

Usability and Ergonomics Considerations on eLearning of Older Adults



Institute for Future Studies
Martinsbühel 6, 6170 Zirl, Austria
petter@futurestudies.org

Prepared for the project: SeniorLearning (Grundtvig)

Prepared by: Institute for Future Studies

Authors: Klaus Reich, Christian Petter, Kathrin Helling

Keywords: Usability, ergonomics, older adults, accessibility, standards, learning environment

Date: June 20, 2007



Sokrates
Grundtvig

SeniorLearning

Contents

Introduction	3
1 Target Group 50+	3
2 Specific Needs of Older Adults	5
3 Context of Use	6
4 Demands on Usability	7
4.1 Usability, Ergonomics and Accessibility	7
4.2 General Design Considerations	9
4.3 Design Considerations for Learning Technologies	10
5 Recommendations	11
5.1 Visual Design	11
5.2 Menus and Navigation	12
5.3 Language and Terminology	14
5.4 Multimedia	14
5.5 User Customization	14
5.6 Documentation and Feedback	15
6 Usability Testing	15
6.1 Usability Goals	15
6.2 Target Audience	16
6.3 Design of the Usability Evaluation	16
6.4 Data Collection and Deliverables	18
6.5 Schedule	18
7 References and Links	19
8 Checklists and guidelines	20
9 Results Usability Tests – Initial testing	21
9.1 Introduction	21
9.2 Results	21
9.2.1 AARP Heuristics	21
9.2.2 Thinking Aloud Tests	26
9.3 Recommendations for interface design and navigation	28
9.4 Suggestion for possible design of the Moodle template	29
9.5 Some Recommendations for Learning Material	30
10 Resources for Usability Tests	31
10.1 Thinking aloud test	31
10.2 Heuristic evaluation	34
10.2.1 AARP heuristics for Moodle testing	34
10.2.2 Adapted AARP heuristics for testing the training courses	37
11 Appendix - Resource Collection	41

Introduction

The structure of societies is changing due to unprecedented demographic changes. One of the challenges to be faced in line with this is the changing habits of older persons towards learning. Still older persons (in most studies referred to as “50 years and older”) show less participation in training and learning activities compared with younger persons (for Germany cf. BMBF 2005, 25). However, authors such as Iller refer to upcoming new generations of older persons that have grown up in an environment characterized by continuous learning. She prognoses a change in the proportion of older persons participating in learning activities in the near future, making it necessary for training providers to adapt to the changing groups of customers and their needs and habits (Iller 2005, 312).

In parallel these groups are acquainted to ICT-based learning (in formal and informal learning settings) and increasingly articulate their interests using technologies for learning purposes. Bubolz-Lutz (Bubolz-Lutz 2004) points out that already 8% of persons 60 years and older learn by using media. She states that introductory courses on using the internet are often fully booked and there are waiting lists and the number of internet users of 60 years and older is growing rapidly. Additionally, she identifies an emerging communication culture among older persons who use electronic media in order to overcome and compensate restrictions in mobility. Older persons use electronic media e.g. to keep in contact with friends, retrieve news, organise post and formalities, or to do the shopping without leaving the house - all via the Internet (Stadelhofer 2002).

Taking into account these positive developments existing learning resources do not satisfy the needs of older adults. The growing importance to develop more suitable learning settings for older persons is even more pressing regarding the continuously rising number of persons participating in eLearning activities and the change of learning settings at the workplace. There is a constant pressure in most business sectors to keep the know-how up-to-date in order to compete on the labour market. Most training of these learners therefore is focused on training activities centred on work related issues. Whereas older learners in enterprises are most often embedded in working learning cultures, training plans and get active support from different sources (e.g. HR-department), a shift in the interest as well as in the purpose of learning is observable following retirement: personal interests, self-fulfilment and most importantly, social activities gain of importance. Learning is often used as a “tool” in order to stay in social contact with others during courses. Clearly, different approaches are needed for these learners.

The extent to which information and communication technologies (ICT) are used by older adults is strongly influenced from the willingness of the target group to acquire the necessary competences. This willingness on the other side is positively influenced, if the system meets the requirements of older adults (Heindl 2003, 3).

1 Target Group 50+

“Generation50+”, “Best Ager”, “Silversurfers” etc. are the terms used to describe new generations of older adults. This group is expected to grow through the next years and will gain more and more economic potential – Baier and Kimpeler point out that this group has already the biggest proportion of available financial means as well as the necessary time to spend it according to their liking (cf. Baier and Kimpeler 2006, 11).

Redish and Chisnell (2004) point to one eminent mistake made quite often in research as well as in practice when dealing with older adults: neglecting the heterogeneity of this group. In relation to this Baier and Kimpeler (2006) proclaim the end of "age" or "older" as a sociological category, as they observe a differentiation and variation of age groups. Life span in pension is embracing several decades and involves different generations with a multitude of backgrounds, norms, values, consumer behaviours and technical experience (cf. Baier and Kimpeler 2006, 13).

On that basis a differentiation of the target group according to the criteria age, ability, aptitude and attitude as proposed by Redish and Chisnell (2004) is more appropriate and allows designers to focus their work on more segmented groups of older persons.

Although segmentation is only possible to a limited extent in the SeniorLearning project, the following aspects need to be taken into account by designers:

- Age: One of the most eminent mistakes made by designers is the unreflective categorisation according to age. Besides chronological age, experiential age along with maturity level, life events and experiences have an influence (not only) on the older person.
- Ability: Ability is normally referred to as the degree of physical and cognitive limitations or restrictions. Gregor, Newell, and Zajicek (2001) divide older adults into three groups on the basis of their ability rather than possible limitations, therefore having a more positive view on this aspect:
 - Fit older people: These people do not appear to be disabled and do not consider themselves disabled, but they definitely are not as able as they were when they were younger.
 - Frail older people: These people usually have at least one obvious disability, but often have other limitations.
 - Disabled people who grow older: These people have long-term disabilities that are also affected by ageing. (cf. Redish and Chisnell 2004, 8).

Obviously this is only a rough segmentation but may work as a starting point for designers.

- Aptitude is the extent to which users have experience and expertise with technology and does not correlate entirely with chronological age as well.
- Attitude – positive (forward looking, risk-taking, and experimental) or negative (fearful or diffident), confidence levels, and emotional need for support from another human being (cf. Redish and Chisnell 2005, 14).

Another important aspect observed is the feminisation of age. Effects due to World War II are diminishing, but still the number of older women is higher than of old men due to differences in life expectancy. Demands of older people are not only determined by characteristics as age, gender, income, education or family status. State of health has an important influence on the demand for professional support services as well as support by and use of ICT (cf. Baier and Kimpeler 2006, 13). Kirchmair (2006, 31) observes a change in life style of older persons resulting in a change of guiding principles of life, ideals and moral concepts. According to him, hedonism and independence of older adults are increasing, resulting in the wish to personalise own living styles, stay at home as long as possible and keep mobile (cf. Kirchmair, 33f).

Overall Kirchmair (2006, 35) points out that older people can hardly avoid using ICT – and they are eager to learn to use these products, if they are useful and fitting to them, and if they are convinced of the personal benefit for them. Communication, leisure time, mobility,

entertainment, social contacts are the important topics that need to be addressed by ICT in general and eLearning understood as learning to use these tools in general and learn to use eLearning plays a major role in assisting older adults. Technology and therefore all sorts of computer systems, internet applications etc. are going to be integrated in nearly every facet of life and older adults are partly already using ICT or have a positive attitude towards ICT (Heindl 2003, 6).

The heterogeneity of the target group has been identified as a major challenge for the SeniorLearning project. As stated in the project proposal, the project partners intend to provide an ICT-based learning solution that might be used by people with a very low level of ICT skills, which is currently valid for the largest proportion of the target group 50+. Clearly, users need to know at least some basics (e.g. using a web browser) in order to be able to use the learning resources provided by the project.

Another option to access the learning environment has been in the provision of teacher training material for trainers, intending to use the learning materials for their trainings with older adults. In order to stimulate their training, one of the online training courses will focus on their needs.

In order to describe the target group and their context of use more in detail and give the designers of the learning environment a better idea of the target group, the project partners of the SeniorLearning project were asked to send in descriptions of the target group in the form of case studies. They can be found in the Case Studies section of the "Senior citizens e-learning needs report" developed in the framework of the project.

2 Specific Needs of Older Adults

Although the group of older adults is very heterogeneous typical degenerative effects are observable: diminished vision, varying degrees of hearing loss, hand-eye coordination and psychometric impairments including difficulty with fine-motor coordination, degenerative diseases including arthritis, osteoporosis or stiffening of the joints, diabetes, cataracts as well as macular degeneration and optic atrophy. Other effects are the result of previous sports and or occupational injuries as well as strokes (agelight 2001).

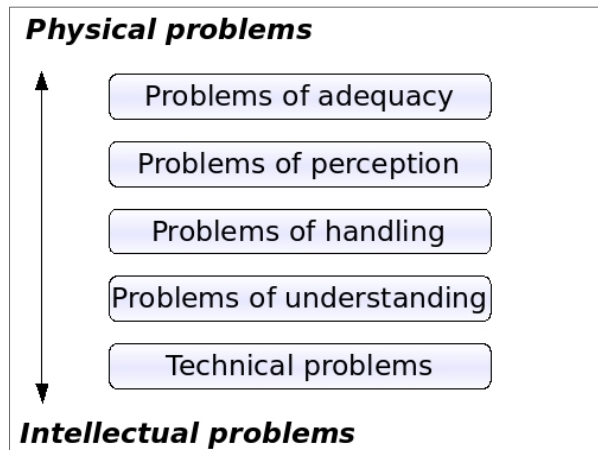
Although there is a reduction of certain senses in general assistive technologies are not necessarily needed to compensate the series of issues emerging in the ageing process. It is rather possible to address these issues by simply considering them in the design process of learning environments for older adults:

- Visual impairments:
Vision is the most common physiological change associated with longevity. Eyeglasses and corrective surgery can help correct nearsightedness and cataracts; others are faced with irreversible deterioration of their eyesight. Most common are the inability to distinguish certain colours and being able to adapt to changes in light levels; decreasing ability to focus on near tasks such as reading; different degrees of colour blindness; dry eyes as a result of declining blink rates; Computer Vision Syndrome (CVS) and shrinking of the pupil, resulting in the need for more light and a diminished capacity for adjusting to changing levels of illumination (agelight 2001).
- Mobility impairments (hand-eye coordination and psychometric impairments including difficulty with fine-motor coordination)
- Hearing impairments (different degrees)

- Cognitive processes (crystallised / fluid functions) – reduced speed of information processing (short term memory)
- Problems with specific (esp. technical) terminology, e.g. Internet, computers, etc. as older adults often are unfamiliar with these terms.

Kirchmair (2006, 35) point to five major difficulties in relation to ICT on the basis of these trends:

- Problems of adequacy: Older adults might have the feeling that IT-products have not been developed for them but for a younger audience, if they are difficult to use or explained by using very complex, technical vocabulary.
- Problems of perception: Problems in this field most often relate to difficulties in visual perception; due to diminishing vision, the handling of IT devices gets difficult, if fonts are too small, contrast is too low, etc.
- Problems of handling: This category is probably the most common category of problems and is due to buttons that are too small, the space between them too narrow or they are placed unfavourably, etc.
- Problems of understanding: Instructions for older adults have to be clear, understandable, logical, and reasonable and avoid the use of incomprehensible technical terms and foreign vocabulary. Symbols and pictures should present meaningful information in a fitting format and size.
- Technical problems: The tasks needed to navigate through websites and learning environments, to use communication tools etc. demand for technical know-how. In order to facilitate handling, these tasks should be logically ordered and simple but not oversimplifying.



Two guidelines emerge out of the outlined problematic fields:

1. ICT tools and environments have to focus on the basic functionality, which has to be directly accessible and easy to handle.
2. Additionally, it is necessary to take into account the physiological specifics of older adults in relation to reduced sensory perception, limited motor capabilities and changes in cognitive processes.
- 3.

Nevertheless, as Kirchmair (2006, 39) points out, older adults demand for good and modern design. They need to have the perception that the design and the quality of the product is up-to-date throughout the life time of the product and is perceived as modern from others as well!

3 Context of Use

In the framework of the SeniorLearning project the following approach has been defined for achieving the intended outcomes of the project:

- A) FKK has done an analysis on learning environments, in order to identify existing products most suitable for the target group (on the basis of a set of criteria developed). Out of the range of different tools Moodle has been chosen as the basis for the further development process.

B) The learning courses should be delivered in the following formats:

- Internet based course delivery: The focus of the project will be set to this provision of resources
- Printed materials;
- A digital version distributed through CD, in order to allow for offline work;
- Forums and chat will be used as communication tools for the learners.

Following experiences made by ZAWIW it was agreed that a course duration of approximately 4-6 weeks would be most appropriate for the target group. The analysis done in WP1 showed that the design of the learning objects should be very simple consisting mainly of HTML pages including text and graphics. Sound and video should be avoided due to the lack of broadband access among older adults observed in WP1. Simple assessment of learning progress, given as automated feedback to the learners, will be implemented. In some cases tutors might be needed. In order to guarantee sustainability of the project, it was agreed to involve peer volunteers out of the target group from an early stage of the project who might act as moderators in the courses.

C) Different levels of users:

The learning environment is designed to allow access to learners having very basic IT-skills or learners who are beginners, the latter ones in most cases having a moderator or tutor in order to support their learning processes

- 1st level (very beginners).
- 2nd level: basic knowledge of photo editing, download, zip, etc...
- 3rd level: basic knowledge of IM, forum, etc. (all other applications)

D) Courses

- Beginners course, introduction to the web / how to use SeniorLearning platform
- Communication: Email, IM, Forums, Skype
- Books (read papers, books), digital libraries, e-commerce (with indications on security on internet)
- Planning a journey (can include download and booking for events) / Editing pictures, sending pictures back home, etc...

