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Report with general requirements

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Executive Summary

In this report we present a set of general requirements to develop banking services for older users. We present an overview of a set of general design requirements that should be considered for all platforms that aim to be developed in the Bank4Elder project.

To conclude we have summarized and enumerated all these general requirements in a Table with the aim to include them in future developments of the interfaces for the Bank4Elder project.

1 Introduction

The purpose of this report is to provide a set of general requirements to develop banking services for older users.

First of all we present general design issues that should be taken into account to develop this sort of interfaces for older people. Thus, we summarize a number of older users' characteristics to introduce the reader to general constraints that it should be taken into account when developing interfaces for them. Secondly, in order to develop the design issues, we have reviewed the guidelines ETSI EG 202 116 V1.2.2 (2009-03) [1]. It aims to help designers to maximize the level of usability of products and services by providing a comprehensive set of Human Factor design guidelines. The guidelines are intended to encourage a "Design for all" approach so as to make products and services accessible to as many people as possible, including older people (and person with disabilities, without the need for adaptation or specialized design). For this reason we have considered appropriated to apply some of these guidelines to define general requirements for developing new banking interfaces for older users using several platforms (TV, web, mobile phone, ATM). Moreover, we have considered interesting to combine this recommendation with information from recognized organisms such as W3C² or another guidelines such as [2]. Thus we have gathered all these information and we present in this report a collection of general design issues that should be considered when designing banking services for older users.

All in all, we have gathered all these information and we have developed a set of general requirements for developing banking services for all older users' profiles, considering all interfaces (Web, ATM, Mobile phone and TV) which are planned to be developed in Bank4Elder project.

² www.w3.org/WAI/presentations/ageing/

2 User characteristics: changing abilities of older users

With the aim to provide general design requirements of banking services for older users, we first should know which ones are their specific characteristics, in order to adapt the technology and the interfaces to them. Thus, in this report we first present a short overview obtained from W3C³ in which we mention some changing abilities of older users that we should take into account when designing interfaces for them.

2.1 Ageing and hearing loss

Impact	Prevalence
Audio can be difficult to discern	47% of people 61 to 80 years
Higher pitch sounds can be missed	93% of people 81+ years

Hearing starts to decline at around 50 years and affects a person's ability to hear higher pitched sounds as well as discern the foreground from background audio such as music or other sounds.

Some hearing loss is experienced by 47% of people 61 to 80 years and 93% of people over 81 years.

Moderate or severe hearing loss or profound deafness is experienced by 20% of people aged 61 - 80 and 75% of people over 80.

2.2 Ageing and vision decline

Impact	Prevalence
Decreasing ability to focus on near tasks	16% of people 65 - 74 years
Changing color perception and sensitivity	19% of people 75 – 84 years
Decreasing contrast sensitivity	46% of people 85+ years

Vision decline includes:

- Decreasing ability to focus on near tasks, including a computer screen
- Changing colour perception and sensitivity - less violet light is registered, making it easier to see red and yellows than blues and greens, and often making dark blue and black indistinguishable
- Decreasing contrast sensitivity from pupil shrinkage - resulting in the need for more light and higher contrast (an 80 year old typically has 80% less contrast sensitivity than a 20 year old)

Vision decline often starts in a person's mid-40s with, for example, 86% of Australians over 40 for example require reading glasses to correct for near vision. Significant vision loss affecting everyday life is estimated to affect 16% of people 65 to 74 years, and 46% of those over 85 years in the UK.

2.3 Ageing and physical decline

Impact (Motor skill decline can result from many conditions including arthritis and	Prevalence (Conditions most commonly reported)

³ www.w3.org/WAI/presentations/ageing/

Parkinson's Disease)	
Difficulty using mouse or keyboard	Arthritis At least 50% of people over 65 affected
Difficult to click small areas	Essential tremor Affects up to 20% of people over 65
Strain from non-ergonomic tasks	Parkinson's Disease Approximately 4% of people over 85 affected

Motor skill decline impacts on dexterity and can result from many conditions, for example arthritis with associated joint stiffening and reduced fine motor control, and essential tremor or Parkinson's Disease with associated hand trembling, making mouse use difficult or impossible for some and also affecting keyboard use. In particular, older people with physical impairments may have difficulty clicking small links, selecting radio buttons, and using many fly-out or pull-down menus.

