SPREADING WEBSITE USABILITY AND ACCESSIBILITY INTO SOCIETY: EXAMPLES FROM PUBLIC AND PRIVATE SECTORS IN TURKEY

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Abstract
Usability and Accessibility issues increasingly become important for efficacious use of publicly available websites and e-inclusion (among others) in today's knowledge society. In Turkey, there are also various initiatives taken for the diffusion of usability and accessibility into society. In this article, specific examples from public and private sector will be provided to present the Turkish case for usability and accessibility. In public sector, Türksat assumes a responsible role for the development and diffusion of standards for usability and accessibility. Various ongoing innovative initiatives in other public institutions such as Middle East Technical University complement these efforts for the improvement of usability. While, such public initiatives are important, they are not sufficient, and needs to be complemented with private initiatives. A good example of private sector initiative is Userspots. Furthermore, future initiatives are being considered for developing tools for online assessment of or focusing on web forms' usability/accessibility. These will be presented as examples of note-worthy initiatives and prospects in Turkey for raising awareness to and spreading usability and accessibility in public affairs. It is hoped the presented information about these initiatives will also provide useful information for related initiatives in other countries.
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1. INTRODUCTION

With the advent of the World Wide Web (WWW), a number of electronic online services including e-government services have emerged. And nowadays, people have encountered these services almost every part of their life. Therefore user interface of these systems have become a critical issue with the increasing dissemination of such systems. Especially, since these systems have been employed in governmental and public affairs, the numbers of the users that are unfamiliar with these online electronic services have also increased. Nevertheless, features of these systems should meet the personal characteristics, cognitive abilities and task requirements of these large numbers of people (Peng, Ramiah & Foo, 2004)

Recently, social computing can be considered to increase its impact on learning, social inclusion, health and governance in the EU information (to be more sophisticated, global knowledge) society and economy (JRC EC 2009). Meanwhile, e-Inclusion is one of the three pillars of the "i2010: European Information Society for Growth and Employment" initiative that emphasizes ICT as the main key to raising the quality of life. Accordingly the European Commission proposes a European Initiative on e-inclusion in 2008, meanwhile the Riga Ministerial Declaration 2006, set some objectives, one of which is e-Accessibility, to be achieved by 2010 as a landmark for e-inclusion (Balcı et al. 2008). Meanwhile, in general accessibility for disabled (or impaired) users holds a profound place for the provision of usability for every citizen. According to the ISO 9241 standards, based on the degree of excellence of a product, usability is defined 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. Another definition of usability can also be found as the capability of the software to be understood, learned, used and liked by the user, when used under specified conditions (ISO/IEC CD 9126-1 definitions) (Bevan, 1997, p. 3, 5).

Tests for usability and thus accessibility are then crucial for improvement of the software product (such as a home page of an institution on the Web) with respect to user feedback (Nielsen 1994). Similarly, Krug (2000) discusses the benefits of the (user) tests and suggests their incorporation to the design process of user-oriented interfaces. For instance, usage of eye tracking technologies nowadays are accepted to have an important impact on usability as a tool to improve computer interface such as applications and web sites (Alaçam and Dalcı 2009, Jacob and Karn, 2005; Kramer and McCarley, 2003).

Similarly, for instance, Web Accessibility Initiative (WAI, http://www.w3.org/WAI/), which provides the Web Content Accessibility Guidelines (WCAG), pursues accessibility of the Internet, developing user agents and authoring, evaluation and repair tools for accessibility (http://www.w3.org/WAI/about.html).

In this paper, we will discuss various public and private sector initiatives of usability and accessibility in Turkey, providing various examples and recommendations for the improvement of usability and accessibility that benefit from user tests. The paper then follows with a discussion of specific public sector initiatives in Turksat and Middle East Technical University, as well as of private sector initiatives in Userspots. Next, suggestions for future work on usability and accessibility, and development of tools for their testing will be provided, before the Conclusion.