Differences between males and females have been identified in the discussion but need to be further clarified in the further progression of the project. Usability tests will give further data on these issues and how they might be taken into account in the design of the learning environment.

The initial language for the development process will be English. All partners agreed that adaptation to the different national languages is vital.

4 Demands on Usability

4.1 Usability, Ergonomics and Accessibility

Usability as defined in ISO 9241-11:1998 is understood as the "extent to which a product

can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". The term "Ergonomics" has a wider meaning and has been introduced in the ISO 6385 in the year 2004: "Scientific discipline concerned with the understanding of interactions among human and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance".

The intention is to enable older adults to use online resources (e.g. a Learning Management System, LMS)

- effectively
- efficient
- and with a positive attitude towards the medium (Schulz 2004, 19).

In general providers of web resources are themselves responsible how they provide information or tools for their customers. Nevertheless, if providers neglect the needs of older adults they may exclude huge proportions of possible customers from their services. Additionally, designing web resources in a more user friendly way facilitates in most cases usage for larger user groups.

Older adults experience age related barriers in the use of web resources, which are similar to those of disabled persons. Therefore, accessibility issues have to be taken into account in the consideration of the design of web resources as well. The legal framework for accessibility issues is based on different national and international anti-discrimination laws. In Europe (for the US cf. Americans with Disabilities Act) guidelines 2000/78/EU and guideline 2000/43/EU on the basis of the Amsterdam treaty Art. 13 EUV have been transferred into national laws in most EU member states (e.g. Bundes-Behindertengleichstellungsgesetz – BGStG in Austria). As a result of the different legal implementation several accessibility guidelines and regulations exist. Most often the Web Content Accessibility Guidelines (WCAG) 1.0, provided by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C), are used, or adapted for the national guidelines (e.g. Barrierefreie Informationstechnik Verordnung - BITV in Germany) respectively.

65 checkpoints in 14 guidelines in the WCAG 1.0 give web designers directions how to design accessible websites on three different levels of accessibility, ranging from A to AAA. The Guidelines cover the following aspects (cf. <http://www.w3.org/TR/WAI-WEBCONTENT/>):

- Guideline 1. Provide equivalent alternatives to auditory and visual content.
- Guideline 2. Don't rely on colour alone.
- Guideline 3. Use mark-up and style sheets and do so properly.
- Guideline 4. Clarify natural language usage
- Guideline 5. Create tables that transform gracefully.
- Guideline 6. Ensure that pages featuring new technologies transform gracefully.
- Guideline 7. Ensure user control of time-sensitive content changes.
- Guideline 8. Ensure direct accessibility of embedded user interfaces.
- Guideline 9. Design for device-independence.
- Guideline 10. Use interim solutions.
- Guideline 11. Use W3C technologies and guidelines.
- Guideline 12. Provide context and orientation information.
- Guideline 13. Provide clear navigation mechanisms.
- Guideline 14. Ensure that documents are clear and simple.

The guidelines should be applied to any web resource before submitted for public use and will also be applied to the SeniorLearning learning environment. It is intended to achieve A level (according to WCAG 1.0) at least.

4.2 General Design Considerations

“Websites tend to be produced by young designers, who often assume that all users have perfect vision and motor control, and know everything about the Web.” These assumptions rarely hold, even when the users are not older adults. However, as indicated by usability metrics developed by Jakob Nielsen, older adults are more affected by usability problems than younger users. Among the obvious physical attributes often influenced by the human ageing process are eyesight, precision of movement, and memory. Many older adults also retired without having used computers and the internet extensively during their working careers. Thus, they have not necessarily learned good conceptual models of how these technologies work, i.e. Nielsen points to older adults finding it difficult to differentiate between a search box and the browser's URL box (cf. <http://www.useit.com/alertbox/20020428.html>).

Older adults, especially when they are retired, invest time in order to get acquainted to the Internet as well as to other information and communication technologies, but quite often they do so on outdated equipment “inherited” for instance from their children. Additionally, many of them are not interested to invest a lot of money in a tool that does not play a prominent role in their lives. Therefore, as indicated by other results of the SeniorLearning project, it is necessary to design the learning environment for hard- and software that quite often is not the state-of-the-art in the field or even is outdated.

Although no data is available on the screen sizes used by older adults, it is recommendable to design for a smaller screen size than for other users or provide automatic processes to redirect to a design adapted for smaller screen sizes (netaspect 2005, 40).

Overall the design of the learning environment has to be modern, possibly cutting edge in order to attract older adults, but more important, the usage of the web environment has to take into account the needs of the target group. This is especially true for visual, acoustic, tactile and cognitive issues.

Aspects in relation to the visual presentation play the most eminent role in the design for older adults, but do not only relate to older adults but all people. Most important, designers need to be aware as well that a large proportion of the intended target group has never used a PC before. Therefore, navigation and access to different functionalities have to be as intuitive as possible.

Older adults need more time to get acquainted to new virtual environments as many of them did never learn to navigate in such a complex system as a Virtual Learning Environment (VLE). The attention of the user is selectively focusing on information; therefore information has to be presented in a clearly structured way. Kirchmair (2006) recommends repeating structures in order to stimulate learning processes and allow the user to get familiar with a new environment by using the same structure several times. In order not to overload short term memory it is recommended to limit the number of items in navigational structures to 5-8 links in the menu. A visual clue for presenting the navigation path is helpful not to lose the way in an online environment.

The speed of information processing of older adults is an important aspect to be considered not only in the instructional design of a learning environment, but even more important in the underlying technological basis – the virtual learning environment. Older adults get distracted by short spots, advertisements, quick (flash) animations that demand for user interaction, complex animated navigation menus etc. quickly and frustration, as a consequence, arises as a major problem. On the other hand, older adults get annoyed by long waiting times and useless information as soon as younger persons.

Overall, designers need to reduce the degree of complexity as much as possible. This applies to the design of the interface as well as the language used (e.g. technical vocabulary, foreign language terms, etc.). Where possible the system should give direct feedback to the inputs of the user in order to give them the certainty that tasks, commands etc. are processed or already finalised and information about the actual position of the user in the system (Kirchmair 2006, 39).

4.3 Design Considerations for Learning Technologies

The design of a virtual learning environment demands for specific considerations in relation to usability. The broad range of materials and tools used for teaching and learning includes paper, audio and videotape, CD-ROM, television, and the Internet. ICT-based learning takes advantage of a variety of technologies to facilitate learning and interaction between participants in order to provide online learners with its characteristic speed and flexibility. Tools used in an eLearning context may include synchronous and asynchronous communication tools, videoconferencing systems, whiteboards, application sharing, learning management systems (LMS), virtual realities, simulations, games etc. Furthermore, online content, for instance presented in a LMS, is varied and can include: text on a website, digital audio, digital video, animated images, and virtual reality environments. This content can be created in a variety of ways, utilizing a variety of authoring tools.

Obviously, taking into account the needs of older adults, not all of these tools and approaches are equally suitable for the target group. With regard of the current status of the project (April 2007) the learning environment is at the centre of the reflections on usability. Tools and the instructional design will be based on outcomes of WP1 and may demand for different usability considerations in the further development process. Following the suggested iterative design process these changes and adaptations will be tested and evaluated throughout the development process.

Recommendations given by Barstow and Rothberg (2002) on accessible design of learning materials and learning environments include the following:

1. Allow for customization based on user preference:
options for customization include display elements, e.g. fonts, font style, cursor screen layout, text size etc. as well as interface features, e.g. timing of events and keyboard settings.
2. Provide equivalent access to auditory and visual content based on user preferences:
for people with disabilities all applications should combine equivalent access for all auditory and visual aspects of learning technologies and content by providing text equivalents.
3. Provide compatibility with assistive technologies and include complete keyboard access.
4. Provide content and orientation information and maintain a consistent layout between pages.

5. Follow relevant specifications, standards, and/or guidelines, e.g. WCAG 1.0, Section 508, BITV, etc.
6. Consider the use of W3C recommended technologies (XHTML, SVG, SMIL, etc.)

5 Recommendations

The recommendations highlighted in this section give an overview of the issues which have to be taken into account in the design of appropriate user interfaces for older adults. As described in chapter 5.7 on “General Usability Testing” it is highly recommended to apply further testing throughout the development process in order to guarantee the intended quality of the product.

Before going into detail, one aspect many designers forget about needs to be addressed – an adequate URL of the learning environment: The name of the URL should be short and easy to write. It is recommended to use a term most older adults are familiar with, but should not discriminate the target group or contain prejudices, e.g. the term “Senior...” in German is not really useful as the target group does not want to be named under this heading. The site should load fast, and if longer loading times occur a visual clue should give information on the estimated duration until the website has loaded (e.g. when flash is used) (cf. Feuersinger 2004, 44).

5.1 Visual Design

Designing the visual aspects of a Web site takes into account form, content, arrangement, light, contrast, and colour. It includes all of the visual elements on a page and depends on the context of the user and the context within the Web site (Redish and Chisnell, 2004).

Layout & Style

(Redish and Chisnell, 2004; NIA & NLM, 2001; Feuersinger, 2004; netaspect, 2005)

- Use a sans serif typeface (Arial, Verdana, Helvetica etc.) that is not condensed. Avoid the use of serif, novelty, and display typefaces.
- Use 12 point or 14 point type size for body text.
- Use medium or bold face type.
- Present body text in upper and lowercase letters.
- Use all capital letters and italics in headlines only.
- Reserve underlining for links.
- Double space all body text.
- Left justified text is optimal for older adults.
- Use white space to help direct users’ attention by grouping items on a page so that users can see at a glance how items are related. Spacing combined with appropriate size of text, links, and buttons will make it easier for older adults to physically select the right link.
- Many older adults (cf. results of user needs analysis in WP1 / SeniorLearning project) are using older computers with slower connections to the Internet. Designers have to avoid, so loading long pages and graphics is very slow.
- An easy to identify “home”-button should be presented on every page.

Scrolling

(Redish and Chisnell, 2004)

- Older adults, who are novices to computers, often do not know the concept of

- scrolling - scrolling is a learned behaviour.
- Avoid automatically scrolling text. If manual scrolling is required, incorporate specific scrolling icons on each page.
- General kinaesthetic sensitivity (ability to control movement) degrades with age, so controlling a mouse in combination movements (such as using pull-down menus and scrolling lists) becomes difficult.

Colour

(NIA & NML, 2001; netaspect, 2005)

- Avoid yellow and blue and green in close proximity as these colours and juxtapositions are difficult for some older adults to discriminate.
- Use dark type or graphics against a light background, or white lettering on a black or dark-coloured background. Avoid patterned backgrounds.
- Warm colours and harmonic colour schemes are more suitable than cold colours and strange colour combinations.
- Use tools to test whether contrast is high enough (e.g. background and font colour) and whether colours may be seen by people having difficulties differentiating colours or being colour blind (e.g. Vischeck: www.vischeck.com)

5.2 Menus and Navigation

Menus and Navigation

(Redish and Chisnell, 2004; Feuersinger, 2004; NIA & NML, 2001; netaspect, 2005)

The main instrument for accessing content is some sort of directory of options or contents, which must be included in a web site. There are some cognitive issues along with motor limitations that make menus and navigation elements difficult for older adults to interact with. While the ease of use of menus and navigation elements is highly dependent on the information architecture – especially labelling – an optimised structure of the site puts less of a burden on working (short-term) memory and demands less in the way of making inferences about the underlying content.

Redish and Chisnell (2004) argue that all users perform better with shallower hierarchies, but that older adults are disproportionately affected by depth in hierarchies. Therefore, it is recommended to have more topics closer to the surface which supports users better than creating deep, narrow hierarchies of information. They state that two or three clicks may not be a hard and fast rule, but shallower hierarchies (needing fewer clicks to get to the right content) are better than very deep/interlaced ones. Additionally, implementing advanced organizers such as process bars that illustrate processes or steps and where the person is within a process will help mitigate memory and attention issues.

Other recommendations:

- The organisation of the web site should be simple and straightforward.
- Use explicit step-by-step navigation procedures whenever possible to ensure that people understand what follows next.
- Carefully label links.
- Use single mouse clicks to access information.
- Use a standard page design and the same symbols and icons throughout the learning environment.
- Use the same set of navigation buttons in the same place on each page to move from one web page or section of the web site to another.
- Label each page in the same location with the name of the web site.

- Incorporate text with the icon if possible, and use large buttons that do not require precise mouse movements for activation (cf. below for more details on buttons).
- Provide a site map to show how the site is organized.
- Use icons with text as hyperlinks.
- Avoid dynamically changing menu structures.
- Implement a breadcrumb menu showing recently visited pages.
- Change colours of links in order to mark already visited pages.

Buttons and Styles

(Redish and Chisnell, 2004; netaspect, 2005)

Buttons are important interface elements not only for navigation. Older adults face two major problems in relation to buttons: Many of them have difficulties to identify what is clickable and once they have identified a target, there are often problems of actually hitting the linked area of the target because of problems related to fine motor movements.

Therefore

- Buttons should be logically arranged.
- They should be large enough (the same applies to symbols and text used for them);
- An easy to read font (sans-serif: Arial, Helvetica, Tahoma, etc.) should be used for text on them;
- The use of colour should take of sufficient contrast to the background,
- the functionality of the button should be clear,
- buttons might be linked to an audio signal, e.g. keystroke. In order to provide optimal audio output for older adults affected by varying degrees of hearing loss, spoken language should be loud, clear and understandable.
- Space between buttons and other elements on the interface.
- In order to facilitate older adults to identify buttons as clickable the cursor may change when pointed to a button.
- Additional feedback might be given that the button has been activated (sound, hover effect, etc.).

Sitemap

(Redish and Chisnell, 2004)

The purpose of a site map is to provide a quick overview of the entirety of a web site which may take the form of a table of contents. This will help searchers find their way through sites more efficiently and gives an idea of the structure of a web site.