Arthritis is estimated to affect at least 50% of people over 65; essential tremor (one of many forms of tremor) is estimated to affect up to 5% of those over 40 and up to 20% of people over 65; and Parkinson's affects around 4% of those over 85.

2.4 Ageing and cognitive decline

Impact Navigation, comprehension, and task completion can be affected by:	Prevalence (Conditions most commonly reported)
Short term memory problems	Dementia: 1.4% of people 65-69 yrs 24% of people 85+ yrs
Difficulty with concentration	Mild cognitive impairment (MCI) is more common: Around 20% of people over 70 years are estimated to experience MCI
Distraction from movement or irrelevant material	
Difficulty coping with	

Cognitive decline is also common, though only dementia and mild cognitive impairment are commonly reported. While Dementia (including Alzheimer's disease) is experienced by some older people (1.4% of people 65-69 years increasing to 24% of people over 85 years in the UK), forms of mild cognitive impairment (or MCI) are much more common, affecting over 20% of those over 70 years in the UK. MCI can result in:

- short term memory limitations (which may result in a person forgetting the purpose of a website visit if they lose orientation on the site)
- concentration and distraction issues (consider the volume of information on some pages, and the multiple animated advertisements that are sometimes present)

3 General Design Issues

To begin with, we have included seven principles of “Design for All” (as, it includes older people) which might be helpful to be considered as a starting point summary (As identified by the Centre for Universal Design):

- **Equitable Use.** The design must be useful and marketable to any group of users.
- **Flexible in Use.** The design must accommodate a wide range of individual preferences and abilities.
- **Simple and intuitive to use.** The design must be easy to use and understand, regardless of the user’s experience, knowledge, skills or concentration level.
- **Perceivable information.** The design must communicate necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities.
- **Tolerance of error.** The design must minimize hazards and the adverse consequences of accidental or unintended actions.
- **Low physical effort.** The design must be usable efficiently and comfortably and with minimum fatigue.
- **Size and space approach and use.** Appropriate size and space must be provided for approach, reach, manipulation and use, regardless of the user’s body size, posture or mobility.

G.1. Adaptability (personalization, configurability, customization)

In order to adapt a service to the specific needs or preferences of the user, it is recommended to allow configuration of the system to the most appropriate media for the users’ special needs, both for input to and output from the system. Thus the user interface should be adjustable to individual needs.

G.2. Consistency and Standardization

It is recommended that the whole user interface should be consistent. Some recommendations about consistency are:

G.2.1. Consistency of language would be applied so that the terms or labels used on the display, keyboard or control panel and any documentation are the same.

G.2.2. Avoiding introducing synonyms.

G.2.3. Consistency of effect should be applied so that the user perceives an action as having the same outcome regardless of mode or level within the system.

G.2.4. Structure the visual display layout so that the user can predict where to find required information

Standardization provides compatibility between systems. Thus, whenever appropriate, reference should be made to internationally recognized standards and guidelines. The connection between terminals and personal user interfaces (e.g. headphones) should be standardized.

G.3. Error Management

Some recommendations for getting a proper error management are the following:

G.3.1. Allow the system to be configured by the user to allow longer than normal timeouts

G.3.2. Provide simple error recovery and when this situation happens, put the user back where the error was committed.

G.3.3. Provide visual or auditory feedback to allow users the opportunity to review entries

G.3.4. Use error messages which do not blame the user

G.3.5. Error messages should be displayed immediately after the user entry in which the error is detected

G.3.6. Provide context sensitive error messages or help which will allow the user to recover from the source of the error.

G.4. Feedback

We highlight the following recommendations about the responses from the system to the user:

- G.4.1. Feedback should be continuous during the entire operation of the service
- G.4.2. Feedback should always be given in response to all user actions
- G.4.3. Feedback is important to let user know the system status.
- G.4.4. It should be possible for users to configure the system so that feedback is always given in a modality (visual, auditory, tactile) and timing appropriate to their needs
- G.4.5. It is mandatory to warn people before they initiate a task that will cause irretrievable data loss.
- G.4.6. When the operation is going to be lengthy (more than 15 seconds), such as retrieval task, or a complex search in a database, provide feedback on how long the operation will take, or visual feedback that the process is continuing.