2. PUBLIC AND PRIVATE SECTOR INITIATIVES ON USABILITY AND ACCESSIBILITY IN TURKEY
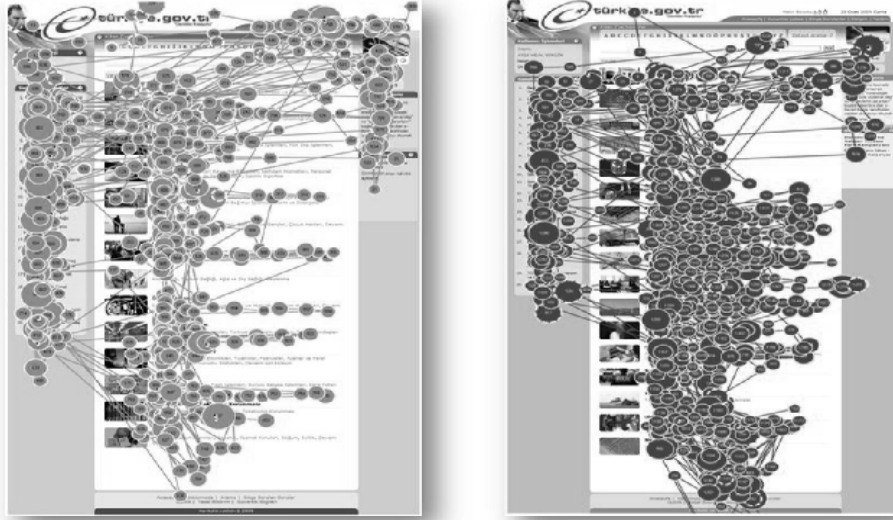
2.1. Türksat

Türksat is given major responsible and supportive roles for the e-government initiatives such as standardization of public websites, development and operation of e-Government Gateway in order to spread e-government into society. As a result of these initiatives, for instance, a guidebook is published to support all public institutions in the development and standardization of their websites (Web Sites of Public Agencies, Kamu Kurumları Internet Siteleri (KAKIS) document, Türksat, 2009). A support website is also available (www.kakis.gov.tr), where not only information and templates on issues such as usability and accessibility are available, but also a site assessment tool is provided. Furthermore, E-Government Gateway (EGG, www.turkiye.gov.tr), which is developed and operated by Türksat, is being improved to provide an example for the application of these standards.

For instance, Tobii tests to analyse user views are regularly implemented to maintain and improve the EGG (Figure 1). Eye tracker equipments, such as Tobii, measure eye positions and eye movements of users. Eye tracker helps to see the site through its visitors. The developer and manager of the site can determine the places where the visitors are looking/missing. The most effective places for advertisement can also be found, as a result.

In addition, tests for the accessibility of various disability groups are conducted. For instance, tests for blindness of different colours are conducted for EGG (Figure 2). Accordingly, characteristics of contrast and brightness (differences) could also be adjusted. Similar tests can also be conducted by the tools suggested at KAKIS.

Having developed and provided these Standards and EGG working in collaboration with academicians from Middle East Technical University and in coordination with Administration for Disabled People (Özürlüler İdaresi), Türksat has recently received recognitions and awards for its contribution to accessibility for disabled people in Turkey. Meanwhile, these developments and provisions are seen necessary but not enough for accessibility (Şat 2009)

Figure 1: User view analysis of the Citizen and State pages of EGG (the analysis, for instance, confirms that left side of the pages should be used to present significant information on the site, with the courtesy of Simsoft, Turkey)

Figure 2: How users that cannot see red (Protanopia) perceive EGG, Citizen Page (Left one is the regular perception)

2.2.   Middle East Technical University

In addition to Türksat, currently the only other Tobii equipment is available at works at Middle East Technical University. Works of Middle East Technical University (METU) can also be given as another example of usability and accessibility initiatives in Turkey.

During METU Library web page design, web accessibility issues and disabled people were also taken into consideration. Valid XHTML 1.0 is the html coding of website and a visually disabled student participated to library web page's usability test. Also this website is tested with screen reader application called Jaws. Similar to those enabled at EGG by Türksat, these achievements help visually disabled people to reach the university web site:

- • Alternative text is added to each image.

- • "Visually impaired users can easily access to METU web site content from this link" description is added to Text version link.

- • Alternative description is added to each Javascript menu.

- • Web page is tested with screen reader application.

