine-) motor skill restrictions and/or seniors suffering from chronic diseases
- **Get insight:** into devices, software, and services that are already in use in the home of seniors (related to tele-communication and tele-medicine services)
- **Collect feedback:** from older persons about their interaction preferences regarding VUI for tele-communication and tele-medical applications
- **Gather information:** about future business models for vAssist services
- **Elicit requirements and recommendations:** for VUI (and GUI) design and functionalities for the further development of the vAssist system

2.2 Research Questions

To achieve the goals of task 2.1 (User Requirements) the following research questions were addressed during the requirements phase:

- What kind of tele-communication and tele-medical devices and services are mainly used by senior adults?
- What kinds of future services have a potential to add value to the daily life of senior users with (fine-) motor skill restrictions and/or chronic diseases that can be equipped with speech control?
- What preferences do senior users have related to speech control design characteristics?
- How can future business models look like that are appropriate for older persons?

3 Target User Specification and Recruitment Procedure

The next section defines the different target user groups of vAssist and the recruitment procedure.

3.1 Target User Specification

In short, vAssist addresses the following three target user groups:

- **Primary users:**
 - older adults with (fine-) motor skill impairments
 - and/or chronic diseases
- **Secondary users:**
 - are divided into formal and informal caregivers
 - *Formal caregivers*: health professionals, medical personnel, nurses
 - *Informal caregivers*: family members, relatives, friends
- **Tertiary users:**
 - service providers (tertiary users are addressed in D.2.2 [Servicer provider and Business Requirements])

A detailed description of primary and secondary target user groups can be found in the following sections.

3.1.1 Primary Users

Primary users in vAssist are defined as persons aged 65 and older (both gender). These persons may show restrictions in their vision, eyesight and / or hearing, as well as AAMI (Age Associated Memory Impairment). The main characteristics are summarized below (see also Table 1):

- **Age:** 65 and older
- **Sex:** male/female
- **Restriction sensual:** showing age related restrictions in their vision, and/or hearing (but not suffering from specific impairments such as blindness or deafness).
- **Restriction cognitive:** Persons may show age related problems with their memory skills, defined as AAMI (Age Associated Memory Impairment), but are not diagnosed with neurodegenerative diseases such as MCI (Mild Cognitive Impairment), Alzheimer`s Disease, Dementia, or similar. Persons with a diagnosed cognitive impairment are not in the focus of vAssist.
- **Experience with ICT:** Having at least little experience with the use of modern ICT Information and Telecommunication Technologies (ICT) such as PCs, laptops, internet, TVs and/or mobile phones.

Diverse combinations of the following additional characteristics are in the focus of vAssist:

- **Restriction physical:** Persons with restrictions in their (fine-) motor skills that lead to problems in the use of mouse and keyboard or touch and/or mobile devices. They may also suffer from different limitations at the upper limb that hinder them in using technical devices.
- **Chronic conditions:** Persons suffering from a chronic disease (e.g. diabetes, rheumatism, arthritis, high blood pressure, cardiovascular diseases, etc.). These persons also may receive stationary medical care or supportive home care services.

Table 1 illustrates the main characteristics of the primary target user group of vAssist, summarizing male and female characteristics.

Main Characteristics of Primary Users	
Gender	male / female
Age	65+
Social contacts	none to some
Limitations / Difficulties in	<i>at least two of the following:</i> bathing, climbing stairs, crouching, kneeling, stooping, difficulties in shopping groceries, doing house work, getting up from chair or bed, lifting or carrying weights over five kilos, pulling and pushing large objects
Diseases	<i>at least one of the following:</i> cataract cholesterol diabetes heart attack high blood pressure osteoporosis
Symptoms	heart trouble pain in joints, back, knees
Devices in use	<i>at least one of the following:</i> Computer with Internet connection Radio TV Landline phone Mobile phone

Table 1. Summary of main characteristics of the primary target user group of vAssist (male and female)


The following two CURE-elderly-Personas [7] (one male, one female) have been chosen since they describe the vAssist primary target user group best (see Table 1).

Alain CŒUR


Bourges, France

Heart-patient


Age: 74



Family & Home



Social contacts



Income


Cognitive:

Memory:

Diseases:

Symptoms:

Limitations:



About & Family:

Alain is married and lives together with his children and grandchildren in their house. Alain has become a more difficult person as he has gotten older. He often has fights with everybody in the household and he spends less and less time outside the house. The family has a small plot of land in the countryside. Recently his children started a new business – a rental house for vacations – to make some additional income. Alain only gets a low pension and the economic situation of the family is currently not the best.

Limitations/Difficulties in

getting up from chair,
climbing several flights of stairs,
stooping, kneeling, crouching
reaching or extending arms above
doing housework

Health

Alain is physically inactive, and is bordering on obese. These factors make his situation worse, as he is a heart patient. Last year he got a cardiac catheterization to measure intra-cardiac and intravascular blood pressure. Since that time he has to take care of his diet. Further, he has difficulties in doing housework, due to pain in his hands and wrists caused by rheumatism and arthritis and he cannot move freely because of the pain in his back and knees. Moreover he is forgetful and incautious. He cannot see or hear well anymore although he is using a hearing aid.

<u>Diseases</u>	<u>Symptoms</u>
heart problems, high blood pressure & Cholesterol Arthritis/rheumatism	pain in back, sleeping problems

Social

He does not participate in social activities and spends his time in front of the TV. He is easily disappointed when things go wrong and cannot stand being the "old ill grandpa". Alain has a close relationship with his grandchildren, although he is a difficult person. The fights he has with his children are mostly about administration issues of the house, as he still wants to decide everything on his own and the children want him to retire. Although he had bitter experiences, he is still a positive person and tries to enjoy his life.

<u>Psychographics</u>	<u>Drugs</u>
fatigue, grumbly, forgetful, modest Hopeful optimistic satisfied with his life	yes <u>Hearing aid</u> <u>Eyesight glasses</u> <u>Educational level</u> basic <u>Risks</u> obese, drinks, inactive

Technology Usage

Alain does not have technological devices, not even a mobile phone. He uses the internet from time to time together with his grandchildren. The grandchildren help him to use the computer. The children like playing Wii and have gotten Alain to play some games with them.

General attitude towards technology

neutral

Devices in use

TV
computer with internet connection

<http://elderlypersonas.cure.at>
 © 2011 CURE-Elderly-Personas
 The CURE-Elderly-Personas are fictitious persons synthetically generated from average traits mixed across countries. Photos are taken from an external database. CURE-Elderly-Personas materials and documents do not represent private data from a single person. Information included in CURE-Elderly-Personas materials and documents do not infringe any privacy and data security rights.


Figure 1. Alain Coer: CURE-Elderly-Persona describing male primary users of the vAssist project

Hilde EIFRIG

Eisenstadt, Austria

Osteoporosis patient

Age: 75



Family & Home



Social contacts



Income


Cognitive:

Memory:

Diseases:

Symptoms:

Limitations:



About & Family:

Hilde is a tough woman who had been nursing her husband for a long time until his death. Being an experienced housewife, Hilde is living with one of her daughters, taking care of the grandchildren and helping her daughter, who is a single parent. Hilde has only a low pension and has difficulties in making ends meet every month. Hilda has two more daughters. One of them lives in the same city and the other one lives in Vienna. They sometimes meet up or at least talk on the phone several times a month.

Health

Hilde has arthritis/rheumatism. On bad days walking long distances is not easy for her, as she has pain in her knees and back. She takes drugs for joint support and for keeping her blood pressure under control. She often stays at home since she is afraid of falling down and breaking her bones. She sits most of the time, therefore she has swollen legs, is overweight and shows high cholesterol. She has restless sleep and feels weak and low on energy. She uses reading glasses and cataract development was recently detected. She is using drugs to prevent its further development.

Social

Hilde thinks that her age prevents her from living independently. She misses her husband and sometimes feels lonely and becomes tearful, thinking about the good old times. She feels sometimes that she would rather be dead. But life has a meaning for her and she tries to be happy with her family. She works voluntarily for a social work organization that raises funds by knitting and collecting old clothes and accessories from the neighbourhood, which are picked up regularly from her flat. Almost every week, she takes care of her grandson for a day. She loves playing with her grandson.

Technology Usage

She is forgetful and has problems in coping with numbers. She does not see herself as competent enough to learn to use new technologies or devices. At home she watches TV and listens to radio. She sometimes sits in front of the computer together with her grandchildren, but she just watches what they do or show her. She has a mobile phone she uses when being outside the house.

Limitations/Difficulties in

getting up from chair,
climbing stairs,
carrying heavy objects more than five kilos,
difficulties in shopping for groceries,
doing work in house and garden

Diseases

Arthritis/rheumatism
High blood pressure & cholesterol

Symptoms

pain in back, knees,
pain in joints
swollen legs,
sleeping problems,
fear of falling down

Psychographics

sad,
tearful,
arduous,
hopeful,
committed to the family,
down-to-earth,
forgetful,
satisfied with her life

Drugs

yes
Hearing
less than good
Eyesight
cataracts, glasses
Educational level
basic
Risks
obese

General attitude towards technology

neutral

Devices in use

TV
radio
mobile phone

<http://elderlypersons.cure.at>
 © 2011 CURE-Elderly-Personas
 The CURE-Elderly-Personas are fictitious persons synthetically generated from average traits mixed across countries. Photos are taken from an external database. CURE-Elderly-Personas materials and documents do not represent private data from a single person. Information included in CURE-Elderly-Personas materials and documents do not infringe any privacy and data security rights.

Figure 2. Hilde Eifrig: CURE-Elderly-Persona describing female primary users of the vAssist project

3.1.2 Secondary Users

This section defines the profile of the secondary users in vAssist. Two groups of secondary users are involved in vAssist, formal (FR) and informal (AT) caregivers.

3.1.2.1 Formal Caregivers

Health Professionals in vAssist are defined as persons with a specific (academic) medical education that get paid for their work and efforts.

These persons can be doctors in general, but also specialists such as neurologists, psychologists, gerontologists, nurses, nutrition or diet coaches or other medical personnel whose focus is on treating seniors who show restrictions in their (fine-) motor skills and/or suffer from chronic diseases. In general these persons supply diverse supportive (home) care and/or medical care services to senior citizens.

Formal caregivers (health professionals, medical personnel, nurses, physicians, etc.) are defined as following:

- **Age:** 20 and older
- **Sex:** male/female
- **Education:** specific (academic) medical education
- **Work/Experience:** supplying diverse supportive (home) care and/or medical care services to older persons with (fine-) motor skill restrictions and/or chronic diseases. Get paid for their work and efforts.

The following general minimum criteria apply for the formal caregivers participating in focus groups (see Table 2).

Main Characteristics of Formal Caregivers	
Gender	male / female
Age	20+
Work Experience	<i>Treating seniors with:</i> Age Associated Memory Impairment (AAMI) Chronic diseases Restriction in (fine) motor skills
Technology Experience	<i>at least once a week use of:</i> Computer with Internet connection E-mail Mobile phone Technical medical devices

Table 2. Summary of the main characteristics of formal caregivers (male and female) of the vAssist project

3.1.2.2 Informal Caregivers

Informal caregivers in vAssist are defined as family members, relatives and/or friends that voluntarily take care of older people without any contracts or payments. The supportive services provided from this group ranges (but not limited to this) from grocery shopping, making the household, helping with sanitary care (if necessary) and being a social companion.

Informal caregivers are defined as persons:

- **Age:** 20 and older
- **Sex:** male/female
- **Education:** No specific education related to medical and or health care of older persons
- **Work/Experience:** Providing voluntarily care support to senior family members and/or relatives. No contracts or payments.

The following general minimum criteria apply for the informal caregivers participating in focus groups (see Table 3).

Main Characteristics of Informal Caregivers	
Gender	male / female
Age	20+
Work Experience	<i>supporting seniors with:</i> cooking grocery shopping helping with sanitary care making the household social interaction
Technology Experience	<i>at least once a week use of:</i> Computer with Internet connection E-mail Mobile phone

Table 3. Summary of the main characteristics of informal caregivers (male and female) of the vAssist project

3.2 Recruitment Procedure

The next section describes the user recruitment procedure that was carried out for the focus groups with primary and secondary users in Austria (AT) and France (FR).

3.2.1 Recruiting Primary Users

Primary users in Austria are recruited by EURAG (supported by CURE). Primary users for the focus groups in France are recruited by APHP.

During the recruiting phase EURAG, CURE and APHP have used existing contacts from other projects and activities to primary users. Further, the partners got in touch with new contacts by applying diverse

strategies (e.g. phone calls, flyers, newsletters, E-mails, social networks, contacting self-help groups, etc.).

The table below gives an overview on the planned number of participants for the focus groups with primary users in Austria and France (see Table 4).

Focus Group 1: Primary Users AT / FR			
10-12 participants	50% male, 50% female	Age 65+	Devices & Services & Business Models
Focus Group 2: Primary Users AT / FR			
10-12 participants	50% male, 50% female	Age 65+	Services & Interaction

Table 4. Overview on focus groups with primary users in Austria and France

3.2.2 Recruiting Secondary Users

In Austria informal caregivers will be recruited and in France formal caregivers.

3.2.2.1 Recruiting Formal Caregivers

Formal caregivers for in France were recruited by APHP. During the recruiting phase APHP used existing contacts from other projects and activities to formal caregivers. Further, APHP got in touch with new contacts by applying diverse strategies (e.g. phone calls, flyers, newsletters, E-mails, social networks, etc.).

The table below gives an overview on the number of participants for the focus groups with formal caregivers in France (see Table 5).

Focus Group 1: Primary Users AT / FR			
10-12 participants	50% male, 50% female	Age 20+	Services & Devices & Business Models

Table 5. Overview on focus groups with formal caregivers in France

3.2.2.2 Recruiting Informal Caregivers

Informal caregivers in Austria were recruited by CURE. During the recruiting phase CURE used existing contacts from other projects and activities to informal caregivers. Further, CURE got in touch with new contacts by applying diverse strategies (e.g. phone calls, flyers, newsletters, E-mails, social networks, etc.).

The table below gives an overview on the number of participants for the focus groups with informal caregivers in France (see Table 6).

Focus Group 1: Primary Users AT / FR			
10-12 participants	50% male, 50% female	Age 20+	Services & Devices & Business Models

Table 6. Overview on focus groups with informal caregivers in Austria

4 Timing

The vAssist follows a user-centred market-oriented design (UCMOD) approach. This means that different user groups will active be involved during all design cycles (requirements phase, iterative lab user evaluations, field user evaluations).

For the requirements phase a mix of qualitative and quantitative methods are applied to gather a broad range of user feedback from primary (seniors) and secondary users (formal and informal care-givers) for the future vAssist system.

The schedule was planned tightly but effective and each task was achieved appropriately as illustrated in the table below (see Table 7).

Timing T2.1 User Requirements			
Week	CURE	APHP	EURAG
1	Planning & Recruiting	Planning & Recruiting	Planning & Recruiting
2			
3			
4	Implementation FGs	Implementation FGs	Implementation FGs
5			
6			
7			
8	Analysis FGs	Implementation FGs	
9			
10			
11		Analysis FGs	
12			
13	Deliverable Input	Deliverable Input	
14	Final Deliverable	Final Deliverable	

Table 7. Timing of the requirements phase

5 Methods

For the collection of the vAssist requirements of primary and secondary users a mix of qualitative and quantitative methods was applied to cover a broad variety of information from the different target user groups.

As qualitative instrument focus groups were selected. Focus groups are a method for collecting qualitative data and have enjoyed a surge in popularity in HCI research [9][10][11]. Most authors agree that the main advantage of a focus group is the purposeful use of group interaction in order to generate fruitful user requirement data. The detailed focus group manual can be found in the annex section.

As quantitative instrument screening questionnaires were applied focusing on services and devices in use. The screening questionnaires were included in the procedure of the focus groups and can be found in the annex section.

Three different focus groups were run at CURE Experience Labs (Vienna, Austria), and APHP premises (Paris, France) to gather basic data from primary (seniors) and secondary (formal and informal caregivers).

The table below gives an overview on the applied qualitative and quantitative methods for the vAssist requirements phase in Austria and France (see Table 8).

	Austria			France		
	Focus groups main topic: Tele-communication			Focus groups main topic: Tele-medicine / Well-being		
Focus Group Nr.	1	2	3	1	2	3
Users	Primary Users	Primary Users	Secondary Users	Primary Users	Primary Users	Secondary Users
Core Aspect	Devices Services	Services Interaction	Devices Services Interaction	Devices Services	Services Interaction	Devices Services Interaction
Side Aspect	Business Models		Business Models	Business Models		Business Models
Quantitative Method	Screening Questionnaire	Screening Questionnaire	Screening Questionnaire	Screening Questionnaire	Screening Questionnaire	Screening Questionnaire

Table 8. Overview on qualitative and quantitative methods for the focus groups in Austria and France with primary and secondary users

6 Procedure

Three different focus groups were organized in Austria and France. The manual can be found in the annex section.

6.1 Focus Groups in Austria and France

Primary Users: Two of the focus groups with primary users took place in Austria and France addressing devices, services, interaction and business requirements for the future vAssist tele-communication and tele-medicine applications (see Table 9).

Secondary Users: The third focus group was held with secondary users addressing formal (France, core topic: tele-medical services) and informal (Austria, core topic: tele-communication services) caregivers and their view on the future vAssist system. Further, also future business aspects were discussed.

The table (Table 9) below gives an overview on focus groups that were held in Austria and France.

Focus Group 1: Primary Users			
Austria	3 male, 7 female	Age 65+	Devices & Services & Business Models
France	3 male, 5 female	Age 65+	
Focus Group 2: Primary Users			
Austria	4 male, 4 female	Age 65+	Services & Interaction
France	3 male, 5 female	Age 65+	
Focus Group 3: Secondary Users			
Austria	5 male, 3 female	Age 65+	Devices & Services & Interaction & Business Models
France	6 male, 10 female	Age 20+	

Table 9. Overview on focus groups in France and Austria with primary and secondary users

Prior to each focus group, the informed consent form was signed by the participants and an introduction including basic project information was presented by the moderator. Next to the moderator another team member participated in the discussions taking notes, collecting information on flipcharts and caring for the audio and video recordings. All focus groups had the following general structure (see Table 10).

	Time in Minutes	Procedure
1	0-5	Welcome: Give a warm welcome to the participants
2	5-15	Informed Consent (IC): Explain document, answer questions, sign IC
3	15-25	Introduction: Short information about vAssist and its goals
4	25-60	Focus Group Session Part 1
5	60-70	Break
6	70-115	Focus Group Session Part 2
7	115-120	Conclusions, Thanks, Good Bye!
8	120	Invite participants to further vAssist studies

Table 10. General structure of the focus groups

Pre-defined sets of open questions and **power point presentations** were prepared for the discussions with the **primary and secondary users**. During these sessions the answers for each question were collected on flipcharts. This kind of mind memory makes the information accessible to everyone at any time and gives support for the final evaluation of the gathered qualitative data. Further, a written protocol and all sessions were audio/video recorded. A **content analysis** approach was applied for the analysis [12].

For a better understanding of speech control different usage scenarios were demonstrated to **primary and secondary users** applying the **Wizard of Oz technique**. Wizard of Oz offers the possibility for showing human computer interaction (HCI) in an embodied environment without having a full functional system available [15]. Further, existing speech control functionalities of smart phones and tablets were demonstrated to raise the experience level of the participants for voice interaction. The applied methods aimed at enabling the participants to get first impressions for the future vAssist system.

Moreover, **primary users** were invited to participate in **group work sessions** where GUI and VUI tasks had to be performed (Task 1: write a short E-mail using touch interaction [GUI]; Task 2: write a short E-mail using speech interaction [VUI]). The aim was to engage the inexperienced participants with modern voice interaction technologies and to enlarge the experience level of the primary users for VUIs. To compare the experience with the voice user interface and the graphical interface the participants were asked to choose **EmoCards** [13] (see Figure 3) for gathering their emotional reactions according to the two different interaction techniques. EmoCards enable the possibility to determine the level of pleasantness and arousal for products and services by selecting one out of nine cards. Further, primary users were asked to take notes regarding advantages (positive aspects) and disadvantages (negative aspects) of VUI and GUI interaction after the tasks.

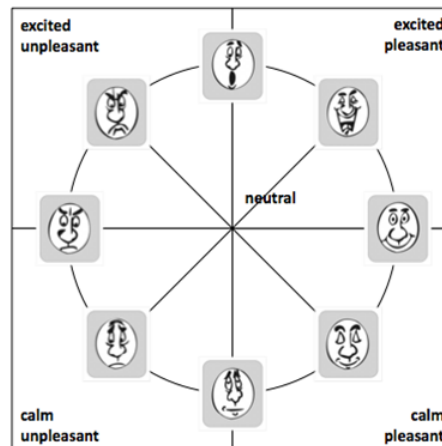


Figure 3. EmoCard Instrument [13]

6.2 Screening Questionnaires

Screening questionnaires for primary and secondary users were developed to collect quantitative feedback during the focus group sessions regarding communication preferences with family members and friends, needs regarding tele-medical and tele-communication services, and the kind of tele-communication and tele-medical services that would be advantageous to equip with speech control for already existing devices and services. The intention of the screening questionnaire was to show possible future perspectives to the involved user groups that were further discussed in detail in the focus groups with primary and secondary users. The screening questionnaires for the different target user groups can be found in the annex section.

6.2.1 Screening Questionnaires Austria

Next to socio-demographic information (age, sex), the screening questionnaires included three questions about tele-communication, services and devices, two of them with single choice and one with multiple choices answer opportunities. The screening questionnaires for primary and secondary (informal caregivers) users for the topic “tele-communication” can be found in the annex section.

The screening questions for the **primary users** were as following:

- **Question 1:** How often do you use the following communication possibilities for the communication with your family members and friends?
- **Question 2:** How often do you use the following devices for the communication with your family members and friends?
- **Question 3:** Which of the following devices at home do you use for what kind of activities?

The screening questions for the **secondary users (informal caregivers)** were as following:

- **Question 1:** How often do you use the following communication possibilities for the communication with your grandparents?

- **Question 2:** How often do you use the following devices for the communication with your grandparents?
- **Question 3:** Which of the following devices at home do you use for what kind of activities?

6.2.2 Screening Questionnaires France

Next to socio-demographic information (age, sex), the screening questionnaires included two questions about tele-medicine, services and devices, both with multiple choices answer opportunities. The screening questionnaires for primary and secondary (informal caregivers) users for the topic “tele-medicine” can be found in the annex section.

The screening questions for the **primary users** were as following:

- **Question 1:** Which of the following devices at home do you use and in which room do you use them?
- **Question 2:** What kind of information related health do you record? What kind of health services and devices do you use?

The screening questions for the **secondary users (informal caregivers)** were as following:

- **Question 1:** which medical services do you propose and which medical data do you record to follow-up chronic diseases (in the focus)?

7 Results

This section reports the results from the focus groups and screening questionnaires in Austria and France with primary (seniors) and secondary users (formal and informal caregivers).

7.1 Results Austria – Tele-Communication

This section reports the results from the focus groups and screening questionnaires in Austria.

7.1.1 Results Primary Users

The section below reports the results from the focus groups and screening questionnaires in Austria with primary users (seniors).

7.1.1.1 Focus Group 1

N=10 primary users (4 male, 6 female; mean age: 70.20; SD: 3.19) participated in the first focus group with primary users in Austria. The topic was set on tele-communication habits, devices at home, future vAssist services and business aspects.

All participants had at least little experience with modern ICT (Information and Communication Technology) and showed restrictions in their (fine-) motor skills due to age, diseases (Parkinson`s, stroke, brain tumor, etc.) or accidents.

Devices at Home

Starting with an exploration of existing technical devices at home and their room locations, feedback from primary users was gathered on a flip chart. The most prominent rooms for communication devices are the living room, the kitchen and the home office (see Table 11) .Most common devices are mobile phones, landline phones, PCs/laptops and TV sets.

These results highlight that vAssist services should be delivered at least for two hardware devices, a mobile and a static device. The most appropriate location for the static device is the living room.

Device	Location
Mobile Phone	carried around in the flat / in the pocket
Landline Phone	living room, kitchen, home office, hallway,
PC/Laptop	living room, kitchen, home office
TV	living room, kitchen, sleeping room

Table 11. Location of communication devices in the home of primary users

Preferred Tele-Communication Channels and Devices

Referring to the preferences for the communication channels current used for the communication with family members and friends audio and text based options are the most frequent used solutions.

- **Short-distance bi-directional communication:** Audio calls with landline and mobile phones are mainly used for short distance tele-communication with family members and friends.
- **Long-distance communication:** For long-distance tele-communication E-mails and internet based video and audio calls are used.
- **Group communication:** Blogging and social networks are mostly used for the communication with a broader community (e.g. club members), to inform others about events and to make appointments with more than one person.

PCs and laptops are mainly used for internet based communication services. The benefits of internet based services that were named by the participants are the following:

- **Text based communication:** since it is cheap, independent from location and time
- **Internet based audio and video communication:** since it is cost effective compared to mobile or landline phone calls.

All the above mentioned aspects outweigh the current problems with the control of the PC/laptop (touchpad, keyboard, mouse) due to the (fine-) motor skill restrictions.

In general primary users show an affinity to text based communication when using the PC/laptop. SMS and other text based message services would be used also on mobile devices if the problems with the input barrier could be overcome (keypad too small for long texts, font size too small, problems due to [fine-] motor skill restrictions). Speech input was perceived as a good alternative to interaction techniques that have to be operated by fingers.

Major negative issues raised were related to **privacy and security issues of personal data** and **physical restrictions** related to keyboard, mouse and touchpad usage. Both, physical restrictions and privacy issues have to be taken into account in the further development of the vAssist system.

Table 12 gives an overview on pros and cons of the different devices and services that primary users current have in use.