Search

(netaspect, 2005)

- Search form should be clearly distinguished from the content of web site and should be labelled with the word "Search".
- Help and important instructions for using the search functionalities should be provided.
- A search functionality offered on a web site should tolerate spelling mistakes or should offer suggestions for improved search results respectively.
- A search engine should consider different grammatical versions of a word and synonyms.
- Search results should be presented without the need of scrolling.
- Search results should be arranged according to relevance.

5.3 Language and Terminology

Redish and Chisnell (2004) point out that older adults are just as likely as younger web users to “read to do” – or skim or scan text on web pages to get what they need as quickly as possible. They even state that older adults can be less patient than younger users, and they may abandon a site or give up on an online task quicker than younger users. Not only based on this reason a careful information design is vital for the success of a learning environment for older adults.

(NIA & NML, 2001; netaspect, 2005)

- Present information in a clear and familiar way to reduce the number of inferences that must be made. Use positive statements.
- Use the active voice.
- Write short, straightforward sentences.
- Keep paragraphs very short.
- Organize the content in a standard format.
- Break lengthy documents into short sections.
- Use lists.
- Use words your readers know, i.e. avoid technical vocabulary or foreign language if possible. When users encounter terms they are unfamiliar with, they simply skip them – often missing opportunities to get closer to their goals.
- Avoid contents stigmatising or discriminating age but point out positive approaches, creative solutions, demanding products, success stories etc. instead.

5.4 Multimedia

(NIA & NML, 2001)

- Use text-relevant images only.
- Use short segments to reduce download time on older computers.
- Provide text alternatives such as open-captioning or access to a static version of the text for all animation, video, and audio.
- Give the user the possibility to control the speed of animations, videos, etc. (e.g. pause/stop buttons).
- Be aware that plugins or additional software needed may not be installed on the computer.
- The printing of all information, for instance through pdf-files, should be possible. Many older adults prefer to read information on printed paper.

5.5 User Customization

Many computer users are unaware of the customization available including display colours, contrast, icon size and typefaces or are not aware of new pointing devices (trackball mice, ergonomic keyboards digital mouse).

Eyestrain and dry-eyes are a common complaint of computer users which may be relieved by upgrading from a small monitor to a larger one (LCD display).

Browsers, as the Mozilla Firefox or Microsoft Internet Explorer allow a high level of customization including text size, fonts and colours. Even more changes to fonts, icons and colour preferences can be applied via the operation system, e.g. resizing the cursor and selecting cursor displays, speed of mouse, enabling single-click option, etc.

Two major issues commonly hinder the full use of these tools:

- Lack of knowledge of the users;
- Web design that does not take into account standards (valid xhtml/css code, WCAG guidelines etc.)

In order to overcome these barriers, it is recommended to provide basic information on how to adjust the browser or operation system settings and keep to approved web design standards (cf. AgeLight 2001).

5.6 Documentation and Feedback

Holt (2000) points to two types of help that should be provided on a website:

- assistance with the technical use of the web environment and
- assistance with content.

Therefore, the learning environment should provide a help menu with several means of getting assistance in both areas. One possibility is to provide a Frequently Asked Questions (FAQ) section, which has to be updated and reflects the feedback from the visitors about problems they experienced.

Probably the learning environment requires an entry activity like registering, submitting e-mail address or simply logging in. Include direct assistance on what to do and explain errors, if for instance a certain field was not completed correctly.

For complex environments offering a series of different functionalities it is recommended to include a tutorial on the learning environment to teach visitors how to use it. Provide a feedback form for persons seeking help, if possible, offer a telephone number for those who would prefer to talk to a person (NIA & NML, 2001).

Additionally, most aspects in relation to appropriate use of language and terminology (cf. chapter 5.3) apply to the documentation as well.

6 Usability Testing

6.1 Usability Goals

The recommendations outlined above can give valuable hints for the design of the learning environment, but they cannot replace actual testing with the target group. Therefore, an iterative design process including different phases of evaluation and further product development is suggested. The usability tests will focus on determining if the needs of the users are met in an easy to understand, useful, and productive manner. Specific measurable goals for the usability evaluation are outlined in the Usability Evaluation Goals section of this document.

The usability evaluation of the SeniorLearning learning environment will evaluate the potential for errors and difficulties involved in using the application for human resource activities. Some specific questions to be addressed in this usability evaluation include:

1. What are the essential usability problems in using a standard Moodle learning management systems (LMS) for the specific target group?
2. Can a non-PC users successfully launch and use the application?

3. Can users successfully navigate through the LMS? Is the system status clear to users at all times?
4. Is the information logically organized and grouped for the non-Human Resource person? Can they easily locate the information they are looking for?
5. Can the LMS be used with only the on-line help, or is a paper-based user guide required?
6. How will users feel about using the on-line help? Is context-sensitive help a requirement for our users?
7. Are there tasks that users will want to perform (i.e. printing specific information) that are not currently supported by the SeniorLearning project?
8. Which types of learning materials are most suitable for the target group?
9. Which communication tools do adequately address the needs and possibilities of the target group?

Specific usability goals were determined from the above concerns. These goals allow for the creation of evaluation scenarios and tasks for the thinking aloud tests and heuristic evaluation that will allow to identify whether the concerns are valid and what measures can help to determine if in fact the participants are having trouble completing the tasks. Specific tasks and questions addressed are described in depth in the different test tools.

6.2 Target Audience

The selection of participants whose background and abilities are representative of the products' intended end user is a crucial element of the evaluation process. Valid results will be obtained only if the participants selected are typical end users of the product, or are matched as closely to the criterion as possible.

The following list shows the key characteristics of the end users that are considered as critical differentiators for successful adoption and use of the SeniorLearning project. These characteristics are the basis for participant selection for the usability evaluation.

- Age: 50+
- Computer literacy: Low to medium
- Use of electronic support tools (email, Internet access, PC or workstation, etc.): 0-2 tools
- Educational level: No limitations
- Nationality: No limitation - for thinking aloud test it is recommended to speak one of the languages spoken by the project partners.

6.3 Design of the Usability Evaluation

The proposed methodology for the usability tests will constitute of three testing processes (cf. chart below):

A) The initial testing will be done on a standard Moodle environment including selected learning materials. Tests to be applied include a thinking aloud test with 2-3 persons out of the target group and a heuristic evaluation using the AARP heuristics (for details see

below). These tests should give basic hints about

- very essential adaptations to be made on the platform;
- getting information on advantages and disadvantages of certain types of learning materials.

B) Thinking aloud tests will be carried out with three persons out of the target group on a prototype of the learning environment. Results of these tests will be fed into the final version of the learning environment.

C) An adaptation of the AARP heuristics will be applied to the draft versions of the four courses that are to be developed. Results of these tests will be fed into the final version of the courses.

	Moodle	Courses
Initial testing	2x thinking aloud, AARP heuristics	-
Prototype testing	2x thinking aloud, AARP heuristics	-
Course testing	-	4 x adapted AARP heuristics

In terms of requirements needed IFS will provide:

- Evaluation methodology and documents
- Usability equipment and evaluation personnel for the “Initial testing”
- Personnel for heuristic evaluation.
- Participants that reflect the profile of potential users for the “Initial testing”
- Support team for length of usability evaluation and evaluation sessions
-

The FKK team will provide:

- Usability equipment and evaluation personnel for the “Prototype testing”
- Participants that reflect the profile of potential users for the “Prototype testing”

All project partners will give input on the methodology and the report

6.4 Data Collection and Deliverables

Data is collected through the use of a “thinking aloud” protocol and heuristic evaluation. The heuristic evaluation is split up in two separate processes: One targeted at the virtual learning environment, the other one at the learning materials used.

Data to be collected include the following:

- Number of and types of errors
- Average amount of time to complete the different tasks
- The number of times the participant used the help line or on-line documentation for each task
- The number of positive or critical statements about the on-line help documentation
- Observations and comments when participants have difficulty, when an unusual behaviour occurs, or when a cause of error becomes obvious.
- Number and type of non-critical and critical errors.
- The number of indications of frustration or joy from the participant and subjective opinions of the usability and aesthetics of the product expressed by the participants

At the completion of the usability evaluation, a formal analysis will be performed. A final evaluation report and an example video will be provided, which will detail the significant problems and observations detected during the usability evaluation, and recommendations to address the findings, will be delivered to the project partners.

6.5 Schedule

The usability evaluation will be conducted in different steps, beginning in May 2007. Further steps in the evaluation process are dependent on the progress of the SeniorLearning project, especially the development of a prototype and design of learning materials.

7 References and Links

References

AgeLight (ed.): Interface Design Guidelines for Users of All Ages. 2001. URL: <http://www.agelight.com/webdocs/designguide.pdf> Download: 23.3.2007

Baier, e. and Kimpeler, S.: "Best Agers" in der Informationsgesellschaft. In: Kimpeler, S. and Baier, E. (ed.): IT-basierte Produkte und Dienste für ältere Menschen – Nutzeranforderungen und Technikrends. Stuttgart, 2006. pp. 7-16

Barstow, C. and Rothberg, M.: IMS Guidelines for Developing Accessible Learning Applications. Boston, 2002. URL: <http://ncam.wgbh.org/salt/guidelines/> Download: 3.4.2007

BMBF (Bundesministerium für Bildung und Forschung) (ed.): Berichtssystem Weiterbildung IX. Ergebnisse der Repräsentativbefragung zur Weiterbildungssituation in Deutschland. Berlin, 2005. URL: www.bmbf.de/pub/berichtssystem_weiterbildung_9.pdf Download: 3.8.2006

Bubolz-Lutz, E.: Bildung im Alter: Ansätze – Erfahrungen – Herausforderungen. 2004. URL: www.fogera.de/files/pdf/publik/Bubolz-Lutz_Bildung_im_Alter_2004.pdf Download: 29.8.2006

Feuersinger, D.: Internet für Senioren. Anspruch und Wirklichkeit seniorengerechter Webseiten. Wien, 2004.

Heindl, M.: Gestaltung von Computersystemen für Ältere . Warum müssen Computersysteme für Ältere besonderen Ansprüchen genügen und wie gelingt dies am besten? Hagenberg, 2003. URL: <http://cblinux.fh-hagenberg.at/~cbl01005/paper/dokumente/paper1.pdf> Download: 3.4.2007

Holt, B. Creating Senior-Friendly Websites. In: Center for Medicare Education (ed.). Issue Brief Vol.1 No.4. Washington, 2000. URL: <http://www.futureofaging.org/PublicationFiles/V1N4.pdf> Download: 29.8.2006

Iller, C.: Altern gestalten – berufliche Entwicklungsprozesse und Weiterbildung im Lebenslauf. Bonn, 2005. URL: http://www.die-bonn.de/esprid/dokumente/doc-2005/iller05_01.pdf Download 10.8.2006

Kirchmair, R.: Bedürfnisse und Anforderungen der Best Agers an IT Produkte. In: Kimpeler, S. and Baier, E. (ed.): IT-basierte Produkte und Dienste für ältere Menschen – Nutzeranforderungen und Technikrends. Stuttgart, 2006. pp. 31-42

Netaspect (ed.): Die Generation 50+ im Internet – Webangebote für Ältere erfolgreich umsetzen. Düsseldorf, 2005. URL: http://www.netaspect.com/50plus/media/info_50plus.pdf Download: 14.8.2006

NIA (National Institute on Aging) and NLM (National Library of Medicine): Making Your Web Site Senior Friendly. A Checklist. URL: www.nlm.nih.gov/pubs/checklist.pdf . 2001. Download: 11.3.2007

Redish, J. and Chisnell, D.: Designing Web Sites for Older Adults: A Review of Recent Research. Washington, 2004. URL: http://catalogue.iugm.qc.ca/GEIDFile/AARP-LitReview2004.PDF?Archive=196490291467&File=AARP-LitReview2004_PDF
Download: 12.11.2006

Redish, J. and Chisnell, D.: Designing Web Sites for Older Adults: Expert Review of Usability for Older Adults at 50 Web Sites. Washington, 2005. URL: <http://assets.aarp.org/www.aarp.org/articles/research/oww/AARP-50Sites.pdf>
Download: 3.8.2006

Schulz, U.: Web-Usability für Silversurfer. In: merz (medien + erziehung). V. 48. Nr. 4. München, 2004. pp. 18-22

Stadelhofer, .C.: www-senioren. Interneterschließung – auch für ältere Erwachsene! In: medien praktisch. Zeitschrift für Medienpädagogik. Heft 1/2002. Frankfurt/M, 2002. URL: www.aqua-nordbayern.de/aqua/download/02.pdf Download: 9.7.2006

Links

<http://www.useit.com/alertbox/20020428.html>

<http://www.vischeck.com>

8 Checklists and guidelines

Web Content Accessibility Guidelines 1.0: <http://www.w3.org/TR/WAI-WEBCONTENT/>

Web Content Accessibility Guidelines 2.0 - Working Draft:
<http://www.w3.org/WAI/GL/WCAG20/>

Barrierefreie Informationstechnik-Verordnung (BITV): <http://www.einfach-fuer-alle.de/artikel/bitv/>

Section 508: <http://www.section508.gov/> and
<http://www.webaim.org/standards/508/checklist.php>

ISO 9241 (parts of it): <http://www.userfocus.co.uk/resources/iso9241/index.html> and
<http://www.controlling21.de/ergonomie/theorie/grundlagen/din-iso.htm>

IBM Web Accessibility Checklist: <http://www-03.ibm.com/able/guidelines/web/accessweb.html>

Microsoft on Accessibility: <http://www.microsoft.com/enable/>

AT&T Web Site Development: http://www.att.com/style/wc_access.html

Mozilla accessibility website: <http://www.mozilla.org/access/>

9 Results Usability Tests – Initial testing

9.1 Introduction

The initial testing has been done on a standard Moodle environment installed on <http://moodle.ict4t.net> including selected learning materials. The theme used on the platform was “formal_white”.

Tests applied included a Thinking Aloud test with 2 persons out of the target group and a Heuristic evaluation using the AARP heuristics. For an in depth description of the applied methodology and tools confer the theoretical report.