In addition, for instance, Municipality of Ankara facilitates a cafe for disabled people with visibility problems, providing screen-reader software (jaws), Turkish synthesisers, print-outs with brail alphabet, among others, to their service. These are only some examples of the various initiatives taken by public institutions. While, such public initiatives are important, and appreciated (, as well as rewarded), they are not sufficient, and needs to be complemented with private initiatives. A good example of private sector initiative is Userspots, which will be described next.

2.3.   Userspots

Userspots (http://www.userspots.com/) conducts usability test of interface with users, tracks users' eye movements and find usability problems, gets the results of test and prepares analysis report including suggestions. These are the specific services provided by Userspots:

- Usability Testing - Usability test for interface helps to understand visitors and create user-friendly visitors. This technique is used evaluate interface by testing it on real users. Usability testing will be conducted with the help of Eye Tracker.

- Advertisement Analysis - Analiyzing advertisement perception with Eye tracker and user surveys.

- A/B Testing - A/B Testing is a method of measuring the effectiveness of alterations to your interface.

- User Needs Analysis - the needs of the users can be understood through focus groups, user surveys and interviews.

- Competitive Analysis - A comparison of competitors' interface.

- Usability Review - Evaluating user interfaces in terms of usability principles and checklists.

- Information Architecture Design and Testing - Using (online) card sorting, an Information Architecture based on how users categorized items in your organization structure can be developed

- Accessibility Analysis -Evaluating user interfaces in terms of accessibility checklists.

Specifically, usability test can provide direct input about the way how users use the interface, aiming to measure product in terms of performance, accuracy, recall and emotional response. Userspots conducts usability studies, tests interface with users, gets the results of test and prepares analysis report including suggestions.

After usability tests are conducted with users with the eye tracker, Userspots can analyze user behaviors, conduct user survey, provide feedback data, and prepare analysis report. Data gathered during usability testing sessions are listed below:

- Number of users that accomplish the task

- Number of steps while user doing tasks

- Number of mistakes while user doing tasks

- Time of accomplishing tasks

- Results of Survey (before and after study)

- Users feedback,mouse and keyboard usage and face expression while user doing tasks

- Eye tracker data

- Fixation number

- Fixation time

- Scanpath

- Heatmaps

Figure 3: Heat Maps (Hotspots) of EGG and METU pages (with the courtesy of Simsoft and METU)
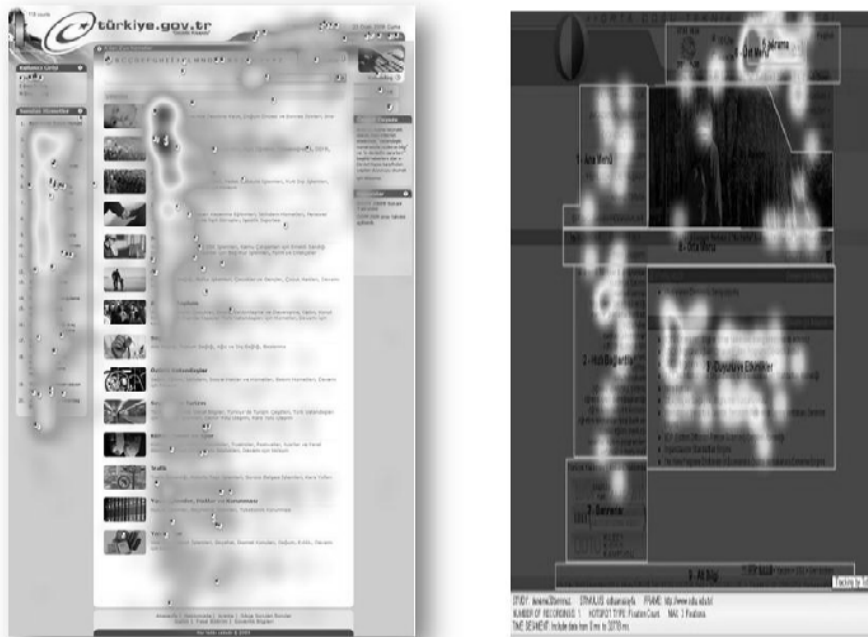
For instance, benefiting from the Eye tracking analysis, heat maps can also be produced. Heat maps are graded colour schemes for showing visual activity of users participating in. Warmer colours (orange,yellow) shows areas that most users looked at, while colder (green) colours show areas that few users noticed. (Figure 3)

Using social media such as Twitter, up-to-date developments regarding usability of Internet sites are continuously monitored and improvement suggestions to the interested parties are provided by Userpots. Moreover, a World Bank-supported project has been initiated to improve leading-edge software for improving accessibility.

