

Guidelines and Standards for Web Usability

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Abstract

Three sets of web guidelines are compared: the Research-Based Web Design & Usability Guidelines published by U.S. Department of Health and Human Services, a set of guidelines being developed for an ISO standard, and guidelines for academic web sites produced in the UK. A detailed analysis shows that each set of guidelines is strong in different areas. The paper highlights the difficulty of defining what constitutes a comprehensive set of web guidelines. Recommendations are made for areas in which the HHS and ISO guidelines could be extended.

1 Introduction

The paper compares guidelines for web usability from three sources:

- The 187 guidelines for effective web design and usability for information-oriented sites developed by the National Cancer Institute, part of the U.S. Department of Health and Human Services (HHS).
- The forthcoming Draft International Standard ISO 9241-151 for the user-centred design of web user interfaces that in its current draft covers 125 topics.
- A study for JISC (Joint Information Systems Committee for higher education) in the UK that produced a list of 121 guidelines for academic web sites.

The guidelines have been reviewed to compare how the intended scope and the processes used for collecting the guidelines differed, and to identify additional topics that could usefully be included in any further development of the HHS or ISO guidelines.

2 HHS Guidelines

Bailey and Koyani (2005) explain that the HHS guidelines were developed because the quality of existing web design and usability guidelines tends to be uneven, making it difficult to tell which guidelines are most important, which have the most research to support them, and even what some of them mean (primarily because of a lack of good examples). The objective was to present research-based guidelines in a meaningful format that was readily understandable, easy-to-use and practical.

The final result (Koyani et al, 2003, 2004) is a set of 187 guidelines for information-oriented web sites, derived from 375 cited publications. The guidelines have been ranked for importance based on ratings provided by 8 website designers and 8 usability specialists. They are categorised based on a card-sorting exercise by 20 website designers. They cover a wide range of web site design issues, including accessibility, home page design, page and site navigation, graphics and images, web content organization and effective web content writing. Each guideline contains:

- A brief statement of the overarching principle that is the foundation of the guideline.
- Comments that further explain the research/supporting information.
- Citations to relevant web sites, technical and/or research reports supporting the guideline.
- A score indicating the "Strength of Evidence" that supports the guideline. These range from "Strong Research Support," indicating that there is at least one formal, rigorous study with contextual validity and agreement among experts to "Weak Research Support," indicating limited evidence and disagreement among experts.

- A score indicating the "Relative Importance" of the guideline to the overall success of a web site. These scores range from 1-5 and are intended to help guide usability experts and web designers to prioritize the implementation of these guidelines.
- One or more graphic examples of the guideline in practice.

3 ISO DIS 9241-151

ISO is developing an International Standard to provide recommendations and guidelines for the user-centred design of web user interfaces. The draft version of ISO 9241-151 reviewed here is work in progress, but when the final version is approved it will carry the authority of an International Standard.

International Standards are developed by working groups of international experts nominated by the national standards bodies. They provide volunteer effort, meeting two or three times a year, and corresponding by email in between meetings. The quality of the documents produced depends on the expertise of the experts, the time they can devote, and the quality of the feedback provided during the international review.

The editor of ISO 9241-151 in ISO TC159/SC4/WG5 is Professor Juergen Ziegler at University Duisburg-Essen, Germany. The first Committee Draft was circulated for international vote in 2004, and was approved, accompanied by numerous comments. Revised drafts will be circulated until a final version is approved, leading eventually to a published International Standard. Individuals wishing to contribute to, or comment on, draft International Standards should contact their national standards body (see <http://www.iso.org/iso/en/aboutiso/isomembers/index.html>).

The rules for developing an International Standard impose certain constraints on the document:

- The title, in this case "Software Ergonomics for World Wide Web User Interfaces", indicates that the document was produced by a software ergonomics committee.
- International Standards are obliged to use terminology that is consistent with existing standards.
- Standards cross-reference, rather than reproduce, material already in other standards.
- The format and language are constrained, which for example results in general section headings (such as "Error pages", rather than instructions such as "Make error messages clear"). This is partly because ISO 9241-151 contains guidelines that have to be indicated by the word "should", so cannot use an imperative as in ISO this would indicate a requirement.
- ISO Standards are normally produced in black and white, with only basic diagrams.