Screencasts of the Thinking Aloud tests as well as the rating according to the heuristics may be obtained from the authors. The most important results of these tests are outlined in this chapter.

9.2 Results

9.2.1 AARP Heuristics

- 1.1 Does the site use standard treatments for links?
Blue is used as the standard colour for links; underline is used as a hover effect; buttons and drop-down forms are used to some extent for linkage
- 1.2 Is link treatment the same from section to section within the site?
cf. above links in all sections are the same (not applicable for learning materials – will be implemented at a later stage)
- 2.1 In lists of bulleted links, are the bullets clickable? not applicable
- 2.2 Are command and action items presented as buttons? yes
- 2.3 Do buttons and links show that they have been clicked? not all of them
- 2.4 Are buttons clearly labelled? in general yes
- 2.5 If there is an image on a button or icon, is it task-relevant? not applicable
- 2.6 Do graphic buttons avoid symbols that will be unfamiliar to older adults who have low computer and Web expertise? not applicable
- 2.7 Is there a visible change (other than the cursor changing) when the user “points” to something clickable with his or her mouse?
no („Hilfe“ = „Help“ link does not change)
- 3.1 Are buttons large enough to easily see the image or text on them – at least 180 x 22 pixels? buttons are large enough
- 3.2 Is the area around buttons clickable? no
- 3.3 Is there enough space between targets to prevent hitting multiple or incorrect

targets? [yes](#)

- 3.4 Do buttons and links enlarge when the rest of the text size is increased? [Yes](#)
- 4.1 Does the site work at the resolution that the user would typically view the site at without horizontal scrolling? [1024x768 ok](#)
- 4.2 Do pop-ups and secondary windows open wide and long enough to contain the content without the need for scrolling? [not applicable](#)
- 4.3 For scrolling lists, for example, a list of all the states:
- Are checkboxes used rather than drop-down or pull-down menus? [not applicable](#)
 - If not, are drop-down menus (a menu that drops down when requested and stays open without further action until the user closes it or chooses a menu item) used rather than pull-down menus (a menu that is pulled down and that stays available as long as the user holds it open)? [not applicable](#)
- 5.1 Does the Back button appear on the browser toolbar on every page? [yes](#)
- 5.2 Does clicking the Back button always go back to the page that the user came from? [yes](#)
- 6.1 Is there no rolling text that goes by automatically? [yes](#)
- 6.2 Does the site use static menus (a click leads to another page) rather than “walking menus” (exposing a sub-menu on hovering)? [yes](#)
- 6.3 If there are walking menus, do they expand on a click (rather than a hover)? [not applicable](#)
- 6.4 Are the sub-menus timed to stay open for 5 seconds or until they’re clicked? [not applicable](#)
- 7.1 Are error pages descriptive and did they provide a solution to the user? [not applicable](#)
- 7.2 Are confirmation pages clear? [not applicable](#)
- 8.1 Are captioning and or meaningful alternative text provided for images, video, and animation? [yes](#)
- 8.2 Does the site support haptic (vibrating, tactile feedback) pointing devices (such as the Logitech iFeel mouse)? [not applicable](#)

Information Architecture: Organizing the content

- 9.1 Does the site use a directory list format for listing topics (such as Yahoo! does or hhs.gov or firstgov.gov)? [not applicable](#)
- 9.2 Does the site use cross-references to related topics and redundant links? [not applicable](#)
- 9.3 Is the site hierarchy as broad and shallow as possible? [not applicable](#)

- 10.1 Are labels descriptive enough to make it easy to accurately predict what the content will be under each topic category?
yes (although users might not expect their own user profile under participants)
- 10.2 Do labels and links start with different, distinct, and relevant key words? **yes**
- 10.3 Are labels useful and understandable each on their own? **yes**
- 10.4 Do labels reflect language that older adults are familiar with? **yes**

- 11.1 Are important, frequently needed topics and tasks closer to the surface of the Web site? **yes**
- 11.2 Are related topics and links grouped and labelled? **not applicable**
- 11.3 Do labels and category names correspond to users' tasks and goals? **not applicable**
- 11.4 Do paths through the information architecture support users' tasks and goals? **yes**
- 11.5 Is the path for any given task a reasonable length (2-5 clicks)? **yes**
- 11.6 Is the path clear of distracters and other obstacles to reaching task goals? **yes**
- 11.7 Are there a few, helpful cross-reference links that are related to the current task goal? **yes**
- 11.8 Do redundant links have the same labels? **not applicable**

- 12.1 Is there a site map? **not applicable**
- 12.2 Is the site map linked from every page? **not applicable**
- 12.3 Does the site map provide a quick overview of the whole site (rather than descriptions of the top level choices (see [aarp.scudder.com](http://www.aarp.scudder.com)), a rehash of the main navigation (<http://www.drugdigest.org/DD/Home/SiteMap/0,4087,,00.html>) or a list of every single topic on the site)? **no sitemap available**

Visual Design: Designing the pages

- 13.1 Are pages clean looking and well organized (versus cluttered or busy)?
in general clean looking – depending on the theme used; three column layout and the number of blocks used in the different sections give access to a lot (too much?) information at a first glance
- 13.2 Is there a clear visual “starting point” to the page?
two starting points possible: overview of courses; overview of individual course.
- 13.3 If pages are dense with content, is content grouped or otherwise clustered to show what is related? **dependent on the approach chosen: contents can be presented in different forms, e.g. grouped by topic; by week etc. in general pages give a good overview of the content**
- 13.4 Is it easy to tell what is content and what is advertising?
no advertising foreseen at the moment
- 13.5 Do task-supporting keywords stand out? **Keywords, e.g. for block headings do stand out; labels used for these headings sometimes ambiguous**
- 13.6 Are images relevant to, and supportive of, the text content? **The icons and symbols used are supportive and give clear indication of underlying functionality**

- 13.7 Are there videos or animated sequences? If so, do they support specific goals or tasks? **Yes**
- 14.1 Is the default type size 12-point or larger? **relative values (em) in the CSS definitions are mixed with absolute values – body element uses 13px as standard; default font size is at the minimum level, certain elements, i.e. accessing the personal profile (right top) and certain table headings (11px) are too small**
- 14.2 If not, is there an obvious way on the page to increase the type size? **no, there is also no indication how browsers might be used to increase font size**
- 14.3 If not, does changing the type size in the browser enlarge all of the text? **yes**
- 14.4 Is the type size on pull-downs and drop-down menus the same size as the text content? Does it change when the user increases the type size? **yes it does**
- 14.5 Are headings noticeably larger than body content (18- or 24-point)? **yes they are (relative values)**
- 14.6 Is sans serif type used for body content? **yes (Verdana, Geneva, Arial, Helvetica, sans-serif;) - including fall back font / font family**
- 14.7 Are headings set in a typeface that is easy to read? **yes**
- 14.8 Are there visual cues to direct users' attention to important items that are in the left and right columns? **block in the right and left column use different background colour as well as another background colour for headings**
- 15.1 Are pages dense with information, or sparse, or in between? Is the amount appropriate for the audience and type of site? **rather dense, especially the number of blocks / functionalities are overwhelming for the target group (older adults)**
- 15.2 Are the most important and frequently used topics, features, and functions, close to the centre of the page rather than in the far left or right margins? **features and functions are on the left and right column; as an LMS the focus is probably more on the content in the centre**
- 15.3 Are task-related topics grouped together? **yes in block on the left and right column**
- 15.4 Are frequently used topics, actions, and links “above the fold”? **depending on screen resolution and number of activated blocks / functionalities; in general yes**
- 16.1 Are text and interaction elements a different colour from the background (not just a different hue)? **yes**
- 16.2 Do the colours that are used together make information easy to see and find? **yes – blocks / functionalities and content space use different background colours; links are easy to identify**
- 16.3 Are clickable items highlighted differently from other non-clickable highlighted items? **cf. above**
- 16.4 Are multiple types of highlighting minimized on each page? **only one sort of highlighting is applied (blue font-colour and “underline” as hover-effect; change in background colour might be helpful)**
- 17.1 Are there visual cues in the layout of the page that help users know there is more content “below the fold”? **no; only scroll bars**

- 17.2 Is there line space between clickable items? (at least 2 pixels).
yes, taking into account the needs of the target group, space could be widened
- 17.3 Is body text broken up with appropriate and obvious headings?
in relation to the course overview yes; not applicable on learning materials yet

Information Design: Writing and formatting the content

- 18.1 Is the amount of text minimized; is only necessary information present? yes
- 18.2 If there are introduction paragraphs, are they necessary? yes
- 18.3 Are instructions and messages easy to recognize?
yes; additional title-element used on some functionalities
- 18.4 Is there liberal use of headings, bulleted lists, and links to assist skimming? yes
- 18.5 Do bulleted lists have the main points and important keywords at the beginning of each item? not applicable
- 18.6 Do links have meaningful labels?
Most of the time; exceptions: course title in the breadcrumb menu; "mehr...", etc.
- 18.7 Are buttons labelled clearly and unambiguously?
Most of the time; exceptions: e.g. "Mitteilungen" in personal profile
- 18.8 Do button and link labels start with action words? yes
- 19.1 Is the content written in active voice, directed to "you"? not applicable
- 19.2 Are sentences short, simple, and straightforward? yes
- 19.3 Are paragraphs short? yes
- 19.4 Is humour used appropriately, if at all? not applicable
- 19.5 Are headings, labels, and captions descriptive of associated content? yes
- 19.6 Are conclusions and implications at the top of a body of text, with supporting content after? (inverted pyramid) not applicable
- 20.1 Does the site use words that most older adults know? depending on the level of experience of the users in general yes – difficulties may arise with certain functionalities and settings (Skype-ID, ICQ, AIM, logout, Blog, Ajax, email-format, etc. - the different settings on the personal profile page in general are distracting
- 20.2 If there are technical words or jargon, are they appropriate for the level of domain expertise that the audience has? cf. above
- 20.3 If there are new or technical terms, does the site help users learn what the terms mean? Glossary might be implemented but not in a standard installation
- 20.4 Are concepts and technical information (such as safety and effectiveness information about a prescription drugs) written in plain language? not applicable
- 20.5 Are instructions written in plain language? yes
- 20.6 Is the reading level appropriate for the capabilities of the audience and their literacy in the topic area? Is it easy to draw inferences and to understand the implications of text? in general yes (more important for learning materials)

9.2.2 Thinking Aloud Tests

Test person 1: female, 51 years old, low computer skills (took part in a computer training course at the time of the test)

1. Open Moodle learning platform at <http://moodle.ict4t.net> in a browser - URL is typed into the Google search bar by the test person
2. Difficulty to find course
3. Difficulty to find login:
 - test person clicks on the Moodle button at the bottom of the page – test person identifies this as the login button
 - does not read through text on the right (“Is this your first time here?”)
4. Difficult to find user profile – User name in the top right corner not clear enough
5. Personal profile: far too complex; too many settings, too many unknown terms (Skype, AIM, etc.);
6. Scrolling (esp. on the personal profile site) is difficult – test person is looking for submit/save button but the button is not visible on the screen, additionally there is no indication (besides scroll bars) that there are more options/contents available.
7. User is not aware of the term “blog”
8. User finds it hard to use screencast/movie as a learning material
 - difficult to identify navigation tools (play/pause/stop)
 - user would like to have an overview on the topic + links to different parts of the movie
9. Posting to the forum is relatively easy
10. User has no difficulties accessing the “text/image only” learning material
11. Identification of tasks is a problem
12. Uploading a file to the system is a problem: User does not know how to upload file, i.e. select file on the local hard drive via the form provided. User is unsure which button to click for finally uploading the file
13. “Logout” button is not easy to find.

Additional Comments made after the Thinking Aloud test

- User points out that fonts, e.g. for accessing the personal profile are too small.
- The structure of the learning materials could be improved – user would like to have an overview of the courses at the top of the website.
- Titles of the blocks on the left and right column are not that clear to the user, e.g. user points out the difficulty to identify the place for personal settings. Searches in the heading “participants”.

Test person 2: female, 59 years, old, low computer skills (basic email, browsing)

1. URL is typed into Google search bar (homepage of browser)
2. Difficulty to find course (link to course is not noticed)
3. Difficulty to find login button
 - however – status “not logged in” is noticed
 - does not notice text: “Is this your first time here...”
4. Difficulty to find user profile
 - would not have looked for it in the side menu (participants) without support
 - did not think of clicking on user name in the right above corner
 - profile has too many tabs which were not noticed at once
 - “change password” button found at once
 - navigation back to the course is not clear (uses browser buttons), breadcrumb menu unknown
5. User has difficulties to differentiate between “course” and “learning material”
 - When searching for learning material the button to hide all exercises except one is clicked unconsciously; exercises cannot be retrieved without help
 - The link “Assignments” in the left side menu is found to be distracting, as it does not contain all exercises
6. User finds it hard to use the screencast as learning material
 - handling of player navigation is unclear
 - presented process in the screencast appears too fast
7. No difficulties in posting to the forum
 - Button “send message” only found by chance
 - Support “how to write texts” not necessary (“I know this!)/ user expected technical support at this point
8. Confusion when other applications open “suddenly”(e.g. Open Office, Outlook) or when other applications need to be used (e.g. to unzip a folder)
 - user is not aware that she left the course
 - too many tabs in taskbar make it hard to find the course again
9. Basic terms/functions are unknown which leads to confusion (e.g. hiding of file extensions, the term “zip-file”, to download a file to the hard drive, to browse the hard drive in advance of uploading a file)
10. Help pages with lots of text have a discouraging effect and therefore are not read
11. Search in forum is done manually, search mask used without problems (after hint from researcher)
12. Log out process unclear, closing of browser understood as log out

Additional Comments made after the Thinking Aloud test

- User points out that after completing a task a clear introduction of how to proceed would be very helpful.
- She would like to have explanations for the use of text processing, etc.

