Usability Standards: Connecting Practice Around the World

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Abstract

One of the core tenets of usability is that the work flows from a deep understanding of the actual people who will use a product and their environment and context of use. But what about usability practice? Do choices of methods, techniques, and process also depend on context and country? Is it enough to have a common approach, or do there need to be formal standards to connect practice around the world?

Keywords: *usability, standards, international*

Introduction

Design and process standards are difficult to create and hard to enforce. Although many groups have tried to create general design standards or patterns, the diversity of industry and content has made it difficult to create strong standards to embody usability knowledge and practice.

We will look at three popular usability standards and two governmental programs, and consider how effective they have been in both fostering good usability practice and in creating an international consensus on practice.

Three usability standards

There are now several standards that have been influential in shaping international understanding of usability and user-centered design, and in formalizing ad-hoc practices, with others in development. Three of them take very different approaches to standardization. By looking at what they attempted to standardize, and how well they have been adopted by industry, we can see some of the strengths and weaknesses of standards as an influence on industry practice. The three standards we will examine are:

- ISO 13407 – Human-centered design process for interactive systems.
- ANSI 354 – Common Industry Format (CIF) for Usability Test Reports
- WAI – The W3C Web Accessibility Initiative

A user centered design process

User centered design is the common name for a process for designing the user interface for software and other products. The Usability Professionals' Association[1] web site says, "User-centered design (UCD) is an approach to design that grounds the process in information about the people who will use the product. UCD processes focus on users through the planning, design, and development of a product.

The term user centered design is widely used in industry, although there is no formal definition of the process beyond some general shared values. It is often described as a way to accomplish usability.[2]

In 1999, an ISO standard, "ISO 13407:1999 Human-centred design processes for interactive systems"[3] was approved, which embodies the general industry approach to UCD. It is a short, generic general description of the process that can be applied to any system or product.

The standard describes four principles of human-centered design[4]:

1. Active involvement of customers (or those who speak for them).
2. Appropriate allocation of function (making sure human skill is used properly).
3. Iteration of design solutions (therefore allow time in project planning).
4. Multi-disciplinary design (but beware overly large design teams).

The core of the standard is the description of five activities, four of which interlock and form the

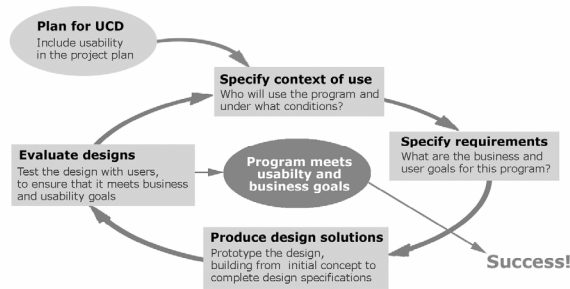basis for an iterative approach to the requirements-design-test cycle.

Figure 1. The user centered design cycle activities described in ISO 13407 can be seen as a cycle that can only be completed when the evaluation of a product shows that it meets the requirements.

The activities in ISO 13407 are:

1. Acknowledge the need for user centered design and plan for it.
2. Understand and specify the context of use
3. Specify user requirements.
4. Produce design solutions.
5. Evaluate designs against requirements.

Acceptance of ISO 13407. A brief examination of presentations on user centered design at industry conferences easily shows the influence of this standard. Whether it is mentioned by name, or whether the process described simply mirrors the one in the standard, it is clear that the industry has embraced at least the principles and broad outline of this standard.

The standard has also found acceptance in government documents. The Quality Framework for UK Government Websites[5], published by the office of the E-Envoy, says that, "Underpinning this is an increasing focus on human centered design issues, supported by the standards ISO13407 and ISO TR 18529."

This leads to the obvious question of the value of such an elastic standard. The very vagueness of this standard may be in its favor. Corporate usability processes can claim to be derived from it, with little fear of contradiction. Government documents can cite it without introducing the substantial burden of detailed requirements. It also has value in building a consensus around an approach that incorporates usability into a design

and development process. It allows for experimentation and innovation around the common core understanding, in an emerging discipline, it. Despite the fact that this standard is simply a high-level description of an approach, the approach itself is novel for many organizations. By being loosely descriptive, it enables organizations to take steps towards a UCD process under its umbrella.

Common Industry Format (CIF)

A project at the US National Institute for Standards and Technology (NIST) took a different approach. The Industry Usability Reporting (IUSR)[6] project was started to explore ways that software purchasers could compare the usability of competitive products.