G.5. Flexibility

If a system could be used by skilled users, it would be important to offer short cuts, more powerful command sequences, or codes that allow for quicker or more efficient operation. I.e. allowing a user to enter a short command rather than wait for a menu to be displayed visually or presented as speech output.

G.6. Response Times

Regarding to system responses and timeouts, some recommendations are the following:

- G.6.1. Response times should be as short as possible
- G.6.2. Unpredictable and variable response times are not acceptable (maximum variation +- 10%)
- G.6.3. In general, delays likely to be longer than 1 or 2 seconds should be supported by feedback.
- G.6.4. Ensure timeouts at any part of the interaction do not affect people who may be slower than normal in tendering control responses to system requirements, particularly if there are amounts of data to be assimilated /comprehended.

G.7. General Dialogue's styles

We provide three general recommendations for achieving a good “understanding” between the user and the system.

- G.7.1. Simplify interaction by reducing the number of commands to be remembered and the number of keystrokes to be entered
- G.7.2. Maintain compatibility with user's expectations and their experience with other systems
- G.7.3 Use self-descriptive procedures whereby the user can immediately perceive what to do.

G.8. General User support

- G.8.1. Provide user guidance appropriate to the user requirements and task complexity
- G.8.2. Provide clear and specific information to guide the user through the operational sequence, including how to recover from errors
- G.8.3. Include task sensitive messages that help the user proceed correctly, indicating the commands or syntax, or permitted range of values
- G.8.4. Ensure that the guidance given is accurate and up-to-date (in general it is most effective to tell the user “what to do”)
- G.8.5. Use familiar wording and short simple sentences

G.9. Help

- G.9.1. Multi-modal help should be provided where possible
- G.9.2. For simple systems with limited display capabilities consider providing help using speech output
- G.9.3. For more complex systems, provide help that is sensitive to the context and to the users' task requirements
- G.9.4. Write the help information in short simple sentences and include what to do next and how to return to the main task

G.9.5. Allow skilled users the option of switching off help prompts if they are not required
Provide the availability of extended help modes

G.10. Tutorials

Three methods of training and guidance are described by: telling the user what to do (verbal methods), showing what to do (demonstration or guidance) and having the user practise under controlled conditions.

G.10.1. Present step-by-step interface procedures to assist the user with specific problems

G.10.2. Provide procedural demonstrations of interface procedures so that users can quickly learn simple operations

As we are dealing with a banking service, the security issues regarding protection and privacy should be carefully designed. The following recommendations should be taken into account:

G.11. Privacy

Privacy should be ensured for public access terminals

G.12. Warnings

Warnings should be provided if the user leaves the card, money, ticket etc in the machine

G.13. Abstract Feedback

For passwords and other secure entries, display feedback of the entry with abstract meaningless characters, such as "*" or "x", showing only the number of characters introduced.

G.14. Privacy with assistive devices

When assistive devices are being used e.g. loud speakers or large print, the privacy of the information should be ensured.

G.15. Eavesdropping

Reduce the danger of eavesdropping by the provision of headsets instead of speakers.

G.16. Adjustability

This is the facility to position and re-position a module or a complete terminal to alter the setting to meet the specific personal requirements of the user. The recommendation would be to allow users to alter the setting such as volume, brightness and contrast so as to meet their personal preferences and to cater for changes in the environment.

G.17. Graphical User Interface (GUI)

Regarding to the graphical user interface it is recommended to use readily identifiable visual elements and icons in preference to abstract images

G.18. Colour

It can be found in the ETSI guidelines [1] a high number of recommendations regarding to the use of the colour on a display screen. We would highlight the following:

G.18.1. Avoiding using colour from the opposite ends of the spectrum

G.18.2. Use no more than five colours when coding information

G.18.3. Use colours to structure the display and group categories of data

G.18.4. Contrast ratio should be maximized when selecting colour for background and foreground elements (black text on a white background provides the highest contrast ratio and optimizes visual processing for text).

G.18.5. Avoid using very dark or very bright colours; keep the difference in average luminance between different visual task areas within a ratio of 10:1. Dark text on a light background is preferred with a brightness contrast of 70% to 80%

G.18.6. Avoid shades of blue, green and violet for conveying information.

G.18.7. It is important that the contrast between the keys/character and the background is high enough for visually impaired people to easily read the character of can distinguish the keys from the background. White on black is optimum.