The project is called "Accessible Pages for the Visually Impaired". The project aims at creating awareness among the web designers and content managers about accessibility so that they can offer alternatives to the visually impaired individuals. It thus intends to create awareness about accessibility, as usability and accessibility are concepts which have only recently been attached importance in Turkey, but are normally very critical parts of the design process.

It has been determined that this project is a necessity after learning about the needs and problems of visually impaired individuals from Claire Özel, who is included in the Handicap-Free METU Project and working with a visually impaired user who was included in the web page design process of METU Library. At the first stage of the project, contents will be

formed on the basis of Web. Contents Accessibility Guideline and translations from the accessibility books are to be obtained. The Usability and Readability Tests will be performed at the Human-Computer Interaction Laboratory at METU Data Processing Unit. In the usability test, the subjects will be asked to use the web site to be prepared and usability problems will be identified to prepare a more accessible web page.

Because the team will have extensive experience about accessibility by the end of the project, the project is considered to be maintained as accessibility consultancy initiative. In addition, the contents and guidelines in the bog and web site will continue to be effective after completion of project, and will serve as a source of reference on this subject. The project will take as a basis the second version, dated 11 December 2008, of the Web Content Accessibility Guidelines, the first version of which was prepared in 1999 by the WWW consortium.

All these examples show that public and private initiatives complement each other, and actually work together. While, Türksat develops and disseminates the Standards in collaboration with academicians from METU, companies that emerge from METU such as Userspots work together with METU and contribute to these developments and disseminations. Among others, initiatives of Simsoft is also another significant example of public private partnerships, which could be discussed in depth elsewhere.

In conclusion, such private sector efforts complement various ongoing innovative initiatives for the improvement of usability and accessibility in public institutions such as Türksat and METU. Furthermore, future initiatives are being considered to develop tools for online assessment of or focusing on web forms' usability/accessibility. These will be presented in the next section as examples of note-worthy initiatives and prospects in Turkey for raising awareness to and spreading usability and accessibility in public affairs.

3. SUGGESTIONS FOR FUTURE

There are several approaches available for designers to meet these usability requirements such as heuristic evaluation, pluralistic walk-through, cognitive walk-through, and graphical jog-through (Albion, 1999). Heuristics approach and user test are the most prevalent of these usability techniques. Heuristics approach is a usability method which "involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles" commonly referred as Heuristics (Nielsen). Heuristic evaluation is known as the easiest methods to learn and results in problem in user interfaces. (For instance Nielsen's ten heuristic principles). On the other hand, user test method "involves a real system and real users interacting with a real computer" (Fu, Salvendy & Turley, p.138). There are several works which compare heuristic and user testing approach, but a clear consensus does not exist about which method find more problems than other.

Meanwhile, the more advanced e-government services become, the newer issues of usability will also raise. For instance, a specific suggestion for the improvement of usability at web forms form the designer perspective is also provided below:

3.1. Creating Better Web Forms on e-Government Portals

As new e-Government applications start to appear on the Internet and become an integral part of our daily routine, we, as the designers of such applications, began facing a new dilemma. As our users are able to file tax reports, make payments and search through immense amount of

26

data , the amount of information we collect using web forms are getting larger in both size and complexity. This poses a new question of usability versus functionality: As we have increased the functionality of our applications, we have begun to sacrifice usability.

Our users now have to learn and adapt to new ways of entering data. In some cases, new application is so poorly designed; users prefer to use the conventional method instead of the online application. This is a major shortcoming we have to eliminate if we intend to spread the usage of such applications. During the course of this research we intend to test different approaches, styles and theories regarding human interaction on data input forms on e-Government web sites.