Device	Service	Pro	Cons
PC/Laptop	E-mail	no time pressure independent from time & location cheap no walking required reliable	impersonal problems with mouse /touchpad/keyboard control spam E-Mails
	Skype (audio/video/text)	cheap especially for long distant calls	contact person has to be online at the same time problems with mouse /touchpad/keyboard control

	Chat/Blog	direct exchange sharing contacts with others	sharing content with others danger of wrong identities fear because of data privacy issues problems with mouse /touchpad/keyboard control
	Social Network	entertainment fun being up to date about family and friends	too much uninteresting info impersonal time consuming problems with mouse /touchpad/keyboard control
Mobile Phone	SMS	good for emergencies	keypad too small for long texts font size too small problems with mouse /touchpad/keyboard control
Landline Phone	Audio Call	good usability	
Tablet PC			too expensive

Table 12. Pros and cons of primary users referring to different tele-communication devices and services

Requirements for Future potential vAssist Services

Referring to the services that should be equipped with speech control in vAssist primary users named the following:

- **Text manipulation:** Overall participants are very interested in speech control for text input especially for longer text passages such as for SMS, E-mails and MMS. Additional ideas include features that can be used to translate text passages into different languages.
- **Contact management:** Another VUI guided feature that was named by primary users is the address book. Older persons can very well imagine managing their telephone numbers and contacting details via speech control.
- **Media management:** Also media management was in the focus of the discussion. Participants recommend a service to manage photos, videos and other media with speech control.
- **Information search:** A further potential vAssist service that is recommended by the primary users is the search for information via the internet applying voice control.
- **Navigation/GPS:** Equipping navigation/GPS services with voice control was named as potential vAssist service to ease the orientation in unknown environments.
- **Emergency service:** A service that was highlighted several times during the discussion was the possibility to start an emergency call to family members and friends using speech control.
- **Physical parameter / tele-medicine:** Next to communication services speech based input and management of physical parameters were named as potential future vAssist service. Blood pressure control (value input and exchange with the practitioner) was the most prominent physical parameter that should be considered in the further vAssist service development.

Table 13 gives an overview on potential future vAssist services and features that should be equipped with speech control functions.

Service	Speech control features
Text manipulation	Writing longer text passages for SMS, E-mails, MMS Translation of longer text passages into other languages
Contact management	Managing telephone numbers and contact details in an address book
Media management	Managing photos, videos and other media
Information search	Searching for information via the internet
Navigation/GPS	Controlling navigation and GPS based services
Emergency service	Starting emergency calls to family members and friends (an included GPS localization function would be advantageous)
Physical parameter / tele-medicine	Reporting blood pressure data and sending the report to the practitioner

Table 13. Overview on potential future vAssist services named by primary users

Business Requirements

Since the vAssist projects follows a user-centred market-oriented design approach (UCMOD) also future business aspects were discussed with the primary users.

To raise the discussion, two example business models were presented that included two different vAssist packages (see Figure 4)

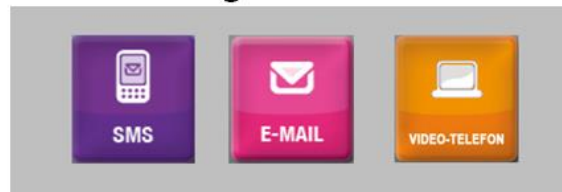
- **Basic package:** including three examples of pre-defined speech controlled services
- **Advanced package:** consisting of the basic package but with the possibility for a free selection on five additional speech controlled vAssist services.

In general, primary users show a positive attitude towards a package approach for a future vAssist business model. Further, the proposition of several different packages was perceived as a good idea to respond to primary users with individual needs and wishes.

In contrast, primary users have a negative attitude towards the pre-definition of services for different packages.

Basic Package: From the primary users point of view a basic package should be restricted to a limited number (range between 3 and 5) of included services. The included services should not be pre-defined. There should be a possibility to be able to select the kind of included services according to the needs of the individual user.

Basic Package:



Advanced Package



Figure 4. Example for future vAssist business aspects

Advanced Package: An advanced package should include the basic package (as described above) and possibilities for selecting several additional vAssist services (range between 5 and 8).

Alternative Package: Moreover, an alternative approach was seen in the possibility to fully individualize the number and kind of services that are included. Solutions similar to current mobile application stores were discussed where an unlimited number of services can be selected from a list.

The discussed business models had one major aspect in common. The **individualized selection of services** was from main importance to the primary users. As additional condition a **flat rate tariff** was named as the tariff model for services where **data traffic** is needed.

To sum up, Future vAssist business models should focus on:

- Proposition of different **individualize able** packages that vary in the **number of services** that can be selected.
- **Flat rate tariffs** for services that need **data traffic**.

Services: Regarding future speech controlled **vAssist services** that are from high potential and should **individually be selected** for basic and advanced packages, the following were discussed (see Figure 5):

- **Services to be individually selected for a basic package:** audio call service (N=10, 90%), E-mail service (N=10, 90%), information search/internet (N=10, 80%) and emergency call service (N=10, 80%).
- **Services to be individually selected for an advanced package:** Media management (photo, videos) (N=10, 40%), a social network service (N=10, 40%), a navigation/GPS service (N=10, 40%), a service for online banking (N=49%), a fitness/well-being service (N=10, 40%) and a service that informs about cultural events (N=10, 30%). Regarding the fitness/well-being service primary users think of some kind of a sport/physical activity diary, a diet/calorie coach and a net doctor service that provides information about different diseases.



Figure 5. Overview on vAssist services preferred from primary users to individually be selected for a basic and advanced package (N=10)

Results from the first focus group with primary users highlight that the following services have a high potential and must be seen as mandatory to be equipped with speech control within the vAssist project:

- **Audio call service**
- **E-mail service**
- **Information search service (internet)**
- **Emergency call services**

Future additional vAssist services to be equipped with speech control may be seen in the following areas:

- **Media management service**
- **Social network service**
- **Navigation/GPS service**
- **Online banking service**
- **Fitness/ well-being service**
- **Information about cultural events service**

7.1.1.2 Focus Group 2

N=8 primary users (4 male, 4 female; mean age: 70.22; SD: 8.84) participated in the second focus group in Austria. The topic was set on future vAssist tele-communication services, giving participants the possibility to have first contact and the possibility to compare touch and voice interaction and specifying speech control characteristics.

All participants had at least little experience with modern ICT (Information and Communication Technology) and showed restrictions of their (fine-) motor skills due to age, diseases (Parkinson`s, stroke, brain tumor, etc.) or accidents.

The second focus group in Austria was planned to address ten primary users. Due to short-term cancellation of two seniors, only eight primary users participated in the second focus group.

The participating primary users did not have any prior contact with speech control systems. To give them a better understanding of speech interaction, different speech interaction scenarios were demonstrated (writing an E-mail, requesting weather information, running an internet search) using the speech control functionality of an iPhone 4S. The demonstration phase was followed by a group work session where each primary user had the chance to write an E-mail using a VUI and a GUI of a smart phone. Following discussions gave insights into upcoming needs and critiques regarding speech controlled (dialogue) systems. Besides that, also first VUI characteristics were discussed such as personalization and feedback mechanisms (but not limited to that).

Group Work: GUI and VUI Interactions

GUI Interactions: Results from the group work session highlight, that for the GUI interactions mainly aspects related to the hardware (smart phone) are seen as interaction barriers by primary users (small keypad, small font size).

The content analysis revealed the following **major negative aspects** related to the touch interaction tasks (GUI) with a smart. **No positive aspects** were listed.

- **Keyboard:** too small keyboard
- **Font size:** too small font size
- **Screen size:** too small screen

Emotional feedback collected with EmoCards (Figure 3) highlight that in general primary users have an average pleasant feeling regarding touch interaction (GUI) on a smart phone (N=8, 42%) followed by excited pleasant (N=8, 25%) emotional feedbacks (see Figure 6). The remaining 33% of the emotional responses are related with calm pleasant and unpleasant feelings.

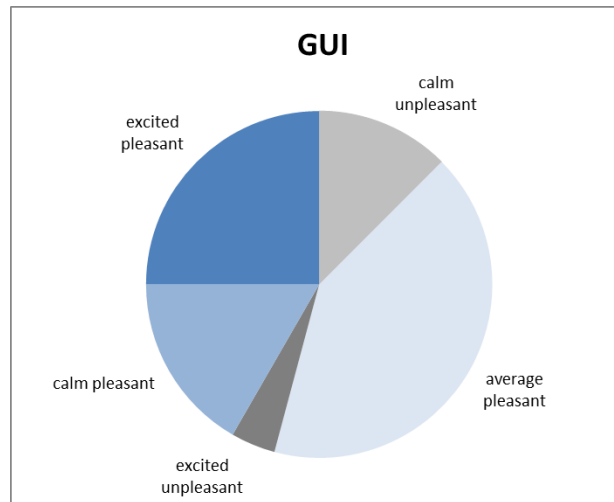


Figure 6. Results from EmoCards regarding touch interaction on a smart phone (GUI) (N=8)

VUI Interactions: Results from the group work session highlight, that for the VUI interactions **mainly positive aspects** were named that are related to the **input characteristics** and interaction **speed**.

The content analysis revealed the following **major positive aspects** related to the **voice interaction tasks (VUI) with a smart phone** that were named by the primary users. In general primary users were positively excited about VUI interactions. **No negative aspects** were listed.

- **No keyboard:** no manual input and key search is needed
- **Input characteristics:** good alternative to manual input, especially when suffering from (fine-) motor restrictions
- **Interaction speed:** enables fast control and input

Emotional feedback collected with EmoCards (Figure 3) highlight that in general primary users have an excited pleasant feeling regarding speech (VUI) on a smart phone (N=8, 46%) followed by average pleasant (N=8, 38%) emotional feedbacks (see Figure 7). The remaining 16% of the emotional responses are related unpleasant feelings (excited and calm).

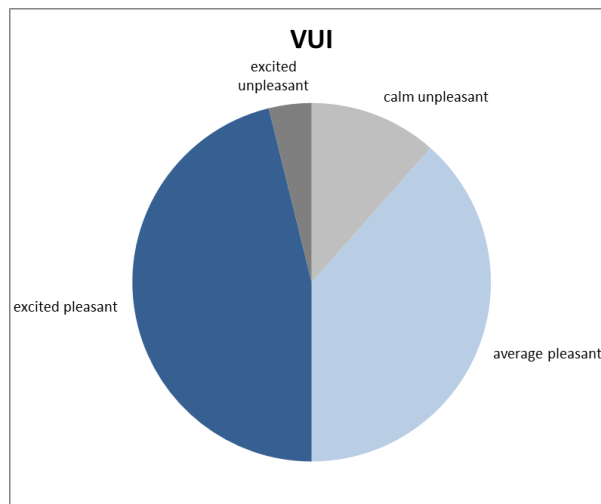


Figure 7. Results from EmoCards regarding speech interaction on a smart phone (VUI) (N=8)

GUI vs. VUI Interactions: Figure 8 illustrates the comparison of emotional feedback from primary users towards GUI and VUI interactions. Results highlight that VUI interactions elicited more pleasant feelings compared to GUI interactions (marked in orange). This means that in general, the aim of vAssist – equipping services with speech control – can be seen as a promising approach to support primary users with (fine-) motor skill restrictions.

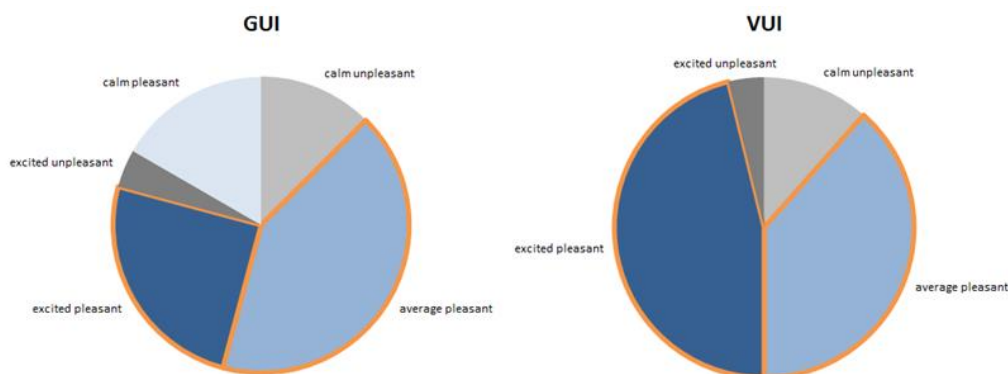


Figure 8. Results from EmoCards comparing emotional responses related to touch (left) and speech (right) interaction of primary users (N=8)

Hardware Requirements

Reconsidering hardware requirements, primary users state that (mobile) hardware should have at least the size of a postcard to be operable also with (fine-) motor restrictions. In case of already existing devices at home seniors are flexible and can imagine a mobile phone (smart phone) or tablet PC as a mobile device and the TV set or the PC/laptop as a more static vAssist device.

Of major interest however is a simple and clear structure of the interface and an easy to understand written instruction manual for the vAssist system.

To sum up, primary users expect the following major properties related to a future mobile vAssist hardware:

- **Portable**

- **Small**
- **Lightweight**
- **Versatile / multifunctional**
- **Large screen size**
- **Fast processor**

Further, the font size of the interface should be large and easy to read (responding to age related visual restrictions) and in case of any needed manual input, the buttons of the keypad should provide larger keys (responding to [fine-] motor skill restrictions).

Microphone and Loudspeaker Requirements

To raise the discussion different microphone and loudspeaker combinations were discussed (see Figure 9).



Figure 9. Discussed loudspeaker and microphone combinations

As the most preferred microphone and loudspeaker solution that should be applied in vAssist, a **wireless headset** could be identified. The following list represents the preferences about diverse microphone and loudspeaker combinations sorted by their preference ratings (N=8):

- **Wireless headset** (63%)
- **Device's microphone and loudspeaker** (38%)
- **Adhesive microphone** (13%)
- **General loudspeaker and microphone** (13%)
- **Wired headset** (13%)

Results indicate that a wireless solution is preferred over all other possible microphone and loudspeaker combinations by the primary users – in case the microphones and loudspeakers integrated into devices lack in quality for applying speech control technology.

Speech Control Requirements

Dialogue Characteristics: Results from the discussions about the dialogue characteristics highlight that in general a **natural language approach** compared to a single word command approach is preferred. Nevertheless the natural language **in- and output dialogues** should be **precise and short** command sentences should be used. In case of **errors**, the system should **pro-active** provide a **solution** how to solve the problem (e.g. If the system has not understood a command it tells the user that it has not understood the command and asks pro-active to repeat the command again). **Error solving strategies** should be **guided by voice and as text on the graphical user interface (GUI)**.

Personalization – Type of Voice: Discussions about the sex of the voice elicit that participants prefer a **female voice** for the interaction with vAssist services. The main aspect that was raised by the primary users is that they expect a female to better understood compared to a male one. Regarding the age of the voice the majority of the participants voted for a **young sounding voice** that further fulfills the criteria to **appear as pleasant**.

Overall as a “nice to have” primary users claim for the opportunity to make their own personal choices regarding the vAssist voice characteristics. Participants expect to have a list of voices differing in sex and age where they can make their own selection.

Personalization – Name of the System: All participants agreed on giving the vAssist system a name for the speech interaction. This aspect contributes to a more natural and personal level of interaction having some kind of “virtual human” they can talk to. As a “nice to have” primary users claim for the opportunity to freely select the name of the system by themselves.

Personalization - T-V Distinction: The T–V distinction is a contrast, within one language, between second-person pronouns that are specialized for varying levels of politeness, social distance, courtesy, familiarity, or insult toward the addressee. In general it can be differentiated between a formal (e.g. Hello Mr. Smith) and an informal (e.g. Hi Paul) form of interaction.

Regarding the T-V distinction, primary users expect the future vAssist system to react on a more personal and informal basis rather than on a formal and distant form of interaction.

A summary about the personalization requirements for vAssist from an primary user`s point of view can be found in the table below (Table 14).

Personalization	Requirements
Type of voice	young female pleasant sounding
Name	Giving the system a name makes the interaction more personal and natural The name should be selected by the user
T-V distinction	a personal informal interaction style is preferred

Table 14. Overview on speech control personalization needs of primary users

Feedback Requirements

Discussing feedback strategies and mechanisms for speech control systems could show that seniors raise the demand for different verbal and text feedback options. Results indicate a combination of voice and text (graphical) based feedback that accompanies the speech interaction as promising opportunity to ease and support the interaction with the future vAssist services. The following feedback needs for different interaction aspects could be identified:

- **Selecting a vAssist service:** For these types of interaction primary users do not claim to get additional voice or visual feedback (e.g. “I would like to write an E-mail”. The start of the service is perceived as feedback that the command was understood by the system.)
- **Longer text input:** For the input of longer text passages seniors suggest separating the text input into several parts (e.g. limit the input to 3 sentences at once). This strategy should ease the interaction by enabling the possibility to follow the text processing so that refinements or changes can be done right after the last sentence was entered.
- **Selecting an interaction element:** Primary users claim that a selection of a certain interaction element (e.g. “send E-mail” button) should be visually highlighted so that they can follow if the system has understood the command. In case of a false reaction of the system the given visual feedback provides additional feedback, what the system has done wrong.
- **Help function:** Support and help functionalities should pro-active deliver information about how to solve the occurred error. Next to a verbal (voice) feedback support and help functions should be accompanied by written text on the GUI.

Further, a major concern of the participants is that the user manual for vAssist should be easy written and good to understand, including possible voice commands to control the service by speech.

7.1.1.3 Screening Questionnaire

This section reports the results from the screening questionnaires with primary users in Austria. The questionnaire can be found in the annex section.

N= 18 screening questionnaires were collected during the two focus groups with primary users in Austria. Three questionnaires had to be excluded from the analysis since they were filled in incorrectly.

Sample

In general, questionnaire results from 7 female and 8 male participants (N=15) were analyzed. The mean age of the sample was 69 years (N=15; SD= 6.227) (see Figure 10).

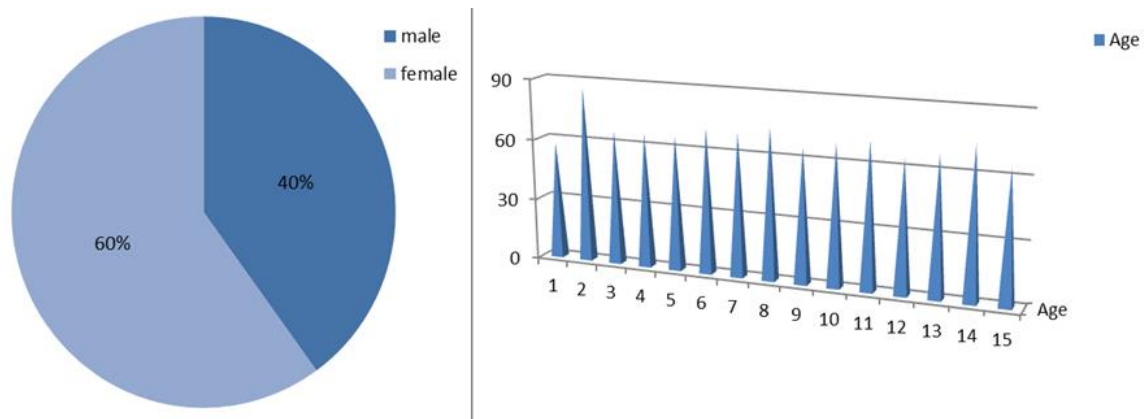


Figure 10. Sample description (gender, age) of the primary users participating in the screening questionnaire in Austria (N=15)

Question 1 – Communication with Family Members and Friends

How often do you use the following communication possibilities for the communication with your family members and friends?

Primary users were asked to rate the offered communication possibilities on a 7-point Likert scale ranging from 1= more than 1x a day to 7= never.

Since one of the participants did not fill in this question results only include the feedback from n=14 primary users.

To get a feedback about the most prominent communication channels used by the primary users the ratings were translated into points to create a list that can be sorted according to the given points. 84 points was the maximum number indicating the most prominent channel to be used for the communication with family members and friends by the primary users. Figure 11 illustrates the results of the communication channels used by primary users.

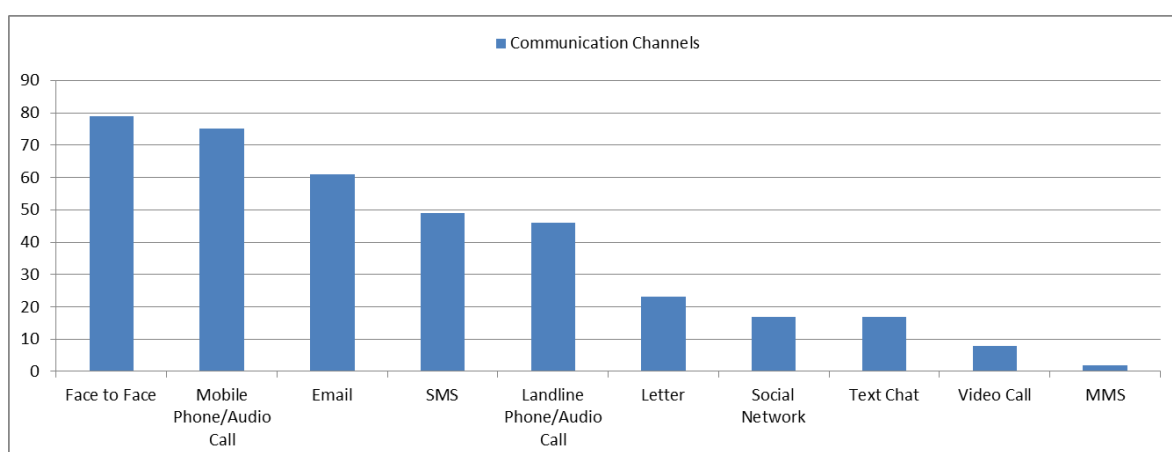


Figure 11. Rating of most frequent used communication channels by primary users (n=14)

The detailed ranking results of the diverse communication channels are as following:

1. Face to face (n=14, 79 points)

2. Audio call / mobile phone (n=14, 75 points)
3. E-mail (n=14, 61 points)
4. SMS (n=14, 49 points)
5. Audio call / landline phone (n=14, 46 points)
6. Letter (n=14, 23 points)
7. Social network (n=14, 17 points)
8. Text chat (n=14, 17 points)
9. Video call (n=14, 8 points)
10. MMS (n=14, 2 points)

Results show that next to face to face communication bi-directional **audio calls via the mobile phone** are the most common used channel for the communication with family members and friends. This result indicates that **bi-directional verbal interaction** under **flexible (mobile) conditions** is the **most prominent communication channel** of the primary users. Next to audio calls via the mobile phone also the bi-directional interaction via the landline phone is often used by the primary target user group.

Further, mobile audio calls are followed by the communication via text based channels. Primary users rate **E-mails and SMS** as their most used **text based communication services**.

Other communication channels such as writing a letter, social networks, text chats, video calls and MMS are not frequently used by the primary target user group for the communication with family members and friends.

Question 2 – Devices in Use for the Communication

How often do you use the following devices for the communication with your family members and friends?

Primary users were asked to rate the offered communication device possibilities on a 7-point Likert scale ranging from 1= more than 1x a day to 7= never.

Since two of the participants did not fill in this question results only include the feedback from n=13 primary users.

To get a feedback about the most prominent communication devices used by the primary users the ratings were translated into points to create a list that can be sorted according to the given points. 78 points was the maximum number indicating the most prominent communication device to be used for the communication with family members and friends by the primary users. The figure (Figure 12) below illustrates the results of the communication devices used by primary users.

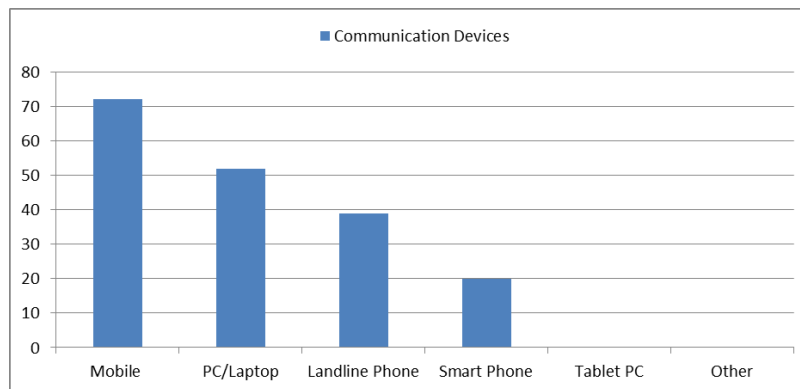


Figure 12. Rating of most frequent used communication devices by primary users (n=13)

The detailed ranking results of the diverse communication devices are as following:

1. Mobile phone (n=13, 72 points)
2. PC/Laptop (n=13, 52 points)
3. Landline phone (n=13, 39 points)
4. Smart phone (n=13, 20 points)
5. Tablet PC and other (n=13, 0 points)

Results highlight that primary users prefer small, lightweight and portable communication devices such as mobile and smart phones that are flexible for the use in mobile situations. This result corresponds with the favoured communication channels as illustrated in Figure 11 (audio calls via the mobile phone). Next to mobile devices PCs and laptops are used for communicating with family members and friends.

Question 3 – Devices at Home and related Activities

Which of the following devices at home do you use for what kind of activities?

Primary users were asked to select devices they have at home from a list and to indicate the activities they use the device for (e.g. communication, entertainment, information, etc.). Single choice for the device and multiple choices for the activities were possible.

TV Set: Results from the devices in use at home indicate that 100% of the participants own a TV set (N=15). For the vAssist project this means that the TV set may be used as the static device opportunity to deliver future vAssist services.

Further, the TV set is mainly used for information purposes (100%) followed by entertainment activities (93%) and for watching videos and DVDs (13%) (see Figure 13).