The ISO document distinguishes between design, process and evaluation aspects of web development. However, since the development process and evaluation is already covered by other ISO standards, it focuses on the design aspects, and provides design guidance and recommendations in four major areas:

- A. Purpose and strategy.
- B. Content and functionality.
- C. Navigation and interaction.
- D. Media design and presentation.

4 JISC Guidelines

JISC is responsible for providing web resources for further and higher education in the UK. The objectives of the JISC study (Bevan & Kincla, 2004) were to:

- Identify how usability guidelines could assist the relevant users and other stakeholders.
- Analyse existing usability guidelines for their applicability to JISC services and resources.
- Review current practice and directions for the support of learning, teaching and research for the UK and other relevant countries.
- Adapt usability guidelines to JISC services and resources.

A survey of JISC services and other academic institutions around the world showed that few organizations use usability methods or specific HCI design principles, and when guidelines exist they are rarely enforced. The main reason the JISC service providers gave for not using guidelines was pressure of time. It is thus apparent that for guidelines to be effective, they need to be straightforward and easy to understand.

The JISC study identified and reviewed over 200 publications related to usability and HCI for learning, teaching and research. The result was a list of 121 web design guidelines that are widely applicable to the development of any web-based service, derived from 32 publications that provided useful practical guidance. Additional guidelines were identified associated with specific aspects of JISC services:

- Online courses.
- Digital libraries: where the search interface is particularly important.
- Personalisation: either customised or automatically personalised.
- Portals. HCI guidelines for complex home pages and for personalisation are relevant.

5 Comparison of HHS and ISO Guidelines

The 187 HHS guidelines and 125 ISO topics are listed in Table 1, showing the ISO topics that appear to be most closely equivalent to each HHS guideline (or category of guideline). Unique ISO guidelines are shown in *italics*. In some cases, more than one ISO guideline corresponded to an HHS guideline.

Table 1. Comparison of HHS and ISO guidelines

Priority	HHS guidelines	ISO 9241-151 topics
	1 Design Process and Evaluation	
5	1:1 Set and State Goals	A. Determining the purpose of a web application <i>A. Prioritizing different design goals</i>
5	1:2 Use an Iterative Design Approach	
5	1:3 Evaluate Websites Before and After Making Changes	
5	1:4 Provide Useful Content	B. Appropriateness of content for the target group and tasks <i>B. Completeness of content</i>
4	1:5 Understand and Meet Users' Expectations	
4	1:6 Establish User Requirements	A. Analysing the target user groups and their goals
4	1:7 Use Parallel Design	
4	1:8 Consider Many User Interface Issues	
4	1:9 Focus on Performance Before Preference	
4	1:10 Set Usability Goals	
4	1:11 Select the Right Number of Participants	
4	1:12 Be Easily Found on the Web	
3	1:13 Recognize Tester Bias	
2	1:14 Use Heuristics Cautiously	
2	1:15 Use Cognitive Walkthroughs Cautiously	
1	1:16 Apply Automatic Evaluation Methods	
		<i>B. Designing the conceptual model</i>
		<i>B. Independence of Content, Structure and Presentation</i>
		<i>A. Coherent multi-site strategy</i>
		<i>D. Consistency across related sites</i>
	2 Optimizing the User Experience	
5	2:1 Display Information in a Directly Usable Format	D. Units of measurement and currency
5	2:2 Do Not Display Unsolicited Windows or Graphics	C. Avoiding opening unnecessary windows
4	2:3 Provide Assistance to Users	
4	2:4 Provide Printing Options	D. Printable Pages D. Providing printable document versions
4	2:5 Standardize Task Sequences	
4	2:6 Minimize Page Download Time	D. Acceptable download times
4	2:7 Warn of 'Time Outs'	
3	2:8 Reduce the User's Workload	
3	2:9 Use Users' Terminology in Help Documentation	D. Providing help
3	2:10 Provide Feedback When Users Must Wait	
3	2:11 Inform Users of Long Download Times	
3	2:12 Do Not Require Users to Multitask While Reading	
3	2:13 Design For Working Memory Limitations	
2	2:14 Develop Pages that Will Print Properly	

