

Tenuta: Simplified Guidance for Usability and Accessibility

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Abstract

There are significant barriers preventing many users, often disadvantaged citizens such as people with disabilities and the elderly, from accessing many services and information provided by e-solutions, especially governmental and commercial web sites and public access systems.

Tenuta is a project funded by the EU from 2005 to 2007 that will help improve the usability and accessibility of transnational EU e-services supported by the EU eTEN programme. The paper explains why usability and accessibility are important in the eTEN application domains (eInclusion, eGovernment, eHealth and eLearning), and the economic and social benefits that can be obtained.

Tenuta will support projects in the use of well established but pragmatic usability and accessibility methods and techniques. Projects will be reviewed, e-solutions evaluated and improvements to both process and product recommended. A major challenge is to employ methods and techniques that with a few days support can transfer appropriate skills to organisations that may have limited previous experience in usability and accessibility.

The Tenuta partners are leading experts in the fields of usability and accessibility, and will make use of the extensive resources from previous EU projects to produce simpler, easy to apply guidance on the use of straightforward techniques combining usability and accessibility.

1 Overview

There is a significant barrier preventing a large number of citizens from making effective use of the e-services provided by governmental and commercial web sites and public access systems. The usability and accessibility of e-services must be improved so that they are easy to use and accessible to people with disabilities and the elderly and other emerging groups such as the immigrant population.

Tenuta will contribute to this objective within the EU eTEN program (European Commission, 2004), which supports the roll-out of e-services across Europe, by providing guidance on how to produce e-services that are not only accessible, but also easy to use.

Currently accessibility is primarily concerned with sensory, physical and cognitive compatibilities, while usability is primarily concerned with cognitive compatibility. In most organisations accessibility and usability are the responsibility of people with different skills (technical and human). Neither approach alone is sufficient. Only by integrating these approaches during development (see for example Hix & O'Connell, 2005) can people with disabilities and ageing citizens be given increased autonomy and the potential to play a full role in society.

Also guidance must be simplified. Many organisations pay lip service to ease-of-use without employing any specific methods to ensure that it is achieved. Many web developers know that web accessibility is important, but admit they do not fully understand relevant guidelines such as the Web Content Accessibility Guidelines (WCAG) (W3C, 1999) or how to apply them. More importantly, it is clear from our experience of working with a wide range of organisations, that the rationales underlying many

accessibility guidelines are not understood. A key aspect of the accessibility work within Tenuta will be training and support on the use of WAI recommendations, particularly WCAG1.0, and further versions of WCAG, if they become available during the lifetime of the project (versions 1.5 and 2.0 are currently planned within the near future).

Tenuta will provide practical advice on how to achieve usability and accessibility. This is not straightforward as merely consulting users during development or superficial adherence to WAI recommendations will not ensure usability and accessibility.

Tenuta will provide qualified assistance to help improve the usability and accessibility of eTEN projects through on-site assistance and guidance. Experienced specialists from Tenuta will support projects in the use of well-established but pragmatic usability and accessibility methods and techniques, combined with Email and telephone support and training courses/workshops.

The key stakeholders are people with the following roles in eTEN projects:

- Project managers: development teams need to understand which usability and accessibility resources are required during development.
- Designers: design teams need to understand how best to apply usability and accessibility methods during development.
- Usability specialists: need to understand how to complement existing approaches to usability with accessibility methods and best practice.
- Small and Medium sized Enterprises: guidance material must be appropriate for use by SMEs.

The project will provide simple, easy to apply usability and accessibility guidance that is tailored to meet the needs of the key stakeholder audiences.

eTEN projects will be given assistance to improve their web sites and/or public access systems. At least four projects will be documented as case studies on the Tenuta web site (www.etenuta.org), which will form an effective means of helping the main audiences understand how to apply the guidance material.

Tenuta will obtain feedback from the assisted projects on the effectiveness of the assistance provided.