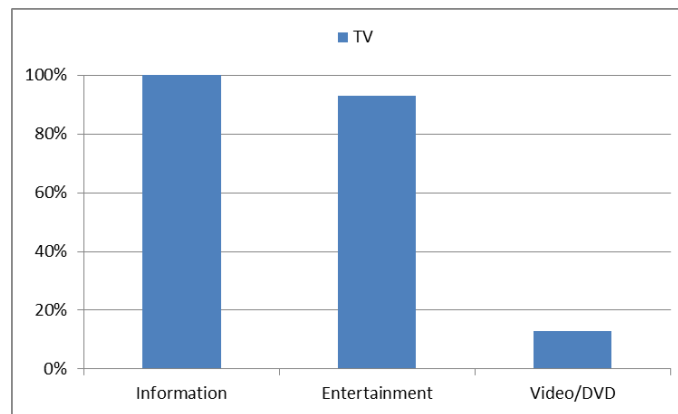


Figure 13. Activities related to TV sets of primary users

PC/laptop: Results from the devices in use at home indicate that 80% of the participants own a PC or laptop (N=15). For the vAssist project this means that PCs and laptops may be seen as an additional option (next to the TV set) for the delivery of future vAssist services.

Further, the PCs/laptops are mainly used for E-mail communication (67%), followed by information search via the internet (60%) and for home office purposes (53%) (see Figure 14). Applications related to entertainment (53%), photo management (33%) and social network (27%) activities are also popular among the participants. Only few participants name additional activities and services they use with their PC or laptop such as SMS, calendar and games (each 20%), video calls, audio calls and messenger services (each 13%) followed by blogging with 7%.

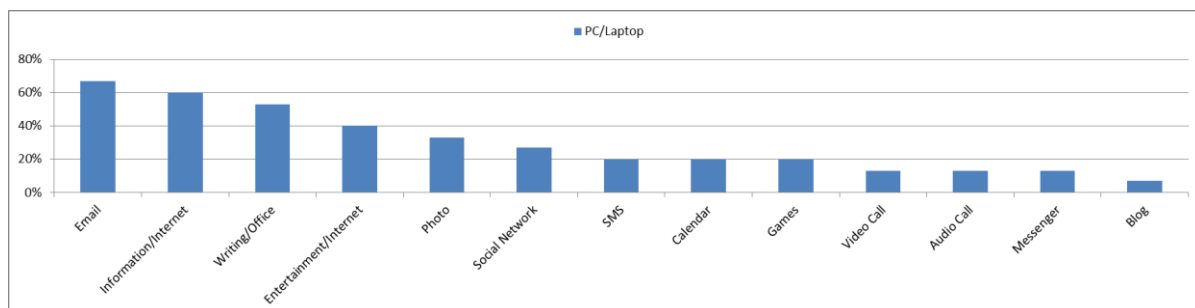


Figure 14. Activities related to PCs/laptops of primary users

Tablet PC: Only one participant owns a tablet PC that is mainly used for information search (internet).

Mobile Phone: Results from the devices in use at home indicate that 87% of the participants own a mobile phone (N=15). For the vAssist project this means that mobile devices may be seen as an additional option (next to the static device options) for the delivery of future vAssist services, since primary users in general have experience with these devices.

Further, the mobile phone is mainly used for audio calls (60%) and SMS (60%) (see Figure 15). Only 27% of the participants take advantage of a mobile calendar function and MMS services are only used by 13% of the primary users.

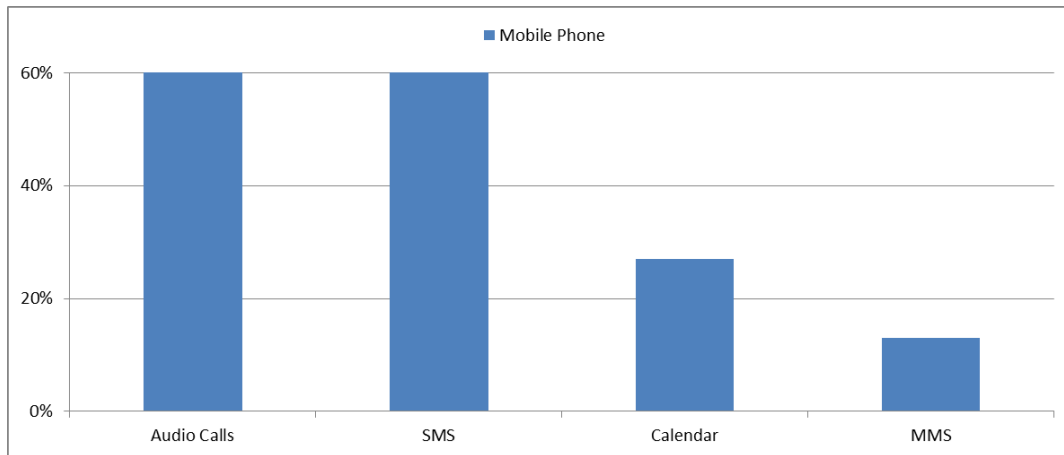


Figure 15. Activities related to mobile phones of primary users

Smart Phone: Results from the devices in use at home indicate that only 20% of the participants own a smart phone (N=15). For the vAssist project this means that in general participants have experience with mobile devices but more on mobile phones that show a limited functionality range than with smart phones that can be seen as small computers. But, since 80% of the participants own PCs and laptops it can be assumed that a basic technical understanding for more advanced mobile devices such as smart phones is available among primary users.

It is interesting that primary users that own a smart phone mainly use this device for information search (internet) (20%) followed by calendar services, audio calls and SMS services (each with 13%) (see Figure 16). Only 7% of the smart phone users use the device for entertainment, photo management, video calls, social networks or entertainment activities that are offered in the internet (each with 7%).

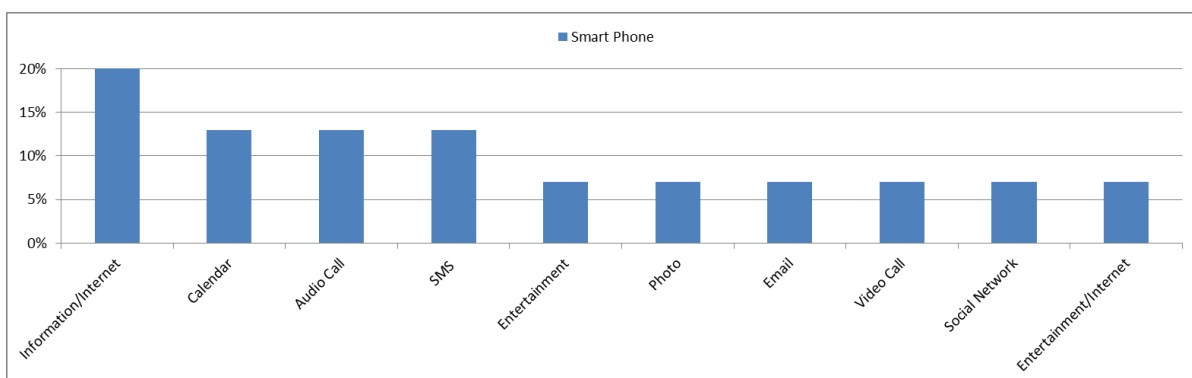


Figure 16. Activities related to smart phones of primary users

Landline Phone: Results from the devices in use at home indicate that not more than 60% of the participants own a landline phone (N=15). Further, landline phones are only used for audio calls.

7.1.2 Results Secondary Users (Informal Caregivers)

The section below reports the results from the focus group and screening questionnaire in Austria with secondary users (informal caregivers).

7.1.2.1 Focus Group 3

N= 8 secondary users (5 male, 3 female; mean age: 25.00; SD: 3.50) participated in the focus group in Austria. The topic of the focus group was set on services and devices for tele-communication with older family members as well as on future vAssist services and business aspects from the secondary user's point of view.

All participants have an older family member (grandmother, grandfather) where regularly communication takes place and voluntary care support is provided.

The focus group in Austria was planned to address ten secondary users. Due to short-term cancellation of two secondary users, only eight secondary users participated in the focus group.

Communication Services to be shared with older Family Members (Primary Users)

The discussion was started with an exploration of current communication services informal caregivers' current use for the communication with their friends. This was followed by a discussion about what of the named communication services to be used with friends would also be used (or not) for the communication with older family members.

Results indicate that all the services current used for the communication with friends could also be imagined to be used for the communication with senior family members. No restrictions related to certain communication services that should not be shared with older family members could be observed.

The most prominent communication channels that can be imagined to be shared not only with friends but also with senior family members are as following (N=8):

- **Audio and video calls** (100%)
- **SMS** (75%)
- **E-mail** (25%)
- **Social networks** (25%)

Hardware Requirements for older Family Members (Primary Users)

Mobile Hardware: Discussions about the mobile hardware to be applied in vAssist for the primary users highlight that informal caregivers claim for the following requirements they see for their senior family members:

- **Multifunctional:** All services and functions of vAssist should be managed via one device.
- **Portable:** The device should be portable and lightweight so that senior family members can use the same device at different locations.

- **Large screen size:** To respond to age related visual restrictions and (fine-) motor skill restrictions in case of manual interaction (if needed).
- **Simplified Interface (GUI):** The GUI should be designed focusing on providing a simple and clear structure. In general, a GUI should accompany the speech control of the vAssist services.
- **Large keypad / keyboard:** To respond to age related visual restrictions and (fine-) motor skill restrictions in case of manual interaction (if needed).

Static Hardware: Next to a mobile hardware solution, informal caregivers also named a solution that is similar to a TV set as an opportunity for a static hardware device for the delivery of the future vAssist services. Since their senior family members are familiar and experienced with TVs and have this device already at home it is seen as the primary alternative next to a mobile solution. A “nice to have” is seen in a TV like solution that supports touch interaction functionalities but also provides standard TV functionalities.

The major aspect that came up during the discussions is that most of the older family members would have to buy a mobile device that is able to provide access to vAssist services – the TV set is already in the home of the primary users.

Requirements for Future Potential vAssist Services

According to the feedback gathered from informal caregivers the “perfect” vAssist system for their senior family members should include various services that can be grouped to the following categories (see Table 15).

- **Communication:**
 - Simple speech controlled audio and text based communication services are seen as potential future vAssist services for senior family members. The audio communication service should include a feature that indicate who has called in case the call was not be answered. A visual representation of the caller (e.g. contact photo) could ease the understanding of who has called.
 - A digital photo album service that includes the feature to share text messages serving as an alternative from of a communication channel between primary users and informal caregivers.
- **Calendar:**
 - An open calendar to share calendar entries between senior family members and informal caregivers (e.g. family events, birthdays, etc.).
 - The calendar function may also serve as a reminder to remind older family members on drug intake or other important events (e.g. medical appointments). Reminders

should be able to be set and edited either by the primary user itself or by the informal caregiver.

- **Information search:**
 - Searching for various information using the internet is seen as a promising future vAssist service for a “perfect” vAssist system for senior family members (e.g. news).
 - Searching for the TV program (e.g. series, shows, documentations, etc.).
- **Navigation:**
 - In the case users are lost or need support when navigating in unknown environments.
 - Location based services that give additional information about certain locations.
- **Entertainment:**
 - **Audio and E-books:** Contributing to senior family members with visual restrictions.
 - **Podcasts:** e.g from certain radio or news broadcasts.
 - **Music:** searching for new content or searching the own digital music database

Categories	Service ideas for the perfect vAssist system
Communication	Audio calls Text based communication Digital photo album
Calendar	Sharing family events Medical reminders (drug intake, medical appointments)
Information search	Internet News TV program
Navigation	Navigation in unknown environments Location based services
Entertainment	Audio and E-books Podcasts Music

Table 15. Future potential vAssist services from informal caregiver’s point of view

Speech Control Requirements

The following speech control characteristics were discussed by informal caregivers they see as important to be adapted to the needs of their senior family members.

Dialogue Characteristics: Results from the discussions about the dialogue characteristics highlight that in general a natural language approach compared to a single word command approach would be valuable for primary users from an informal caregiver pint of view.

Personalization - Type of Voice: Discussions about the sex of the voice indicate that informal caregivers recommend a voice that meets the criteria of being calm. The focus should be set on a voice that sounds as natural as possible. For the sex and age a mid-aged female voice was suggested.

Personalization - Name of the System: The informal caregivers vote for giving vAssist a name. The name of the system should also be used to make it clear for the system that the primary user starts the interaction with it. Codes or technical terms should not be used for the name of the system since this might be hard to remember for the primary users.

Personalization - T-V Distinction: Regarding the T-V distinction, informal caregivers suggest a more informal form of interaction. That is because secondary users estimate that the fear of contact with the technical system could be minimized if vAssist talks with the senior family member using their name.

A summary about the personalization requirements for vAssist from an informal caregiver point of view can be found in the table below (Table 16).

Personalization	Requirements
Type of voice	female mid-aged calm clear natural sounding
Name	name to start the interaction with the system
T-V distinction	informal and friendly form of interaction minimizing the fear of contact

Table 16. Overview on speech control characteristic needs from an informal caregiver point of view

Feedback Requirements

Discussing feedback strategies and mechanisms for speech control systems could show that informal caregivers raise the demand for a parallel feedback strategy meaning that verbal and text (graphical) feedback should accompany the speech control. With this strategy it should be guaranteed that seniors have the chance to read the message in case they have not understood the system's speech output.

The following feedback needs for different interaction aspects from an informal caregiver point of view should be integrated into the vAssist system:

- **Help function:** Support and help functionalities should pro-active deliver information about how to solve the occurred problem. This should be done by spoken feedback accompanied by written messages. vAssist should provide the following help functions:
 - **Pro-active help:** In case an error occurs (e.g. the system has not understood the natural voice command) the system should pro-active support the user in solving the problem (e.g. I have not understood what you have said, please tell me again or move to a more quiet location"). The spoken verbal feedback should be accompanied by a written text message.

- **Home button:** In case the primary user gets lost or stuck, a clear “back to the start” option should be available (VUI and GUI).
- **Tutorials:** Small tutorials should be offered to support novel primary users by operating the future vAssist services (e.g. giving hints for natural language command possibilities).

As a general recommendation, informal caregivers pointed out that the font size of written texts should be large enough. In addition, the structure of the menu that is represented via the GUI should be simple, clear and easy to understand avoiding technical terms that might not be understood by senior family members. Further, the system should be open to be controlled not only by speech (VUI) but should also be supported by a GUI and a manual input alternative in case of e.g. a noisy environment where voice interaction might fail.

Further, microphones and loudspeakers should be from high quality and the volume level should be able to be set according to the individual needs (e.g. responding to age related hearing restrictions). Moreover, all sound feedback that is used in the future vAssist services should be smooth and pleasant not to cause stress and panic reactions by the primary users.

As a “nice to have” informal caregivers can well imagine that the future vAssist system includes an intelligent self-learning functionality that adapts itself to the behaviour of the senior user. For example, if the older person frequently uses the E-mail service vAssist should list this service over other services. An example on a deeper level: If the senior wants to write an E-mail to the son and the son has two E-mail addresses (business and home), vAssist suggest the E-mail address that is used more frequently.

Business Requirements

Since the vAssist projects follows a user-centred market-oriented design approach (UCMOD) also future business aspects were discussed from the point of view of informal caregivers.

To raise the discussion, the same two example business models as presented to the primary users were used including two different vAssist packages as following (see Figure 4).

- **Basic package:** including three examples of pre-defined speech controlled services.
- **Advanced package:** consisting of the basic package but with the possibility for a free selection on five additional speech controlled vAssist services.

The discussion about future business aspects from an informal caregiver’s point of view delivered the following results.

In general, also secondary users show a positive attitude towards a package approach for a future vAssist business model. Further, the proposition of several different packages differing in the number of included services was perceived as a good idea to respond to primary users with individual needs and wishes. In contrast (and according to the results from the primary users), also informal caregivers have a negative attitude towards the pre-definition of included services for different packages. They

suggest providing different packages that differ in the number of included services but are open for the possibility to re-fine and customize the included vAssist services to the current needs of the primary user.

Basic Package: Informal caregivers suggest the following steps towards the definition of services included in a basic package that will be delivered to the primary users:

1. **Evaluation:** General service needs of primary users have to be evaluated (e.g. questionnaire studies) to define a set of basic vAssist services (in a range of 3 - 5) that cover the needs of a broad range of senior persons.
2. **Suggestion:** The resulting 3 - 5 basic vAssist services are seen as suggestions for services that are included in a basic package. These services are not seen as the final definition of included services, but dealing as a basis for a personal consultation between a primary user and a consultant.
3. **Consultancy:** In one-on-one interviews between a consultant and a primary user the included service suggestions can be exchanged (if needed) due to the current needs of the senior user.
4. **Support:** The basic package should include (next to the vAssist services) a personal support that help primary users with the following activities:
 - Solving problems primary users have with vAssist services and hardware.
 - Re-financing (customizing) and changing vAssist services and/or packages in case the service needs of the senior user change over time.

Advanced Package: From an informal caregiver point of view an advanced package should consist of a basic package (as described above). In addition, the advanced package enables the primary user to select an unlimited number of additional vAssist services. The selection of additional services should be accompanied by a catalogue (including descriptions of the vAssist services). As an alternative, also an online store similar to current existing App stores could be the form of the delivery of additional vAssist services.

To sum up, informal caregivers recommend an package approach that differ in the number of included vAssist services. All provided packages should be able to be customized re-considering the included services together with the primary user in one-on-one interviews. A personal support is seen as highly important that should be included in any vAssist package. As a tariff model, only flat rate tariffs should be provided so that primary users do not have to look on costs for services that need data traffic (e.g. E-mail, internet, emergency calls, etc.). To make it easier for the primary user to select the right package and services, informal caregivers suggest providing the possibility to test the advanced package for a limited time (e.g. 3 months) with a fixed cost rate. After the period is ended, primary users will have the chance to make a decision on the package and included services. The two (basic and advanced) package ideas suggested by the informal caregivers are illustrated in Figure 17.

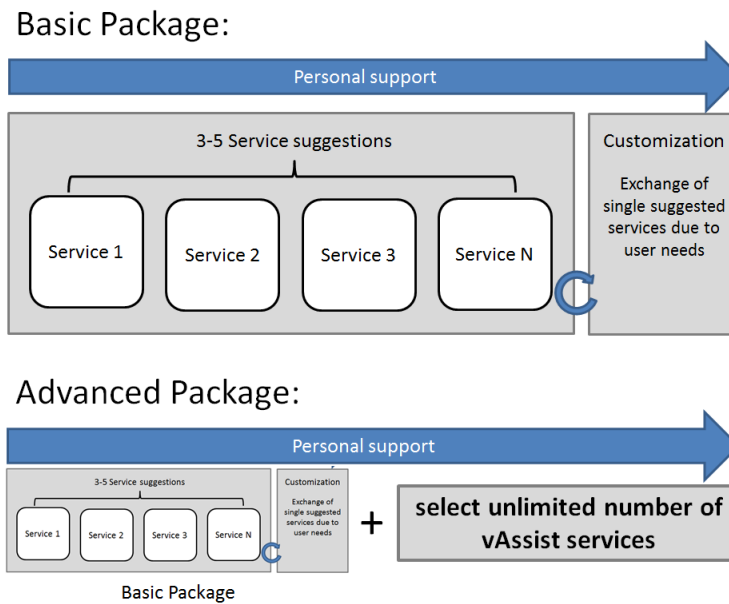


Figure 17. Package suggestions from informal caregivers for future vAssist business models for primary users

Cost model: From a financial point of view informal caregivers discussed the following different possibilities:

- **Low cost model:** Includes the basic package, data traffic and personal support for about 20-30€ per month. The selection of one vAssist hardware device should be included (mobile or static device).
- **Mid cost model:** Includes the advanced package, data traffic and personal support for about 30-40€ a month. The selection of two vAssist hardware devices should be included (mobile and static device).
- **High cost model:** Includes the advanced package, data traffic, personal support and TV for about 40-50€ a month. The selection of two vAssist hardware devices should be included (mobile and static device).

The transparency of the costs was a major concern of the informal caregivers. Primary users should active be informed about the current costs to avoid cost traps.

7.1.2.2 Screening Questionnaire

Questionnaire results from 3 female and 5 male participants (N=8) were analysed. The mean age of the sample was 25 years (N=8; SD= 3.50) (see Figure 18).

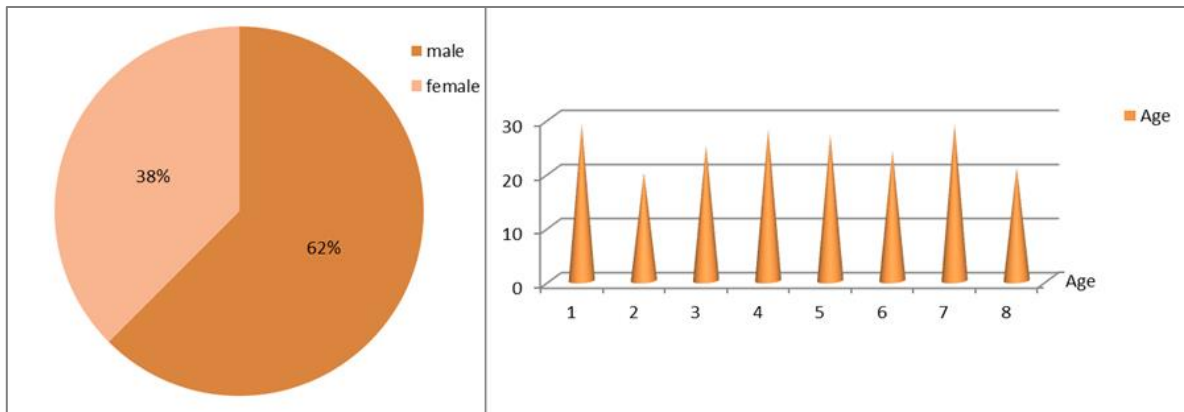


Figure 18. Sample description (gender, age) of the informal caregivers participating in the screening questionnaire in Austria (N=8)

Question 1 – Communication with older Family Members (Primary Users)

How often do you use the following communication possibilities for the communication with your grandparents?

Informal caregivers were asked to rate the offered communication possibilities on a 7-point Likert scale ranging from 1= more than 1x a day to 7= never.

To get a feedback about the most prominent communication channels used by the informal caregivers to communicate with primary users the ratings were translated into points to create a list that can be sorted according to the given points. 48 points was the maximum number indicating the most prominent channel to be used for the communication with senior family members. The figure below (Figure 19) illustrates the results from the communication channels used by informal caregivers to communicate with primary users.

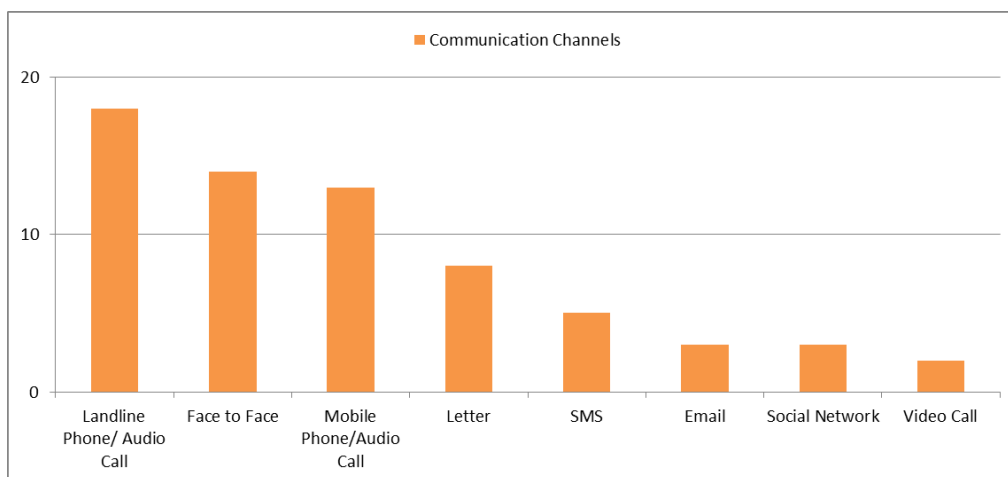


Figure 19. Rating of most frequent used communication channels by informal caregivers to communicate with primary users (N=8)

The detailed ranking results of the diverse communication channels are as following (N=8):

1. Audio call / landline phone (18 points)
2. Face to face (14 points)

3. Audio call / mobile phone (13 points)
4. Letter (N=8, 8 points), SMS (5 points)
5. E-mail (N=8, 3 points), social network (3 points)
6. Video call (2 points)

Results indicate that in general the communication between informal caregivers and their senior family members is not very frequently. The preferred communication channel is having bi-directional audio calls using the landline and mobile phone followed by face to face communication. Modern communication channels such as SMS, E-mail, social networks and video calls are not used very often for the communication with senior family members.

Question 2 - Devices in Use for the Communication

How often do you use the following devices for the communication with your grandparents?

Informal caregivers were asked to rate the offered communication device possibilities on a 7-point Likert scale ranging from 1= more than 1x a day to 7= never.

To get a feedback about the most prominent communication devices used by the informal caregivers to communicate with primary users the ratings were translated into points to create a list that can be sorted according to the given points. 48 points was the maximum number indicating the most prominent communication device to be used for the communication with senior family members by the informal caregivers. The figure below (Figure 20) illustrates the results of the communication devices used by informal caregivers.