		<i>D. Observing principles of human perception</i>
		<i>D. Error pages</i>
		<i>D. Naming of URLs</i>
	3 Accessibility	
5	3:4 Do Not Use Color Alone to Convey Information	<i>D. Using colour</i>
4	3:2 Design Forms for Users Using Assistive Technology	
4	3:3 Provide Text Equivalents for Non-Text Elements	D. Providing alternative text presentations
3	3:1 Comply with Section 508	C. Making Web user interfaces accessible
3	3:5 Provide Equivalent Pages	
3	3:6 Ensure that Scripts Allow Accessibility	
3	3:7 Provide Client-Side Image Maps	
3	3:8 Enable Users to Skip Repetitive Navigation Links	
3	3:9 Provide Frame Titles	D. Providing alternatives to frame-based presentation
3	3:10 Test Plug-ins and Applets for Accessibility	
2	3:11 Synchronize Multimedia Elements	
2	3:12 Do Not Require Style Sheets	
2	3:13 Avoid Screen Flicker	
	4 Hardware and Software	
5	4:1 Design for Common Browsers	
4	4:2 Account for Browser Differences	
4	4:3 Design for Popular Operating Systems	
4	4:4 Design for User's Typical Connection Speed	
2	4:5 Design for Commonly Used Screen Resolutions	
	5 The Homepage	
5	5:1 Create a Positive First Impression of Your Site	
5	5:2 Ensure the Homepage Looks like a Homepage	
5	5:3 Show All Major Options on the Homepage	C. Directly accessing relevant information from home page
4	5:4 Enable Access to the Homepage	C. Linking back to the home page
4	5:5 Attend to Homepage Panel Width	
4	5:6 Announce Changes to a Website	D. Recognizing new content
3	5:7 Communicate the Website's Purpose	A. Recognizing the purpose of a web application C. Informative home page
2	5:8 Limit Prose Text on the Homepage	
1	5:9 Limit Homepage Length	
		<i>C. Avoiding unnecessary start (splash) screens</i>
	6 Page Layout	
4	6:1 Set Appropriate Page Lengths	D1. Quantity of text per information unit/page
4	6:2 Use Frames When Functions Must Remain Accessible	D2. Using frames with care
4	6:3 Establish Level of Importance	
4	6:4 Place Important Items at Top Center	D. Avoiding scrolling for important information
3	6:5 Place Important Items Consistently	D. Consistent page layout
3	6:6 Structure for Easy Comparison	
3	6:7 Use Moderate White Space	D. Use of "white space"
3	6:8 Align Items on a Page	
2	6:9 Choose Appropriate Line Lengths	
2	6:10 Avoid Scroll Stoppers	
		<i>D.7 Making content fit the expected size of the display area</i>
	7 Navigation	
5	7:1 Provide Feedback on Users' Location	C. Showing users where they are C. Using navigation components appropriately C. Consistency between overview and content
4	7:2 Use a Clickable 'List of Contents' on Long Pages	C. Subdividing long pages
4	7:3 Do Not Create Pages with No Navigational Options	
4	7:4 Differentiate and Group Navigation Elements	C. Providing navigation overviews C. Placing navigation overviews consistently <i>C. Making several levels visible</i> <i>C. Splitting up navigation overviews</i> <i>C. Limiting the number of split-up navigation overviews</i>
4	7:5 Use Descriptive Tab Labels	