9.3 Recommendations for Interface Design and Navigation

Log in/ Log out

- Button "Login to Course XY" should appear on the frontpage
- "Login as a guest" should be eliminated – distracting
- It has to be clarified whether this section "Is this your first time here..." is really needed or how it can be optimised.
- Log out button should be placed more prominent on the website

User profile

- Button "user profile/my settings" or "user name" should be placed more prominent on the website
- Personal settings should be reduced in complexity / unknown and unneeded terms should be deleted from user profile (e.g. Skype, AIM, etc.)
- Button "update profile" could be changed to "save changes" – makes it more clear to users

Course structure/Presentation of tasks

- Button "Course XY" should be available on each page for navigating back to the course overview, e.g. menu bar at top of the page
- Tasks should be clearly labelled for every topic ; links "Assignments" and "Resources" from the left side menu should be deleted since they are misleading >> assignments should be clearly attributed to "Topics"
- The possibility to show/hide Topics should be deleted

Forum

- Button "send message" should be more prominent in the forum
- Help on "how to write texts"... etc. could be substituted by technical support

Help/Support

- Clear explanations for the use of other applications should be provided in the learning materials when needed (training in advance might be forgotten too fast if not applied at once) – e.g. using zip-files, text processing, saving of documents on hard drive, using flash player
- Help pages should be structured clearly and should not contain too much text

General remarks

- The use of terms the target group is not familiar with should be avoided if not necessary (e.g. blog)

9.4 Suggestion for Possible Design of the Moodle template

Based on the findings of the Thinking Aloud tests with the two test persons and Heuristic evaluation, the following suggestion for the design of a Moodle template for the SeniorLearning courses was developed. Note that colours used in the paper mock up do not reflect actual colours!

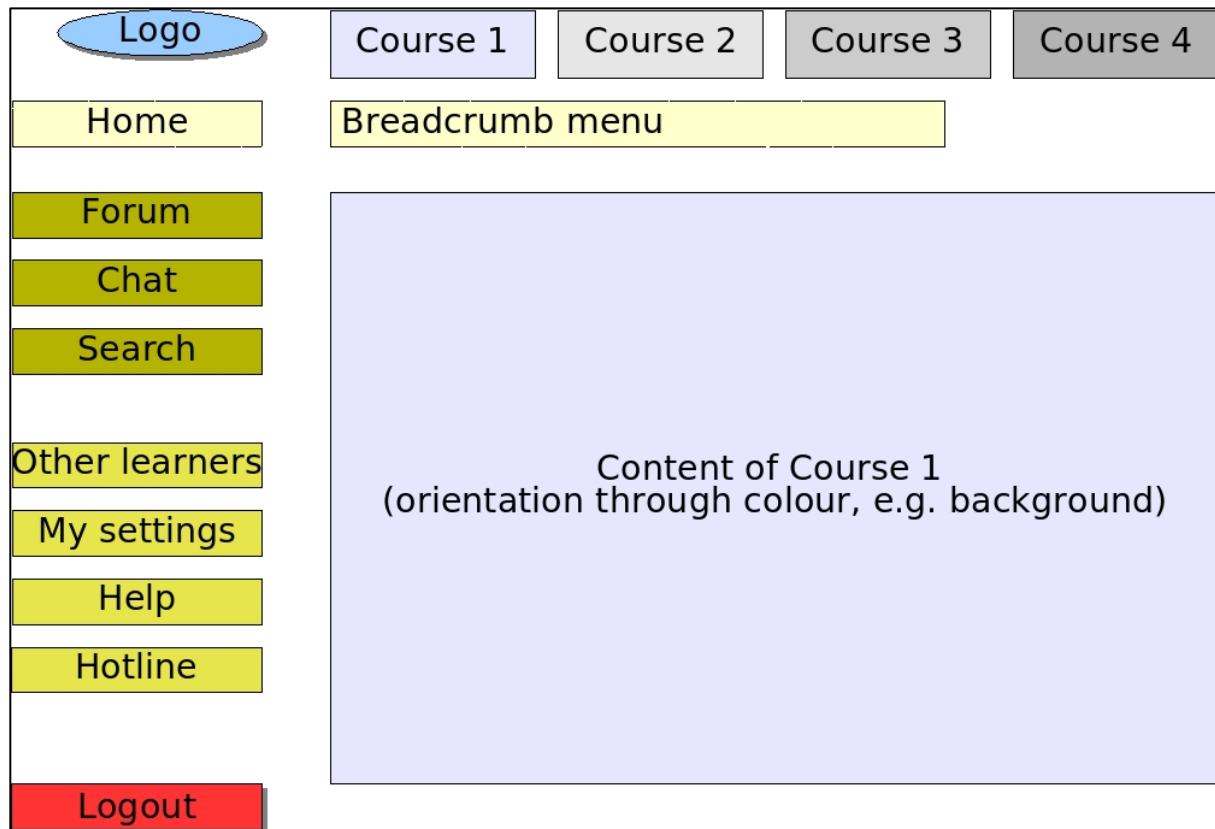


Fig. 1: Paper mock up of Moodle template

Elements

- 2 column layout
- “Functionality block” on the left – most often used functionalities grouped
- “Other learners” - access profiles of others
- “My settings” – too small and hard to find in the top right corner as it is at the moment
- “Help” and “Hotline” as very important “tools” - hotline should be telephone hotline! Older adults are used to this way of communicating
- “Logout” in the left bottom – clearly labelled and easy to identify symbol
- General course navigation on top > learning units should reflect colours used for course navigation in order to facilitate orientation
- Breadcrumb menu (incl. label “You are here:”) indicating current position of user; Labels for links should give a clear picture about present positions – no acronyms, codes etc.!

9.5 Some Recommendations for Learning Materials

- state learning goals
- present learning contents in small sections
- indicate the approximate time needed to complete the learning unit
- indicate necessary pre-knowledge to successfully complete the course
- describe the assessment methods at the beginning of the course
- provide small summaries at the end of a unit + repeating questions
- progress bar where users can see the learning progress they have made in terms of completed units
- short repetition at the beginning of a unit (if units depend on each other)
- descriptions of tasks should also contain information on the usage of applications needed to complete the tasks (e.g. Zip, Flashplayer, etc.)

10 Resources for Usability Tests

10.1 Thinking aloud test

A) DESCRIPTION OF TEST OBJECT

→ Test object

LMS Moodle + selected learning materials

→ Description of LMS

The test object is the learning management system MOODLE installed on <http://moodle.ict4t.net>

The version used for testing is 1.7.1

The theme used for testing is “formal_white” and only minor adaptations have been made on the platform resulting in only minor differences to a standard installation - please see the attached screen shots for details. Screencasts of the tests are available as well; please contact christian.petter@futurestudies.org for further information.

Moodle is a GPL licensed Learning Management System which puts the focus on the parallel distribution of courses, which may be taught by trainers/teachers/tutors. The focus is on supporting collaborative work on learning materials in learner groups. Moodle supports individual learners, but this is not the aim of the LMS. In order to fully support learners a set of different tools are offered: Forum, Wiki, tests, tasks, exercises, workshops etc. (cf. <http://moodle.de/mod/book/view.php?id=3>). For a detailed description of Moodle in English have a look at <http://moodle.org/>

→ Description of learning materials

The selection of learning materials focuses on the different possibilities of the LMS as well as different forms of learning materials.

- a) Screencast (developed using the software Camtasia) opening in the current browser window of Moodle
- b) Learning material (text+graphic) opening in the current browser window of Moodle
- c) Learning materials in the form of a small training course: The course consists of several html files in a zip-file. Learners have to download (a small pop-up window opens) the file, unzip it and open the materials in their browser.
- d) Accessible learning materials provided by University of Linz. The learning material is similar to c) but offers sliding html-pages as well as sound (Realplayer installation necessary).

The learning materials selected focus mainly on “climate” and “multimedia” in order to attract persons and in parallel do not provoke any aversions, bias etc.

B) TESTING

→ Procedure

Test persons are informed about the background of the project and reasons for

testing the LMS. The testing procedures are explained to them: for this purpose the usage of the Laptop used for carrying out the tests, as well as the headset (used to record comments by the test persons) are presented to the test persons.

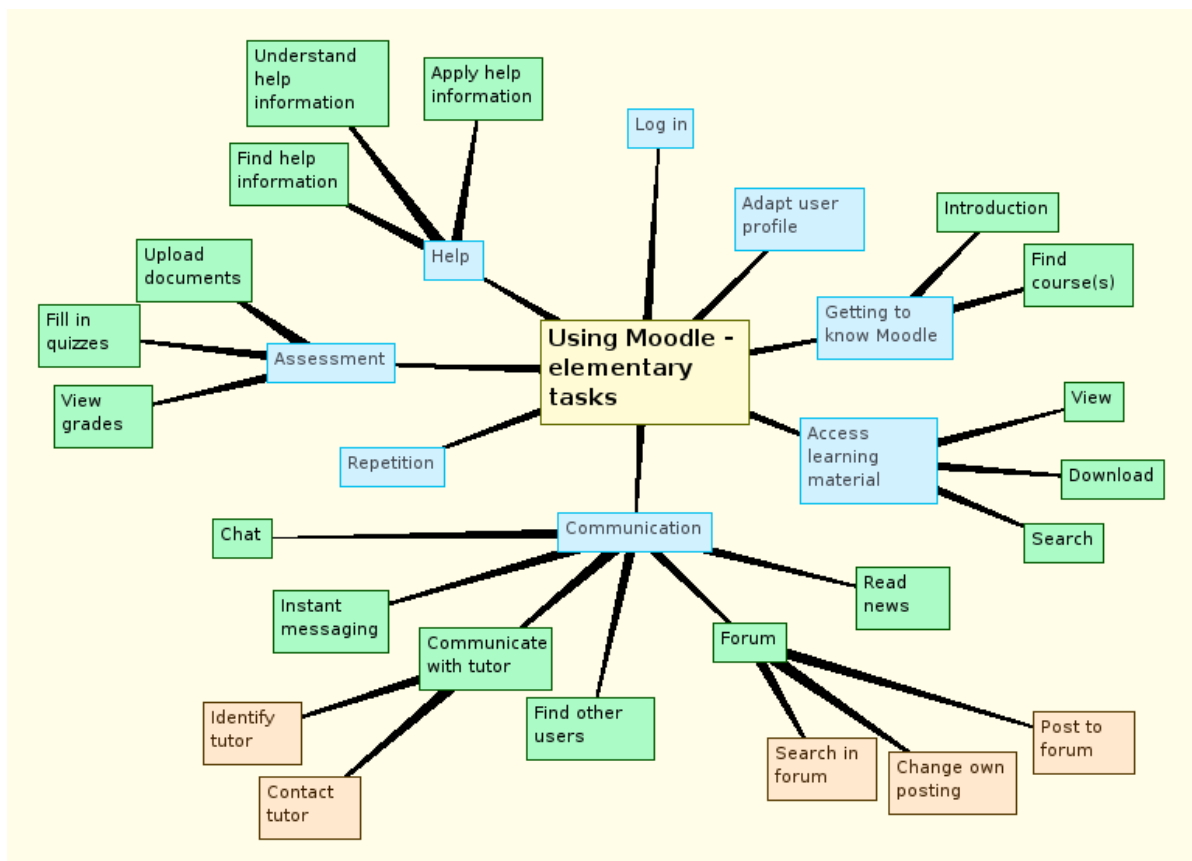
The necessity of speaking aloud all the tasks, ideas, reflections of the test persons is once again pointed out to the test persons. The test phase takes about one hour and is completed by the log out of the user from the platform.

For recording the screen as well as the spoken comments of the test person the software Camtasia (<http://de.techsmith.com/camtasia.asp>) is used.

A talk with the test person about her/his experiences/feelings/preference during the test marks the end of the session. A short interview guideline is given below.

→ Tasks

A LMS like Moodle offers a multitude of different functionalities to the user. In order to make the tests operable within a reasonable amount of time and focus on the needs of the SeniorLearning project a selection out of the possibilities as listed in the graphic below had to be made. The selection tries to focus on the most important tasks to be carried out by users on the LMS using a standard instructional design and standard tools on the platform.



- Find course
 - Name of course: Testkurs
- Log in
 - User-ID: user
 - Password: user
- Adapt user profile

- Fill in email address: user@mail.com
- Change password to: user1
- Using learning materials 1
 - Open the material "[Erstellen von Audiodateien - Podcast](#)"
 - Listen to the screencast for two minutes
 - Answer the following question by posting it to the forum of the learning unit: "Auf welche Audiosoftware bezieht sich der Vortragende?"
 - Go to the "Nachrichtenforum" of the learning unit
 - You can find a thread named "Forum Podcast"
 - Post your answer into this thread
- Using learning materials 2
 - Open the "Arbeitsmaterial [Klimazonen der Erde](#)"
 - Read through the learning material
 - Go to the overview on the learning units again and open the task "[Aufgabe Klimazonen](#)" - follow the instructions given there.
- Using learning materials 3
 - Download the "Arbeitsmaterial [Klima](#)"
 - Go to the folder "Klima" and
 - Open the file "index.html" in your browser
 - Go through the learning material.
- Using learning materials 4
 - Download the zip-file [Lernmaterial.zip](#)
 - Unzip the file to your local hard drive
 - Go to the folder "Lernmaterial" and
 - Open the file "index.html" in your browser
 - Go through the learning material.
- Searching the forum:
 - Search the term "podcast" in the forum
- Logout

➔ **Interview guideline**

What is your personal feeling at the moment?

Which tasks did you find especially difficult to perform?

Which tasks were easy to perform?

How do you like the design of the interface in general?

Which type of learning materials did you prefer?

Which recommendations would you like to give the developers of the software?

When you think about YOUR ideal learning software and environment – how would it look like?

10.2 Heuristic evaluation

10.2.1 AARP heuristics for Moodle testing

Based on: Chisnell, D. and Reddish, J.: Designing Web Sites for Older Adults: Expert Review of Usability for Older Adults at 50 Web Sites. Washington, 2005.