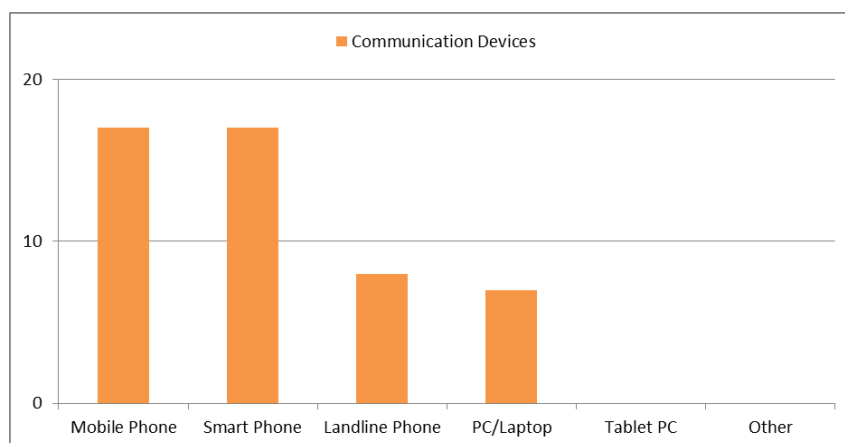


Figure 20. Rating of most frequent used communication devices by informal caregivers (N=8)

The detailed ranking results of the diverse devices are as following (N=8):

1. Mobile phone (17 points), smart phone (17 points)
2. Landline phone (8 points)
3. PC/Laptop (7 points)

4. Tablet PC and others (0 points)

Results highlight that informal caregivers prefer mobile devices such as mobile and smart phones for the communication with senior family members. The landline phone and PCs/Laptops are seldom used for the communication with primary users. None of the informal caregivers uses a Tablet PC for the communication with primary users.

Question 3 – Devices at Home and related Activities

Which of the following devices at home do you use for what kind of activities?

Informal caregivers were asked to select devices they have at home from a list and to indicate the activities they use the device for (e.g. communication, entertainment, information, etc.). Single choice for the device and multiple choices for the activities were possible.

TV Set: Results from the devices in use at home indicate that 75% of the informal caregivers own a TV set (N=8).

Further, the TV set is mainly used for entertainment purposes (75%) followed by information purposes and for watching videos and DVDs (each with 63%). Less frequent activities are related with photo management, information search or entertainment offers via the internet (each with 13%) (see Figure 21).

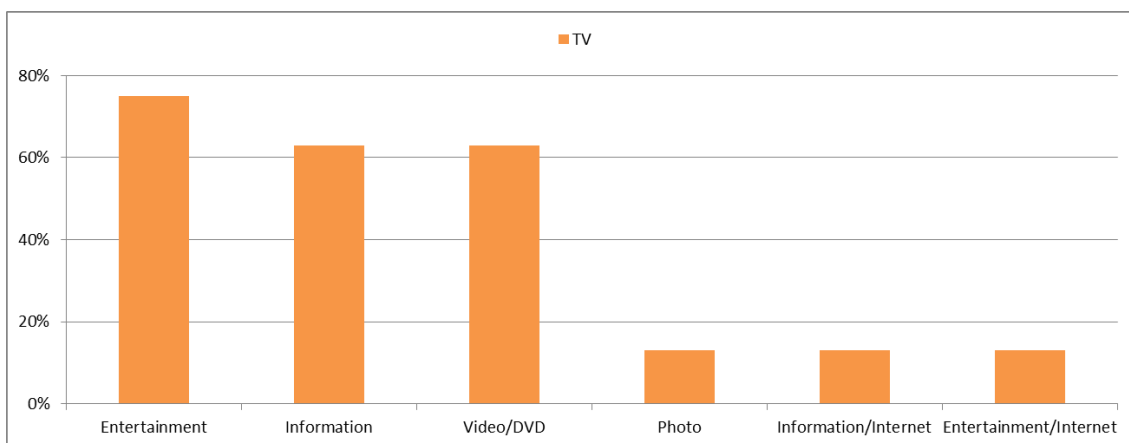


Figure 21. Activities related to TV sets of secondary users

PC/Laptop: Results from the devices in use at home indicate that 100% of the participants own a PC or laptop (N=8).

Further, the PCs/laptops are mainly used for photo management, home office purposes, E-mail services, social networks, information search via the internet and entertainment purposes offered via the internet (each with 100%) (see Figure 22). Gaming and messenger services are also frequently used, each with 76%. Calendar services as well as internet based audio and video calls are used by 63% of the informal caregivers. 50% of the participants also use their PC/laptop for blogging or writing SMS. Only 25% use IPTV services for watching TV via the internet.

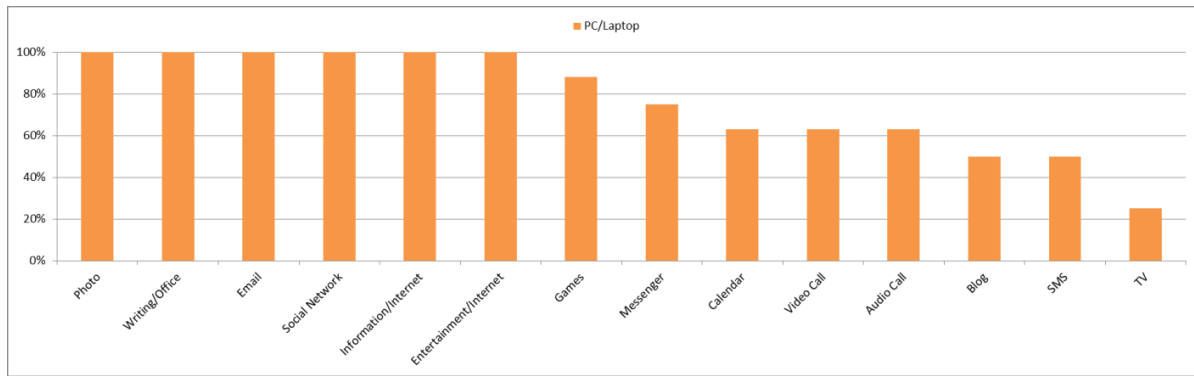


Figure 22. Activities related to PCs/laptops of informal caregivers

Tablet PC: None of the informal caregivers own a tablet PC.

Mobile Phone: Results from the devices in use at home indicate that 63% of the informal caregivers own a mobile phone (N=8).

Further, the mobile phone is mainly used for audio calls (63%), SMS (63%) and calendar services (see Figure 23). 50% of the participants use the mobile phone for gaming. MMS services are only used by 38% of the informal caregivers. These results indicate that the mobile phone is mainly used for audio and text communication as well as for organizational matters (calendar).

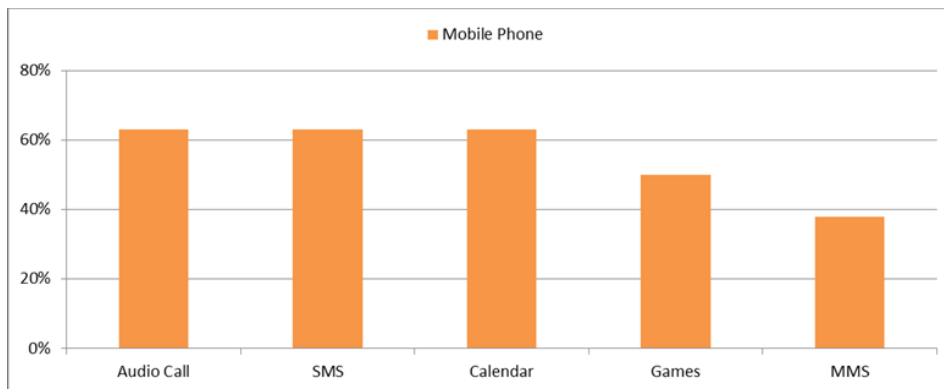


Figure 23. Activities related to mobile phones of informal caregivers

Smart Phone: Results from the devices in use at home indicate that 88% of the participants own a smart phone (N=8).

Further, the smart phone is mainly used for E-mail, SMS and calendar services as well as information search using the internet (each with 88%) (see Figure 24). Audio calls, photo management, gaming, social networks and entertainment purposes offered via the internet are also frequently used (each with 75%). 63% of the informal caregivers use the smart phone also for office applications. 50% take the advantage of messenger services. Messenger services are used by 50% of the informal caregivers. Only 38% of the informal caregivers indicate to use the smart phone for blogging and video calls. Secondary users rather own a smart than a mobile phone and use it like a PC/Laptop except for writing long texts.

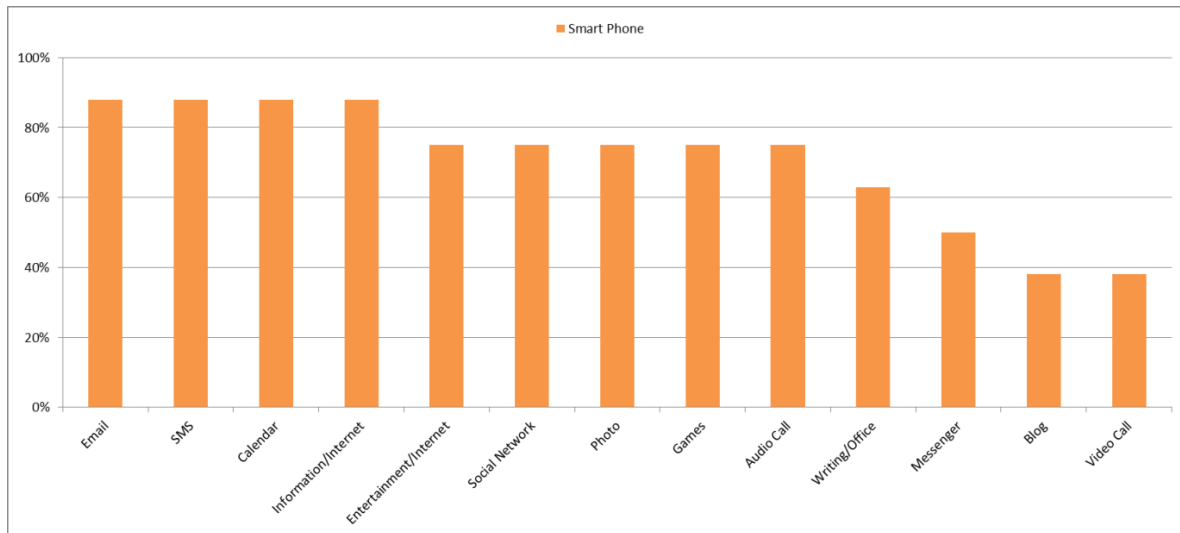


Figure 24. Activities related to smart phones of informal caregivers

Landline Phone: Results from the devices in use at home indicate that only 38% of the informal caregivers own a landline phone (N=8). Further, landline phones are only used for audio calls.

7.2 Results France – Tele-Medicine

This section reports the results from the focus groups and screening questionnaires in France.

7.2.1 Results Primary Users

The section below reports the results from the focus groups and screening questionnaires in France with primary users (seniors).

7.2.1.1 Focus Group 1

N=8 primary users (3 male, 5 female; mean age: 78; SD: 6.48) participated in the first focus group with primary users in France. The topic was set on health information recordings, medical devices and services used, ICT devices used and business aspects.

All participants had at least little experience with modern ICT (Information and Communication Technology) and showed restrictions of their (fine-) motor skills due to age or diseases (rheumatism, arthritis, brain damage, etc.).

Devices at Home

Starting with an exploration of existing technical devices at home and their room locations, feedback from primary users was gathered on a flip chart. The most prominent rooms for communication devices are the living room, the kitchen and the sleeping room (see Table 17). Most common devices are mobile phones, landline phones, PCs/laptops and TV sets.

These results highlight that vAssist services should be delivered at least for two hardware devices, a mobile and a static device. The most appropriate location for the static device is the living room and sleeping room.

Device	Location
Mobile Phone	carried around in the flat / in the pocket
Landline Phone	living room, kitchen, hallway, sleeping room
PC/Laptop	living room, sleeping room
TV	living room, sleeping room

Table 17. Location of communication devices of primary users

Health needs: Health Information Recordings, Devices and Services used

After exploration of existing technical devices at home, the aim of this focus group was to get an overview on health information recordings, medical devices and services used. Primary users were asked about which kind of information related health they record and which kind of health services and devices they actually profit.

Next, this first result was discussed to get information about satisfaction/limits of these services. All results are summarized in Table 18.

Medical Data Records	tool/device	kind of service	actual limits
Blood Pressure	electronic tensiometer	hospital follow-up	frequency of medical consultation (too short/too high), required movement
Sugar rate	glucometer		
clearance	laboratory		
urea			
creatinin level			
cholesterol			
Other physiological data...			
drugs	pill jars	general practitioner/hospital follow-up	delay of adjustment of treatment
	emergency call system	emergency call service	battery failure, unreliable
	respiratory support (respirators)	follow-up	

Table 18. Medical Data records, related devices and services, and limits of these services

From this discussion, the hospital emerged as the main healthcare service actually used by primary users. **All physiological data are recorded during medical consultations or in external laboratories** (but results are finally provided to the hospital). From primary user's perspective, they benefit to a trivial medical follow-up which could be modulated depending on their diseases.

Nevertheless, participants have identified some limitations which leading to their needs and expected improvement of this classic healthcare monitoring. At first, **required movement to the hospital was not easy for people with articulation pain and movement restrictions**.

Then, frequency of medical consultations was not **always well suited to their healthcare needs**; too frequent or too rare in several cases. At the opposite, **to get an emergency appointment was very difficult** (or impossible) and emergency department could be seen as unique solution.

During the discussions, drugs seemed to be a particular case. Large prescriptions, side-effects or low tolerance was frequently mentioned. But **the adjustment of ill-adapted treatment was very long because of delay for an appointment with practitioners**. Nevertheless, medical consultation seemed not necessary to adjust a treatment from their perspective and a simple call could be sufficient.

Emergency call system was used by two participants, who had no experience with this system. **They actually did not know if the system would work in case of a real emergency**. Some participants

quote anecdotes with battery failure of the system. Respiratory support was mentioned by several participants as potential used device, but none of them actually used it.

Regarding healthcare devices, very few were identified. Some primary users used an electronic tensiometer to check their blood pressure. All of them have thought to a glucometer, even if none of participants suffered from diabetes. Similarly, pills jars were well-known, but this device seemed to be rare in reality.

In summary, the medical follow-up of primary users in France was restricted essentially at the hospital (public or private) and their general practitioner. Few of them used specific healthcare devices at home, or benefited of healthcare services. Nevertheless, two participants had an emergency call system at home. The vast majority of participants highlighted drugs management issues and delay for “extra” medical appointment.

Future Voice Controlled Services and Devices

After the first session about medical services used by primary users, their opinion was asked about future vAssist healthcare services. From previously identified medical data, they had to imagine related healthcare services with a speech controlled interface. These results are summarized in Table 19.

Medical issues	tool/device	kind of service	Relevance for vAssist
Blood Pressure	electronic tensiometer	electronic medical file, recognition of medical healthcare card, medical results transmission	+++
Sugar rate	glucometer		
Clearance *	laboratory		
Urea **			
creatinine level ***			
cholesterol			
Other physiological data...			
drugs	"drug-diary"	efficiency, side-effects, reminder	+++
fall, feeling sick	emergency call system	global monitoring system, medical support 24h/24	+++
respiratory failure	respiratory support (respirators)	real-time follow-up	+

Table 19. Futures voice controlled services and devices from primary users' perspective

* The **clearance** is a measurement of the renal excretion ability

** The **Urea** is used as a marker of renal function

*** Measuring serum **creatinine** is a simple test and it is the most commonly used indicator of renal function

The first idea which has emerged from this question was an **electronic medical file, available to the vAssist user** of course, but also to each **formal caregiver**. Moreover, they thought to a compatibility with individual healthcare card (“carte vitale”, mandatory chip card in France). This file could be updated with every new event in medical history of patients.

The second idea highlighted by participants was a “**drug diary**”. Similarly to the electronic file, a global prescription could be adjusted on real-time, taking account **side-effects named by patient, or incompatibility with new drugs**. Every main player (practitioner/specialist/patient/pharmacist) could access to this diary. An **integrated reminder** could help them to observe medical recommendation. Some participants have asked how vAssist could **verify drugs intake** (electronic pill jars?).

The last point raised by primary users was a **reliable emergency call system**. This system could include a **fall detection** device and allows **communication with a phone operator** in any circumstances. For them, a complete availability (night and day, after a fall) was essential.

Respiratory support was also named by participants, but it could be a service on the request of particular cases.

Business Requirement

Since the vAssist projects follows a user-centred market-oriented design approach (UCMOD) also future business aspects were discussed with the primary users.

To raise the discussion, two example business models were presented that included two different vAssist packages (see Figure 25)

- **Basic package:** including three examples of pre-defined speech controlled services
- **Advanced package:** consisting of the basic package but with the possibility for a free selection on five additional speech controlled vAssist services.



Figure 25. Example for future vAssist business aspects

Even if this discussing was planned and introduced, remaining time for talking about this topic was very low (< 5 minutes). Primary users had no significant opinion about this issue.

Nevertheless, they highlighted that **free selections of services**, taking account individual needs, was **more appropriate than pre-determined packages**.

Another point has emerged before the end of the session. Several participants seemed to be worry about how vAssist could be **placed on the market**. From their point of view, this kind of system had to be **supported by healthcare institutions**, and not by private companies.

Regarding the price, primary users did not named indicative prices. They “don’t care” of the price if the system was reliable and provide a relevant solution to their tele-communication and tele-medicine issues. Of course, they clarified further that vAssist had **to be not too expensive**.

7.2.1.2 Focus Group 2

N=8 primary users (3 male, 5 female; mean age: 78; SD: 6.48) participated in the second focus group in France. The topic was set on future vAssist tele-medicine/well-being services, giving participants the possibility to have first contact and the possibility to compare touch and voice interaction and specifying speech control characteristics.

All participants had at least little experience with modern ICT (Information and Communication Technology) and showed restrictions of their (fine-) motor skills due to age or diseases (rheumatism, arthritis, brain damage, etc.).

The second focus group in France included the same primary users than Focus Group 1.

The participating primary users did not have any prior contact with speech control systems. To give them a better understanding of speech interaction, different speech interaction scenarios were demonstrated (writing an E-mail, asking for the drug intake, launching an emergency video call) using the speech control functionality of an assistive robot’s interface (Kompai, from Robosoft; Microsoft Windows 7 Speech Recognition).

The demonstration phase was followed by a group work session where each primary user had the chance to write an E-mail using a VUI of an Android smart phone (VUI; HTC Wildfire S & Vlingo App.) and a GUI of an iPad 2 Tablet. Following discussions gave insights into upcoming needs and critiques regarding speech controlled (dialogue) systems. Besides that, also first VUI characteristics were discussed such as personalization and feedback mechanisms (but not limited to that).

Group Work: GUI and VUI Interactions

GUI Interactions: Results from the group work session highlight, that for the GUI interactions mainly aspects related to the hardware (tablet) are seen as interaction barriers by primary users (small keypad, small font size). Additionally, some participants focused on software’s latency (delay between act and visual feedback), which misleads the user.

The content analysis revealed the following **major negative aspects** related to the touch interaction tasks (GUI) with a tablet.

- **Keyboard:** too small, not bright enough, unusual keyboard

- **Font size:** too small

Nevertheless, some positive aspects related to a GUI are listed too:

- **More playful** than VUI for some participants
- **More accurate** than VUI (less corrections)

Emotional feedback collected with EmoCards (Figure 3) highlight that in general primary users have an unpleasant feeling regarding touch interaction (GUI) on a tablet (N=8, 62.5%), included half (N=8, 37.5%) of calm unpleasant emotional feedbacks (see Figure 26). The remaining emotional responses are related with calm neutral (N=8, 12.5%) and average pleasant feelings (N=8, 25%).

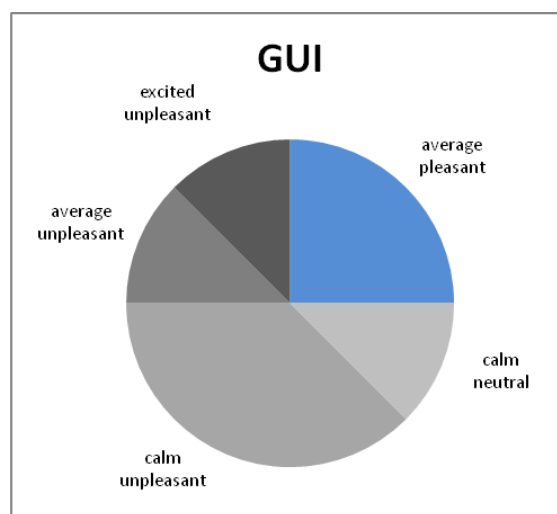


Figure 26. Results from EmoCards regarding touch interaction on an Ipad 2 (GUI) (N=8)

VUI Interactions: Results from the group work session highlight, that for the VUI interactions **mainly negative aspects** were named that are related to **unreliability** and the **lack of accuracy** of the system.

The content analysis revealed the following **major negative aspects** related to the **voice interaction tasks (VUI) with a smart phone** that were named by the primary users.

- **Interaction repetition:** Several trials are necessary
- **Lack of feedback:** users were not allways able to check his/her message or actions.
- **Unreliable:** unaccurate speech recognition

Nevertheless, there were some **positive aspects** named by the participants:

- **Good alternative** to keyboard system
- **Speed of interaction** (if system works)

Emotional feedback collected with EmoCards (Figure 3) highlight that in general primary users have an neutral feeling regarding speech (VUI) on a smart phone (N=8, 50%), with excited or calm compo-

ment (N=8, 25% each). The remaining emotional responses are related to excited pleasant, average pleasant, excited unpleasant and calm unpleasant feelings at equal part (N=8, 12.5% each) (Figure 27).

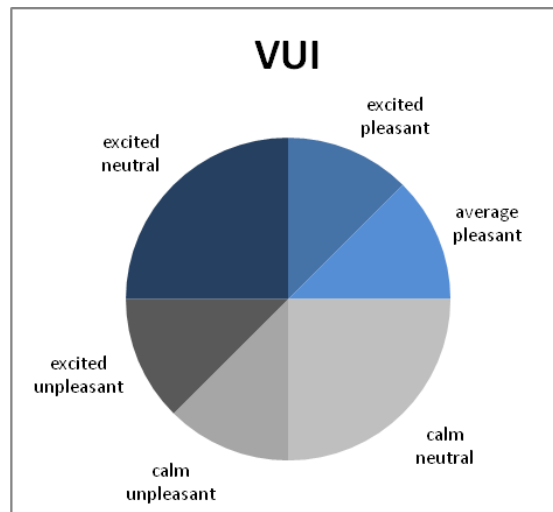


Figure 27. Results from EmoCards regarding speech interaction on a smart phone (VUI) (N=8)

GUI vs. VUI Interactions: Figure 28 illustrates the comparison of emotional feedback from primary users towards GUI and VUI interactions. Results highlight that VUI interactions elicited as much pleasant feelings as compared to GUI interactions (marked in yellow). But GUI interactions elicited more unpleasant feelings than VUI interactions (marked in red), and an increase of neutral feelings could be observed. These results indicate that, even if participants are not convinced by these new technologies/interfaces, a VUI interface **could provide a great support when being reliable**. For both VUI and GUI interaction, most of the FG participants thought that **training** would be necessary

N.B. The Android speech recognition solution was perhaps less efficient than Siri of iPhone 4S; there was a lot of noise during work group session, which could explain the lack of reliability of the system.

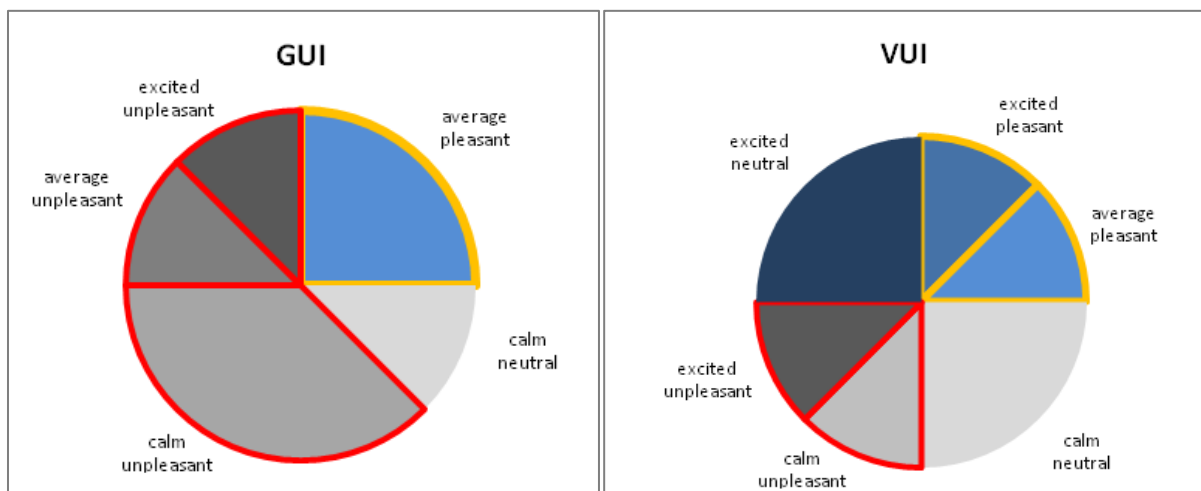


Figure 28. Results from EmoCards comparing emotional responses related to Touch (left) and speech (right) interaction of primary users (N=8)

Speech Control Requirements

Dialogue Characteristics: Results from the discussions about the dialogue characteristics highlight that in general a **single word command approach** compared to a natural language approach is preferred. Nevertheless, primary users agreed to think that vAssist had to **allow a choice between both solutions** (natural and command language). The most important feature for them was the **efficiency of the interaction/control** of the system.

Personalization – Type of Voice: Discussions about the sex of the voice elicit that participants had **no preferences between female or male voice** for the interaction with vAssist services. The main aspect that was raised by the primary users is that they expect a **clear natural voice, that speaks slowly**.