3	7:6 Present Tabs Effectively	
3	7:7 Use Site Maps	C. Providing a site map
3	7:8 Use Appropriate Menu Types	
2	7:9 Keep Navigation-only Pages Short	
1	7:10 Use 'Glosses' to Assist Navigation	
		<i>C. Supporting the user's navigation strategy</i>
		<i>C. Organising the navigation in a meaningful manner</i>
		<i>C. Task-based navigation</i>
		<i>C. Offering alternative navigation paths</i>
		<i>C. Minimizing navigation effort</i>
		<i>C. Choosing suitable navigation structures</i>
		<i>C. Overlaying of navigation structures</i>
		<i>C. Breadth versus depth of the navigation structure</i>
		<i>C. Going back to higher levels</i>
		<i>C. Visibility of main navigation links</i>
		<i>C. Providing a 'step back' function</i>
	8 Scrolling and Paging	
5	8:1 Eliminate Horizontal Scrolling	D. Avoiding horizontal scrolling
3	8:2 Use Scrolling Pages for Reading Comprehension	
2	8:3 Use Paging Rather Than Scrolling	
2	8:4 Scroll Fewer Screenfuls	
1	8:5 Facilitate Rapid Scrolling	
	9 Headings, Titles, and Labels	
5	9:1 Use Clear Category Labels	
5	9:2 Use Unique and Descriptive Headings	<i>D. Placing title information consistently</i>
3	9:3 Use Descriptive Row and Column Headings	
3	9:4 Use Descriptive Headings Liberally	<i>D. General page information</i>
3	9:5 Provide Descriptive Page Titles	
3	9:6 Highlight Critical Data	
2	9:7 Provide Users with Good Ways to Reduce Options	
1	9:8 Use Headings in the Appropriate HTML Order	
	10 Links	
5	10:1 Provide Consistent Clickability Cues	D. Identification of links D. Distinguishing navigation links from transactions
4	10:2 Avoid Misleading Cues to Click	
4	10:3 Use Text for Links	D. Inferring the link target from the link cues
4	10:4 Use Meaningful Link labels	D. Using descriptive link labels
4	10:5 Match Link Names with Their Destination Pages	
4	10:6 Ensure that Embedded Links are Descriptive	
4	10:7 Repeat Important Links	C. Providing crosslinking to potentially relevant content D3. Redundant links
4	10:8 Designate Used Links	D. Highlighting previously visited links
4	10:9 Link to Related Content	
3	10:10 Link to Supportive Information	
3	10:11 Use Appropriate Text Link Lengths	D4. Link length
3	10:12 Indicate Internal vs. External Links	C. Distinguishable within-page links
3	10:13 Use 'Pointing-and-Clicking'	
3	10:14 Clarify Clickable Regions of Images	
		<i>C. Dead links</i>
		<i>D. Distinguishing links from each other</i>
		<i>D. Marking links to special targets</i>
		<i>D. Distinguishing navigation links from action links</i>
		<i>D. Avoiding link overload</i>
		<i>D. Naming bookmarks</i>
	11 Text Appearance	
5	11:1 Use Black Text on Plain, High-Contrast Backgrounds	
5	11:2 Ensure Visual Consistency	
4	11:3 Format Common Items Consistently	
4	11:4 Use at Least 12-Point Font	

3	11:5 Use Familiar Fonts	
3	11:6 Emphasize Importance	
2	11:7 Use Attention-Attracting Features when Appropriate	
	12 Lists	
4	12:1 Order Elements to Maximize User Performance	[ISO 9241-12 5.7.1]
4	12:2 Display Related Items in Lists	
4	12:3 Introduce Each List	
4	12:4 Format Lists to Ease Scanning	
4	12:5 Start Numbered Items at One	[ISO 9241-12 5.7.6]
3	12:6 Place Important Items at Top of the List	
1	12:7 Capitalize First Letter of First Word in Lists	
1	12:8 Use Appropriate List Style	
	13 Screen-based Controls (Widgets)	
5	13:1 Distinguish Required and Optional Data Entry Fields	
5	13:2 Detect Errors Automatically	
5	13:3 Minimize User Data Entry	
5	13:4 Label Data Entry Fields Clearly	
5	13:5 Put Labels Close to Data Entry Fields	
4	13:6 Label Pushbuttons Clearly	
4	13:7 Label Data Entry Fields Consistently	
4	13:8 Allow Users to See Their Entered Data	C. Search field size
4	13:9 Display Default Values	
4	13:10 Use a Minimum of Two Radio Buttons	
3	13:11 Use Radio Buttons for Mutually Exclusive Selections	C. Choice of interaction objects
3	13:12 Use Check Boxes to Enable Multiple Selections	
3	13:13 Use Familiar Widgets	
3	13:14 Use a Single Data Entry Method	
3	13:15 Partition Long Data Items	
3	13:16 Do Not Make User-Entered Codes Case Sensitive	
3	13:17 Place Cursor in First Data Entry Field	
3	13:18 Provide Auto-tabbing Functionality	
3	13:19 Label Units of Measurement	
3	13:20 Ensure that Double-Clicking Will Not Cause Problems	
2	13:21 Do Not Limit Viewable List Box Options	
2	13:22 Use Open Lists to Select One from Many	
2	13:23 Prioritize Pushbuttons	
1	13:24 Minimize Use of the Shift Key	
1	13:25 Use Data Entry Fields to Speed Performance	
		<i>C. Explicit activation</i>
		<i>C. Consistent activation</i>
	14 Graphics, Images, and Multimedia	
4	14:1 Use Video, Animation, and Audio Meaningfully	D. Choice of suitable media D. Selecting appropriate media objects
4	14:2 Include Logos	A. Identifying the site and its owner D. Identifying all pages of a site
4	14:3 Limit Large Images Above the Fold	
3	14:4 Limit the Use of Images	
3	14:5 Label Clickable Images	
3	14:6 Ensure that Images Do Not Slow Downloads	
3	14:7 Use Thumbnail Images to Preview Larger Images	
3	14:8 Graphics Should Not Look Like Banner Ads	
3	14:9 Use Simple Background Images	
3	14:10 Include Actual Data with Data Graphics	
2	14:11 Display Monitoring Information Graphically	
2	14:12 Introduce Animation	
2	14:13 Ensure Website Images Convey Intended Messages	
1	14:14 Use Images to Facilitate Learning	
1	14:15 Emulate Real-World Objects	