Tenuta support will include helping projects to:

- Justify the business value of usability and accessibility.
- Review the needs for usability and accessibility and specify appropriate requirements.
- Apply usability and accessibility criteria to designs/solutions where needed.
- Select the most cost-effective methods for accessibility and user centred design.
- Test whether a solution conforms to usability and accessibility requirements and standards, and recommend improvements to both process and products/solutions.
- Improve projects' usability and accessibility capability.

2 eTEN Application Domains

Tenuta will support projects in the main eTEN application domains:

- eInclusion: Accessibility and Design for All specialists who need to understand how to complement existing approaches to accessibility and Design for All with usability methods and best practice.
- eGovernment: Organisations producing systems for government agencies who need to understand how to incorporate usability and accessibility requirements into procurement and development of systems for public and professional use.
- eHealth: Organisations providing eHealth services for public and professional use.
- eLearning: Courseware developers who need to understand how to make eLearning usable and accessible.

- Trust and Security: Security specialists who have to make appropriate trade-offs between security and usability.

2.1 eInclusion

The objectives of eInclusion in eTEN are “to address the specific needs of people with disabilities, the elderly and the socially disadvantaged, to contribute to overcoming socio-economic, educational, geographic, cultural and gender barriers and to favour the prevention of new risks of ‘digital exclusion’” and “the promotion of independence and the assistance of participation in society for the widest possible range of users” (European Commission, 2004).

At the launch of the European Year of People with Disabilities, European Commission (2003) declared that there were 37 million people with disabilities within the Union; to this must be added those from the countries that joined the EU in 2004. Any inclusive policy must also pay particular attention to the needs of the rapidly expanding elderly population of the Community. Thus people with disabilities and elderly people represent a substantial force within the Union, both in numbers and a political force.

The Special European Council of Lisbon on the Information Society (March 2000) took special account of the needs of people with disabilities in drawing up the New Regulatory Framework (European Union, 2003) that came into force in July 2003. The Framework in particular covers access to the World Wide Web, as well as other aspects of the information society.

Accessibility has been a central plank since the launch of the Information Society initiative in 1996 (European Union, 1996). The EU and its Member states have underlined their commitment to access to the Information Society by people with disabilities through establishing a special Group on Inclusive Communication (InCom) under the auspices of the Communications Committee (CoCom) which is responsible for implementing the New Regulatory Framework.

City University has recently completed research for the Formal Investigation into Web accessibility for the Disability Rights Commission of Great Britain (Disability Rights Commission, 2004). Most websites (81%) fail to satisfy the most basic Web Accessibility Initiative category. In addition, the results of the evaluations undertaken by people with disabilities show that they have characteristics that make it very difficult, if not impossible, for people with certain impairments, especially those who are blind, to make use of the services provided.

2.2 eGovernment

In the UK there is a growing awareness of accessibility and usability problems with government web sites. The government e-Envoy recently said that “UK government web sites tend to be boring and inaccessible, ie useless in many respects”. The UK government has issued its own guidance on user centred design (Office of the e-Envoy, 2003). However, this has been criticised as too complex and difficult to follow (Ferguson, 2003).

The Swedish National Audit Office has investigated the usability and accessibility of 92 Swedish public sector and governmental agency web sites (RRV, 2003). Not one site conformed to WAI guidelines. There was very little consistency, and users were forced to learn new structures, navigation techniques, menus, link locations and functions for each web site they visited. This challenged all users, but particularly people with disabilities and the elderly and those with little or no computer experience. Other common problems were poor navigation, which did not support the task at hand, or a structure that did not reflect user expectations. Citizens with learning disabilities and those with reading and writing problems were particularly affected. Link names, graphics and pictures were not adapted to technical aids for the visually disabled (such as speech synthesis). Information was published in a format that could not be used by people with disabilities.

2.3 eHealth

Usability is a critical factor for the success of eHealth applications. There do not appear to have been studies in Europe, but studies in the US have shown that most health web sites have low usability (D'Alessandro et al, 2001). The US Department of Health and Human Services has funded comprehensive guidelines for website usability and accessibility (usability.gov, 2004). Significant usability problems have also been found with medical information technology in patients' homes (Kaufman et al, 2003).