We have also included in this document an interesting table in which recommendations are given about colour combinations for displays (see Table 1).

Background	Colour of character/symbol							
	Black	White	Magenta	Cyan	Yellow	Green	Red	Blue
Black		+	+	+	+	+	-	-
White	+		+	-	-	-	+	+
Magenta	+	+		+	+	+	-	-
Cyan	+	-	+		-	-	+	+
Yellow	+	-	+	-		-	+	+
Green	+	-	+	-	-		-	+
Red	-	+	-	+	+	-		-
Blue	-	+	-	+	+	+	-	

Table 1: Suitable colour combinations for displays (e.g. monitors)

G.19. Text

Regarding to the use of text we have collected some recommendation provided from the National Institute of Aging in USA⁴.

G.19.1. Limit the number of points you make. Stick to one to five messages in each section. Keeping your information brief can make it easier for users to stay focused.

G.19.2. Put the key message first. Putting the main message at the beginning ensures that your users will see it.

G.19.3. Keep paragraphs and sentences short. Paragraphs should express one main idea.

G.19.4. Sentences should be simple and straightforward, Choose words your users know. Minimize jargon and technical terms. Write in simple language. Give specific instructions; tell users exactly what to do.

G.19.5. Define unfamiliar terms. If you need to use a term that older adults do not know, define it when you use it.

G.19.6. Space. Allow sufficient white space to ensure an uncluttered look. Put a space between paragraphs.

G.19.7. Allow enough space around clickable targets, such as links and buttons, so that each one is easy to target and hit separately.

G.19.8. Typeface. Use a sans serif and not condensed typeface. Arial is the most commonly used sans serif font, but Tahoma and Verdana are also widely available and were developed specifically for the screen.

G.19.9. Type size. Make it easy for users to change the text size directly from the screen.

G.19.10. Type weight. Use medium or boldface.

G.19.11. For headings, increase the size and weight or use a colour. If you use bold for body text, make headings stand out with size or colour.

G.19.12. Capital and lowercase letters. Put all text in uppercase and lowercase letters. Never use all capitals, all capitals take up more space, it is also more difficult to distinguish different letters in capitals.

G.19.13. Avoid using italics. Italics are hard to read, especially online.

G.19.14. Text align / Justifications. Left-justification type is best for older adults. Left-justification allows an even left margin and an uneven right margin.

⁴ <http://www.nia.nih.gov/health/publication/making-your-website-senior-friendly>

G.20. Labels and abbreviations

We have selected the following recommendations:

- G.20.1. Use full words that accurately describe the control or display's function. Avoid abbreviations, unless usability testing confirms they are acceptable
- G.20.2. Abbreviations can be used if they are familiar to the user group, however, icons can be more language independent. Use symbols, icons and pictograms to overcome language difficulties when identifying controls or displays or to give guidance
- G.20.3. Use established graphical symbols for common functions
- G.20.4. Ensure printed material is clear and legible and easily understood by the users.
- G.20.5. When using small displays ensure that there is adequate space on the display for the labelling of soft keys.
- G.20.6. In order to help blind and visually impaired people and people with learning difficulties, it is important that the control for adjusting the volume is clearly labelled, so that it is easy to find and to understand the use of the control

Where using a specific system is complex, older users may have difficulty remembering specific sequences of operations and a small reminder card on the system can be very helpful.

G.21. Menus

We next present some recommendations for the menu dialogues design.

- G.21.1. The main menu should be available and it should always be possible to return to it easily and quickly
- G.21.2. Give the menu a title that clearly and unambiguously indicates the contents and give the menu options informative names which relate to the users task and are distinctive from the menu labels.
- G.21.3. Group de options in a way that is meaningful to the user, in groups that cover all possibilities. If conventional ordering for options is possible, the most frequently used options should be placed first. If no logical order or no frequency order exists, and users are likely to know the names of the desired options, options should be placed in alphabetical order.
- G.21.4. Avoid using cascading menus for frequent, repetitive commands.
- G.21.5. Limit the number of options to less than 10. If more options are required arrange them into meaningful groups that can be accessed as a next level menu.
- G.21.6. Limit the hierarchy of menus to 3 levels. If more levels are required, provide navigational cues to the current level and navigational aids to assist backtracking, and/or returning to a main menu.
- G.21.7. Avoid automatic scrolling for menus
- G.21.8. A pop-up menu should only contain commands that apply to the selected object or objects and its context, rather than commands grouped by function
- G.21.9. In a sequence of screens, menus should always be displayed in the same location
- G.21.10. It is preferable to build a menu structure with more items in the beginning and at the end than in the middle: 8x2x2x8 will produce better results than 2x8x8x2.
- G.21.11. The user should be able to step back up the menu structure in a single action, and either goes back one step at a time or directly to the top. If the menu is large provide a map of its levels.