	15 Writing Web Content	
4	15:1 Define Acronyms and Abbreviations	
4	15:2 Use Abbreviations Sparingly	
4	15:3 Use Familiar Words	
4	15:4 Use Mixed Case with Prose	
4	15:5 Avoid Jargon	
3	15:6 Make First Sentences Descriptive	
3	15:7 Use Active Voice	
3	15:8 Write Instructions in the Affirmative	
3	15:9 Limit the Number of Words and Sentences	D. Writing style
3	15:10 Limit Prose Text on Navigation Pages	
2	15:11 Make Action Sequences Clear	
		<i>D. Readability of text</i>
		<i>D. Supporting text skimming</i>
	16 Content Organization	
5	16:1 Organize Information Clearly	C. Decomposition of content
5	16:2 Put Critical Information Near the Top of the Website	
4	16:3 Facilitate Scanning	
4	16:4 Group Related Elements	
4	16:5 Display Only Necessary Information	
4	16:6 Ensure that Necessary Information is Displayed	
4	16:7 Format Information for Multiple Audiences	
3	16:8 Design Quantitative Content for Quick Understanding	
2	16:9 Use Color for Grouping	
		<i>B. Level of granularity</i>
		<i>B. Keeping the content up to date</i>
		<i>B. Making the date of the last update available</i>
		<i>B. Enabling communication with the site owner</i>
		<i>B. Accepting online user feedback</i>
		<i>D. Visualizing temporal status</i>
	17 Search	
5	17:1 Provide a Search Option on Each Page	C. Availability of search
5	17:2 Ensure Usable Search Results	C. Ordering of search results <i>C. Relevance-based ranking of search results</i> <i>C. Descriptiveness of results</i>
5	17:3 Allow Simple Searches	C. Provide a simple search facility
4	17:4 Make Upper-and Lowercase Search Terms Equivalent	
4	17:5 Design Search Engines to Search the Entire Site	
4	17:6 Design Search Around Users' Terms	
3	17:7 Notify Users When Multiple Search Options Exist	C. Scope of a search
2	17:8 Provide Search Templates	
		<i>C. Providing a search function</i>
		<i>C. Providing appropriate search functions</i>
		<i>C. Search functions appropriate for the user's experience</i>
		<i>C. Advanced search</i>
		<i>C. Full-text search</i>
		<i>C. Describing the 'search' technique used</i>
		<i>C. Shortcut to search function</i>
		<i>C. Error-tolerant search</i>
		<i>C. Sorting search results</i>
		<i>C. Selecting the scope of a search</i>
		<i>C. Providing feedback on the volume of the search result</i>
		<i>C. Showing the query with the results</i>
		<i>C. Giving advice for unsuccessful searches</i>
		<i>C. Repeating searches</i>
		<i>C. Refining searches</i>
	eCommerce	
		<i>B. Privacy and Business Policies</i>
		<i>B. User control of personal information</i>