As with ISO 13407, one of the industry goals was to encourage better usability practice. The group felt that "one way to encourage software developers to integrate usability engineering into their development process is for purchasers to require evidence of product usability."[7]

With no agreed-on usability metrics or standard conformance tests, the project focused instead on reporting. The Common Industry Format (CIF)[8], is a template for reporting on the results of a summative usability testing. By insisting on a standard presentation of test data (and therefore a test that would produce that data), they were able to create a way to compare two products, even in the largely qualitative world of usability testing.

The CIF template is a standardized table of contents for any report:

- Title page (identifies the product tested, the dates of the test and report and the people who led the test)
- Executive summary
- Introduction
    - Product description
    - Test objectives
    - Test method
    - Test participants
- Test context
    - Tasks and scenarios
    - Test facility
    - Participant's computing environment
- Experimental design
    - Procedure

- Usability Metrics
  - Efficiency metrics
  - Effectiveness metrics
  - Satisfaction metrics
- Results
  - Data analysis
  - Performance results
- Appendices
  - Participant questionnaires
  - Participant instructions
  - Release notes

After several years of development under NIST, the CIF became an ANSI standard in 2001, and is on an ISO fast-track as an international standard.

Acceptance of the CIF. The project team has done an admirable job of communicating the content and value of the CIF, through a large number of industry publications (all listed on the project site), and it seems to have gained general acceptance in the industry. Unfortunately, however, the template seems to be used only infrequently, in part because so few companies do the summative usability testing for which it is intended. This standard also may serve a more important purpose in codifying a common understanding among practitioners than in dictating details of practice.

The committee also learned that the CIF template was being adapted for use to report formative usability testing. This has led to the formation of a new project, called CIF-Formative, to possible formats for reporting on formative, or diagnostic, usability testing. This project, which held its first workshop on October 18-19, 2005, is focusing on guidance for reporting, rather than a formal template.

Web accessibility initiative

The World Wide Web Consortium (W3C)[9] "develops interoperable technologies to lead the Web to its full potential," and "is a forum for information, commerce, communication, and collective understanding." It issues specifications and recommendations through a public consensus process. Most of the W3C guidelines are technical specifications, such those for HTML, CSS and other languages.

One of the W3C projects is the Web Accessibility Initiative (WAI). The WAI addresses not just technical requirements, but a social goal, as stated in the quote from Tim Berners-Lee, W3C Director and inventor of the World Wide Web, "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."[10]

The WAI sets guidelines for authoring Web sites that are accessible to people with disabilities and those using assistive devices. Their core work is the Web Content Authoring Guidelines 1.0 (WCAG)[11], which was accepted as a W3C Recommendation on May 5, 1999. The WCAG defines three levels, called Priorities, of design and coding practice, each with higher levels of difficulty. The WAI also publishes a collection of advice, tools and other informational material to help web authors create accessible web sites.
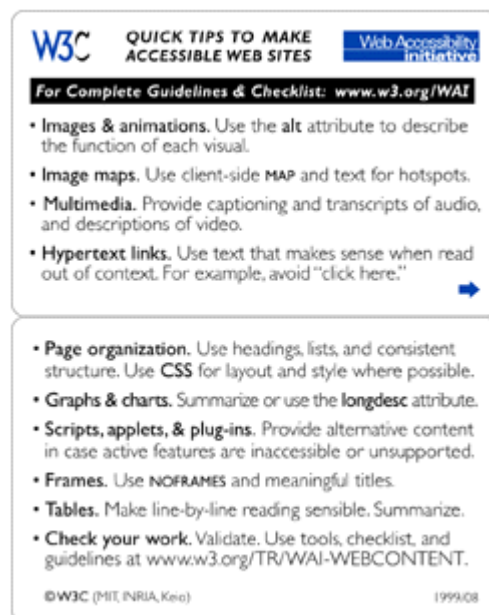

Figure 2. The Quick Tips are available as a wallet card in over a dozen languages. The "Quick Tips to Make Accessible Web Sites" are widely distributed, and mentioned in many industry publications.

- Images and animations: Use the *alt* attribute to describe the function of each visual.
- Image maps: Use the client-side map and text for hotspots.
- Multimedia: Provide captioning and transcripts of audio, and descriptions of video.
- Hypertext links: Use text that makes sense when read out of context. For example, avoid "click here."