Interaction Design: Designing the way users work with the site

1 Use conventional interaction elements.

- 1.1 Does the site use standard treatments for links?
- 1.2 Is link treatment the same from section to section within the site?

2 Make it obvious what is clickable and what is not.

- 2.1 In lists of bulleted links, are the bullets clickable?
- 2.2 Are command and action items presented as buttons?
- 2.3 Do buttons and links show that they have been clicked?
- 2.4 Are buttons clearly labelled?
- 2.5 If there is an image on a button or icon, is it task-relevant?
- 2.6 Do graphic buttons avoid symbols that will be unfamiliar to older adults who have low computer and Web expertise?
- 2.7 Is there a visible change (other than the cursor changing) when the user “points” to something clickable with his or her mouse?

3 Make clickable items easy to target and hit.

- 3.1 Are buttons large enough to easily see the image or text on them – at least 180 x 22 pixels?
- 3.2 Is the area around buttons clickable?
- 3.3 Is there enough space between targets to prevent hitting multiple or incorrect targets?
- 3.4 Do buttons and links enlarge when the rest of the text size is increased?

4 Minimize vertical scrolling; eliminate horizontal scrolling.

- 4.1 Does the site work at the resolution that the user would typically view the site at without horizontal scrolling?
- 4.2 Do pop-ups and secondary windows open wide and long enough to contain the content without the need for scrolling?
- 4.3 For scrolling lists, for example, a list of all the states:
 - Are checkboxes used rather than drop-down or pull-down menus?
 - If not, are drop-down menus (a menu that drops down when requested and stays open without further action until the user closes it or chooses a menu item) used rather than pull-down menus (a menu that is pulled down and that stays available as long as the user holds it open)?

5 Ensure that the Back button behaves predictably.

- 5.1 Does the Back button appear on the browser toolbar on every page?
- 5.2 Does clicking the Back button always go back to the page that the user came from?

6 Let the user stay in control.

- 6.1 Is there no rolling text that goes by automatically?
- 6.2 Does the site use static menus (a click leads to another page) rather than “walking

menus" (exposing a sub-menu on hovering)?

6.3 If there are walking menus, do they expand on a click (rather than a hover)?

6.4 Are the sub-menus timed to stay open for 5 seconds or until they're clicked?

7 Is there clear feedback on actions?

7.1 Are error pages descriptive and did they provide a solution to the user?

7.2 Are confirmation pages clear?

8 Provide feedback in other modes in addition to visual.

8.1 Are captioning and or meaningful alternative text provided for images, video, and animation?

8.2 Does the site support haptic (vibrating, tactile feedback) pointing devices (such as the Logitech iFeel mouse)?

Information Architecture: Organizing the content

9 Make the structure of the Web site as visible as possible.

9.1 Does the site use a directory list format for listing topics (such as Yahoo! does or hhs.gov or firstgov.gov)?

9.2 Does the site use cross-references to related topics and redundant links?

9.3 Is the site hierarchy as broad and shallow as possible?

10 Clearly label content categories; assist recognition and retrieval rather than recall

10.1 Are labels descriptive enough to make it easy to accurately predict what the content will be under each topic category?

10.2 Do labels and links start with different, distinct, and relevant key words?

10.3 Are labels useful and understandable each on their own?

10.4 Do labels reflect language that older adults are familiar with?

11 Implement the shallowest possible information hierarchy.

11.1 Are important, frequently needed topics and tasks closer to the surface of the Web site?

11.2 Are related topics and links grouped and labelled?

11.3 Do labels and category names correspond to users' tasks and goals?

11.4 Do paths through the information architecture support users' tasks and goals?

11.5 Is the path for any given task a reasonable length (2-5 clicks)?

11.6 Is the path clear of distracters and other obstacles to reaching task goals?

11.7 Are there a few, helpful cross-reference links that are related to the current task goal?

11.8 Do redundant links have the same labels?

12 Include a site map and link to it from every page.

12.1 Is there a site map?

12.2 Is the site map linked from every page?

12.3 Does the site map provide a quick overview of the whole site (rather than descriptions of the top level choices (see aarp.scudder.com), a rehash of the main navigation (<http://www.drugdigest.org/DD/Home/SiteMap/0,4087,00.html>) or a list of every single topic on the site)?

Visual Design: Designing the pages

13 Make pages easy to skim or scan.

- 13.1 Are pages clean looking and well organized (versus cluttered or busy)?
- 13.2 Is there a clear visual “starting point” to the page?
- 13.3 If pages are dense with content, is content grouped or otherwise clustered to show what is related?
- 13.4 Is it easy to tell what is content and what is advertising?
- 13.5 Do task-supporting keywords stand out?
- 13.6 Are images relevant to, and supportive of, the text content?
- 13.7 Are there videos or animated sequences? If so, do they support specific goals or tasks?

14 Make elements on the page easy to read.

- 14.1 Is the default type size 12-point or larger?
- 14.2 If not, is there an obvious way on the page to increase the type size?
- 14.3 If not, does changing the type size in the browser enlarge all of the text?
- 14.4 Is the type size on pull-downs and drop-down menus the same size as the text content? Does it change when the user increases the type size?
- 14.5 Are headings noticeably larger than body content (18- or 24-point)?
- 14.6 Is sans serif type used for body content?
- 14.7 Are headings set in a typeface that is easy to read?
- 14.8 Are there visual cues to direct users’ attention to important items that are in the left and right columns?

15 Visually group related topics.

- 15.1 Are pages dense with information, or sparse, or in between? Is the amount appropriate for the audience and type of site?
- 15.2 Are the most important and frequently used topics, features, and functions, close to the centre of the page rather than in the far left or right margins?
- 15.3 Are task-related topics grouped together?
- 15.4 Are frequently used topics, actions, and links “above the fold”?

16 Make sure text and background colours contrast.

- 16.1 Are text and interaction elements a different colour from the background (not just a different hue)?
- 16.2 Do the colours that are used together make information easy to see and find?
- 16.3 Are clickable items highlighted differently from other non-clickable highlighted items?
- 16.4 Are multiple types of highlighting minimized on each page?

17 Use adequate white space.

- 17.1 Are there visual cues in the layout of the page that help users know there is more content “below the fold”?
- 17.2 Is there line space between clickable items? (at least 2 pixels)
- 17.3 Is body text broken up with appropriate and obvious headings?

Information Design: Writing and formatting the content

18 Make it easy to find things on the page quickly.

- 18.1 Is the amount of text minimized; is only necessary information present?
- 18.2 If there are introduction paragraphs, are they necessary?
- 18.3 Are instructions and messages easy to recognize?

- 18.4 Is there liberal use of headings, bulleted lists, and links to assist skimming?
- 18.5 Do bulleted lists have the main points and important keywords at the beginning of each item?
- 18.6 Do links have meaningful labels?
- 18.7 Are buttons labelled clearly and unambiguously?
- 17.8 Do button and link labels start with action words?

19 Focus the writing on audience and purpose.

- 19.1 Is the content written in active voice, directed to “you”?
- 19.2 Are sentences short, simple, and straightforward?
- 19.3 Are paragraphs short?
- 19.4 Is humour used appropriately, if at all?
- 19.5 Are headings, labels, and captions descriptive of associated content?
- 19.6 Are conclusions and implications at the top of a body of text, with supporting content after? (inverted pyramid)

20 Use the users’ language; minimize jargon and technical terms

- 20.1 Does the site use words that most older adults know?
- 20.2 If there are technical words or jargon, are they appropriate for the level of domain expertise that the audience has?
- 20.3 If there are new or technical terms, does the site help users learn what the terms mean?
- 20.4 Are concepts and technical information (such as safety and effectiveness information about a prescription drugs) written in plain language?
- 20.5 Are instructions written in plain language?
- 20.6 Is the reading level appropriate for the capabilities of the audience and their literacy in the topic area? Is it easy to draw inferences and to understand the implications of text?

10.2.2 Adapted AARP heuristics for testing the training courses

Probably needs adaptation during the further progression of the project!! e.g. will the course be implemented in Moodle or linked via Moodle, etc...

Based on: Chisnell, D. and Reddish, J.: Designing Web Sites for Older Adults: Expert Review of Usability for Older Adults at 50 Web Sites. Washington, 2005.

Interaction Design: Designing the way users work with the site

1 Use conventional interaction elements.

- 1.1 Do the learning materials use standard treatments for links?
- 1.2 Is link treatment the same from section to section within the learning materials?

2 Make it obvious what is clickable and what is not.

- 2.1 In lists of bulleted links, are the bullets clickable?
- 2.2 Are command and action items presented as buttons?
- 2.3 Do buttons and links show that they have been clicked?
- 2.4 Are buttons clearly labelled?
- 2.5 If there is an image on a button or icon, is it task-relevant?
- 2.6 Do graphic buttons avoid symbols that will be unfamiliar to older adults who have low computer and Web expertise?
- 2.7 Is there a visible change (other than the cursor changing) when the user “points” to

something clickable with his or her mouse?

3 Make clickable items easy to target and hit.

3.1 Are buttons large enough to easily see the image or text on them – at least 180 x 22 pixels?

3.2 Is the area around buttons clickable?

3.3 Is there enough space between targets to prevent hitting multiple or incorrect targets?

3.4 Do buttons and links enlarge when the rest of the text size is increased?

4 Minimize vertical scrolling; eliminate horizontal scrolling.

4.1 Does the learning material work at the resolution that the user would typically view the learning material at without horizontal scrolling?

4.2 Do pop-ups and secondary windows open wide and long enough to contain the content without the need for scrolling?

4.3 For scrolling lists, for example, a list of all the states:

- Are checkboxes used rather than drop-down or pull-down menus?
- If not, are drop-down menus (a menu that drops down when requested and stays open without further action until the user closes it or chooses a menu item) used rather than pull-down menus (a menu that is pulled down and that stays available as long as the user holds it open)?

5 Ensure that the Back button behaves predictably.

5.1 Does the Back button appear on the browser toolbar on every page?

5.2 Does clicking the Back button always go back to the page that the user came from?

6 Let the user stay in control.

6.1 Is there no rolling text that goes by automatically?

7 Provide feedback in other modes in addition to visual.

7.1 Are captioning and or meaningful alternative text provided for images, video, and animation?

Information Architecture: Organizing the content

8 Make the structure of the learning material as visible as possible.

8.1 Does the learning material use cross-references to related topics and redundant links?

9 Clearly label content categories; assist recognition and retrieval rather than recall

9.1 Are labels descriptive enough to make it easy to accurately predict what the content will be under each topic category?

9.2 Do labels and links start with different, distinct, and relevant key words?

9.3 Are labels useful and understandable each on their own?

9.4 Do labels reflect language that older adults are familiar with?

10 Implement the shallowest possible information hierarchy.

10.1 Do paths through the information architecture support users' tasks and goals?

10.2 Is the path for any given task a reasonable length (2-5 clicks)?

10.3 Is the path clear of distracters and other obstacles to reaching task goals?

10.4 Are there a few, helpful cross-reference links that are related to the current task goal?

10.5 Do redundant links have the same labels?

11 Include an index of contents and link to it from every page.

11.1 Is there an index of contents?

11.2 Is the index linked from every page?

Visual Design: Designing the pages

12 Make pages easy to skim or scan.

12.1 Are pages clean looking and well organized (versus cluttered or busy)?

12.2 Is there a clear visual “starting point” to the page?

12.3 If pages are dense with content, is content grouped or otherwise clustered to show what is related?

12.4 Do task-supporting keywords stand out?

12.5 Are images relevant to, and supportive of, the text content?

12.6 Are there videos or animated sequences? If so, do they support specific goals or tasks?

13 Make elements on the page easy to read.

13.1 Is the default type size 12-point or larger?

13.2 If not, is there an obvious way on the page to increase the type size?

13.3 If not, does changing the type size in the browser enlarge all of the text?

13.4 Is the type size on pull-downs and drop-down menus the same size as the text content? Does it change when the user increases the type size?

13.5 Are headings noticeably larger than body content (18- or 24-point)?

13.6 Is sans serif type used for body content?

13.7 Are headings set in a typeface that is easy to read?

13.8 Are there visual cues to direct users’ attention to important items that are in the left and right columns?

14 Visually group related topics.

14.1 Are pages dense with information, or sparse, or in between? Is the amount appropriate for the audience and type of site?

14.2 Are the most important and frequently used topics, features, and functions, close to the centre of the page rather than in the far left or right margins?

14.3 Are task-related topics grouped together?

14.4 Are frequently used topics, actions, and links “above the fold”?

15 Make sure text and background colours contrast.

15.1 Are text and interaction elements a different colour from the background (not just a different hue)?

15.2 Do the colours that are used together make information easy to see and find?

15.3 Are clickable items highlighted differently from other non-clickable highlighted items?

15.4 Are multiple types of highlighting minimized on each page?

16 Use adequate white space.

16.1 Are there visual cues in the layout of the page that help users know there is more content “below the fold”?

16.2 Is there line space between clickable items? (at least 2 pixels)

16.3 Is body text broken up with appropriate and obvious headings?

Information Design: Writing and formatting the content

17 Make it easy to find things on the page quickly.

- 17.1 Is the amount of text minimized; is only necessary information present?
- 17.2 If there are introduction paragraphs, are they necessary?
- 17.3 Are instructions and messages easy to recognize?
- 17.4 Is there liberal use of headings, bulleted lists, and links to assist skimming?
- 17.5 Do bulleted lists have the main points and important keywords at the beginning of each item?
- 17.6 Do links have meaningful labels?
- 17.7 Are buttons labelled clearly and unambiguously?
- 17.8 Do button and link labels start with action words?