Personalization – Name of the System: All participants agreed on giving the vAssist system a neutral name for the speech interaction. They judged “vAssist” as a great potential name for example. They highlighted that a personalization of the system was **less important than real interactions** with vAssist system (call or video-call). Regarding a visual avatar, they had a preference for **an abstract logo**, similar to the vAssist logo for example.

Personalization - T-V Distinction: The T–V distinction is a contrast, within one language, between second-person pronouns that are specialized for varying levels of politeness, social distance, courtesy, familiarity, or insult toward the addressee. In general it can be differentiated between a formal (e.g. Hello Mr. Smith) and an informal (e.g. Hi Paul) form of interaction.

Regarding the T-V distinction, primary users expect the future vAssist system to react on a more **neutral and simple basis** than a personalized and complex way. They emphasized the importance of a **clear and concise** message. Some primary users quote further they had a **preference for French words instead of English words** (mail, spam, etc.).

N.B. In France, English ICT vocabulary has equivalent French vocabulary, even if it is rarely used.

A summary about the personalization requirements for vAssist from an primary user`s point of view can be found in the table below (Table 20. Overview on speech control personalization needs of primary users).

Personalization	Requirements
Type of voice	natural clear speaking slowly
Name	Neutral name Abstract logo
T-V distinction	Clear and concise language Neutral and simple No English words

Table 20. Overview on speech control personalization needs of primary users

Feedback Requirements

Discussions about feedback strategies and mechanisms for speech control systems could show that seniors raise the demand for different verbal and text feedback options. Results indicate a **combination of voice and text (graphical) based feedback that accompanies the speech interaction** as promising opportunity to ease and support the interaction with the future vAssist services. Primary users did not differentiate any kind of functionality or interaction, but they esteemed that graphical feedback has, at least, equal importance to vocal feedback.

Microphone and Loudspeaker Requirements

To raise the discussion different microphone and loudspeaker combinations were discussed (see Figure 29).



Figure 29. Discussed loudspeakers and microphone combinations

As the most preferred microphone and loudspeaker solution that should be applied in vAssist, an **external microphone with loudspeakers** could be identified (N=8, 87.5%). Primary users highlighted that each room had to be fitted with communication hardware. Nevertheless, they did not name a preference between external microphone/loudspeakers and device microphone/loudspeakers. On the one hand, they expected a **clear vocal feedback and a reliable control**, i.e. the **best sound quality** of microphone and loudspeakers; on other hand, they **preferred a minimum of additional devices**.

One participant had an opposite thought than most of his colleagues. He preferred wireless headset, because he already used to this device with a smart phone. Moreover, he was the only participant using a smart phone, a **Samsung Galaxy Note**. Former user of an iPhone, he preferred the Galaxy because of a **very large screen**.

Additional Hardware requirements

Some extra hardware requirements could be identified within the discussions about the vAssist system. Participants were concerned by the **independence of the system from general electric supply and battery maintenance**.

Participants have expressed **fears about potential power failure**. Emergency call or communications services would be unavailable in similar cases. The use of batteries could be a relevant solution, but from their perspective, notifications had to **signal a lack of power and time for battery changing**.

At least, they expected an **additional keyboard** (traditional or touch screen) as alternative input device, **in case of severe cold or voiceless issues**.

7.2.1.3 Screening Questionnaire

In general, questionnaire results from 5 female and 3 male participants (N=8) were analyzed. The mean age of the sample was 78 years (N=8; SD= 6.48) (see Figure 30).

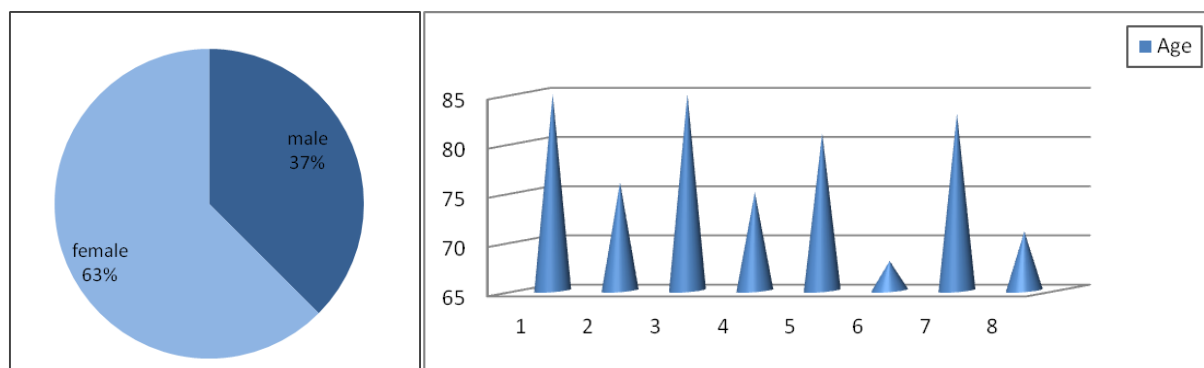


Figure 30. Sample description (gender, age) of the primary users participating in the screening questionnaire (N=8)

Socio-demographical data included questions about limitations and diseases. The aim was to have a healthcare perspective with a relation between healthcare status of primary users and their healthcare services/devices.

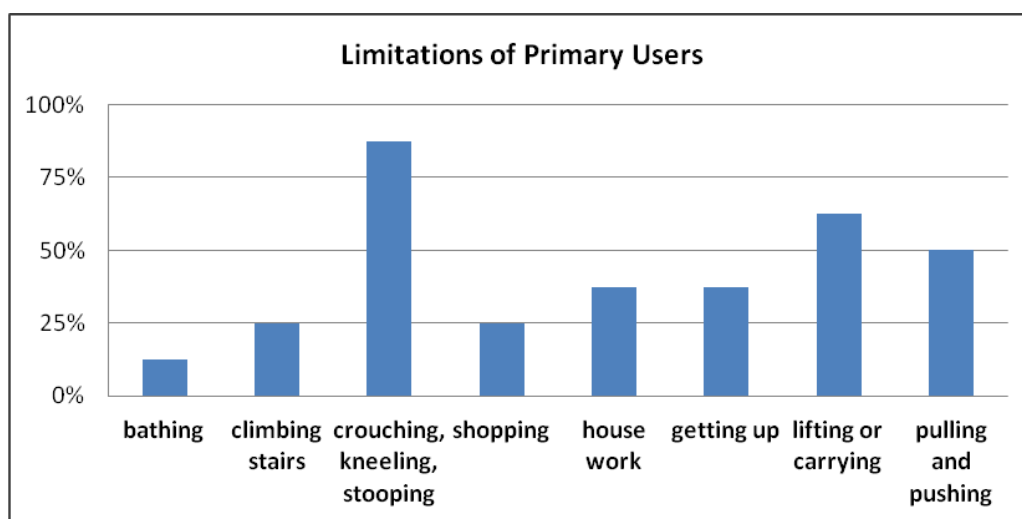


Figure 31. Sample description (limitations) of the primary users (N=8)

Main limitations encountered by primary users focused on ability to crouching, kneeling or stooping (N=8, 87.5%) and ability to lifting or carrying weights over 5 kg (N=8, 50%). Similarly, pushing or pulling large objects, doing house work and getting up from chair or bed were experienced 37.5% or more of primary users (N=8). Bathing, climbing stairs or shopping difficulties were rarer than others, only 25% or less of primary users checked off them on the related questionnaire (N=8).

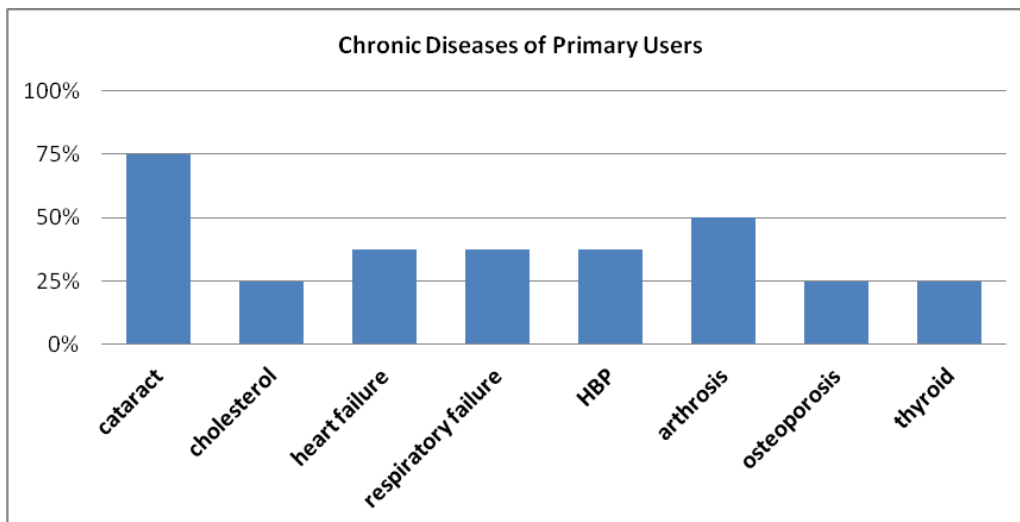


Figure 32. Sample description (chronic diseases) of the primary users (N=8)

Regarding chronic diseases, **cataract and arthritis (including rheumatism)** were most common age-related illnesses (N=8, 75% and 50% respectively). Heart and respiratory disorders and high blood pressure (HPB) were less frequent (N=8, 37.5% each). Based upon the completed questionnaires, cholesterol and thyroid disorders were quiet rare (N=8, 25%). Osteoporosis is a gender related disease that could affect women only. Considering this criteria, 40% of female participants were affected (N=5).

Question 1 – ICT Devices at Home

The first question was relative to ICT devices currently used by primary users and arrangement of identified devices in their homes. The results are displayed with distribution of ICT devices in each room completed in questionnaires

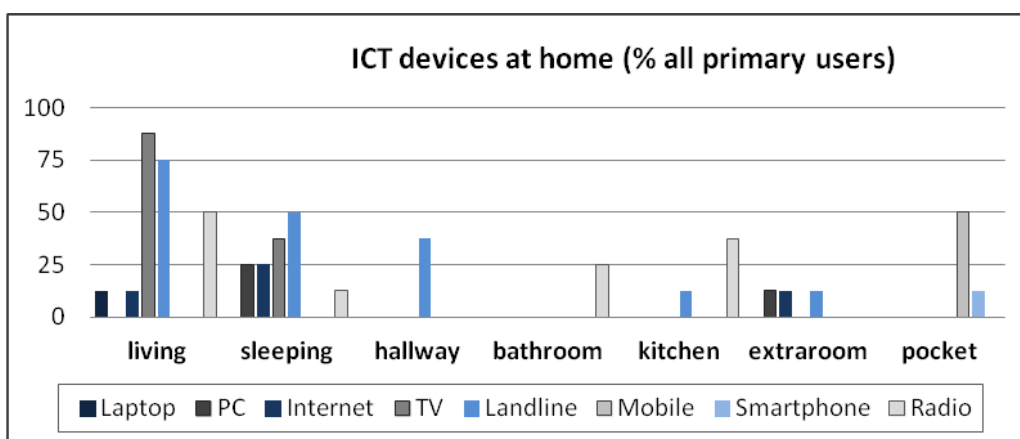


Figure 33. Distribution of ICT devices currently used by primary users in each room (N=8)

TV-set was the most common device, placed in the living and sleeping room (N=8, 87.5% and 37.5% respectively). Some participants had also 2 TVs sets, one in each room (N=8, 25%). Results concerning landline phone are similar, with 75% having it in the living room, 50% having it in the sleeping room, 37.5% having it in the hallway and also 12.5% having it in the kitchen (N=8). Again, most of

primary users had two or more devices (N=8, 75%), and among this panel, wireless phones with dock station were the best represented devices (qualitative result, based upon focus group discussion).

Another well-represented device was the radio set (N=8), used in the living room (50%), kitchen (37.5%), bathroom (25%) and also the sleeping room (12.5%). This device was more frequents available than PC/laptop devices and internet connection: only 50% of primary users are equipped with a computer (PC/laptop), even if all computers are connected to the internet. Computers (N=4) were located in the sleeping (50%), living (25%), and spare room (25%).

Mobile phones are also not very common yet: only 50% of primary users own a mobile phone (N=8). This kind of portable device was obviously not found in a specific room. Nevertheless, approximately one half of concerned participants had a low use of their mobile phone (qualitative result, based upon focus group discussion. Only one participant was equipped with a smart phone (Samsung Galaxy Note).

Question 2 - Medical Services and Devices

The second question focused on healthcare services and related devices. The questionnaire included also location of healthcare activities, to have a better representation of home services in the healthcare area.

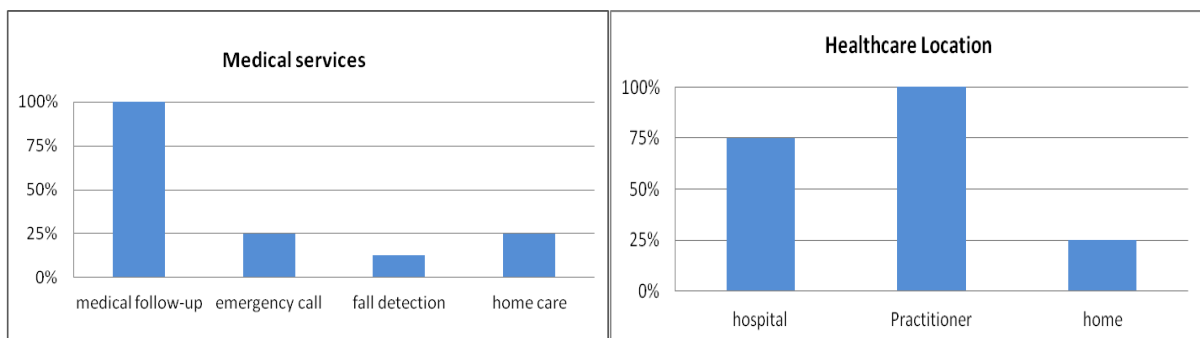


Figure 34. Medical services, and related location, which primary users benefit (N=8)

Regarding medical services, results highlight that all primary users benefit of a medical follow-up (N=8, 100%). This follow-up is related to the chronic diseases described above, and are carried out by formal caregivers in hospitals (75%) or in private practices (100%), depending on involved medical speciality and related data records (e.g. private practices are not always equipped for a heart disorder monitoring). Results of healthcare service locationa represent primary users who checked off one of them (e.g. hospital) for one medical service at least.

Emergency call systems, fall detection and mobile home care services (visiting nurse) were also named in the questionnaires, albeit to a less extent (N=8, 25% or less). The three services were provided at home, and in one case a fall detection service was combined with an emergency call service. Regarding home care, one participant stated providing home care for the spouse (the spouse benefit from the service, but was not a primary user of vAssist).

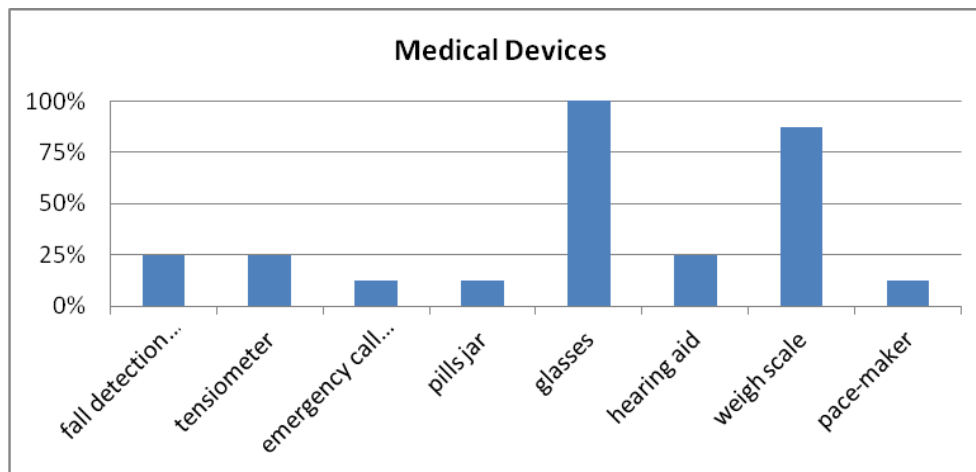


Figure 35. Medical devices used by primary users (N=8)

An overview of healthcare related devices can show that glasses and weigh scales are the most common ones (N=8, 100% and 87.5 % respectively). Next, fall detection holters, tensiometers, emergency call systems, pill jars, hearing aids and pace-makers were named, but they seemed to be less present in the primary users home (N=8, 25% or less each).

7.2.2 Results Secondary Users (Formal Caregivers)

The section below reports the results from the focus group and screening questionnaire in France with secondary users (formal caregivers).

7.2.2.1 Focus Group 3

N= 16 secondary users (6 male, 10 female; mean age: 38.5; SD: 8.5) participated in the focus group in France. The topic of the focus group was set on medical/well-being services and devices for tele-medicine with patients (primary users) as well as on future vAssist services and business aspects from the formal caregiver's point of view.

All participants are working at the Broca Hospital (APHP) as health care professional. Half of them are geriatrists; remaining participants were neurologist, internist, general practitioners, psychologists, speech therapists or ergo therapists. All participants worked since many years with older persons.

The focus group in France was planned to address formal caregivers during a weekly medical staff meeting. Due to the duration of the staff meeting (1 hour), this focus group was divided into two sessions. The first FG3 session included 12 participants and the second one included 8 participants (with only 4 participants being present in both sessions).

Health/Wellbeing Information Recordings and Medical Services in Clinical Activity

The discussion was started with a medical description of primary users, their diseases and their symptoms (Table 21).

Gender	male / female
Age	65+
Limitations / Difficulties in	at least two of the following: bathing, climbing stairs, crouching, kneeling, stooping, difficulties in shopping groceries, doing house work, getting up from chair or bed, lifting or carrying weights over five kilos, pulling and pushing large objects
Diseases	at least one of the following: cataract, cholesterol, diabetes, heart attack, high blood pressure, osteoporosis
Symptoms	heart trouble, pain in joints, back, knees
Drugs	Yes

Table 21. Medical description of primary users

Participants were asked what kind of information related to health they ask to their patients to record regularly, or what kind of regularly medical examinations they practice. Their answers are summarized with several features: medical data records, used devices, frequency of records, diseases and the nature of the healthcare service. The table below summarizes the given information (Table 22).

Medical Data Records	tool/device	frequency	Related diseases	kind of service
Blood Pressure	electronic tensiometer	once/15 days	High Blood Pressure	medical follow-up
Heart Rate	stethoscope pulse	once/15 days	Heart rate diseases	medical follow-up
Cardiac Rhythm	heart rate monitor	occasional	Cardiac Rhythm diseases	medical follow-up/diagnosis
INR measures*	(medical analysis laboratory)	once/15 days	vascular diseases, cardiac rhythm diseases	medical follow-up (anticoagulant treatment)
Sugar rate	glucometer	3 times/day	diabetes	medical follow-up
oxygen saturation	pulse oximeter	occasional	respiratory and cardiac failure	diagnosis
pace-maker setting off	holter (experimental)	occasional	Cardiac Rhythm diseases	medical follow-up
weight	weight scale	regular	cardiac failure, under nutrition and obesity	medical follow-up /diagnosis
fall detection	holter	occasional		
bedsore/pressure ulcers	camera	at the request of visiting nurse	wound / bedsore	medical follow-up
pain care	VAS	occasional to regular	chronic pain	medical follow-up
Intestinal transit	(note)	Regular	constipation	diagnosis
food survey	(note)	Regular	under nutrition	diagnosis
sleep quality	Respiratory polygraph / note	occasional	sleep disorder/sleep apnea syndrome	diagnosis
step number	pedometer	occasional	Well-being/assessment of physical activity	

Table 22. Overview on health information recordings, medical devices and services used by formal caregivers

* *International Normalized Ratio (INR) is measure of the extrinsic pathway of coagulation*

Frequencies are provided on an indicative basis, because they are widely related to the kind and severity of the disease, and can be very specific to individual issues. Considering the kind of services, diagnosis are essentially restricted to a single examination, or very few, because this information becomes useless for the follow-up of a diagnosed disease.

Then, several data records usually require medical acts, as for **INR measures which require a blood test** and **bedsore care, usually provided by a visiting nurse**. Some data records are always carried out at the hospital, as for **heart rate monitoring** or **oxygen saturation**.

At least, pace-maker setting-off measure is still relatively uncommon in usual medical practice (only one participant had experience with this kind of data records).

The following usual used **medical devices** could be identified. Most of them are simple devices, with only one specific function, and without wireless connections.

- electronic blood pressure monitor
- heart rate monitor
- blood glucose monitor
- oximeter
- holter (fall detection)
- respiratory polygraph
- pedometer

Considering **healthcare services**, it is important to note that all services are described as a kind of medical care (diagnosis/follow-up), provided in a hospital. Very **few services** are actually provided in France, excepted **fall detection**. Some data records can be carried out per patients themselves, but recorded data are checked and used during the next medical follow-up appointment.

A last service, actimetrics*, has been named by secondary users. This service is actually highly experimental and related to several ethic issues. Nevertheless, several formal caregivers thought that it could be implemented in vAssist, and judged this service as useful.

* *Actimetrics refers to measurement and analysis of motor activities of a subject in his/her environment by using sensors worn by the subject or which are integrated into the environment*

Voice controlled Services to be included in the vAssist system for healthcare professionals

The aim of this session was to collect ideas of formal caregivers about which voice controlled services they would include in a perfect vAssist system for their patients. In this session, some participants had difficulties to understand the aim of the vAssist system. Nevertheless, this group (different from the group of the first session) could imagine some relevant services for vAssist.

Healthcare services	Relevance for vAssist	pros	cons
Blood Pressure	++	direct assessment	professional device
Heart Rate	++	direct assessment	
Cardiac Rhythm	-		useless at home
INR measures*	++		
Sugar rate	++	direct assessment	professional device
oxygen saturation	-		useless at home

weight	++		
fall detection	+++	contact, even if on the floor	
bedsore/pressure ulcers	+++	visual information	
pain care	+++	direct assessment	
Intestinal transit	++	direct assessment	
food survey	+		
sleep quality	++		
drugs	+++	centralized prescription	
actimetrics	+++	autonomy assessment	a lot of invasive home devices
Screening neuropathy tests (e.g. MMSE)	?	better follow-up	

Table 23. Future voice controlled healthcare services from formal caregivers' perspective

The first result concern physiological data, which are judged as minor relevant for vAssist. Several data require professional devices and/or clinical exams and expertise. But formal caregivers expected saving time with a direct transmission of these data. At the opposite, some participants quote that they were already informed by letter, and asked for an added value on vAssist (not described during the FG). These physiological data include **blood pressure, heart rate, INR measures (blood test), sugar rate and weight** (cardiac rhythm and oxygen saturation were judged not relevant for a regular home service).

Secondly, participants have focused on some services high relevant for vAssist. The **bedsore follow-up was judged very relevant** because, vAssist system could allow a visual assessment of the wound and a direct adaptation of the bandage (by the visiting nurse). **The fall detection and actimetrics were already expected by most of formal caregivers**, and fit very well in a system such as vAssist. Pain care could also become a main service of vAssist: with Visual Analogical Scales (VAS) on a screen, **formal caregivers could assess degree of pain at patient's home**. At least, a **centralized prescription was hardly expected by formal caregivers**. Drugs could be added on prescription by practitioner, available for pharmacist and vAssist remind drugs intake to the primary user. But primary user could also precise tolerance and side-effects and doctors have a great tool to assess how the drug intake is respected.



Figure 36. Illustration of a Visual Analogical Scale (VAS)

Remaining described services, **intestinal transit**, **food survey** and **sleep quality**, were judged less relevant, but could be easily **included in a well-being diary**. The implementation of online cognitive screening tests has also been discussed. It could be a great tool for practitioners, but it also requires a massive work (design and validation, with normative data). An adapted version of MMSE (Folstein and Folstein, 75) or MoCA (Ref?) could be included in the vAssist system.

Business Requirements

Regarding business requirements, this topic was not extensively discussed with secondary users due to time limitations. Some comments could be listened before the end of the session. In general, secondary users (formal caregivers in this focus group) did not feel concerned by this issue. They only rose that such system had to be **accessible to a large population**. They also highlighted that some healthcare services could be very expensive, from a human factor perspective. Thus, these services should not be very expensive.

7.2.2.2 Screening Questionnaire

This section reports the results from the screening questionnaires with formal caregivers in France. The questionnaire can be found in the annex section.

Socio-demographical Data

Questionnaire results from 10 female and 6 male participants (N=16) were analyzed. The mean age of the sample was 38.5 years (N=16; SD=8.55) (see Figure 37. Sample description (gender, age) of the formal caregivers participating in the screening questionnaire).

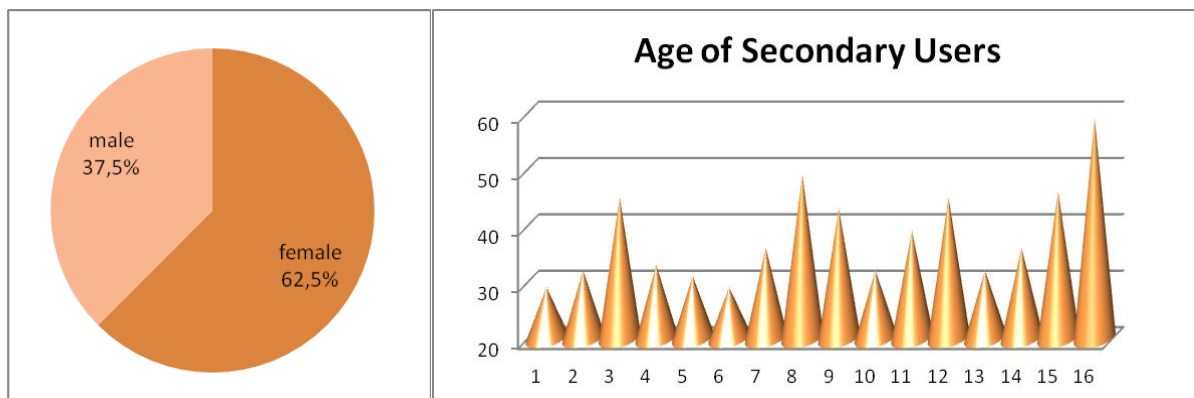


Figure 37. Sample description (gender, age) of the formal caregivers participating in the screening questionnaire (N=16)

Formal caregivers had practice in many different healthcare areas. It seemed interesting to give an overview of these professional fields in the sample which participated in the screening questionnaire (see Figure 38). Thus, half of formal caregivers were geriatrists (N=16, 50%), whereas remaining specialities belong to speech and ergo therapy, psychology, neurology, or internal medicine (N=16, 13% or less).