- Page organization: Use headings, lists, and consistent structure. Use CSS for layout and style where possible.
- Graphs & charts: Summarize or use the *longdesc* attribute.
- Scripts, applets, & plug-ins: Provide alternative content in case active features are inaccessible or unsupported.
- Frames: Use the *noframes* element and meaningful titles.
- Tables: Make line-by-line reading sensible. Summarize.
- Check your work: Validate. Use tools, checklist, and guidelines at http://www.w3.org/TR/WCAG

Legal regulations using the WCAG. The work of the WAI has been used as the basis for legislation in the US, the UK, European Union as well as other countries. In the US, the Access Board[13] used the core provisions of the WCAG 1.0 as the basis for federal regulations known as "Section 508"[14].

Acceptance of the WCAG. Because its work concerns the Web, activities of the W3C usually garner wide attention. That fact alone would give it more visibility than other voluntary standards, but the addition of the similarity of the WCAG to many national legal regulations gives it a special status. In addition, there is a micro-industry that has sprung up to provide training, technical support and tools to help companies and government agencies comply with the regulations.

There is some evidence of only limited compliance, no matter how enthusiastically the WCAG has been embraced. Almost five years after the Recommendation was accepted, few sites achieve more than Priority Level 1 compliance. Despite, or perhaps because of, this wide attention, the WCAG has also been the center of some controversy. The two biggest complaints are:

- The WCAG guidelines are not specific and prescriptive enough. They sometimes call for Web sites to meet goals, but do not explain what they must to do meet these goals.
- The WCAG guidelines are too onerous, and cause hardships for Web developers.

Two Governmental Programs

Governments around the world have taken an interest in the usability as more and more government services have moved online. Corporations may, to some extent, choose their users, and can decide to aim their usability efforts at their most important customers. Governments have a mandate to make their information and services available to all citizens, and are often overseen by public and private watchdog agencies. This has made governments particularly sensitive to usability issues (though this does not always speed up implementation). Governmental programs are also convenient to study because they are usually in the public domain and available for all to review.

We will look at two examples, each taking a different approach to ensuring usability in government web sites:

- The US-based "Research-Based Web Design and Usability Guidelines" [15]
- The UK-based e-Envoy's "Quality Framework: Usability Issues for government websites" [5]

Research-Based Guidelines
The "Research-Based Web Design and Usability Guidelines" are an excellent example of a "bottom up" approach. These guidelines are offered as a set of best practices, and address specific common problems or design elements in web sites, and thus provide building blocks out of which a usable site could be created.

This program was created by the usabilty.gov group, originally housed at the National Cancer Institute, and now a joint program of the Department of Health and Human Services and the General Services Agency. Because of its connection to a scientific research community, this project took an unusual approach to determining the content of these guidelines, following a peer-review process. A panel of experts evaluated a list of over 500 candidate guidelines for their relative importance. This was used to reduce the set of guidelines, and to clarify the remaining ones. Then, a second panel of experts classified each as having strong or weak strength of evidence in both academic research and general design practice. Guidelines that had no support from either research or practice were dropped.

In the end, 187 guidelines were accepted for publication. They are presented with the aggregate score for both "Strength of Evidence" and "Relative Importance" and are divided in 17 groups that range from the general (Content Organization) to the specific (Links):

1. Design Process and Evaluation
2. Optimizing the User Experience
3. Accessibility
4. Hardware and Software
5. Page Layout
6. Navigation
7. Scrolling and Paging
8. Headings, Titles, and Labels
9. Links
10. Text Appearance
11. Lists
12. Screen-based Controls
13. Graphics, Images, and Multimedia
14. Writing Web Content
15. Content Organization
16. Search

Acceptance of the research-based guidelines. It is hard to assess the acceptance of these guidelines. They are offered as advice, but with no other force behind them. They have, however, generated some acceptance on the strength of the work that went into creating them.

Although early versions have been available for several years, the full version was only published in 2004. It will be interesting to watch for evidence that they are being cited in industry papers or other standards.

The Quality Framework

The "Quality Framework for UK government website design" takes a more "top down" approach. Rather than offer specific design advice, it offers guidance on an overall process for creating a high-quality, usable, accessible web site.