18 Focus the writing on audience and purpose.

- 18.1 Is the content written in active voice, directed to “you”?
- 18.2 Are sentences short, simple, and straightforward?
- 18.3 Are paragraphs short?
- 18.4 Is humour used appropriately, if at all?
- 18.5 Are headings, labels, and captions descriptive of associated content?
- 18.6 Are conclusions and implications at the top of a body of text, with supporting content after? (inverted pyramid)

19 Use the users’ language; minimize jargon and technical terms

- 19.1 Does the site use words that most older adults know?
- 19.2 If there are technical words or jargon, are they appropriate for the level of domain expertise that the audience has?
- 19.3 If there are new or technical terms, does the site help users learn what the terms mean?
- 19.4 Are concepts and technical information (such as safety and effectiveness information about a prescription drugs) written in plain language?
- 19.5 Are instructions written in plain language?
- 19.6 Is the reading level appropriate for the capabilities of the audience and their literacy in the topic area? Is it easy to draw inferences and to understand the implications of text?

11 Appendix - Resource Collection

IFS

Klaus Reich

5.12.2006

Name	Type	Relevant aspects addressed	Description	URL / Contact information / Reference
Usability for Senior Citizens	Webpage (report)	Readability, Clickability, User satisfaction, Senior internet users	<p>Well known usability specialist Jakob Nielsen writes about design guidelines for websites, especially those relevant for seniors' needs: "The Internet enriches many seniors' lives, but most websites violate usability guidelines, making the sites difficult for seniors to use. Current websites are twice as hard to use for seniors than for non-seniors."</p> <p>The webpage outlines some of the aspects covered in: "Nielsen Norman Group Report: Web Usability for Senior Citizens: 46 Design Guidelines Based on Usability Studies with People Age 65 and Older."</p> <p>The guidelines are based on empirical findings made by usability testing with 44 senior internet users. Nielsen states that web usability is lower for senior persons (65+) because "Websites tend to be produced by young designers, who often assume that all users have perfect vision and motor control, and know everything about the Web. These assumptions rarely hold, even when the users are not seniors. However, as indicated by our usability metrics, seniors are hurt more by usability problems than younger users. Among the obvious physical attributes often affected by the human aging process are eyesight, precision of movement, and memory. Also, many seniors retired without having used computers and the Internet extensively during their working careers."</p>	<p>http://www.useit.com/alertbox/20020428.html last visited: 4.12.2006</p>
Web Accessibility for Older Adults	Webpage	Usability tests, graphic analyser, aging vision simulator	<p>There are two very interesting aspects on this website:</p> <ul style="list-style-type: none"> * Links to statistics on senior Internet users and links to a set of tools intended to evaluate usability for elderly people. * The tools include the following: <ul style="list-style-type: none"> - Dottie - The Dottie tool evaluates a Web page for compliance with the National Institute on Aging guidelines for making senior-friendly Web sites. 	<p>http://cob.fit.edu/facultysites/abecker/Accessibility/main.html last visited: 4.12.2006</p>

			<ul style="list-style-type: none"> - Readme - The ReadMe tool evaluates the content of a Web page in terms of reading complexity. - Graphic Analyzer - The Graphic Analyzer uses neural net technology to transform an image (gif file) into one that is seen by a person with colour-deficiency or visual-acuity problems. - Aging Vision Simulator - The Aging Vision Simulator tool demonstrates the yellowing and darkening of an image, as seen by a 60 or 75 year old adult. - Usability Enforcer - The Usability Enforcer transforms a Web page by enforcing usability rules associated with a user profile and computing environment. 	
Accessibility at Microsoft	Webpage	Accessibility, barrierfree web design, Operating system, Windows, Office	<p>There are many reasons why to include Microsoft in this link collection: Microsoft is offering the most often used operating system and office suite, and therefore there is a strong need, as well as legal requirements, to make it as usable and accessible to users as possible. Microsoft has taken several initiatives in this field – some of them described on this website. More important the website also documents built in accessibility features in Microsoft products as well as assistive technology products for Microsoft. The website is especially targeted at users in need of accessible products but also enterprises and software developers working on usable and accessible software based on the Microsoft products.</p>	http://www.microsoft.com/en/able/ last visited: 5.12.2006
Interface Design Guidelines for Users of All Ages	Report	Usability testing, Physiological changes, accessibility, disabilities, colour	The report intends to give an overview on interface design for all users, but taking into account the special needs of elderly people on 17 pages. Clearly the report highlights most important issues which have to be taken into account in developing user interfaces for all ages. These guidelines are helpful as they give an overview on a series of issues that have to be taken into account but for real tackling o problems further resources have to be considered.	AgeLight LCC: Interface Design Guidelines for Users of All Ages. 2001. URL: http://www.agelight.com/web/docs/designguide.pdf last visited: 5.12.2006
Unabhängiges Wohnen im Alter mit innovativen Kommunikationsmöglichkeiten	Thesis	Television, interface design, fonts, colours, form, layout, presentation	<p>In the relevant parts of her thesis Astrid Tarkus is describing needs in of elderly persons in relation to fonts, colours, forms and layout. Most interesting parts cover considerations in relation to the use of pictures, video and sound.</p> <p>The general topic of the thesis is the development of an application on TV-screen for the target group 65+.</p>	Tarkus, A.: Unabhängiges Wohnen im Alter mit innovativen Kommunikationsmöglichkeiten. Graz, 2005. Unpublished thesis.
Making Your Web Site Senior Friendly	Checklist	fonts, easy-to-read text, media,	I am quite sure that the statement “They go on line principally to find health information, to plan personal travel and for e-mail.” is changing rapidly. More and more the web will become important in fields related to communication, elearning, etc. as well for elderly users. Therefore the guidelines presented	National Institute on Aging and the National Library of Medicine: Making Your Web Site Senior Friendly. URL:

			<p>offer a basic overview of most important aspects to be considered in developing web pages.</p> <p>The chapter on the design of text is worth having a (short) look at: "Older adults also process information more slowly than younger adults. There are effective ways to present text to mediate these age-related changes." Good for a first overview and awareness raising, too much on the surface in order to really get profound background information.</p>	<p>http://www.nih.gov/icd/od/ocp/resources/wag/documents/hecklist.pdf last visited: 5.12.2006</p>
<p>Die Generation 50+ im Internet – Webangebote für Ältere erfolgreich umsetzen</p>	Report	<p>Statistical information on Internet use of elderly people, socio-demographic developments, recommendations for web usability, outlook on future design needs</p>	<p>Unfortunately this report is in German only as it is covering important aspect in relation to elderly Internet users:</p> <ul style="list-style-type: none"> * The first chapter of the report highlights demographic developments especially in relation to spare time activities, use of media and the own perception of elderly persons. * The statistics on available hard- and software and the Internet use of elderly people are mainly based on data from Germany. Nevertheless some interesting conclusions can be drawn for other countries as well. Very interesting: chapters on usage habits and points of interest. * The chapter on usability and barrier free website design provides valuable information on a series of aspects in the field. <p>Worth reading: Outlook on future developments in the Internet.</p>	<p>netaspect gmbh: Die Generation 50+ im Internet – Webangebote für Ältere erfolgreich umsetzen. Düsseldorf, 2005.</p>
<p>ETSI - European Telecommunications Standards Institute</p>	Website	<p>Standards, usability, norms, design-for-all, usability testing</p>	<p>The European Telecommunications Standards Institute offers a series of publications for free at their website (registration required for downloading more than three papers).</p> <p>Most interesting papers in relation to the SeniorLearning project include</p> <ul style="list-style-type: none"> - "Human Factors (HF); Guidelines for ICT products and services; "Design for All" - "Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability" - "Human Factors (HF); Minimum Man-Machine Interface (MMI) to public network based supplementary services" - "Human Factors (HF); Usability evaluation for the design of telecommunication systems, services and terminals" 	<p>URL: http://www.etsi.org/ last visited: 1.12.2006</p>
<p>Designing Web Sites for Older Adults: Expert Review of Usability for Older Adults at 50 Web Sites</p>	Report	<p>Personas, usability testing, heuristics, website evaluation</p>	<p>A statement to bear in mind taken from the foreword:</p> <p>"The existing heuristics seemed to me to be focused on people's disabilities rather than on people's abilities. Not everyone over 50 has eyesight poor enough to require maximizing the size or contrast of text of a web page. Not every person over 50 has problems with motor control or significant short term memory loss." (p. 6). In the report the team reports "... findings from an expert review of 50 Web sites. In a variation on the traditional heuristic</p>	<p>Chisnell, D. et al.: Designing Web Sites for Older Adults: Expert Review of Usability for Older Adults at 50 Web Sites. Washington, 2005. URL: http://www.aarp.org/olderwis</p>

			<p>evaluation methodology, we used heuristics derived from research about older adults and Web design to perform persona-based, task-based reviews of Web sites that older adult users are likely to go to.”</p> <p>Recommended: Having a look at the “personas” developed, and how they have been used for evaluating the different websites. Additionally their approach to segment the target group 50+ in more specific audiences is interesting (p13 ff).</p> <p>The list of heuristics given at the end of the report and used for usability evaluation gives a good indication on the numerous aspects to be taken into account.</p>	<p>erwired/oww-resources/designing_web_sites_for_older_adults_expert_review.html last visited: 1.12.2006</p>
<p>SCoPE Seminar: Accessibility of eLearning</p>	<p>Website</p>	<p>Accessibility, usability, design-for-all</p>	<p>The seminar has just started (4th December 2006) and participation might be of interest for all project partners.</p> <p>Description taken from the website: “For the past three years, the Adaptech Research Network has been investigating the accessibility of eLearning (e.g., PowerPoint in the classroom, online tests) to Canadian college and university students with visible and invisible disabilities. During this seminar, Jennison and Catherine will describe the research and share some early findings from their 409 research participants:</p> <ul style="list-style-type: none"> ➔ college and university students with disabilities who have used eLearning ➔ professionals who provide disability-related accommodations on campus ➔ faculty who have taught a course where they used some form of eLearning and had at least one student with a disability in that course, and ➔ individuals who support/drive eLearning at their institution. <p>They will also be eager to hear about your experiences teaching using eLearning with people with disabilities, your successes, and lessons learned. Wherever possible, they will provide guidance and suggestions, as well as facilitate the sharing of best practices among participants.</p>	<p>http://scope.lidc.sfu.ca/mod/forum/view.php?id=336 http://scope.lidc.sfu.ca</p> <p>last visited: 5.12.2006</p>

CRIC

Clara Valenti

5.12.2006

Name	Type	Relevant aspects addressed	Description	URL / Contact information / Reference
Age-Related Research-Based Usability Guidelines	Webpage	Usability Guidelines	Conclusions of a study which pretended to determine the degree to which perceived adherence to the guidelines had and impact on site performance and preference.	http://www.usability.gov/pubs/112005news.html
Web Content Accessibility Guidelines	Webpage	Guidelines explaining how to make Web content accessible to people with disabilities	Several guidelines describing how to make Web content accessible to people with disabilities and to <i>all</i> users. These guidelines do not discourage content developers from using images, video, etc., but rather explain how to make multimedia content more accessible to a wide audience. Guidelines described include: colour, language, multimedia... matters.	http://www.w3.org/TR/WCAG10/
Making It Easy For Seniors (and Everyone Else)	Website		Short article about Tom Tullis current work: how to improve websites for older adults. Although its short size, some conclusions from his experience are described on it, concerning specially "caution clicking" and "tooltips".	http://www.worldusabilityday.org/stories/tom-tullis-making-it-easy-for-seniors-and-everyone-else
Authoring Tool Accessibility Guidelines 2.0	Webpage	guidelines for designing Web content authoring tools	Draft document including recommendations for assisting authoring tool developers to make their tools (and the Web content that the tools generate) more accessible to all people, especially people with disabilities.	http://www.w3.org/TR/2006/WD-ATAG20-20061207/
Usability at Fidelity	Webpage	"Top Ten" Lessons Learned from Usability Tests	Dr. Tom Tullis, Fidelity Vice President (Boston), shared the "Top Ten" Lessons Learned from Usability Tests, presented in an educational evening exploring Human Factors and Usability.	http://www.acm.org/chapters/nuchi/2001/01mtg.html
Effective Web Design Considerations for Older Adults	Webpage	"Aging population" as an argument for accessibility	This paper from Microsoft is intended to be a wake-up call to Web designers and businesses, raising international awareness of certain considerations and requirements. This document is broken down in to bulleted sections, addressing the following basic design topics: layout, style, color, contrast, fonts, general usability, accessibility, educate the user, links & resources and related reading.	http://lists.w3.org/Archives/Public/w3c-wai-ig/1999AprJun/0639.html
Involving Seniors	Report	Involving	Having in mind that one of the main uses of computers for seniors is to look	http://personalpages.manche

in Designing Information Architecture for the Web		prospective users in the design of the Web.	for health information; this study applied a series of user-centred design exercises to build a senior-oriented information architecture for health-related information on the Web. The results of the study showed that involving prospective users in the design can capture users' underlying perceptions of different components of the information architecture, including the structure and the labels of the hierarchy. The resulting information architecture is expected to be more user-friendly as we believe it is designed based on closer fit to user's mental model.	ster.ac.uk/staff/S.Kurniawan/files/HCI_health.pdf
User-centred development of video telephony	Report	User-centred development of video telephony for servicing mainly older users: review and evaluation of an approach applied for 10 years.	“Participatory ergonomic research and development (R&D) approach, PERDA, with an emphasis on user-centered technology and usability, has been applied to video telephony and its applications.” This report consists on an exhaustive study about video telephony usability, described in general and through two cases. The focus has been on the considerable involvement of ergonomics within the engineering and implementation of VT.	http://www.humantechnology.jyu.fi/articles/volume2/2006/vayrynen-roning-alakarppa.pdf
An Information Society Open to All	Report	European Commission guidelines for eAccessibility	Information from European Commission regarding eAccessibility	http://europa.eu.int/information_society/doc/factsheets/012-eaccessibility.pdf
Teens Teaching Internet Skills to Senior Citizens	Paper	An original approach to teach IT to seniors	a pilot for a larger, national effort to engage youth in teaching senior citizens computer and Internet skills to navigate and obtain needed information from the Medicare web site	http://www.joe.org/joe/2002june/rb2.html