G.22. Query Language

It is also known as a question and answer style. Some recommendations are:

- G.22.1. Ask only one question at a time
- G.22.2. Keep the sequence of questions compatible with any user model

G.23. Form fill-in dialogues

We next summarize some recommendations related to this special type of question and answering dialogue.

G.23.1. Related fields should be adjacent and aligned with a blank space for separation between groups.

G.23.2. Use alignment to create a feeling of order and comprehensibility.

G.23.3. Indicate the maximum length of data entry fields, provide feedback (both visual and auditory) if user tries to exceed this maximum

G.23.4. Mandatory and optional fields should be clearly distinguished. Where possible, place mandatory fields first

G.23.5. For fields where information is required in a particular format, indicate the format required. If possible accept several input styles.

G.23.6. Default values should be displayed if possible

G.23.7. Use clear and meaningful titles for fields.

G.24. User Prompting

Prompts are system initiated messages or dialogues requesting the user to perform a particular action (e.g. "Please introduce your password"). We highlight the following recommendations:

G.24.1. Inexperienced users will require a greater degree of prompting than experienced users. For experienced users, prompting might be provided as an optional aid.

G.24.2. Prompts should indicate the nature of the input required from the user ("Please answer yes or no") and the type of data to be entered.

G.24.3. Prompts for data or command entry should be displayed in a standard location next to the entry field

G.24.4. Users should have the option that prompts are presented both visually and aurally simultaneously, and the content should be exactly the same, to avoid any kind of interference.

G.24.5. The user should be allowed to interrupt the auditory prompts.

G.24.6. Speak directly to users. Choose wording for user prompting in the active voice rather than in the passive voice since sentences in the active voice are easier to understand. Use "press ENTER to continue" rather than "the user should press ENTER to continue"

G.24.7. Use positive statements. "Begin speaking after the tone" is better than "Do not speak until after the tone"

G.24.8. Use an active verb structure and address the user. "Connect the battery to the terminal" is better than "The battery should be connected to the terminals"

G.24.9. When prompting the user towards a sequence of steps follows the same sequence in a wording of a prompt message. Use "Enter log-on sequence before running programs" better than "Before running programs, enter log-on sequence"

G.25. Multimodal Interaction

Multimodal interfaces can achieve more natural and effective human-computer interaction. In particular, a range of several modalities can be used to overcome many of the interaction problems that people with different disabilities may have. Basic recommendations regarding multimodality are the following:

G.25.1. Where possible, allow users to select from a range of presentation modalities

G.25.2. Ensure that the information presented to the different sensory channels is congruent.

G.25.3. Consider multimodality to overcome adverse environment constraints

G.26. Input Components

We include here some general recommendations obtained from [1] applying to most input devices.

G.26.1. When choosing a specific input technology, designers should be aware of the typical failure rates for the technologies under consideration and, equally, the likely human error rates in using that technology within the range of tasks expected.

G.26.2. When choosing a particular input technology, designers should be aware of the limitations particular technologies present to older people. In general, the following recommendations should be taken into account:

- G.26.2.1. Avoid simultaneous manipulation, e.g. pushing and rotating
- G.26.2.2. Avoid making the user to hold a control in a specific position for periods of time.
- G.26.2.3. Offer alternative input modalities for visually-impaired users when employing pointing and continuous input devices.

G.27. Output Components

Next we present a number of output components recommendations from [1] applying to all platforms considered in Bank4Elder project. Apart from a set of general recommendations, we have added a specific subsection which contains general recommendation for visual displays, as all banking interfaces we are dealing with (ATM, Web, Mobile and TV) provide a visual display. However, in the following sections we include a collection of more specific requirements for each banking mode.