	<i>B. Storing information on the user's machine</i>
Internationalization	
	<i>D. Showing relevant location information</i>
	<i>D. Making supported languages identifying</i>
Personalisation	
	<i>B. Taking account of users' information needs</i>
	<i>B. Making personalization evident</i>
	<i>B. Making user roles evident</i>
	<i>B. Allowing users see and change profiles</i>
	<i>B. Informing about automatically generated profiles</i>
	<i>B. Switching off automatic personalization</i>
	<i>B. Providing access to complete content</i>
	<i>C. Making dynamic navigation components obvious</i>

ISO 9241-151 primarily contains material that is unique to the web, so some topics covered by HHS are omitted from ISO 9241-151 as they are covered by more general ISO standards, in particular:

- 1: Design Process and Evaluation: ISO 13407, ISO TR 16982, and ISO 9241-11.
- 3: Accessibility: ISO TS 16071 and WAI Guidelines.
- 12: Lists: partly covered by ISO 9241-12.
- 13: Screen-based Controls (Widgets): ISO 14915-2.
- 14: Graphics, Images, and Multimedia: ISO 14915-3.

This means that for complete guidance on the web, readers have to acquire additional standards and identify the parts that are relevant. This is not easy to do, particularly as some interpretation is needed to apply the material in other standards to the web.

Only 43 of the guidelines are in common (24% of the HHS guidelines and 35% of the ISO guidelines). For the 93 HHS guidelines rated highest for importance, the proportion in common with ISO rises from 24% to 32%. If the categories of HHS guidelines and equivalent ISO topics covered in other ISO standards are excluded, there are 37 guidelines in common (30% of the HHS guidelines and 35% of the ISO guidelines). For the 68 remaining HHS guidelines rated highest for importance, the proportion in common with ISO is then 38%: 41 high priority HHS guidelines do not appear in ISO. (As some judgements had to be made for what constitutes equivalence, these figures are only approximate.)

Some HHS guidelines are not in the ISO draft because they are beyond the scope of software ergonomics, e.g.:

- Hardware and Software: browser, and operating system (e.g. 4:1 Design for common browsers).
- 5:1 Create a Positive First Impression of Your Site.

In some areas the HHS guidelines may be regarded as controversial, or contradictory, e.g.:

- 11:1 Use black text on plain, high-contrast backgrounds.
- 8:2 Use scrolling pages for reading comprehension, 8:3 Use paging rather than scrolling.

But other types of HHS guidelines that are not included by ISO include:

- Home page design, e.g.: 5:2 Ensure the Homepage Looks like a Homepage.
- Scrolling and paging: the relative merits, e.g. 8:2 Use scrolling pages for reading comprehension.
- Headings, Titles and Labels: window titles and descriptive headings, e.g.:
9:1 Use clear labels for categories of information that summarise the items within the category.
- Appearance, e.g.: 11:2 Ensure visual consistency of website elements within and between web pages.
- Lists: headings, ordering and formatting, e.g. 12:2 Display a series of related items in a vertical list.
- Writing Web Content: jargon, abbreviations, and case, e.g. 15:2 Use abbreviations sparingly.
- Content Organisation: support scanning and display necessary information, e.g.:
16:1 Organize information clearly: Structure the site to be meaningful to the user
16:2 Put critical information near the top of the hierarchy of a website to make it easy to find.

ISO provides more detail in areas specific to the web such as Navigation and Searching, and includes Privacy and Internationalization that are outside the scope of HHS. In total 69 guidelines are unique to ISO. Examples of apparently important guidelines within the scope of HHS, but unique to ISO include:

- C. Avoiding unnecessary start (splash) screens
- C. Minimise the number of navigation steps needed to reach a certain piece of content
- C. Provide a separate 'back' function if the standard function does not lead to a meaningful previous state
- C. The search function should return useful results in spite of imprecise or incorrect terms entered in the query
- D. The content of error messages should clearly state the reason why the error occurred
- D. The name of the URL used for accessing the site should conform to user expectations

These items may not have been included by HHS either because they were not included in the original set of guidelines that were reviewed (for example because there was no supporting evidence), or because they were subsequently judged "less important" and therefore eliminated from the published set.