In this research, specifically, we intend to test the following aspects of a web form. We believe that these aspects directly affect the user experience and play an important role in the success of any online application. Variations of these particular aspects have been chosen according to industry standards and conventions.

These conventions were carefully chosen among published best-practices, popular web applications and forms we currently use on the Turkish e-Government portal (http://www.turkiye.gov.tr).

1. Segmentation of Web Forms (Single page or spread across several pages?)

2. Placement of labels (Top, Inline, Left or Right aligned?)

3. Default values (Are they really helpful? How to pick sensible defaults?)

4. Progress Indicators (Placement and contents of a progress indicator.)

5. Required Fields (Placement and appearance of required field indicators.)

6. Validation (Client side vs. server side validation. Where to place indicators?)

7. Error and Success Messages (How and where to present errors?)

8. Help Text (Placement of the text. Is this really necessary?)

9. Accessibility Issues (How disabled people use rich forms?)

10. Forgiveness of the Form (Undo & Redo. Submit with new parameters. Navigation.)

11. Order of Actions (Placement of submit buttons and other actions.)

12. Captcha (Is this really necessary? Where to use and how to determine complexity?)

13. AJAX (Dynamically created form elements. Usability and accessibility implications.)

14. Complex Elements (Address Pickers, Sortable Elements, Drag and Drop, Masked Inputs and their implications on usability and accessibility)

We intend to test the articles listed above, using the methods below where appropriate. All tests will be conducted with the presence of a controller. The controller will measure the time, ask questions before and after each task, and will be responsible for operating the eye tracker.

1. **Online or Paper?** On some complex cases (such as a tax report), user will be presented with a standard printed form and then will be asked to complete the online version. Upon

completion user will be asked to rate the overall experience. By conducting this research we will be able measure how much and if the online version is helpful to user. Since the main focus of this research is the usability aspect and submitting a paper form to a government agency often takes longer and complex, time to complete the form will be ignored.

2. **Eye Tracking:** An eye tracker device will be used to capture users browsing behaviour. User will be asked to complete several tasks and eye movements will be captured to produce heat-maps and browsing patterns. By conducting this research we intend to find out what type of presentation is easier to read and takes less to complete. We will also be able to learn what elements are ignored on what cases.

3. Duration: On cases involving presenting different versions (i.e. A form with different label positions) to user will be measured for completion time. In addition to eye tracking, gathering this data will enable us to measure which visual design is better perceived and therefore completed faster.

4. **Accuracy:** We will present user some fields that require carefully reading a set of instructions. In addition to eye tracking and duration tracking, gathering this data will enable us to measure which visual design is better perceived, completed faster and more accurately.

5. **User Rating:** We will ask user a few questions about the overall experience. Gathering this data will help us determine what visual style our users like the most. What shortcomings does a particular element has?

6. **Accessibility:** Where possible we intend to work with disabled people with visual, aural, physical and mental disorders. A screen reader or magnifier device will be used. Controller will ask questions and want the user to rate the overall experience. By conducting this test we will be able to evaluate complex entry methods as they are often not accessible to disabled people.

After the completion of tests, all gathered data will be analyzed to find out what form elements and visual styles work best on different situations. Findings will be published as a best practice guideline and will be implemented on www.turkiye.gov.tr.

The improvement of web forms on e-Government portals is one suggestion for future work. Other suggestions regarding the improvement of specific aspects of websites that target different user groups, and development of related tools, tests, methods and methodologies can also be considered.

4. CONCLUSION

In this paper, we have discussed various public and private sector initiatives of usability and accessibility in Turkey, providing various examples and recommendations for the improvement of usability and accessibility that benefit from user tests. The paper has then followed with a discussion of specific public sector initiatives in Türksat and Middle East Technical University, as well as of private sector initiatives in Userspots. Finally, suggestions for future work on usability and accessibility, and development of tools for their testing has been provided.

It is hoped the presented information about these initiatives and suggestions will also provide useful information for related initiatives in other countries, and new works can be initiated for

the development and diffusion of usability and accessibility in society. It is aimed that, in return, e-inclusion and social computing initiatives would eventually benefit from these works.

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