2.4 eLearning

In an analysis of three commercial eLearning packages, Frontend (2001) found that serious usability problems were common, including:

- Counter-intuitive reading order of on-screen material.
- Failure to relate to the real-world experience of the user.
- Poor presentation of key information.
- Lack of accessibility, even in the most basic sense.

Bevan & Kincla (2004) have produced specific HCI design guidelines for eLearning, based on a review of research and good practice.

eLearning also poses severe accessibility problems for students with disabilities. Research at City University recently found that commercial eLearning training programmes, which claim to be accessible (and compliant to Section 508, the accessibility-enabling procurement legislation in the USA), were completely inaccessible and unusable to blind and partially sighted students. This was a result of incomplete and inappropriate use of Section 508 (Dimitrova & Petrie, 2002).

2.5 Trust and Security

It is important that security features are designed to be usable, otherwise they can actually compromise security. For example users who are forced to frequently change complex alphanumeric passwords often resort to writing the current code on a sticky note attached to the screen.

There is a complex relationship between usability, trust and security. For example, InteractionArchitect.com has found that people's perception of security when doing on-line transactions depends on the simplicity of the site and on the availability of user support (D'Hertefeldt, 2000). People trust systems that are easier to use.

3 Benefits of Usability and Accessibility

One of the strategic objectives of eTEN is: "To enable citizens to derive full benefit from the single market and the information society" (European Commission, 2004). This can only be achieved if e-services are both usable and accessible.

There is also a need for simplified guidance: most web developers know that web accessibility is important, but many don't understand the WAI guidelines and need further support in understanding and implementing guidelines such as WCAG1.0. For example, a recent investigation conducted by City University for the British Disability Rights Commission found that only 9% of web developers surveyed claimed any expertise in accessibility issues (Disability Rights Commission, 2004).

3.1 Industrial competitiveness

Usability for all should be the major design objective for an interactive product or system: that it can be used for its intended purpose by the intended users. Increased usability and accessibility will bring significant benefits to European industrial competitiveness.

Most existing approaches to software and systems quality focus exclusively on adherence to technical and process requirements. Insufficient consideration of user needs and consequent poor usability has been one

of the major reasons why systems are either partially used, misused, abused, not used at all or have failed to gain broad acceptance. This problem is being aggravated as public users become an increasingly relevant target group for the information market. Especially for the public user, applications have to be easy to use and must address usability aspects such as enjoyability that are usually neglected in professional applications.

3.2 Reducing risk of failure

The Standish Group (2003) found that only 34% of IT projects completed were on time, on budget, and delivering the functionality required; 51% of IT project were “challenged”—meaning that they were not on time, not on budget, or not delivering the functionality required; and 15% of IT project failed or were abandoned. One of the major causes is inadequate user requirements. User centred design is a very cost-effective means of identifying user requirements and reducing the financial risk of releasing a system which will fail to meet its objectives in use (Landauer, 1996).

3.3 Assisting disadvantaged consumers

If complex systems can only be used by those with a technical aptitude or specialised skills, this will increase the divergence between the technologically advantaged and disadvantaged. The design of easier to use systems that more closely match user needs is an important way to bridge that gap. Wider adoption of user interface standards will provide greater consistency and transferability of skills.

3.4 Special needs: accessibility and Design for All

User centred design provides a framework for achieving accessibility and Design for All. The Design for All philosophy emphasises the need to provide access to information systems for the widest possible range of users, particularly the young and old, and those with impaired physical and visual capabilities. User centred design provides a framework within which to identify and understand the needs of such diverse user groups, and plan for how to integrate those needs into the development process (Bevan, 2000). Tenuta also has access to specific information on how to design for groups with special needs.