Some differences were noticed in the content of some HHS and ISO guidelines:

- ISO D1 recommends limiting the quantity of text per information unit/page, while HHS 6:1 recommends using an appropriate page length, and using longer scrolling pages when reading for comprehension (8:2).
- ISO D2 warns against using frames, while the HHS guidelines recommend frames in some circumstances (6:2 When functions must remain accessible) and suggest how they should be used (3:9 Use frame titles).
- ISO D3 warns against using redundant links, while HHS 10:7 recommends repeating important links.
- ISO D4 recommends that link names should not exceed one line of text, while HHS 10:11 recommends that link names should be long enough to be understood, but short enough to minimise wrapping.

6 JISC Guidelines

The current set of HHS guidelines were published during preparation of the JISC guidelines. The draft JISC guidelines were cross-referenced against the HHS guidelines, and 49 were found to be in common. Although the HHS guidelines are designed for information oriented web sites in general rather than academic sites, they were considered sufficiently authoritative to provide the main structure and reference point for JISC.

To reduce the 187 HHS guidelines to a more manageable set of key guidelines, nine guidelines that were unlikely to be applicable to academic sites were eliminated. All remaining guidelines that were classified as either extremely important (28) or very important (54) were selected. To these were added additional guidelines judged by academic webmasters to be particularly important for academic web sites: a further 32 lower priority guidelines from the HHS set and 7 of the original guidelines. This gives a total of 121 guidelines.

The 7 additional guidelines not in the HHS set are:

- Avoid PDF for on-screen reading: only use pdf format if the text is intended to be printed and read offline
- Provide a list of the contents of each part of the site as a list of links to the final information, in meaningful groups
- Customise the 'page not found' error message to offer suggested solutions
- Default search should work like Google (look for the phrase then individual words), or be labelled (e.g. 'phrase')
- State how many search results have been found
- Display the search criteria on the results page, either as a separate page heading or in the search box
- Ensure a search box is provided for repeat searches, both at the top and especially at the bottom of the page

Some of these search guidelines are also in the ISO set.

The final set of guidelines for JISC (Bevan & Kincla, 2003) comprises:

- A checklist of 121 guidelines that are most relevant to academic web sites.
- A tailored set of 85 guidelines aimed at people producing online courses.
- Additional guidelines on digital libraries, portals and personalisation.
- Pointers to information on user-centred design.

7 Conclusions

7.1 HHS Guidelines

The HHS Guidelines have been widely welcomed as an authoritative source of guidance. They have the following advantages:

- The guidelines are written in simple language and are illustrated with examples.
- The publication has an attractive full-colour layout.
- Each guideline has a rating for relative importance and strength of evidence.
- The guidelines are available free online (Koyani et al, 2003) or as a book (Koyani et al, 2004).

However, as noted above, the guidelines are not exhaustive, and as they are aimed at information-oriented sites they omit some material that is specific to topics such as ecommerce. 68 of the ISO guidelines are not included in HHS.

7.2 JISC

The study for JISC demonstrated the superiority of the HHS guidelines to what is otherwise readily available on the web. It also showed how the subsets of the HHS guidelines can be tailored for particular audiences, and complemented with additional guidelines outside the scope of HHS.

The study concluded that the main guidelines are widely applicable across most types of web services. The additional guidelines for specific domains primarily interpret or prioritise existing guidelines.

7.3 ISO DIS 9241-151

The approach taken by ISO 9241-151 is to provide general principles as well as specific solutions, for example giving advice about use of conceptual models, task structures and navigation structures. This approach, combined with the constraints imposed by the rules for producing International Standards means that the scope is narrower and the content will be less immediately accessible to some web site designers. 142 of the HHS guidelines are not in ISO 9241-151. The ISO standard could assist readers by being more specific on which topics are not covered. However, ISO 9241-151 has more comprehensive guidelines for some topics such as navigation and search, and as an International Standard, it will carry authority and reach a wide audience.

7.4 General

This paper highlights the difficulty of defining what constitutes a comprehensive set of web guidelines. There is no perfect set of guidelines: different audiences have different needs. After identifying the intended audience, decisions have to be made about the scope (which categories of guidelines to include) and the depth: how many guidelines to include in each topic area.

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