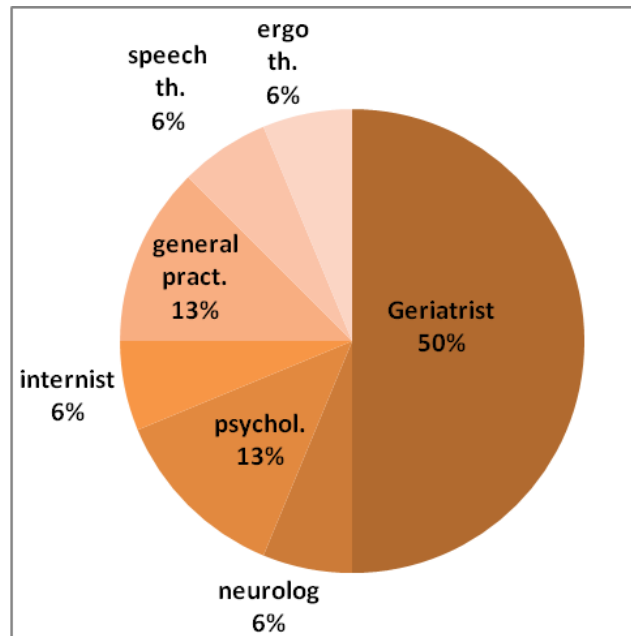


Figure 38. Sample description (healthcare area) of the formal caregivers participating in the screening questionnaire (N=16)

Question 1- Healthcare Data records, related devices and services

The first, and only question, was related to medical data records/services and location of these activities. Figure 39 illustrates all medical data frequently recorded by formal caregivers depending on the proportion of participants experiencing them.

At first, **drugs monitoring** was ensured by 75% of formal caregivers (N=16). Physiological data records, included **blood pressure, heart rate, cardiac rhythm, INR measures, sugar rate, oxygen saturation and weight**, were carried out by 68.75% of secondary users in France (N=16).

Bedsore follow-up, **intestinal health and pain care** concerned 25% at least of them, whereas remaining data were rarer (N=8, less than 25% of secondary users' sample). Also **physical activity, nutrition, cognitive efficiency, fall risk assessment, sleep quality, cognitive stimulation and daily activities** were listed. It is important to highlight that some medical data could be related to only one healthcare area. If a speciality is under represented in the sample, proportion of a related record is also lower.

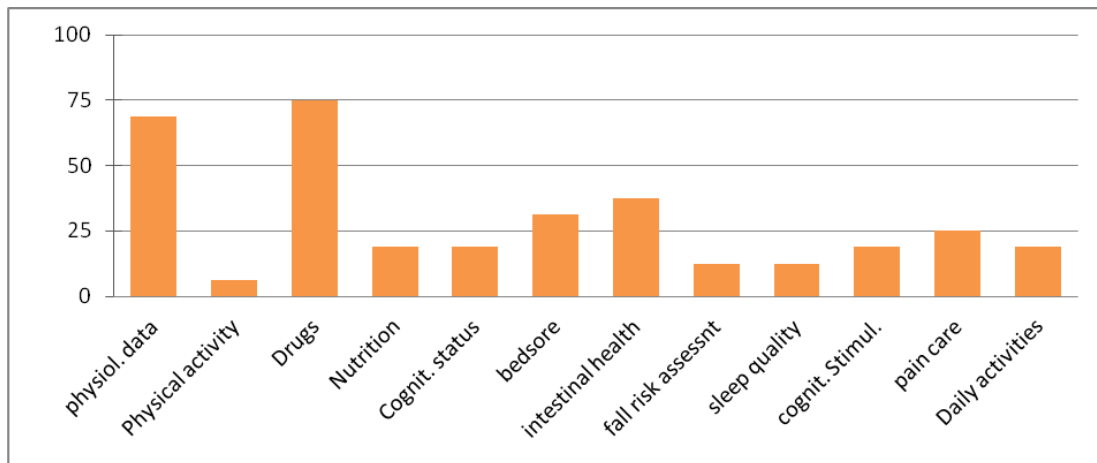


Figure 39. Medical Data records frequently carried out by formal caregivers (N=16)

Concerning location of healthcare services, formal caregivers ensured **most of their medical activities in the hospital** (N=16, 83%). This results was not very surprising because all formal caregivers were recruited in Broca’s hospital. Nevertheless, remaining services named by participants were frequently ensured at home (N=16, 17%).

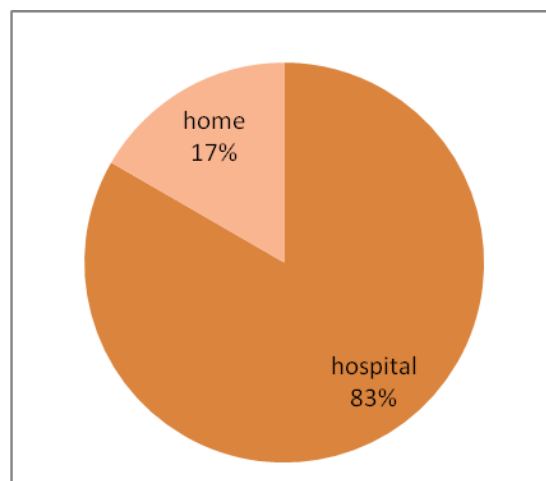


Figure 40. Location of healthcare services practiced by formal caregivers

At least, the screening questionnaire allowed to identify the main healthcare devices. This result is displayed in Table 24, below.

Healthcare services	Relevance for vAssist
Blood Pressure	electronic tension meter
Blood Sugar	Glucose meter
Weight	weight scale
heart rate	stethoscope
cardiac rhythm	heart rate monitor
INR measures	blood test
oxygen saturation	pulse oxy meter
Physical activity	
Drugs	
Nutrition	food survey
Cognitive status	neuropsychological tests
bedsore	
intestinal health	
fall risk assessment	specific treadmill
sleep quality	Respiratory polygraph
cognitive stimulation	paper & pencil test / Experimental software / video & serious games
pain care	VAS
Daily activities	

Table 24. Medical devices frequently used by formal caregivers

8 Summary

This section includes the summary from the requirements activities in Austria and France with primary (seniors) and secondary users (formal and informal caregivers) for future vAssist tele-communication and tele-medical services.

8.1 Summary Austria – Tele-Communication

The summary from the requirements activities in Austria with primary and secondary users (informal caregivers) includes the main results and needs balancing the information coming from both user groups. The core topic was set on tele-communication and related devices, services, user interactions and business aspects to derive the user requirements for the vAssist system.

8.1.1 Device Requirements - Tele-Communication

In general, results from the three focus groups indicate, that vAssist services should be available on two kinds of devices, a static and a mobile one.

Devices at home: Primary users current mainly use mobile and smart phones as well as PC's/laptops for the communication with family members and friends. Next to these devices, TV sets are very common in senior households and are mainly located in the living room.

Static solution: As a static device for the delivery of vAssist services a solution similar to a TV set that includes touch interaction functionalities (next to standard TV functionalities) or PC's/laptops are promising alternatives. Current, PCs/laptops are mainly used for text based (E-mail) communication, information search, entertainment purposes and home office activities. TVs are mainly used for information and entertainment purposes.

Mobile solution: The requirements for a mobile device are that it is portable, small (at least the size of a postcard), lightweight, versatile, equipped with a fast processor and a larger screen. Current, primary users are used to handle technical devices such as mobile and smart phones as well as PCs/laptops. This result highlight that a larger smart phone or a Tablet PC can be seen as the mobile device option.

A major aspect that came up during the discussions is that most of the primary users will have to buy a mobile device that is able to provide access to vAssist services, static devices such as TV sets and PC's/laptops are already in their homes. This result must be considered when forming business models.

Microphone and loudspeakers: As the device for the speech control of the vAssist services primary users claim for a wireless solution (headset) in case the microphone and loudspeakers included in the devices (mobile, static) lack in quality for having an adequate voice interaction. Secondary users recommend that this device should be from high quality and should include the possibility to set the volume level to the individual needs of the user (e.g. age related hearing loss).

8.1.2 Service Requirements - Tele-Communication

Main vAssist services: Results from the focus groups show that audio (calls) and text based (E-mail, SMS) communication services are the most frequent used communication channels between primary and secondary users. Both target user groups see these services as the most prominent and standard vAssist services to be equipped with speech control. Further, not only the services itself but also the address book (contact management) should be able to react on natural language commands. Next to these options, information search (internet browsing) and emergency calls are perceived as high valuable future vAssist services.

The main advantage of internet based communication services (audio/video calls, E-mail) are seen in being cheap and cost effective. For vAssist this means that the developments will have to focus on internet based services.

Additional vAssist services: Media management for managing photos, videos or other data (e.g. digital album where short messages related to photos and videos can be shared, dealing as an alternative communication channel), a navigation/GPS service that gives support and location based information when being in an unknown environment, tele-medical/well-being applications for managing physiological parameters (e.g. blood pressure data) and sharing reports with health professionals and a calendar service for sharing family events and dates or setting medical reminders (drug intake, medical appointments) are promising future vAssist service ideas.

8.1.3 User Interaction Requirements - Tele-Communication

Observations and user feedback from manual input tasks could show that the main barriers in using small devices (smart phone) are small keypads, small font sizes and small screens – especially for primary users with (fine-) motor skill restrictions.

In general, primary and secondary users have a positive attitude towards speech control as an alternative interaction technique. Results from speech and manual (touch) control tasks indicate, that speech control elicits more positive emotional reactions compared to manual touch interactions. The main advantage of a VUI is seen in the speed of the interaction since no key and button search is needed. For vAssist this means that speech control can be seen as a promising approach to support primary users with (fine-) motor skill restrictions. Further, this is a first indicator that the future vAssist system will have the chance for a high acceptance and may enter a profitable market.

It must be noted that both, primary and secondary users, claim that speech control have to be accompanied by a GUI and manual interactions for situations where speech control fails (e.g. noisy environment). Further, a special focus will have to be set on privacy and security of personal data, an aspect primary user see as high important.

VUI requirements: Natural language in- and output commands are preferred that are formulated in a clear, short and precise way. Primary users want to interact with a young female pleasant sounding voice. The form of interaction should be informal and personal. This may alleviate the fear of this new technology. Both target user groups suggest giving the vAssist system a name. On the one hand, the

name can be used as a trigger to start the interaction with the vAssist system. On the other it may contribute to a more natural and personal level of interaction having some kind of “virtual human” to talk to. Technical terms and codes dealing as a name should be avoided. From main importance is that all speech interactions should be accompanied and guided by written text messages on the GUI. Considering feedback sounds applied in vAssist, smooth and pleasant sounds should be used to not stress or fear primary users during the interaction.

GUI requirements: vAssist services will have to include GUIs dealing as an alternative from of interaction in situation where speech control fails (e.g. noisy environment). The GUI should have a clear and simple structure and technical terms must be avoided. A larger font size is mandatory to respond to age related visual restrictions. Responding to (fine-) motor skill restrictions, keypads and interaction elements should be larger as the standard norm. Speech controlled selections of interaction elements (e.g. buttons, keys) should be highlighted on the GUI to make the selection clear for the primary user.

Error solving strategies: In case of errors (e.g. natural language command is not understood by the system) a pro-active error solving strategy should be applied providing information how to solve the problem (e.g. “I have not understood what you have said, please tell me again or move to a quieter place!”). The pro-active error solving messages should be presented as voice output as well as in a written form on the GUI. Next to this function, a “home” or “back to start” feature will have to be provided on the GUI and VUI so that primary users have an emergency exit in case they get stuck or lost in the vAssist system.

8.1.4 Business Requirements - Tele-Communication

In general, primary and secondary users show a positive attitude towards a package approach to be considered in a future vAssist business model. Further, providing several different packages differing in the number of included services was perceived as a good idea to respond to primary users with individual needs, wishes and financial conditions.

Individualization: In contrast, both user groups have a negative attitude towards the pre-definition of included services for different packages. It is suggested to enable the possibility to re-fine and customize the services that are included in a package based on the individual needs of the primary users. The offer of a trial phase where different services can be tried for a limited period of time (e.g. three months) was suggested prior to a final selection of the package and included services.

Packages: Different packages were discussed resulting in the need for a basic, advanced and an alternative package. These packages mainly differ in the number of included vAssist services. Primary users mainly see speech controlled audio call, E-mail, information search (internet browsing) and emergency call functions to be included in a basic package. An advanced package should include the basic package and a limited number of additional services. As an alternative package the free selection of an unlimited number of vAssist services was considered.

Service Delivery: Related to the delivery of additional vAssist services, both target user groups can imagine a solution similar to current app stores for mobile applications. This can be accompanied by

some kind of written catalogue that explains the main features of the different services in short, supporting the decision-making.

Cost model: Discussions about costs result in the general need for flat rate tariffs for the connection fee (including costs for calls, messaging and internet data traffic). From main importance is the transparency of the costs that should be available at any time. Moreover, secondary users claim for a personal support that should be included in any cost model supporting primary users in A) the selection of packages and services and B) during the use of vAssist services with hard and software problems and the exchange or adding of vAssist services.

Low, mid and high cost models were suggested from secondary users that mainly differ in the included service package (basic, advanced, alternative) and included hardware (mobile, static). In common, all cost models should include the personal support and connection fee (flat rate for calls, messaging and internet data traffic).

8.2 Summary France – Tele-Medical

The summary from the requirements activities in France with primary and secondary users (formal caregivers) includes the main results and needs balancing the information coming from both user groups. The core topic was set on tele-medicine and related services, user interactions and business aspects to derive the user requirements for the vAssist system.

8.2.1 Device Requirements - Tele-Medical

Devices at home: Primary users current mainly use mobile phones as well as TV sets which are mainly located in the living and sleeping room. Next to these devices, PC's/laptops are very common in senior households, but less used. Smart phones are not very popular yet for primary users in France.

Reliable, always available and no battery failure: Primary users expect a system without battery failure and service support 24/7. The most important point is the reliability of the system. Next, the control of the vAssist must be easy and efficient.

Microphone and loudspeakers: As the device for the speech control of the vAssist services primary users claim for loudspeakers and microphones in each room. They could be included in vAssist-related devices if the sound is clear enough. A wireless head set could be a good alternative from their perspective, but they have some fears about time-life battery of such a device. Moreover, they do not want search their headset any time when using vAssist.

Healthcare devices: Primary users use very few healthcare devices at home. Except tele-alarm in some cases, almost all medical data is recorded at hospitals, laboratories or from general practitioners. Electronic tensiometer is still rare, as glucometer and fall detection device too. Secondary users have not identified alternative healthcare devices which could be used by primary users at home, except previously named ones. Nevertheless, a link between an actimetrics system, electronic pill jars and vAssist should be taken into account.

8.2.2 Service Requirements - Tele-Medical

Drug diary: This is a potential tele-medical service which emerged from the focus groups. Both primary and secondary users expect a drug monitoring, including real-time prescription and adjustment from a formal caregivers' perspective, as well as a drug reminder for primary users as being included in vAssist. The service should also include the ability to record all side-effects related to new drugs, and a quick transfer of this information to the health professional.

Electronic medical file: The electronic medical file is an old project in France, and formal caregivers are waiting for it yet. This concept is highly relevant for a system such as vAssist. All medical information should be collected in a unique file that is always available to each formal caregiver and also to primary users. Such file should be able to be updated in real-time, depending on the user's healthcare dynamic status.

Emergency call system: This wish mainly comes from primary users. The main issue is that this service must be reliable and robust taking the battery status into account. This service expects an access to an emergency operator that provides help 24/7 (reliability in terms of human factors).

Bedsore follow-up: Using a webcam device or photo transfer, the vAssist system could help practitioners to follow-up the evolution of bedsore. This pathology is a direct consequence of long-term inactivity in the same position (e.g. long hospitalization), and would not concern a lot of primary users. Nevertheless, it will not require the development of a special service since a basic access to Skype (or similar software) or photos attached to E-mails would be enough to ease the communication between the visiting nurse and the practitioner.

Pain care: Arthrosis and rheumatism are high related to pain. So pain care emerged as a relevant service from both, primary and secondary users. The main issue is ease the communication and assessment of pain. The service development would require an adaptation of Visual Analogical Scales (VAS) on the GUI and VUI of the vAssist system.

Easy transfer of medical data: The notion of an easier transfer of medical data was named in the description of the vAssist project. The focus group analysis confirmed this main idea, even if participants (primary and secondary users) did not provide features of this service.

8.2.3 User Interaction Requirements - Tele-Medical

VUI with GUI feedback: In contrast to the primary users in Austria, French participants remained more doubtful regarding VUI. They were quite unfamiliar with both tablets and smart phones and encountered difficulties when sending an E-Mail in both modalities (VUI, GUI). Even if VUI seemed to be more promising from their perspective, they worry about the reliability of a VUI and expected a GUI as important fallback solution.

Neutral and clear voice: Concerning type of voice, primary users expressed a preference for a neutral and clear voice. Voice gender issues seemed to be not relevant, and they focused on voice clarity with freedom to choose the gender of the voice.

Little personalization: Primary users highlighted their preference for a neutral name and an abstract logo. All participants named an impersonal system as a better solution than a virtual person.

Simple and concise language: The language of vAssist system should be simple, with short information and common, everyday words. An additional idea was to limit the number of messages, i.e. to avoid that vAssist system provides too much information at the same time. Primary users highlighted they could be disturbed by simultaneous information and preferred to have only one message at a time.

8.2.4 Business Requirements - Tele-Medical

In general, results from the focus groups in France highlight that primary users expect the vAssist system to be placed on the market and supported by health care institutions and not by private companies.

Moreover, both, primary and secondary users claim for a vAssist system that can be achieved at rather low costs so that a broad range of older persons will get easy access to it for a reasonable price.

Individualization: Primary users raise the wish to be able to select future vAssist services based on individual needs, having a negative attitude towards the offer of pre-defined services and packages.

Costs: Both, primary and secondary users do not have a special price for the vAssist system in mind but claim for reasonable prices so that the services will be widely available for a broad range of senior citizens.

9 Conclusion

This section summarizes the main conclusions from the requirements activities with primary and secondary users in Austria and France.

Devices at home: Results indicate that primary users mainly use mobile and smart phones as well as PC's/laptops, but are not expert users. Moreover, TV sets, located in living and sleeping rooms, are very common. Only a few electronic medical devices are currently used at home. These include emergency services (tele-alarm services), tensiometers, glucometers and fall detection devices. Currently, almost all medical data is recorded at hospitals or laboratories from health professionals.

vAssist device requirements: In general, vAssist services should be available on two devices, a static and a mobile one. Whereas for the static solution TV sets or PCs/laptops (including touch interaction) are promising alternatives, for the mobile solution a larger smart phone or tablet PC can be seen as an option. The requirements for the mobile device are being portable, small (at least the size of a postcard), lightweight, versatile, equipped with a fast processor and a larger screen. For the interaction with the vAssist system a wireless headset, loudspeakers and microphones included in the devices and external microphones and loudspeakers are preferred. In common, these devices have to provide a high sound quality and the possibility to set the volume level to individual needs. Since primary users considered the displacing of wireless headsets, vAssist will have to consider possibilities to provide speech control with and without the use of extra hardware. Moreover, for all included mobile and wireless devices, a re-finding and battery alarm strategy will have to be taken into account.

vAssist service requirements: Currently, mainly audio (calls) and text based (E-mail, SMS) communication services are used for the communication between younger and older family members. Both user groups see these services as mandatory to be equipped with speech control in vAssist (including the address book). Further, also information search (internet browsing) is of high importance for primary users. For the well-being services, emergency functionalities (calls, tele-alarm), the recording and reporting of blood pressure data, a drug intake reminder and electronic pill jars, a drug diary (including monitoring of intake, real-time prescription and drug adjustment, recording and reporting of side-effects) and the information exchange (e.g. sharing summary reports including all relevant information) between health professionals and clients for easy follow-up appointments management will have to be considered. In addition, bed sore evolution follow-ups (using the combination of video, photo and communication services), actimetric functions and alternative pain care reporting (e.g. using VAS) are promising functionalities. Of major importance is that all these services have to focus on being easy to use, cheap and cost effective as well as reliable (e.g. battery).

vAssist interaction requirements: The main identified barriers in using current (small) electronic devices are small keypads, small font sizes and small screens. In general, both target groups have a positive attitude towards speech control as an alternative interaction technique. The main advantage of a VUI is seen in its interaction speed. It must be noted that all target users claim for a speech controlled system that is accompanied by a GUI and manual interactions for situations where speech control fails. Further, a special focus will have to be set on privacy and security of personal (medical) data.

Natural language in- and output commands have to be short, precise and clear avoiding complex technical and English terms. A young, female, pleasant sounding voice is preferred providing a personal and informal interaction with a system that has a natural or neutral name. The supportive GUI will have to consider a clear and simple structure. Larger font sizes, keypads and interaction elements are mandatory. In case of errors a pro-active error solving strategy will have to be applied providing information how to solve the problem on GUI and VUI. Moreover, a “home” or “back to start” feature will have to be included. From main importance is that the interaction with the whole system (VUI and GUI) will have to offer a high reliability level.

vAssist business requirements: In general, a positive attitude towards a package approach could be identified to be considered in future business models. Moreover, all user groups claim for the possibility to re-fine and customize services included in a package towards individual needs. Referring to the service delivery a solution similar to current app stores is considered accompanied by a written catalogue to shorten decision-making processes. Discussions about costs result in the general need for low, mid and high cost models including flat rate tariffs and devices to make the future vAssist services accessible for a broad range of older persons with diverse financial possibilities. In addition, it must be considered that most of the primary users will have to buy mobile and static devices that are able to provide access to the future vAssist services. From main importance is the transparency of the costs and a personal support that should be included in any cost model. Another aspect raised during the discussions is that primary users see the promotion of the vAssist system to be supported mainly by health care institutions and not by private companies.

The next steps towards the specification and development of the future vAssist system will have to balance the above summarized device, service, interaction and business requirements taking technical feasibility and legal issues into account. Iterative studies involving future users will follow in later work packages evaluating and re-fining low-fi and high-fi service prototypes and business models aiming at creating a vAssist system that achieves a high technology acceptance and market potential.

References

- [1] Riva, G., Vatalero, F., Davide, F., Alcaniz, M. [Ed.] 2005. Ambient Intelligence: The Evolution of Technology, Communication and Cognition Towards the Future of Human-Computer Interaction. IOS Press, XX.
- [2] McTear, M. 2009. The Role of Spoken Dialogue in User-Environment Interaction. In: Aghajan, H., Lòpez-Cònar Delgado.R., Augusto, J.C. [Ed.] 2009. Human-Centric Interfaces for Ambient Intelligence. Academic Press, 225-254.
- [3] Fei, Y., Lin, C. J., Chen, M., and Chiang, C. 2007. Performance evaluation of voice interaction as a universal web interface. In Proceedings of the 4th international Conference on Universal Access in Human-Computer interaction: Applications and Services (Beijing, China, July 22 - 27, 2007). C. Stephanidis, Ed. Lecture Notes In Computer Science. Springer-Verlag, Berlin, Heidelberg, 279-288.
- [4] Czaja, S.J., Lee, C.C.: Information Technology and Older Adults. Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications. In: Sears, A., Jacko, J.A. [Ed.] 2007. Human-computer interaction handbook, 2nd edn. Lawrence Erlbaum, Mahwah.
- [5] Jastrzembski, T., Charness, N., Holley, P., Feddon, J. 2005. Aging and input devices: Voice recognition is slower yet more acceptable than a lightpen. In: Proceedings of the 49th Annual Meeting of the Human Factors and Ergonomics Society. Orlando, FL.
- [6] Fraser, N. 1997. Assessment of interactive systems. In: Handbook of Standards and Resources for Spoken Language Systems, D. Gibbon, R. Moore, and R. Winski, Eds. Mouton de Gruyter, New York, NY, 564-614.
- [7] Cure-Elderly-Personas: <http://elderlypersonas.cure.at> (last visit: 22.12.2011)
- [8] SHARE project: <http://www.share-project.org> (last visit: 22.12.2011)
- [9] Merton R.K., Fiske M. & Kendall P.L. (1990) The Focused Interview: A Manual of Problems and Procedures, 2nd ed. Free Press, New York.
- [10] Kitzinger J. (1996) Introducing focus groups. In Qualitative Research in Health Care (Mays N. & Pope C., eds), B. M. J. Publishing Group, London, pp. 36-45
- [11] Morgan, D. (1996). Focus groups. Annual Review Sociology 22, 129-152. Annual review inc.
- [12] Mayring, Ph. (1994a). Qualitative Inhaltsanalyse. In A. Böhm, A. Mengel & T. Muhr (Hrsg.), Texte verstehen: Konzepte, Methoden, Werkzeuge. Konstanz: Universitätsverlag.
- [13] Desmet, P.M.A., Overbeeke, C.J. & Tax, S.J.E.T (2001). Designing products with added emotional value; development and application of an approach for research through design. The Design Journal, 4 (1). 32-47.
- [14] Beach, S., Schulz, R., Downs, J., Matthews, J., Barron, B., Seelman, K. 2009. Disability, Age, and Informational Privacy Attitudes in Quality of Life Technology Applications: Results from a National Web Survey. ACM Trans. Access. Comput. 2, 1, Article 5 (May 2009), 21 pages.
- [15] Dow, St., Mehta, M., MacIntyre, B., Mateas, M. (2010). Eliza meets the Wizard-of-Oz: Blending Machine and Human Control of Embodied Characters. CHI 2010. April 10-15. 2010. Atlanta. Georgia. USA.