3.5 Special needs: elderly citizens

Another issue which deserves attention for the design of information applications is the demographic development in Europe. The number of elderly people in Europe is expected to almost double by the year 2025, while the under-20s group is set to decrease by 11%. By the year 2030, a third of the population will be over 60 years of age (Eurostat, 1997). This increase in the population of elderly people needs to be considered in the light of the corresponding shrinkage in more recent generations. The ratio of people of working age to those beyond working age is important for a number of reasons – it is the working people who generate the income to care for the older generations, but more importantly for the current argument, they also provide the person power to provide that care. The number of people of working age per older person is currently 2.75, but by 2020 this will drop to 1.99 (Buhler & Schmitz, 1999). This substantial decline in person power means that older people will need to increasingly rely on technology to care for themselves.

While many people are now connected to the internet, the number of older or retired people using it is still quite small. According to a Eurobarometer 2003 survey (European Union, 2005) the internet is only used by 17% of over 55s, compared to 69% of 14-24 year olds. In the USA, the Kaiser Family Foundation (2005) found that less than a third (31%) of senior citizens (age 65 and older) have ever gone online, but that more than two-thirds (70%) of the next generation of seniors (50-64 year-olds) have done so.

This raises the question of whether older people will be able to enjoy the benefits of the connected future, with information available electronically on tap, and convenient and inexpensive shopping on-line. If not, this would be a lost opportunity for suppliers as, according to Ofcom (the UK telephone watchdog organisation) and disability campaign groups, “A growing grey market containing millions of potential customers is being ignored in the telecoms boom” (Dawe, 1998). With the growing average age of the

population, systems have to take this factor into account both concerning the functional needs of this large group as well as concerning the actual user interface of the system. Usability is also a key issue for the group of people with special needs. It is also becoming a requirement in law as non-discriminative legislation is being discussed in Europe, both within separate countries and in the European Union. User centred design, development and evaluation processes and the observation of usability guidelines is therefore of utmost importance for the successful introduction of new telematics services.

For elderly people, accessibility and usability of technology is also very important, and will become more important in the future. As the demographic balance changes, elderly people will need as much technological support as they can use, to make up for the decreasing availability of human assistance. But as people currently in their 30s and 40s get older, they will expect to continue to use the technologies that they have become accustomed to (e.g. PCs, mobile phones, digital television) and will expect these mainstream technologies to be easy to use with a range of assistive technologies they may need to start using. So if mainstream technologies are not made both accessible and usable, this cohort will feel doubly disadvantaged, not only will they not have access to technologies, but they will be denied access to technologies that they already have (Petrie, 1997).

3.6 Special needs: people with disabilities

Providing e-services which are more accessible and more usable will have a considerable impact on the daily lives of people with disabilities.

For people with disabilities, the accessibility and usability of both mainstream and specialist technologies is currently very poor. Research by City University (Petrie & Johnson, 2003, Hamilton et al, 2003) has found that people with disabilities are currently very frustrated by the poor usability of their technologies and of the Internet. There is a very high rate of discarding assistive technology (Soede, 2001) that is undoubtedly related to poor usability issues. Yet technologies can transform the lives of people with disabilities if they are designed appropriately.

Assistive technology can allow people to do things they could not previously do (e.g. non-speaking people can communicate with Augmentative and Alternative Communication devices in ways which were simply impossible before computer technology) and do things far more effectively. Access to mainstream technologies is also extremely important for people with disabilities. As able-bodied people rely increasingly on technologies such as mobile phones and digital television, there is a fundamental need to ensure that these technologies are also accessible to and usable by people with disabilities. Thus there is a great need to consider both accessibility and usability issues in technology for people with disabilities.

4 Providing Support to eTEN projects

In many cases the organisations to be supported will not have existing skills in usability and accessibility. Organisations usually acquire these skills by:

- employing staff with the necessary skills, or
- employing consultants, or
- receiving training and support in use of the methods.

The objective is for Tenuta to offer training and support to all eTEN projects that require assistance with usability and/or accessibility of web sites and/or e-services. Support for usability will be provided by Nigel Bevan and Nigel Claridge, who have worked in previous EU projects to develop resources for usability and user centred design and to provide support (e.g. UsabilityNet, 2003). City University has extensive experience of providing support for accessibility, for example for the UK Disability Rights Commission and the Culture Online initiative of the Department of Culture, Media and Sport.