G.27.1. Select output components that are appropriate to the information requirements of the task (see Table 2)

G.27.2. Whenever possible provides redundant alternative output customizable by the user.

G.27.3. Ensure display selected meets relevant standards

G.27.4. When choosing particular output technologies, designers should be aware of the limitations different technologies present to different older user profiles. In general:

- G.27.4.1. Choose a modular solution so that alternative output devices can be used;
- G.27.4.2. Ensure critical warning signals are both audible and visible

Type of Information	Output Requirements
Status	Display needs to show continuing state, use non-intrusive optical signal.
Warning	Demand user attention with auditory tone, flashing light, or provide centrally positioned text message.
Feedback	Provide rapid acknowledgement of action, such as audible tone, lamp flash, change of display, tactile feel such as click action of keys.
Numeric	Use numeric digital display, consider how to show rate of change, such as dials and clockface, and use of graphs or tables.
System Prompt	System needs input/response from user. Use audible signal to gain immediate user attention. Use specific speech or visual message to instruct user. Place visual message central to user's line of sight. Allow user to cancel message if no longer required. Integrate display/controls to give soft-key interface or to prompt use of function keys.
Text	Use small panels or speech output for text messages. For text documents use sufficiently large alphanumeric display, consider CRT or flat panel display. Needs to conform to accepted standards affecting legibility and safety.
Pictorial	Use high quality graphics display with rapid display rate to show digitized visual images.

Table 2: summary of output information requirements

G.28. Visual displays (General)

According to the recommendations from [1] we next summarize some general recommendations for visual displays.

G.28.1. Contrast and brightness should be adjustable by the user

G.28.2. The characters should be well defined and easily distinguishable

G.28.3. The screen should be free of glare and reflections

In addition, in [1] is pointed out that visual displays should meet a set of requirements defined by organism such as ISO [iso9241-3] or European Directives [90/70/EEC].

4 Conclusions

In this report we have gathered a set of requirements that would help to build usable interfaces for older people considering general design issues that should be taken into account when developing the Bank4Elder interfaces: Web, ATMs, TV sets and Mobile phones.

Following we present a Table which summarize and enumerate all the requirements that have been previously identified.

Table 1: General Design Issues

Requirement	Description	Category
G.1.	Adaptability (personalization, configurability, customization)	General
G.2.	Consistency and Standardization	General
G.2.1.	Consistency in language	
G.2.2.	Avoiding synonyms	
G.2.3.	Consistency in actions	
G.2.4.	Consistency in the visual display structure	
G.3.	Error Management	General
G.3.1.	Longer timeouts configuration	
G.3.2.	Simple error recovery	
G.3.3.	Visual/auditory feedback to review entries	
G.3.4.	Not blame the user in error messages	
G.3.5.	Error messages displayed immediately	
G.3.6.	Context sensitive error messages	
G.4.	Feedback	General
G.4.1.	Continuous feedback	
G.4.2.	Response to user actions feedback	
G.4.3.	System status feedback	
G.4.4.	Configurable feedback	
G.4.5.	Warning feedback	
G.4.6.	Delay feedback	
G.5.	Flexibility	General
G.6.	Response Times	General
G.6.1.	Short	
G.6.2.	Not variable (max. variation 10%)	
G.6.3.	Feedback in delays longer than 1 or 2 sec.	
G.6.4.	Adjust timeouts	
G.7.	General Dialogue's styles	General
G.7.1.	Reduce number of commands to enter	
G.7.2.	Compatibility with other systems	
G.7.3.	Self-descriptive procedures	
G.8.	General User support	General
G.8.1.	Provide user guidance	
G.8.2.	Clear and specific information	
G.8.3.	Task sensitive messages	
G.8.4.	Accurate guidance	
G.8.5.	Familiar wording	
G.9.	Help	General
G.9.1.	Multimodal help	
G.9.2.	Speech output help	
G.9.3.	Sensitive to the context help	
G.9.4.	Simple and short sentences	
G.9.5.	Switching off help prompts	
G.10.	Tutorials	General