Annex A: Manual Focus Groups (Austria and France)

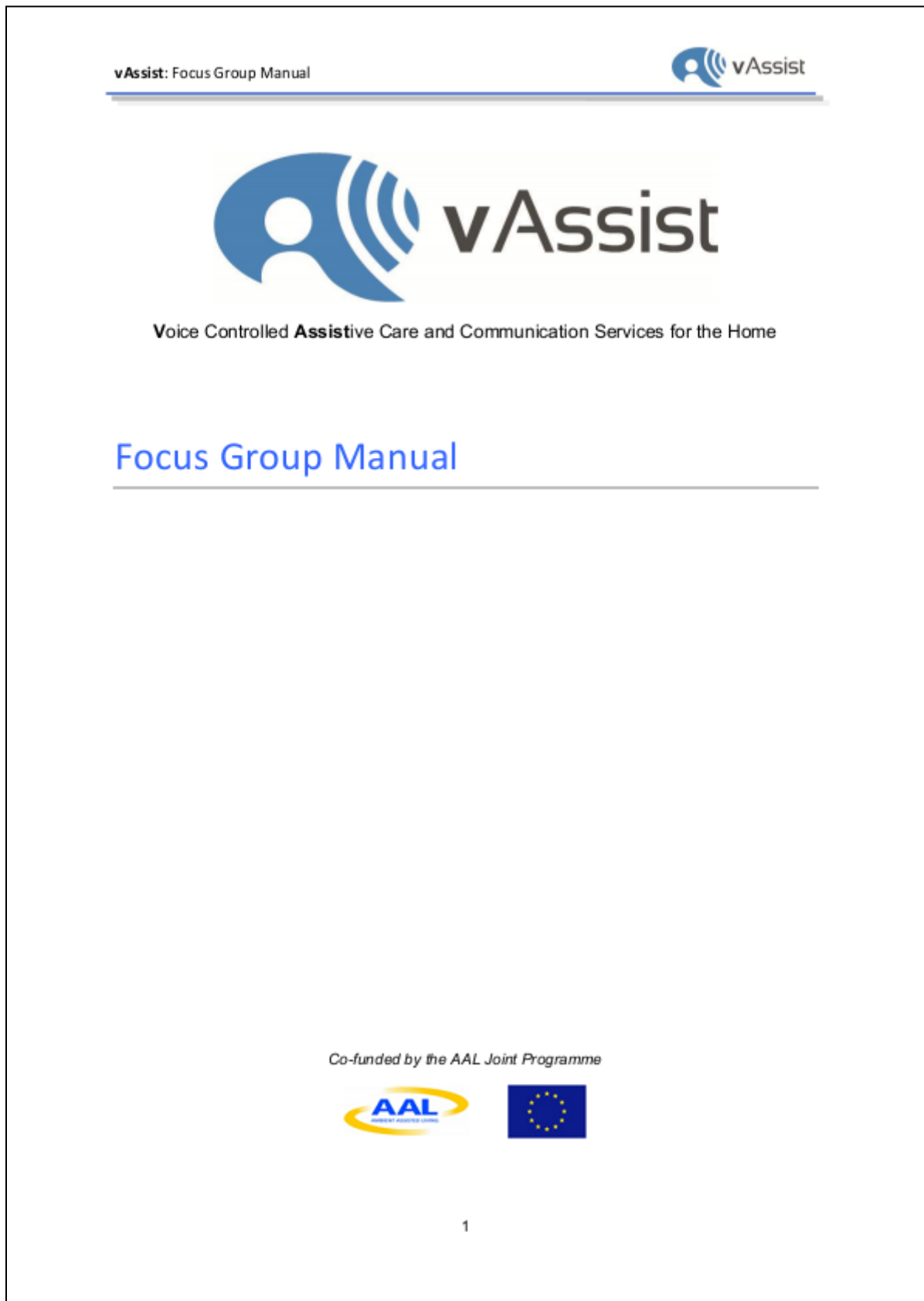


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1 Moderating Focus Groups

This section provides short information and guidelines for moderating focus groups.

- Ask **broad open-ended questions**. Then specific questions.
- **Do not give your opinion** to respondents. Do not judge answers. Stay neutral.
- If the respondents ask about your opinion, turn the question back to them:
 - e.g.: "I don't know. What do you think about it?"
- Dig below top-of-the-mind answers. Find out why and how?
- Cover your primary topics. **Keep track of time**. Stay on track.
- Look respondents in the eye and listen to their answers. Show understanding and empathy. Nod your head.
- Be friendly, polite, and respectful, and most people will usually respond in kind.
- Challenge in a friendly way. Keep the tone upbeat and positive. Do not argue.
 - e.g.: "Help me out. I don't understand."
- If a question confuses a respondent, rephrase it. Ask in a different way. If the question still does not work, skip to the next question.
- Manage the respondents so that every respondent gets equal talk time. In some focus groups, dominant respondents show up.
 - e.g.: Tell the dominant respondent you want to hear from the others. Do not look at the dominant respondent when you ask a question

Give summaries at the end of a discussion session and ask if you have understood everything correct!

2 Checklist, Equipment and Materials

2.1 Checklist

Tasks	Check
BEFORE	
Book focus group facility	
Arrange for audio/video recording of focus group (backup)	
Arrange refreshments for participants	
Recruit participants	
Remind participants (2 days prior the focus group)	
Print Informed Consent forms	
Print focus group manual	
Check Equipment (beamer, pc, smart phone, TV, Tablet, iPhone 4s, etc.)	
Check material (ppt., flip chart, etc.)	
Check incentives and invoices (only AT)	
Digital-camera to take pictures of focus groups and flip charts	
Questionnaires	
DAY OF	
Check audio- / video recording	
Digital-camera to take pictures of focus groups the charts created	
Projector for the powerpoint presentation	
Refreshments	
Check materials: <ul style="list-style-type: none"> • Pencils for questionnaires • Flipcharts • Powerpoint presentation(s) • Questionnaires 	
List of participants and name tags	
Make copies of Informed Consents for Participants	
Facilitate group	
AFTER	
Data enter transcripts	
Read results	
Identify themes	
Code comments	
Analyze results	
Interpret results	
Write report	
Disseminate findings	

Table 1 Checklist for focus groups

3 Procedure of Focus Groups

3.1 General Structure of a single Focus Group Session

A single focus group session will take 120 min and will have the following general structure.

- 1 0-5 **Welcome:** Give a warm welcome to the participants
- 2 5-15 **Informed Consent (IC):** Explain document, answer questions, sign IC
- 3 15-25 **Introduction:** Short information about vAssist and its goals
- 4 25-60 **Focus Group Session Part 1**
- 5 60-70 **Break**
- 6 70-115 **Focus Group Session Part 2**
- 7 115-120 **Conclusions, Thanks, Good Bye!**
- 8 120 **Invite participants to further vAssist studies**

3.2 Preliminary Steps

3.2.1 Protocol

The moderator of the focus groups should be supported by another person noting findings and statements from the participants during the sessions. Further results are protocolled directly via the generated flipcharts (also take photos of the flip charts). In addition, the focus groups should be recorded (audio and video) for backup reasons and a protocol should be written during the session.

3.2.2 Welcome (0-5)

Give a warm welcome and thank participants shortly!

3.2.3 Informed Consent (5-15)

Before starting with the focus groups, each participant must be informed about

- The project
- The study and its goals
- The procedure
- What data are recorded and
- How the recorded data is used

For this, each user is given an Informed Consent (IC) that must be read and signed by them in order to participate. To ease the procedure and shorten the time, you can also go through the document together with the participants and explain the information in the IC form step by step. Templates for the Informed Consent can be found in D.1.2 – Ethical Guidelines and in the Appendix section of this manual.

3.3 Focus Group 1 (AT): Primary Users

Topic: Devices at home, communication services in use, future voice controlled service and device combinations, future business models

3.3.1 Introduction (15-25)

Short Introduction.

3.3.2 Focus Group Session Part 1 (25-60)

3.3.2.1 *Devices at Home and Communication Services in Use*

Aim:

- To get an overview on devices users have at home, services they use for the communication with their family members and friends and interaction behavior (e.g. frequency of use, preferences, barriers, etc.).

Procedure:

- Start with a short questionnaire about current services and devices in use (see Appendix section) (25-35)
- After the questionnaire, discuss the following starting and following questions.

Starting Question (ppt.slide) (35-45):

- *Where are the devices you use for the communication with your family members and friends located at your home?*

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart.

Make sure that the post-its / cards are easy to read for the participants, because they may take the ideas of others or a previous question for creating a new idea.

Do not let them discuss too long, since there are a lot of questions waiting to be answered

The board / flipchart for starting question 1 shows a home environment that is divided into several sections (Example see Figure 1). The number of rooms and name of rooms will be defined together with the focus group participants. The answers about devices collected from the participants will be posted on the referring location, which is/are the room/s the participants have named.



Figure 1 Example: Flip chart / board for devices at home

Make a photo for the analysis!

Following Questions: (ppt.slide)(45-60)

- What services do you prefer for the communication with your family members and friends?
 - Why do you prefer some services to others?
 - Are there any specific problems with the current services in use?
 - Are there any barriers, why you do not use a special functionality of a service?
 - What problems and barriers?

Expected Output:

- List of frequency of communication channels/options to be used for the communication with family members and friends (Questionnaire)
- List of frequency of devices in use at home for the communication with family members and friends (Questionnaire)
- List of additional devices (consumer electronics) at home and activities related with the devices (Questionnaire)
- List of preferred services in use for the communication with family members and friends (Questions)
- List of barriers and problems with specific communication services (Questions)

3.3.3 Break (60–70)

3.3.4 Focus Group Session Part 2 (70-115)

3.3.4.1 *Demonstration of Voice Interaction (70-80)*

Aim:

- To give participants an idea of how voice interaction could/can look like in a real world environment by presenting short practical examples applying a Wizard of Oz approach and/or devices that include voice control (e.g. iPhone 4s).

Procedure:

Demonstrate participants voice interaction/control. The following two scenarios and techniques will be applied:

- Scenario 1: Focus group leader writes an E-mail with voice commands on a TV set.
 - Technique: Wizard of Oz (*ppt. slides*)
- Scenario 2: Focus group leader writes an E-mail/SMS with voice commands using a smart phone.
 - Technique: Real-time voice interaction (iPhone 4s).

Expected Output:

- All participants know what voice interaction is and how it works.

3.3.4.2 *Future Voice Controlled Services and Devices (80-100)*

Aim:

- To get an overview on communication services that should be equipped with voice control.
- To get an overview on potential device and service combinations.

Procedure:

- Start with giving examples of existing telecommunication services (*ppt. slide*)
- After the examples, discuss the following starting and following questions.

Starting Question (*ppt. slide*):

- *What kind of communication channels/options/services can you imagine to control by voice, what not*
 - *Why?*
 - *What are pros and cons?*

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart. Make sure that the post-its / cards are easy to read for the participants, because they may take the ideas of others or a previous question for creating a new idea.

Do not let them discuss too long, since there are a lot of questions waiting to be answered.

An example for the board / flipchart for the starting question is shown in Figure 2. Note what kind of communication services participants can imagine adding voice control and what not.

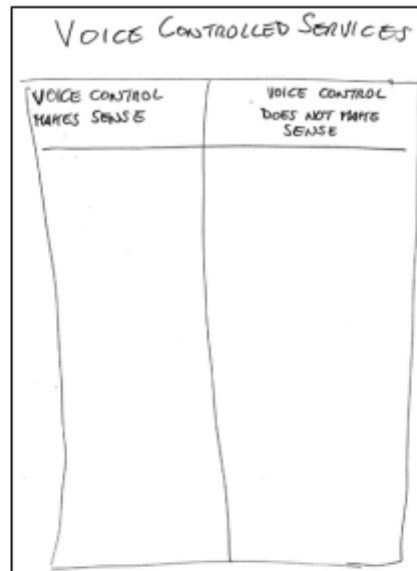


Figure 2 Example: Flip chart / board for voice controlled services

[If time is left:

- What can be future additional services that make sense to equip with voice control?
 - Service ideas other than telecommunication?
 - What kind of?

Note the ideas for service ideas other than telecommunication on a flip chart / board and make a photo for the analysis.]

Expected Output:

- List of communication services that should be equipped with voice control
- List of device and communication service combinations
- [List of additional service ideas that should be equipped with voice control]

3.3.4.3 Future Business Models (100-115)

Aim:

- To gather information about future business model ideas that will be accepted by the primary target users.

Procedure:

vAssist: Focus Group Manual



Present some examples for future ideas of business models or packages of the created vAssist services. (*ppt.slide*)

- Basic Package: Includes three basic communication services (E-mail, SMS, Videotelephony)
- Advanced Package: Includes the Basic Package + the possibility of a free selection of five additional services
 - Telephone
 - MMS (Message + Photo)
 - Social Network Site (Facebook)
 - Brain training games
 - Internet
 - Calendar
 - Drug intake reminder
 - Blood pressure monitoring
 - Blood sugar monitoring
 - Navigation service

Starting Question (*ppt.slide*):

- *What do you think about the proposed business models or packages?*
 - *What would you prefer and why?*
 - *What are pros and cons?*
 - *What should be included in a Basic Package?*
 - *What should be included in an Advanced Package?*

Note the pros and cons for the proposed business models or packages on a flip chart and make a photo.

Note the services that should be included in a Basic Package and Advanced Package on a flip chart and make a photo.

Following Questions: (*ppt.slide*)

- *How could the ideal business model or package look like?*
 - *What are alternatives?*

Note the ideas and alternatives on a flip chart and make a photo.

Expected Outcome:

- List of preferred services for a Basic Package
- List of preferred services for an Advanced Package
- List of ideas for alternative Packages or business models

3.3.5 Conclusion and Thanks (115-120)

Summarize the session in one or two sentences. State, that very valuable inputs were given and that the participant's input will be very helpful for the next steps of the vAssist project.

3.3.6 Invite participants to further vAssist studies (120)

Invite participants to take part in future studies of the vAssist project.

3.4 Focus Group 1 (FR): Primary Users

Topic: Health Information Recordings, Devices at home, health/well-being services in use, future voice controlled service and device combinations, (future business models).

3.4.1 Introduction (15-25)

Short introduction.

3.4.2 Focus Group Session Part 1 (25-60)

First ideas:

(Keep the development of a voice controlled well-being diary and/or the inclusion of existing medical/well-being services in your mind, when working on the focus group manual)

Aim:

To get an overview on (1) health information recordings, (2) medical devices and services used, and (3) ICT devices used

3.4.2.1 ICT devices used

Aim:

- To get an overview on ICT devices used

Procedure:

- Start with a short questionnaire about the participants general information and current ICT devices in use (see Appendix section) (25-35)

3.4.2.2 Health needs: Health Information Recordings, Devices and Services used

Aim:

- To get an overview on (1) health information recordings, (2) medical devices and services used,

Procedure:

- Discuss the following starting and following questions, related to health information recording, devices and services used.

Starting Question (ppt slide) (35-45):

- *We would like to know more about your needs related to health. What kind of information related health do you record? What kind of health services and devices do you use?*

Additional/optional questions helping the participants to develop comprehensive answer:

- *What kind of regularly medical examinations do you have?*
e.g. in hospital/at practitioner, other specialist, etc.

- *What kind of regularly physical parameter / medical information are recorded in these medical examinations?*
- *Do you regularly have to measure/record any physical parameter / medical information at home? (and bring to the health professionals at visits)*
e.g. blood, pressure, blood sugar, weight...
- *What kind of technical/electronic devices you use for the measurements?*
- *Do you record any regularly activities to stay healthy?*
e.g. physical activities, nutrition/diet, brain exercises, wellness activities, cultural/social activities, other.
- *What kind of technical/electronic devices you use for these other activities?*
e.g. step counter for walkers, wii fit ...
- *What kind of technical/electronic devices and other records do you use for the documentation of physical parameter / medical information?*
e.g. lists, diary, calendar, etc. on electronic / paper support

Collect the answers of the starting question on flipchart (the group leader asks questions, manage the discussion while the leader assistant write the participants answers on the board / flipchart).

Make sure that the answers are easy to read for the participants, because they may take the ideas of others or a previous question for creating a new idea.

Do not let them discuss too long, since there are a lot of questions waiting to be answered

The board / flipchart for starting question 1 shows a home environment that is divided into several sections (Example see Figure 5Figure 1). The number of rooms and name of rooms will be defined together with the focus group participants. The answers about devices collected from the participants will be posted on the referring location, which is/are the room/s the participants have named.

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<i>Info Recordings</i>	<i>Related services</i>	<i>Used devices</i>	<i>Where?</i>
Blood pressure	None, next cardiologist examination	tensiometer	hospital
Fall at home	Emergency alarm	Fall detection de- vice (holster)	At home, every room
...

Figure 5 Example: Flip chart for Health Information Recordings

Make a photo for the analysis!

Following Questions (ppt slides) (35-45):

- What would be interesting for yourself to record in a "health / well being diary"? next to physical parameter / medical information?
 - What health information recording is the most relevant for you?
 - What devices/way of recording is the most appropriate for you?
 - Are there any specific problems with the use of devices? Any advantages/disadvantages?
 - Are there any specific problems or barriers with the use of health services?

Expected Output

- List of health and well-being information recordings
- List of health related activities
- List of devices to measure physical parameters
- List of devices to record health and well-being information
- Lists of health services used
- List of pertinent activities / parameters to be included in a "well-being diary"

3.4.3 Break (60–70)

3.4.4 Focus Group Session Part 2 (70-115)

3.4.4.1 *Demonstration of Voice Interaction (70-80)*

Aim:

- To give participants an idea of how voice interaction could/can look like in a real world environment by presenting short practical examples applying a Wizard of Oz approach and/or devices that include voice control (android tablet).

Procedure:

Demonstrate participants voice interaction/control. The following two scenarios and techniques will be applied:

- Scenario 1: Focus group leader makes a videocall with voice commands to a doctor
 - Technique: Real-time voice interaction (Android tablet)
- Scenario 2: Focus group leader check his/her drug intake with voice command (*Do I have taken my medicine today?*)
 - Technique: Real-time voice interaction (Android tablet).

Expected Output:

- All participants know what voice interaction is and how it works.

3.4.4.2 *Future Voice Controlled Services and Devices (80-100)*

Aim:

- To get an overview on health/wellbeing services that should be equipped with voice control.
- To get an overview on potential device and service combinations

Procedure:

- Start with giving examples of existing health/wellbeing services (*ppt.slide*)
- After the examples, discuss the following starting and following questions.

Starting Question (*ppt.slide*):

- *What kind of health/wellbeing services can you imagine to control by voice, what not?*
 - *Why?*
 - *What are pros and cons?*

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart. Make sure that the post-its / cards are easy to read for the participants, because they may take the ideas of others or a previous question for creating a new idea.

Do not let them discuss too long, since there are a lot of questions waiting to be answered.

An example for the board / flipchart for the starting question is shown in Figure 3. Note what kind of health/wellbeing services participants can imagine adding voice control and what not.

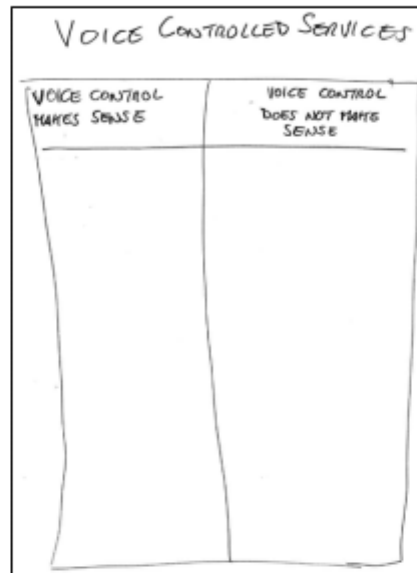


Figure 3 Example: Flip chart / board for voice controlled services

[If time is left:

- What can be future additional services that make sense to equip with voice control?
 - Physical / nutrition activities
 - Service ideas other than health/wellbeing?
 - What kind of?

Note the ideas for service ideas other than telecommunication on a flip chart / board and make a photo for the analysis.]

Expected Output:

- List of health/wellbeing services that should be equipped with voice control
- List of device and health/wellbeing service combinations
- [List of additional service ideas that should be equipped with voice control]

3.4.4.3 Future Business Models (100-115)

Aim:

vAssist: Focus Group Manual



- To gather information about future business model ideas that will be accepted by the primary target users.

Procedure:

Present some examples for future ideas of business models or packages of the created vAssist services. (*ppt.slide*)

- Basic Package: Includes three basic health/wellbeing services: medical agenda (drug intake, recordings and appointment reminder), emergency call (videotelephony) and fall detection.
- Advanced Package: Includes the Basic Package + the possibility of a free selection of five additional services
 - E-mail
 - SMS
 - Videotelephony
 - Telephone
 - MMS (Message + Photo)
 - Social Network Site (Facebook)
 - Brain training games
 - Internet
 - Calendar
 - Drug intake reminder
 - Blood pressure monitoring
 - Blood sugar monitoring
 - Navigation service

Starting Question (*ppt.slide*):

- *What do you think about the proposed business models or packages?*
 - *What would you prefer and why?*
 - *What are pros and cons?*
 - *What should be included in a Basic Package?*
 - *What should be included in an Advanced Package?*

Note the pros and cons for the proposed business models or packages on a flip chart and make a photo.

Note the services that should be included in a Basic Package and Advanced Package on a flip chart and make a photo.

Following Questions: (*ppt.slide*)

- *How could the ideal business model or package look like?*
 - *What are alternatives?*

Note the ideas and alternatives on a flip chart and make a photo.

Expected Outcome:

- List of preferred services for a Basic Package
- List of preferred services for an Advanced Package
- List of ideas for alternative Packages or business models

3.4.5 Conclusion and Thanks (115-120)

3.4.6 Invite participants to further vAssist studies (120)

3.5 Focus Group 2 (AT): Primary Users

Topic: Demo of voice interaction, working with voice interaction, voice interaction design characteristics

3.5.1 Introduction (15-25)

Short introduction.

3.5.2 Focus Group Session Part 1 (25-65)

3.5.2.1 *Demonstration of Voice controlled Services and Interaction (25-35)*

Aim:

- To give participants an idea about the current status quo of VUI (Voice User Interfaces) and voice control possibilities using a mobile phone (AT: iPhone 4s)

Procedure:

Demonstrate participants voice interaction/control. The following scenarios will be applied using Real-time voice interaction (AT: iPhone 4s):

- Scenario 1: Focus group leader writes an SMS/E-Mail with voice commands.
- Scenario 2: Focus group leader asks for the weather with voice commands. "Tell me the current weather!"
- Scenario 3: Focus group leader takes a picture with voice commands. "Make a picture!"
- Scenario 4: Focus group leader conducts an internet search with voice commands. "Open www.orf.at"

Expected Output:

- All participants know what voice interaction is and how it works.

3.5.2.2 *Group Work (35-65)*

Aim:

- To collect first user feedback and user experiences on touch vs. voice interaction.
- To get insight in upcoming problems and critiques regarding touch vs. voice interaction.

Procedure:

Participants are split in two groups (equal size). Each group is asked to work on two different short tasks (each 15 minutes) after a short training phase/introduction. The different tasks are to write a short E-mail/SMS using a GUI and to write a short E-mail/SMS using a VUI. Both groups are asked to work on both tasks but in a different order. The interaction with the GUI and VUI will be evaluated applying a non-verbal User Experience measurement instrument, the EmoCards [1] (see Figure 4), to gather first emotional feedback/responses on the interaction with the VUI and GUI for the different tasks. Each participant will choose one card right after each session. Further, participants are asked to

name advantages and disadvantages they have experienced with each form of interaction (VUI, GUI) and will write down their thoughts during each session.

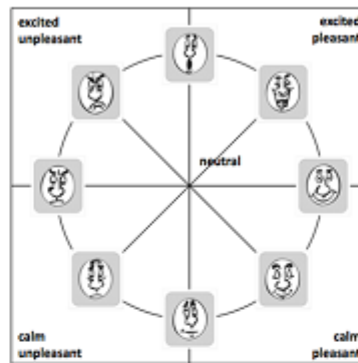


Figure 4 EmoCard instrument

Participants will work with a smart phone (AT: iPhone 4s) for the VUI task and a similar smart phone for the GUI tasks.

- Group 1:
 - Task VUI:
 - Each participant writes a short E-Mail using the smart phone (AT: iPhone 4s) to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the VUI.
 - Task GUI:
 - Each participant writes a short E-Mail using another smart phone to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the GUI.
- Group 2:
 - Task GUI:
 - Each participant writes a short E-Mail using another smart phone to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the GUI.
 - Task VUI:
 - Each participant writes a short E-Mail using the smart phone (AT: iPhone 4s) to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the VUI.

During accomplishing both tasks, participants are asked to name advantages and disadvantages of the experienced VUI and GUI interaction.

Note the advantages and disadvantages on a flip chart and make a photo.