FKK

Peter Bartal

18.12.2006

Name	Type	Relevant aspects addressed	Description	URL / Contact information / Reference
A conceptual view of web-based e-learning systems	Paper (pdf)	Learner modelling, personalisation, content management	Starting from a general framework for web-based an e-learning system that is based on an abstraction layer model, this paper presents a conceptual modeling approach. Courses are modeled by outline graphs, which are further refined by some form of process algebra. The linguistic analysis of word fields referring to an application domain helps to set up these course outlines. Learners are modeled by classifying value combinations for their characteristic properties. Each learner type gives rise to intentions as well as rights and obligations in using a learning system. Finally, the management of data in an e-learning system is approached on two different levels dealing with the content of individual learning units and the integrated content of the whole system, respectively. This leads to supporting databases and views defined on them.	Klaus-Dieter Schewe et al. - A conceptual view of web-based e-learning systems - Education and Information Technologies 10:1/2, 81–108, 2005. Springer Science + Business Media, Inc.
A web-based e-learning system for increasing study efficiency by stimulating learners motivation	Paper (pdf)	increase of learning efficiency, stimulating learner's motivation, grouping of learners	In today's e-learning systems the completion rate is about 30%. One of the reasons is the low study desire when the learner studies the learning materials. In this paper, an interactive Web-based e-learning system is proposed with the aim of increasing the e-learning completion rate by stimulating the learner's motivation.	Leonard Barolli et al. - A web-based e-learning system for increasing study efficiency by stimulating learner's motivation - Inf Syst Front
Senior Net	Website	education for and access to computer technologies for senior citizens	SeniorNet's mission is to provide older adults education for and access to computer technologies to enhance their lives and enable them to share their knowledge and wisdom." This website was designed for seniors. Information, starting points and tutorials.	http://www.seniornet.org/php/default.php
Bobby by Watchfire	Website / software	Test websites for accessibility issues	Bobby is free software specially designed to check any URL specified for accessibility issues. Different compliance levels (recommendations) can be selected. Other options help customize the settings for accessibility issue search.	http://webxact.watchfire.com/

Techniques for Web Content Accessibility Guidelines 2.0	Website / guidelines	W3C approved guidelines for website accessibility	Web Content Accessibility Guidelines 2.0 (WCAG 2.0) covers a wide range of issues and recommendations for making Web content more accessible. This document contains principles, guidelines, and success criteria that define and explain the requirements for making Web-based information and applications accessible. "Accessible" means usable to a wide range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning difficulties, cognitive limitations, limited movement, speech difficulties, photosensitivity and combinations of these.	http://www.w3.org/TR/WCAG20/
IMS Guidelines for Developing Accessible Learning Applications	White paper	Innovation Adoption Learning – Global Learning Consortium published a white paper with detailed accessibility guidelines	The guidelines developed by the IMS Accessibility Project Group and presented in this document, will provide a framework for the distributed learning community. This framework will highlight existing solutions, discuss the opportunities and strategies for their implementation and will identify areas where further development and innovation are required to ensure education that is truly accessible to anyone, anytime, anywhere. Other standards and guidelines currently exist; however the IMS Accessibility Guidelines are targeted at the distributed learning community and specifically address the challenges that exist in online education. The IMS Accessibility Guidelines are not meant to replace existing standards and guidelines, but instead to references to those resources and to provide additional information and solutions compatible with existing recommendations. That said, some topics addressed in this document, such as mathematic, scientific and music notation guidelines do not yet have mainstreamed or widely adopted solutions. In these cases, this document offers suggestions and indicates the direction of current research.	http://www.imsproject.org/accessibility/accessiblevers/index.html
An approach to usability evaluation of e-learning applications	Paper (pdf)	Accessibility evaluation issues	This work is a first step towards the definition of a methodology for evaluating e-learning applications. Specific usability attributes capturing the peculiar features of these applications are identified. A preliminary user study involving a group of e-students, observed during their interaction with an e-learning application in a real situation, is reported. Then, the proposal is put forward to adapt to the e-learning domain a methodology for systematic usability evaluation, called SUE. Specifically, evaluation patterns are proposed that are able to drive the evaluators in the analysis of an e-learning application.	C. Ardito et al. - An approach to usability evaluation of e-learning applications - Univ Access Inf Soc (2006) 4: 270–283

IPIC

Oonagh Mc Nerney

19.12.2006

Name	Type	Relevant aspects addressed	Description	URL / Contact information / Reference
Usability News	Website	Usability issues of Internet relating to Blind, Children, Senior Citizens	A UK website featuring relevant news about usability issues. Good source of papers, articles, studies, etc. on Internet usability for all segments of users (not just senior citizens). An interesting article: http://www.usabilitynews.com/news/article3431.asp Entitled: "HCI2006: Designing for Older People - Hints and Tips" This article summarises the conclusions of the the HCI 2006 workshop on "HCI, the Web and the Older Population", organised by UK universities of renown: University of Cambridge, University of Dundee, Middlesex University.	www.usabilitynews.com
Evaluation of Websites for Older Adults: How "Senior-Friendly" Are They?	Webpage/report article	Usability tests and Guidelines for senior-friendly websites	This report corresponds to an evaluation of 36 websites which were designed for older adults to determine how well they complied to 25 "senior-friendly" guidelines recommended by the National Institute of Aging. Results of the study revealed that a majority of the sites complied with guidelines related to basic navigation and content style but not for text size, text weight, or site map availability. Implications of compliance to these guidelines on user satisfaction and performance are discussed.	http://psychology.wichita.edu/surl/usabilitynews/61/older_adults.htm
Designing websites for older users	Webpage/Report Article	Usability tests and recommendations	This article features the main findings/results/conclusions from a study which was carried out by an organisation called Webcredible, whereby they conducted a series of 40-minute 'talk-aloud' sessions which involved asking participants to find information on a range of government websites - 8 of these sessions were conducted with elderly users (i.e. over the age of 65), and 8 with younger users (i.e. under the age of 40). Recommendations for designing websites for older users are provided on the basis of the findings of this study.	http://www.webdevtips.co.uk/webdevtips/article.php?item=102
Designing websites with senior citizens in mind	Article	Improving websites for the elderly.	This is an article which featured in the Boston Globe in 2005. It is an interesting little article that provide a few key suggestions as to just some of the problems faced by elders when using the Internet: such as lack of familiarity with computers, difficulty reading small type, distinguishing certain colours, or remembering information in the short term, arthritis and hand tremors which can make using a mouse difficult, etc. It also comments on	http://www.boston.com/business/technology/articles/2005/04/03/designing_websites_with_senior_citizens_in_mind/?page=2

			interesting work done by Dr. Tullis from the Fidelity Centre in the US, in such areas as vibrating mouses, talking pop-ups, etc.	
Less is More in Web Search Interfaces for Older Adults	Report/Paper		Report on the research work carried out by 2 PhD students from the University of Tampere from the Tampere Unit for Computer Human Interaction (TAUCHI). They designed an elderly-friendly search interface which they called Etsin. They then carried out a usability study in order to evaluate the success of the design in comparison to Google. Results revealed that the participants faced fewer usability problems when using Etsin than Google and they valued the clarity of the Etsin interface. Among the main conclusions of this paper are that elderly users benefited from a simplified search engine interface that is easy to understand and that takes into account age-related issues. Some interesting design issues/problems/considerations, etc. are discussed in this paper.	http://www.firstmonday.org/issues/issue10_7/aula/index.html
SeniorLink	Website	WebSite designed for Seniors	This is a website which was designed by the Australian based Seniorlink Computer Club. This website was designed purely with seniors in mind and it is worth taking a look at both its design features as well as its interesting content. You will see when you enter the site that the tool bars, etc. are in large font and that visually everything is very simple and clear. Furthermore, it contains content that is relevant and of interest to seniors (as it as been designed by seniors) and contains information on seniors' health, IT training and support, financial planning, online shopping, news, travel, accommodation and special member services such as forums and advertising facilities.	http://www.seniorlink.com.au/index.shtml
Senior Net	Website	Website designed for Seniors	This is an example of another Australian website called Senior Net which belongs to a seniors association providing computer skills training and social interaction for its members. Again you will see in you enter the large font of the letters and the clear, simple design. Of interest might be to have a look at the training courses they are offering, which includes introductory level courses covering basic computer and Internet skills using Windows 95/98, MS Outlook Express, Eudora, Netscape, MS Internet Explorer; introduction and advanced word processing and spreadsheets using MS Word 2000 and MS Excel 2000. They also have "card making courses"! As well as Picture and Camera processing courses.	http://www.seniornet.com.au/
Computers made easy for senior citizens	Website	Tips, lessons, terminology, etc. to assist senior citizens in using internet	This website is designed to help seniors to understand how computers work and locate some resources for improving their computing skills. It could provide some food for thought for our own project. It gives definitions of basic computer terminology that we as savvy users may simply take for granted. The site is run by a PhD and Instructor of computer courses for the elderly so many of his experiences will be reflected in the information that he has	http://www.csuchico.edu/~csu/seniors/computing2.html

			deemed necessary to provide senior users with in the website. Also he has complied links to many free Internet tutorials and other instructional sites along with information about organizations, research techniques and other resources.	
Eye tracking study on Web-use: Comparison between younger and elderly users in case of search task with electronic timetable service	Report/Paper	Usability, Common problems and problems specific to elderly	This paper represents a report on work carried out in 2003 by Ryoko Fukuda and Heiner Bubb from the Institute of Ergonomics for the Technische Universität München in Germany. In order to study concrete difficulties in Web use, they carried out research to observe the behaviour of younger and elderly users with eye tracking during a timetable search task using electronic timetable systems on the Web. Results showed on the one hand common difficulties for younger and elderly users caused by an inconvenient navigational structure and an inappropriate page design. On the other hand, several important differences between the two age groups are confirmed. It suggests the necessity of particular consideration for elderly users in Web design. Some good content in this document and suggestions for future web designers/course designers.	http://www.psychnology.org/File/PSYCHNOLOGY_JOURNAL_1_3_FUKUDA.pdf
Silver Surfers	Website	Website and links for senior web users	I love this concept of “Silver Surfers”, i.e. older web users, normally the over 50s. This website is a non-profit making initiative which was initially set up to cater for the needs/interests of the over 50s but it seems it is now being used by the general public. Now there are many similar type sites, such as www.silversurfers.org.uk , etc, etc. There are even Silver Surfer weeks to promote the use of the Internet among seniors. These sites don't necessarily deal with ergonomic/usability issues, but they are highly relevant as they are being used by 1000s of seniors each day. The BBC asked Silvers Surfers in a survey what they were using the Internet for and there are some very interesting comments and feedback at the following link (at the end of the article): http://news.bbc.co.uk/2/hi/technology/5004584.stm Well worth a read!	www.silversurfers.net

Name	Type	Relevant aspects addressed	Description	URL	Contact information
Barrierefreies Internet	Website	Einstieg in das Thema bei Wikipedia	1 Internet-Techniken, die Barrieren darstellen 2 Grundlegende Techniken für barrierefreies Internet 2.1 Positionierung von Elementen 2.2 Bilder für Layoutzwecke 2.3 Interaktive Schaltflächen per CSS 3 Standards zur Barrierefreiheit 3.1 Europäische Union 3.2 Deutschland 3.3 USA 4 Siehe auch 5 Literatur 6 Weblinks	http://de.wikipedia.org/wiki/Barrierefreies_Webdesign	
Barrierefreies Webdesign	Website	Das Web und seine Zugänglichkeit	Grundlagen, Richtlinien, Buchtipps und Links zur behindertengerechten Gestaltung des Internet	http://www.barrierefreies-webdesign.de/index.php	
Zugänglichkeitsrichtlinien für Web-Inhalte 1.0	Website		Diese Richtlinien erläutern, wie Web-Inhalte für Behinderte zugänglich gemacht werden können. Diese Richtlinien richten sich an alle Entwickler von Web-Inhalten (Autoren von Web-Seiten und Site-Designer) und an Entwickler von Tools zur Seitenerstellung. Das primäre Ziel dieser Richtlinien ist die Förderung der Zugänglichkeit.	http://www.w3c.de/Translations/WAI/webinhalt.html	
Simone Kimpeler, Elisabeth Baier (Hrsg.). IT-basierte Produkte und Dienste für ältere Menschen – Nutzeranforderungen und Technikrends. Stuttgart:	Tagungsband zur FAZIT-Fachtagung „Best Agers‘ in der Informationsgesellschaft“		Darin ein Beitrag von Rolf Kirchmair: „Bedürfnisse und Anforderungen der Best Agers an IT-Produkte“	http://www.fazit-forschung.de/fazit-news.html?&no_cache=1&tx_ttnews[tt_news]=1389&tx_ttnews[backPid]=1	

Fraunhofer IRB Verlag, 2006					
WEB for ALL – Projekt für Barrierefreiheit im Internet	Projekt		<p>"LOB - Land ohne Barrieren" Bildungsinitiative zur barrierefreien Gestaltung von Internetseiten. Ausbildung von Internet-Lotsen, die ältere und behinderte Menschen bei der Einrichtung und Nutzung des Internets unterstützen. Projektbeschreibung: http://www.doit-regional.de/fileadmin/doitregional/downloads/lob.pdf</p> <p>(gefördert vom Impulsprogramm doIT-regional Baden-Württemberg http://www.doit-regional.de im Rahmen „Digitale Integration“)</p>	<p>www.land-ohne-barrieren.de www.webforall.info</p>	<p>Verein zur beruflichen Integration und Qualifizierung e.V. (Vbl) WEB for ALL – Projekt für Barrierefreiheit im Internet Alte Eppelheimer Str. 38 D-69115 Heidelberg Ansprechpartnerin: Kathrin Kaschura Tel.: 06221 / 970319 E-Mail: info@land-ohne-barrieren.de</p>