G.10.1.	Assistive procedures (specific problems)	
G.10.2.	Learning procedures (simple operation)	
G.11.	Privacy	General
G.12.	Warnings	General
G.13.	Abstract Feedback	General
G.14.	Privacy with assistive devices	General
G.15.	Eavesdropping	General
G.16.	Adjustability	General
G.17.	GUI: not abstract images	General
G.18.	Colour	General
G.18.1.	Avoid using colours from the opposite ends of spectrum	
G.18.2.	No more than five colours	
G.18.3.	Colours to structure display/group categories	
G.18.4.	High contrast (background/foreground)	
G.18.5.	Avoid using very dark or very bright colour	
G.18.6.	Avoid shades of blue, green and violet	
G.18.7.	High contrast (characters/background)	
G.19.	Text	General
G.19.1.	Limit the number of messages (1 to 5 max. in each section)	
G.19.2.	Key message first	
G.19.3.	Use short sentences	
G.19.4.	Direct and simple language	
G.19.5.	Define unfamiliar terms	
G.19.6.	Enough space between paragraphs	
G.19.7.	Enough space around clickable targets	
G.19.8.	Typeface: sans serif and not condensed (Arial, Tahoma and Verdana are ok)	
G.19.9.	Type size: easy to read	
G.19.10.	Type weight: medium or boldface	
G.19.11.	Headings: increase the size and weight/colour	
G.19.12.	Capital and lowercase letters	
G.19.13.	Avoid using italics	
G.19.14.	Text align and left-justification	
G.20.	Labels and abbreviations	General
G.20.1.	Avoid abbreviations when possible	
G.20.2.	Use icons, symbols and pictograms	
G.20.3.	Use established graphical symbols	
G.20.4.	Printed material legible and understandable	
G.20.5.	Enough space in small displays for labelling of soft keys	
G.20.6.	Control for adjusting volume clearly labelled	
G.21.	Menus	General
G.21.1.	Main menu available (return easy)	
G.21.2.	Clear Menu title	
G.21.3.	Logical option groups	
G.21.4.	Avoid cascading menus for frequent ops.	
G.21.5.	Limit menu options (less than 10)	
G.21.6.	Limit menus hierarchy (maximum 3)	
G.21.7.	Avoid automatic scrolling	
G.21.8.	Contextual pop-ups menus	
G.21.9.	Menus displayed in the same location	
G.21.10.	Structure (8x2x2x8 better than 2x8x8x2)	
G.21.11.	Single action to step back	
G.22.	Query Language	General

G.22.1.	One question at a time	
G.22.2.	Sequence of questions	
G.23.	Form fill-in dialogues	General
G.23.1	Adjacent and aligned related fields	
G.23.2.	Alignment	
G.23.3.	Indicate maximum length of data entry fields	
G.23.4.	Distinguish mandatory and optional fields	
G.23.5.	Indicate the format required	
G.23.6.	Default values should be displayed	
G.23.7.	Clear and meaningful titles for fields	
G.24.	User Prompting	General
G.24.1.	Greater degree of prompting for inexperience users	
G.24.2.	Indicate the type of data to be entered	
G.24.3.	Prompts displayed next to the entry fields	
G.24.4.	Simultaneous visually and audio prompts	
G.24.5.	Interrupt the auditory prompts	
G.24.6.	Speak directly to the users	
G.24.7.	Use positive statements	
G.24.8.	Use active verbs structure	
G.24.9.	Steps sequence: the same wording sequence in a prompt message	
G.25.	Multimodal Interaction	General
G.25.1.	Multiple presentation modalities	
G.25.2.	Congruent info. in different channels	
G.25.3.	Multimodality in adverse environments	
G.26.	Input Components	General
G.26.1.	Aware of typical failure rates for the technologies	
G.26.2.	Aware of the technological input limitations for older people	
G.27.	Output Components	General
G.27.1.	Appropriated output components for the task	
G.27.2.	Redundant alternative output	
G.27.3.	Standard display	
G.27.4.	Aware of the technological input limitations for older people	
G.28.	Visual Display	General
G.28.1.	Customizable contrast and brightness	
G.28.2.	Easily distinguishable characters	
G.28.3.	Screen free of glare and reflections	

References

- [1] ETSI Guide. ETSI EG 202 116 V1.2.2 (2009-03). *Human Factors (HF); Guidelines for ICT products and services; "Design for All"*.
- [2] CEN Workshop Agreement. *Specifications for a Web Accessibility Conformity Assessment Scheme and a Web Accessibility Quality Mark*. CWA 15554. European Committee for Standardization. June 2006.