3.5.3 Break (65–75)

3.5.4 Focus Group Session Part 2 (75-115)

3.5.4.1 VUI Design Characteristic: Dialogue Strategy (75-90)

Aim:

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- Design characteristic: dialogue strategy (commands vs. natural language)

Procedure:

Present an example for a command and natural language dialogue strategy. (*ppt.slide*)

- Command dialogue: Single words are used to control a system by voice.
 - Example: E-mail, new, to Sascha, subject, text, send
- Natural language dialogue: Sentences are used to control a system by voice.
 - Example: "I want to write a new E-Mail to Sascha". "The subject is our meeting tomorrow". "Write the following text".

Starting Question (*ppt.slide*):

- *What do you think about voice input with commands and natural language?*
 - *What are pros and cons?*
 - *What do you prefer?*
 - *Why?*

Note the pros and cons for the different dialogue strategies on a flip chart and make a photo.

Expected Output:

- List of pros and cons for different dialogue strategies (command, natural language)
- Preferences for one of the options

3.5.4.2 VUI Design Characteristic: Personalization (90-105)

Aim:

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- Design characteristic: personalization (male vs. female voice, name of the system, formal/informal language, etc.)

Procedure:

Discussion only.

Starting Question (ppt.slide):

- What do you think about the sex of the voice of the system?
 - Should this be male or female?
 - Should this be old or young?
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

Following Questions: (ppt.slide)

- What do you think about giving the system a name?
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

- What about the form of responses of the system (T-V distinction)?
 - (Formally: like a stranger)
 - (Informally: like a friend)
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

[If time is left:

- What about other ideas for personalizing the system?
 - Colors, Age, Slang, etc.
 - What are additional ideas?
 - What would you like to personalize?
 - Why?

Note the ideas for personalization alternatives on a flip chart and make photos.]

3.5.4.3 VUI Design Characteristic: Visual Feedback of Voice In/Output (105-115)

Aim:

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- The focus is set on the following design characteristic: visual feedback of voice in/output.

Procedure:

Present an example for voice in/output with and without visual feedback. (ppt.slide)

- Voice in/output with visual feedback: Voice input and output is simultaneously presented on the device at the same time.
 - Example:
 - The command "I want to write a new E-Mail to Sascha" is presented in a line on top of the GUI.
 - The system response is presented as a speech bubble in the line for the subject for the E-Mail saying "Please name the subject of the E-Mail".
- Voice in/output without visual feedback: Voice input and output only without visual feedback.

- Example:
 - The same example scenario as above but without any visual feedback.

Starting Question (ppt slide):

- *What do you think about additional visual feedback that accompanies voice in/output?*
 - *When do you need it, when not?*
 - *Do you need visual feedback for speech in/output or only for one of these?*
 - *Why?*

Expected Output:

- Specification of situations when additional visual feedback is needed
- Specification of visual feedback for voice in/output

3.5.5 Conclusion and Thanks (115-120)

3.5.6 Invite participants to further vAssist studies (120)

3.6 Focus Group 2 (FR): Primary Users

Topic: Demo of voice interaction, working with voice interaction, voice interaction design characteristics

3.6.1 Introduction (15-25)

Short introduction.

3.6.2 Focus Group Session Part 1 (25-65)

3.6.2.1 *Demonstration of Voice controlled Services and Interaction (25-35)*

Aim:

- To give participants an idea about the current status quo of VUI (Voice User Interfaces) and voice control possibilities using a tablet (FR: Android tablet).

Procedure:

Demonstrate participants voice interaction/control. The following scenarios will be applied using Real-time voice interaction (FR: Android tablet):

- Scenario 1: Focus group leader writes an SMS/E-Mail with voice commands.
- Scenario 2: Focus group leader asks for the drug intake with voice commands. "Have I take my medicine today?"
- Scenario 3: Focus group leader calls his/her doctor "Call my doctor!"

Expected Output:

- All participants know what voice interaction is and how it works.

3.6.2.2 *Group Work (35-65)*

Aim:

- To collect first user feedback and user experiences on touch vs. voice interaction.
- To get insight in upcoming problems and critiques regarding touch vs. voice interaction.

Procedure:

Participants are split in two groups (equal size). Each group is asked to work on two different short tasks (each 15 minutes) after a short training phase/introduction. The different tasks are to write a short E-mail/SMS using a GUI and to write a short E-mail/SMS using a VUI. Both groups are asked to work on both tasks but in a different order. The interaction with the GUI and VUI will be evaluated applying a non-verbal User Experience measurement instrument, the EmoCards [1] (see Figure 4), to gather first emotional feedback/responses on the interaction with the VUI and GUI for the different tasks. Each participant will choose one card right after each session. Further, participants are asked to

name advantages and disadvantages they have experienced with each form of interaction (VUI, GUI) and will write down their thoughts during each session.

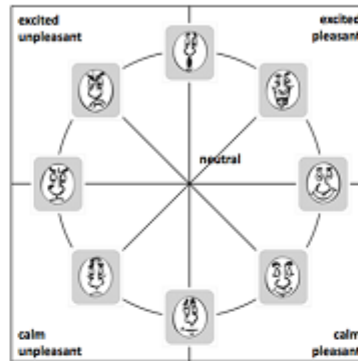


Figure 5 EmoCard instrument

Participants will work with a tablet (FR: Android tablet) for the VUI task and a similar smart phone for the GUI tasks.

- Group 1:
 - Task VUI:
 - Each participant writes a short E-Mail using the tablet (FR: Android tablet) to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the VUI.
 - Task GUI:
 - Each participant writes a short E-Mail using another tablet to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the GUI.
- Group 2:
 - Task GUI:
 - Each participant writes a short E-Mail using another tablet to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the GUI.
 - Task VUI:
 - Each participant writes a short E-Mail using the tablet (FR: Android tablet) to one of the focus group leaders.
 - Each participant chooses an EmoCard [1] that expresses best how s/he has experienced the interaction with the VUI.

During accomplishing both tasks, participants are asked to name advantages and disadvantages of the experienced VUI and GUI interaction.

Note the advantages and disadvantages on a flip chart and make a photo.

3.6.3 Break (65–75)

3.6.4 Focus Group Session Part 2 (75-115)

3.6.4.1 VUI Design Characteristic: Dialogue Strategy (75-90)

Aim:

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- Design characteristic: dialogue strategy (commands vs. natural language)

Procedure:

Present an example for a command and natural language dialogue strategy. (*ppt.slide*)

- Command dialogue: Single words are used to control a system by voice.
 - Example: E-mail, new, to Sascha, subject, text, send
- Natural language dialogue: Sentences are used to control a system by voice.
 - Example: "I want to write a new E-Mail to Sascha". "The subject is our meeting tomorrow". "Write the following text".

Starting Question (*ppt.slide*):

- *What do you think about voice input with commands and natural language?*
 - *What are pros and cons?*
 - *What do you prefer?*
 - *Why?*

Note the pros and cons for the different dialogue strategies on a flip chart and make a photo.

Expected Output:

- List of pros and cons for different dialogue strategies (command, natural language)
- Preferences for one of the options

3.6.4.2 VUI Design Characteristic: Personalization (90-105)

Aim:

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- Design characteristic: personalization (male vs. female voice, name of the system, formal/informal language, etc.)

Procedure:

Discussion only.

Starting Question (ppt.slide):

- What do you think about the sex of the voice of the system?
 - Should this be male or female?
 - Should this be old or young?
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

Following Questions: (ppt.slide)

- What do you think about giving the system a name?
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

- What about the form of responses of the system (T-V distinction)?
 - (Formally: like a stranger)
 - (Informally: like a friend)
 - What are your preferences?
 - Why?

Note the answers on a flip chart and make a photo.

[If time is left:

- What about other ideas for personalizing the system?
 - Colors, Age, Slang, etc.
 - What are additional ideas?
 - What would you like to personalize?
 - Why?

Note the ideas for personalization alternatives on a flip chart and make photos.]

3.6.4.3 VUI Design Characteristic: Visual Feedback of Voice In/Output (105-115)**Aim:**

- To get insight into specific design characteristics of VUIs for a future vAssist prototype.
- The focus is set on the following design characteristic: visual feedback of voice in/output.

Procedure:

Present an example for voice in/output with and without visual feedback. (ppt.slide)

- Voice in/output with visual feedback: Voice input and output is simultaneously presented on the device at the same time.
 - Example:
 - The command "I want to write a new E-Mail to Sascha" is presented in a line on top of the GUI.
 - The system response is presented as a speech bubble in the line for the subject for the E-Mail saying "Please name the subject of the E-Mail".
- Voice in/output without visual feedback: Voice input and output only without visual feedback.

- Example:
 - The same example scenario as above but without any visual feedback.

Starting Question (ppt slide):

- *What do you think about additional visual feedback that accompanies voice in/output?*
 - *When do you need it, when not?*
 - *Do you need visual feedback for speech in/output or only for one of these?*
 - *Why?*

Expected Output:

- Specification of situations when additional visual feedback is needed
- Specification of visual feedback for voice in/output

3.6.4.4 Vocal Control and vocal feedback (optional)

Aim: define preferences about vocal devices to use the system

Procedure: present several possible devices, e.g. traditional headset + included microphone, earbuds with microphone for mobile phone, traditional microphone + speakers, nothing except microphone and speakers included in devices,

Starting questions:

- Which device would you use to command the system?
- Which device would you not use to command the system?
- Why?
- Do you think to alternatives devices?

3.6.5 Conclusion and Thanks (115-120)

3.6.6 Invite participants to further vAssist studies (120)

3.7 Focus Group 3 (AT): Secondary Users

Topic: Communication services in use, communication services to share, demo of voice interaction, voice controlled services to be included in vAssist, future business models

3.7.1 Introduction (15-25)

Short introduction.

3.7.2 Focus Group Session Part 1 (25-60)

3.7.2.1 Communication Services in Use (25-45)

Aim:

- To get an overview on communication services users use for the communication with their friends and also want to share with their father/mother, grandmother/grandfather.

Procedure:

- Start with a short questionnaire about current used communication services for the communication with friends and father/mother, grandfather/ grandmother (see Appendix section) (25-35)
- After the questionnaire, discuss the following starting and following questions.

Starting Question (ppt.slide)(25-45):

- *What are current used communication services you use for the communication with your friends you would like to share with your father/mother, grandfather/grandmother?*
 - *What are pros and cons?*
 - *What communication services would you like to share, what not?*
 - *Why?*
 - *What are your preferences?*
 - *What are barriers and problems?*

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart.

Make sure that the post-its / cards are easy to read for the participants, because they may take the ideas of others or a previous question for creating a new idea.

Do not let them discuss too long, since there are a lot of questions waiting to be answered

An example for the board / flipchart for the starting question is shown in Figure 6.

FAMILY	FRIENDS
E-MAIL	E-MAIL
SKYPE	FACEBOOK
SKYPE	SKYPE
TELEPHONE	TELEPHONE

Figure 6 Example: Flip chart / board for sharing services

Make a photo for later evaluation!

Expected Output:

- List of frequency of communication channels/options to be used for the communication with friends (Questionnaire)
- List of frequency of communication channels/options to be used for the communication with father/mother, grandfather/grandmother (Questionnaire)
- Identification of preferred communication services to be shared with father/mother, grandfather/grandmother (Questions)
- Uncover barriers and problems for sharing/not sharing specific communication services with father/mother, grandfather/grandmother (Questions)

3.7.2.2 Demonstration of Voice Interaction (45-60)

Aim:

- To give participants an idea of how voice interaction could/can look like in a real world environment by presenting short practical examples applying a Wizard of Oz approach and/or devices that include voice control (e.g. iPhone 4s).

Procedure:

Demonstrate participants voice interaction/control. The following scenarios and techniques will be applied:

- Scenario 1: Focus group leader writes an E-mail with voice commands on a TV set.
 - Technique: Wizard of Oz (ppt. slides)
- Scenario 2: Focus group leader writes an E-mail/SMS with voice commands using a smart phone.
 - Technique: Real-time voice interaction (iPhone 4s).

- Scenario 3: Focus group leader asks for the weather with voice commands. "Tell me the current weather!"
 - Technique: Real-time voice interaction (iPhone 4s).
- Scenario 5: Focus group leader takes a picture with voice commands. "Make a picture!"
 - Technique: Real-time voice interaction (iPhone 4s).
- Scenario 6: Focus group leader conducts an internet search with voice commands. "Open www.orf.af"
 - Technique: Real-time voice interaction (iPhone 4s).

Expected Output:

All participants know what voice interaction is and how it works.

3.7.3 Break (60–70)**3.7.4 Focus Group Session Part 2 (70-115)****3.7.4.1 Voice controlled Services to be included in the vAssist system for your grandmother / grandfather (70-90)****Aim:**

- To collect ideas of informal caregivers what voice controlled services they would include in a perfect vAssist system for their father/mother, grandfather/grandmother

Procedure:

Present some examples for future voice controlled service ideas for vAssist. (*ppt.slide*)

- E-mail
- SMS
- Videotelephony
- Telephone
- MMS (Message + Photo)
- Social Network Site (Facebook)
- Brain training games
- Internet
- Calendar
- Drug intake reminder
- Blood pressure monitoring
- Blood sugar monitoring
- Navigation service

Starting Question (ppt.slide):

- *What voice controlled services do you think should be included in a "perfect" vAssist system for your mother/father, grandfather/grandmother? Also consider services that have not been named so far, but might give an added value!*
 - What voice controlled communication services should be included, what not?
 - Why?
 - What other voice controlled services should be included, what not?
 - Why?
 - What are barriers and problems?

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart.

Make a photo for later evaluation!

Expected Output:

- List of voice controlled communication services to be included in vAssist
- List of other voice controlled service ideas to be included in vAssist

3.7.4.2 *Future Business Models (90-115)*

Aim:

- To gather information about future business model ideas from informal caregivers.

Procedure:

Present some examples for future ideas of business models or packages of the created vAssist services. (*ppt.slide*)

- Basic Package: Includes three basic communication services (E-mail, SMS, Video telephony)
- Advanced Package: Includes the Basic Package + the possibility of a free selection of five additional services
 - Telephone
 - MMS (Message + Photo)
 - Social Network Site (Facebook)
 - Brain training games
 - Internet
 - Calendar
 - Drug intake reminder
 - Blood pressure monitoring
 - Blood sugar monitoring
 - Navigation service

Starting Question (ppt.slide):

- *What do you think about the proposed business models or packages?*
 - *What services would you include, what not?*
 - *What are pros and cons?*
 - *What should be included in a Basic Package?*
 - *What should be included in an Advanced Package?*

Note the pros and cons for the proposed business models or packages on a flip chart and make a photo.

Note the services that should be included in a Basic Package and Advanced Package on a flip chart and make a photo.

Following Questions: (ppt.slide)

- How could the ideal business model or package look like?
 - What are alternatives?

Note the ideas and alternatives on a flip chart and make a photo.

Expected Outcome:

- List of preferred services for a Basic Package
- List of preferred services for an Advanced Package
- List of ideas for alternative packages or business models

3.7.5 Conclusion and Thanks (115-120)

3.7.6 Invite participants to further vAssist studies (120)

3.8 Focus Group 3 (FR): Secondary Users

Topic: Health information recording and medical services, future voice controlled service and device combinations, and future business models.

3.8.1 Introduction (15-25)

Short introduction.

3.8.2 Focus Group Session Part 1 (25-60)

3.8.2.1 Health/Wellbeing Information Recordings and Medical Services (25-45)

First ideas:

Aim: Health/Wellbeing diary definition/specification

- To get an overview on (1) health information recordings, (2) medical devices and services used,

Procedure:

- Discuss the following starting and following questions, related to health information recording, devices and services used.

Starting Question (ppt slide) (35-45):

- *We would like to know more about your needs related to health. What kind of information related health do you record? What kind of health services and devices do you use?*

Additional/optional questions helping the participants to develop comprehensive answer:

- *What kind of regularly medical examinations do you have?*
e.g. in hospital/at practitioner, other specialist, etc.
- *What kind of regularly physical parameter / medical information are recorded in these medical examinations?*
- *Do you regularly have to measure/record any physical parameter / medical information at home? (and bring to the health professionals at visits)*
e.g. blood, pressure, blood sugar, weight...
- *What kind of technical/electronic devices you use for the measurements?*
- *Do you record any regularly activities to stay healthy?*
e.g. physical activities, nutrition/diet, brain exercises, wellness activities, cultural/social activities, other.
- *What kind of technical/electronic devices you use for these other activities?*
e.g. step counter for walkers, wii fit ...
- *What kind of technical/electronic devices and other records do you use for the documentation of physical parameter / medical information?*
e.g. lists, diary, calendar, etc. on electronic / paper support

- *What information do you record? What does exist already? What is missing?*

3.8.2.2 Demonstration of Voice Interaction (45-60)

Aim:

- To give participants an idea of how voice interaction could/can look like in a real world environment by presenting short practical examples applying a Wizard of Oz approach and/or devices that include voice control (e.g.) ppt (functionality list) and demo (videoconf & drug reminder" via real time voice interaction)

Procedure:

Demonstrate participants voice interaction/control. The following scenarios and techniques will be applied:

- Scenario 1: Focus group leader writes an SMS/E-Mail with voice commands.
 - Technique: Real-time voice interaction (Android tablet)
- Scenario 2: Focus group leader asks for the drug intake with voice commands. "Have I take my medicine today?"
 - Technique: Real-time voice interaction (Android tablet)
- Scenario 3: Focus group leader calls his/her doctor "Call my doctor!"
 - Technique: Real-time voice interaction (Android tablet).

Expected Output:

All participants know what voice interaction is and how it works.

3.8.3 Break (60–70) / end: appetizer "for next time, think about possible voice control services related to health"

3.8.4 Focus Group Session Part 2 (70-115)

3.8.4.1 Voice controlled Services to be included in the vAssist system for your patients (70-90)

Aim:

- To collect ideas of formal caregivers what voice controlled services they would include in a perfect vAssist system for their patients

Procedure:

Present some examples for future voice controlled health/wellbeing service ideas for vAssist. (ppt.slide)

- Start with giving examples of existing health/wellbeing services (ppt.slide): fall detection/wearable device – tele assistance,
- After the examples, discuss the following starting and following questions.

Starting Question (ppt.slide):

- What voice controlled health/wellbeing services do you think should be included in a "perfect" vAssist system for your patients? Also consider services that have not been named so far, but might give an added value!
 - What voice controlled health/wellbeing services should be included, what not?
 - Why?
 - What other voice controlled services should be included, what not?
 - Why?
 - What are barriers and problems?

Collect the answers of the starting question on post-its / cards and pin them up on a board / flipchart.

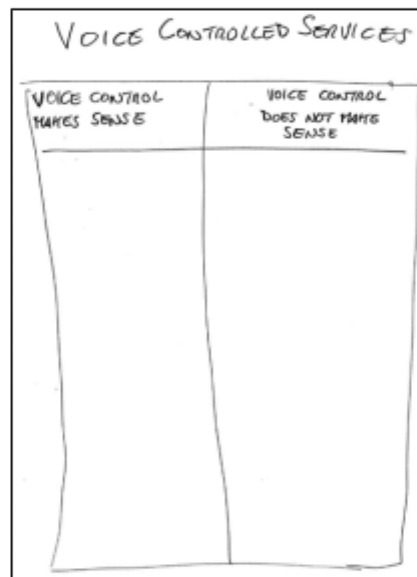


Figure 10 example: Flip chart for medical services to be included

Make a photo for later evaluation!

Expected Output:

- List of voice controlled health/wellbeing services to be included in vAssist
- List of other voice controlled service ideas to be included in vAssist

3.8.4.1 Future Business Models (90-115)

Aim:

- To gather information about future business model ideas from formal caregivers.

Procedure:

Present some examples for future ideas of business models or packages of the created vAssist services. (*ppt.slide*)

- Basic Package: Includes three basic health/wellbeing services: medical agenda (drug and appointment manager/reminder), emergency call and fall detection alarm.
- Advanced Package: Includes the Basic Package + the possibility of a free selection of five additional services
 - E-mail
 - SMS
 - Video telephony
 - Telephone
 - MMS (Message + Photo)
 - Social Network Site (Facebook)
 - Brain training games
 - Internet
 - Calendar
 - Drug intake reminder
 - Blood pressure monitoring
 - Blood sugar monitoring
 - Navigation service

Starting Question (*ppt.slide*):

- *What do you think about the proposed business models or packages?*
 - *What would you prefer and why?*
 - *What are pros and cons?*
 - *What should be included in a Basic Package?*
 - *What should be included in an Advanced Package?*

Note the pros and cons for the proposed business models or packages on a flip chart and make a photo.

Note the services that should be included in a Basic Package and Advanced Package on a flip chart and make a photo.

Following Questions: (*ppt.slide*)

- *How could the ideal business model or package look like?*
 - *What are alternatives?*

Note the ideas and alternatives on a flip chart and make a photo.

Expected Outcome:

- List of preferred services for a Basic Package
- List of preferred services for an Advanced Package
- List of ideas for alternative Packages or business models


3.8.5 Conclusion and Thanks (115-120)

3.8.6 Invite participants to further vAssist studies (120)

References

- [1] Desmet, P.M.A., Overbeeke, C.J. & Tax, S.J.E.T (2001). Designing products with added emotional value; development and application of an approach for research through design. *The Design Journal*, 4 (1). 32-47.

Annex B: Screening Questionnaire: Primary Users – Tele-Communication (Austria)

FB FG1 / NR.:


Name: _____


Geschlecht: _____

Alter: _____

Beruf: _____

Insgesamt stellen wir Ihnen 3 Fragen: Bitte kreuzen Sie an!

Felder mit „Andere“ dienen dazu, frei weitere Möglichkeiten zu nennen, die nicht vorgegeben worden sind.



Frage 1: Wie oft benutzen Sie folgende Möglichkeiten zur Kommunikation mit Ihren Familienmitgliedern und Freunden? – bitte kreuzen Sie an!


	mehr als 1x proTag	1x pro Tag	3-4x pro Woche	1x pro Woche	1-2x pro Monat	weniger als 1x pro Monat	nie
Persönliches Gespräch							
Telefongespräch Festnetz							
Telefongespräch Handy							
E-Mail							
SMS Kurznachricht vom Handy							
MMS Foto mit Kurznachricht							
Soziales Netzwerk im Internet z.B. Facebook							
Text Chat / Messenger z.B. Skype							
Video-Telefonie z.B. Skype							
Brief / Postkarte							
Andere:							
Andere:							

2



Geräte zuhause	Aktivitäten
<input type="checkbox"/> Andere:	Aktivität:
<input type="checkbox"/> Andere:	Aktivität:

Annex C: Screening Questionnaire: Informal Caregivers – Tele-Communication (Austria)

FB FG3 / NR.: _____ 

Name: _____

Geschlecht: _____


Alter: _____

Beruf: _____

Insgesamt stellen wir Ihnen 3 Fragen: Bitte kreuzen Sie an!

Felder mit „**Andere**“ dienen dazu, frei weitere Möglichkeiten zu nennen, die nicht vorgegeben worden sind.

1



Frage 1: Wie oft benutzen Sie folgende Möglichkeiten zur Kommunikation mit Ihren Großeltern? – bitte kreuzen Sie an!

	mehr als 1x pro Tag	1x pro Tag	3-4x pro Woche	1x pro Woche	1-2x pro Monat	weniger als 1x pro Monat	nie
Persönliches Gespräch							
Telefongespräch Festnetz							
Telefongespräch Handy							
E-Mail							
SMS Kurznachricht vom Handy							
MMS Foto mit Kurznachricht							
Soziales Netzwerk im Internet z.B. Facebook							
Text Chat / Messenger z.B. Skype							
Video-Telefonat z.B. Skype							
Brief / Postkarte							
Andere:							
Andere:							

2



Geräte zuhause	Aktivitäten
<input type="checkbox"/> Andere:	Aktivität:
<input type="checkbox"/> Andere:	Aktivität:

- **Quels types d'appareils technologiques de télécommunication utilisez-vous chez vous et dans quelles pièces de votre domicile sont-ils situés?**

Pièces de votre domicile	Appareils Utilisés		
Salle de séjour / Salon	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Salle-à-manger	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Chambre	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Bureau	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Entrée / Couloir	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Salle-de-bain	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Cuisine	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile
Autre pièce	Précisez : _____		
	<input type="checkbox"/> PC portable <input type="checkbox"/> téléphone fixe <input type="checkbox"/> TV	<input type="checkbox"/> PC fixe <input type="checkbox"/> Smartphone <input type="checkbox"/> Autre (précisez) _____	<input type="checkbox"/> Internet <input type="checkbox"/> téléphone mobile

- De quels types de services médicaux vous bénéficier ? Quelles sont les données médicales recueillies, à quelle fréquence et à quel endroit sont réalisés les examens ?

	Service médical associé	Lieu de l'examen (domicile/hôpital/autre)	Fréquence (jour/semaine/mois/année)
Données médicales recueillies			
Tension artérielle			
Glycémie			
Activité physique			
Médicaments			
Nutrition			
Performances cognitives (examen mémoire)			
Poids			
Autres données médicales (précisez)			
Autres informations liées à la santé et au bien-être (précisez)			
Services de santé			
Détection de chute			
Télé-Alarme			
Stimulation Cognitive			
Suivi médical			
Services de soins à domicile (précisez)			
Autres services liées à la santé et au bien-être (précisez)			

Annex E: Screening Questionnaire: Formal Caregivers – Tele-Medical (France)

- Quels types de données médicales devez-vous régulièrement recueillir, et à quelle fréquence? Quels types d'appareils utilisez-vous pour cela ?

	Appareil de mesure nécessaire	Lieu de l'examen (domicile/hôpital/Autre)	Fréquence (jour/semaine/mois/année)
Données médicales recueillies			
Tension artérielle			
Glycémie			
Activité physique			
Médicaments			
Nutrition			
Performances cognitives (examen mémoire)			
Poids			
Autres données médicales (précisez)			
Services médicaux			
Evaluation du risque de chute			
Détection de SAS			
Stimulation cognitive			
Suivi médical			
Autres services (précisez)			