Tenuta only has resources to give each project between 3 and 10 person days of on-site support. How can this effort be used most effectively? Usability is not common sense, and it is not easy for amateurs to

make use of usability methods (Bias, 2003). But Bevan (2005) has shown that with hands-on training, existing design and development staff can learn to use simple usability methods.

Projects without previous experience of using usability/accessibility methods generally have great difficulty understanding how to apply the methods until they have been given some personal assistance. For example, City University's experience in training web developers in accessibility has been that developers need practical experience of seeing a range of WAI compliant and non-compliant code with a variety of technologies for people with disabilities (screen readers for blind people, screen magnification programs for partially sighted people and specialist software for dyslexic people) before they really grasp the importance of conforming to the guidelines. This is in spite of the fact that they often initially say they are aware of the guidelines and know what assistive technology people with disabilities use in accessing the Web.

Tenuta will provide each project with basic training in the use of simple methods. The typical sequence of activities will be:

- An audit of any prior activities undertaken by the project to ensure usability and accessibility.
- A detailed review of existing user requirements documentation and, if necessary, a workshop to identify and define the intended context of use (intended user groups and user characteristics, main user tasks and usage environment), and user scenarios. This is an essential pre-requisite for prioritising subsequent work on usability and accessibility, but in our experience, this information is rarely defined in sufficient detail (cf ISO 13407). The resulting concrete descriptions of the types of users and their tasks helps create awareness of usability and accessibility issues in the development organisation.
- Carry out a detailed expert evaluation of the usability of the prototype from the user's perspective, and a detailed expert accessibility audit, and make appropriate recommendations.
- The information from these activities will provide the basis for discussing the extent to which usability and accessibility are prerequisites for successful implementation of the system being developed, and the risks to success of the project if at least minimal usability and accessibility is not achieved. The result will be to establish usability and accessibility requirements.
- Agree the future activities needed to achieve the usability and accessibility objectives, and the degree of training and support required to carry out these activities.
- Provide training and support as necessary. This could include basic training in usability and accessibility methods, and/or hands-on training to assist existing staff in adopting simple design and evaluation techniques (see Bevan 2005, for usability examples and case studies).
- Provide support in obtaining assistive technologies used by people with disabilities in the target countries (this will involve obtaining screen readers and other assistive technologies in relevant languages). Contact will be made with local associations of visually impaired people to arrange demonstrations of the use of assistive technologies in relevant languages and establish ongoing links with experienced users to participate in evaluations.
- Obtain feedback from the projects on the extent to which the usability and accessibility targets are met.

The objective is to achieve a major improvement in usability and accessibility as a result of providing each project with this support, followed by telephone and email back-up.

5 Conclusion

Achieving the objectives listed above with limited resources will be challenging. The obstacles include:

- Both the EU sponsors and some of the projects may have preconceptions that all that is needed to achieve usability and accessibility is to follow a few well-established guidelines. The complexity of the issues to be resolved will only become apparent after initiating the activities listed above.

- There are insufficient resources to implement all the activities for all the projects, so some support may have to be provided remotely, and any projects requiring extensive assistance will have to make available their own resources to support this.
- Some projects with work-plans that are already well-established may resent the implication that their existing strategy is inadequate. The approach we will take will be to work co-operatively with them to discuss whether they have the skills and planned activities to achieve usability and accessibility objectives that are acceptable to their EU sponsors and that are adequate for achieving project success.
- It will be essential to tailor the activities to the specific circumstances of each project in order to make the most effective use of limited resources. The previous consultancy experience of the Tenuta partners will provide a good starting point, but we expect to become more efficient with increasing experience of this particular environment and the challenges it imposes.

To help eTEN projects beyond the duration of Tenuta benefit from our experience, we plan to exchange experience with others working in this field, and to document the training procedures and techniques that we find most effective, together with case studies.

Initial feedback on the success of the approach will be reported at the conference.

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