Like the "Research-Based Guidelines," the "Quality Framework" draws on a wide range of industry expertise to "clarify what relevant usability and design criteria should be used when planning a government website or judging how good it is."[5] In this approach, it is closer to the ISO 13407 standard on which it is partially based. The "Framework" is organized into six short sections, plus an annex with an extensive list of references and tools:

1. Incorporating users' needs into the design process
2. Human Centered Design (HCD)
3. Working with web designers
4. Getting content right
5. Getting services right
6. Conclusion: useful, usable, used

These guidelines do not include much specific advice on the design or content of web pages, though it does refer to the broader reference, the "Illustrated handbook for web management teams." which includes technical and process guidance for the overall web site.

Acceptance of the Framework. When the Framework was first released, it was not universally accepted. In a widely publicized article, Louise Ferguson [16] quoted many in the UK usability community in criticizing it as un-useful, un-usable and destined to be un-used, "a good idea in principle, but poorly executed." Their assessment may be correct, as a Google search for the "Framework" has few hits besides the document itself and the articles criticizing it. If there is a lesson here, it is that positive uptake among usability thought leaders is critical for a standard to gain acceptance.

The Value of Standards

The standards and guidelines that have been discussed in this paper are just a few of the many that exist or are being developed. But what is the value of all this work? Standards are just an empty documents unless they are used in practice, so it is worth considering the impact they might have in relationship to the work and time they take to create. Have they helped to improve the usability of information technology products and Web sites? Have they helped create an international understanding for shared practice?

Can standards improve usability?

The answer to this has to be a qualified, "perhaps."

Most usability standards activities have as one of their goals to increase the level of usability of the products or Web sites they affect. The CIF, for example, states that one of their goals is to "Encourage software supplier and purchaser organizations to work together to understand user needs and tasks."[6] These sorts of goals are noble statements, but the standards themselves are

usually more limited in scope. This makes it possible to meet the standard, while not achieving the underlying goal. This is especially true for documentation or process standards. The CIF does not require a positive outcome to the usability test, simply that it is documented in a standard way.

Even more direct design or technical standards can allow a situation in which products that meet the letter of the standards fail to meet the broader goals underlying them. A recent case in point is a UK Disability Rights Commission report[16], which said that not only were sites not meeting the standards:

> "This report demonstrates that most websites are inaccessible to many disabled people and fail to satisfy even the most basic standards for accessibility recommended by the World Wide Web Consortium."

It went on to claim that even compliance did not always provide good accessibility, and that the site itself is just part of a larger social problem in assisting people with disabilities"

> "It is also clear that compliance with the technical guidelines and the use of automated tests are only the first steps towards accessibility: there can be no substitute for involving disabled people themselves in design and testing, and for ensuring that disabled users have the best advice and information available about how to use assistive technology, as well as the access features provided by Web browsers and computer operating systems."

Killam and Autry[17] made a similar point in a talk on design standards. After examining several types of standards they conclude that, "...design guidelines...are all valuable, but are best for teaching and learning – not for doing. Designers should know them before starting a design." Their point is that the standards should reflect best common practice, which should be well-known by designers. They also point out that, "process standards are more important, as well as dedicated, skilled people."

The government regulations have been used as the basis for successful legal challenges. The

Australian Olympic Committee[18], for example, lost a court suit alleging that their site failed to provide access for people with disabilities. Although this punishes lack of compliance more than it promotes good usability or accessibility *in the specific Web site,* the incentive to improve compliance with both the letter and the spirit is obvious.

Can standards promote shared practice?
The answer to this question is more positive. In all three of the standards examined here, there is strong international support:

- ISO 13407 is an international standard, and used as the basis for user centered design practice around the world.
- The CIF has been reported in papers in several countries, and is being fast-tracked for ISO status.
- The WCAG has been used as the basis for both international web design and legal regulations in many countries.

There is especially strong anecdotal evidence that ISO 13407 represents a truly international view of standard practice, as the same diagram and list of activities has been spotted in conferences and company Web sites around the world. What is not clear is whether the standard created this consensus, or describes a shared understanding. Either way, it is valuable.

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About the Author

Whitney Quesenbery (Whitney Interactive Design) is a user interface designer and usability specialist with a passion for clear communication. She creates new concepts for product designs and has produced award winning multimedia products, web sites, and web & software applications.

Whitney is President of the Usability Professionals' Association (UPA), and was named an Associate Fellow of the Society for Technical Communication (STC). As director of the UPA Voting and Usability Project, a member of an IEEE Standards Committee, and an appointed member of a US federal advisory committee, she works to ensure the usability of voting systems.

Before she was seduced by a little beige computer into the world of usability, Whitney was a theatrical lighting designer on and off Broadway. The lessons from the theatre stay with her in creating user experiences.