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1 Introduction

1.1 Assessment Report and Evaluation Criteria Requirements

Assessment Report Requirements

a) The acm digital library (via www.acm.org/dl)
b) The HCI bibliography of HCI resources (via www.hcibib.org)
c) Jakob Nielsen’s website (via www.useit.com)

You will be allocated one of the problems listed above. Your task is to investigate your designated interface and produce an individual report on the results of the investigation.

The report should cover:

a) A description of the system

b) A description of the likely tasks that users would want to carry out with the system; these should be examples of real tasks specified in detail i.e. not at an abstract generic level.
Carry out a KSLA of 2 of the tasks you have identified.

c) A discussion of the likely characteristics of people who might use the system including any knowledge they are expected to have.

d) A discussion of how the design of the interface supports the user (or not as the case may be) in allowing them to carry out the task.

e) Carry out a Heuristic Evaluation of the interface. You should include a description of how you carried out this evaluation.

f) A conclusion – this should include a critical discussion of all the techniques used and their usefulness in evaluating the usability of the interface.

g) A bibliography citing any references you use. Use Harvard notation for citations.
### Assessment Criteria Requirements

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demonstrate understanding of evaluation techniques.</strong></td>
<td>Rigorous evaluation. Complete and detailed analysis substantiated by the techniques.</td>
<td>Good evaluation. Complete analysis, less detailed but is substantiated by use of the techniques.</td>
<td>Reasonable Evaluation. Analysis is insufficiently detailed but all important factors are considered.</td>
<td>Satisfactory evaluation. Analysis lacks detail and a number of important factors are omitted.</td>
<td>Little evidence serious evaluation or analysis.</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Correct application of evaluation techniques.</strong></td>
<td>Excellent approach to the process of evaluation.</td>
<td>Sound Understanding of the process of evaluation.</td>
<td>Satisfactory understanding of the process of evaluation.</td>
<td>Basic understanding of the process of evaluation.</td>
<td>Lacks understanding of the process of evaluation.</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Critical Assessment of the techniques employed.</strong></td>
<td>Analytical and clear criticism grounded in the literature and own experience.</td>
<td>Good summary of criticism based in the literature.</td>
<td>Evidence of criticism based in the literature.</td>
<td>Little evidence of criticism based in the literature.</td>
<td>Lacks evidence of critical thought.</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Referencing</strong></td>
<td>Referencing is comprehensive and accurate using the Harvard system.</td>
<td>Referencing is mainly accurate using the Harvard system (continuum)</td>
<td>Referencing is mainly accurate using the Harvard system.</td>
<td>Little research undertaken. Relies solely on lecture notes.</td>
<td>Inaccurate, outdated, and inadequate. No evidence of Research.</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>Demonstrates excellent use of up to date knowledge from wide area using mainly primary sources.</td>
<td>Use of relevant knowledge not necessarily up to date</td>
<td>Some research in evidence. Mostly secondary sources.</td>
<td>Little research undertaken. Relies solely on lecture notes.</td>
<td>Inaccurate, outdated, and inadequate. No evidence of Research.</td>
<td></td>
<td>0.2</td>
</tr>
</tbody>
</table>
1.2 Personal Analysis and Overview of the System

Personal Analysis

Due to the explosive growth in the number of users of the internet over the past decade, e-mail and browsing the World Wide Web has emerged as a new public medium that rivals printed media. As connections to the internet become easier with dynamic operating systems and application software, as well as Internet Service Providers (ISPs) marketing high bandwidth services for lowering prices, web development has reached new heights. However, this has also caused problems in the correct allocation of technologies and the control of the web. The World Wide Web Consortium (W3C) has developed control through the past decade to organise and establish standards for web-design, internet use and future technology development.

“The workstations that people use today differ greatly from one another. There are different operating systems (for example OS/2, AIX), different user interface styles (for example Macintosh, Motif, CUA), different graphic standards (for example, BGA, VGA), and different system response times. This variety presents great challenges to designers who want to make applications that run on a variety of workstations. A technical approach is needed that allows the same application to work in all these workstations.”
(Rudisill, Lewis, Polson, McKay 1996)

As computer and internet technology continues to develop at tremendous speed, the implications that it has on humans and the society that it builds, tends to become ignored. Scientific studies of modern trends could argue that humans are becoming lazy and reclusive (i.e. internet shopping), resulting in an obese and anti-social society. However, although all this maybe happening, humans still need the fastest and efficient productivity through their web-pages, mobiles, PDAs, etc. Human Computer Interaction (HCI) recognises the advantages and drawbacks with human interaction with modern communications, computer equipment and applications. Many HCI techniques throughout the past years have made the modern professional sit back and take note of social trends and psychological effects on users.

“There are powerful user preferences for the various user interface styles. Vendors have them, and customers have them. There are few new human-computer interaction techniques. Today, there is much more prototyping than there was a decade ago. What is now needed are tools and a development environment that allow these prototypes to evolve into real applications.”
(Rudisill, Lewis, Polson, McKay 1996, continued)

Remember the above quotation is almost a decade old and new technologies and developments have emerged and need to be considered in areas such as human cognitive psychology, memory and behaviours. Numerous other concerns should also be acknowledged, such as design, layout, technical implications, browser diversity, plus standards portrayed by the World Wide Web Consortium.

My evaluation report of the ACM website (www.acm.org/dl) involves HCI evaluation techniques and procedures taught on the module, as well as including personal discussion, appraisal and criticism. Some of my own personal techniques have been employed to aid with evaluation, such as, referring to the web-page source code. I have documented the following ‘Overview of the System’ into topics of related information.
Overview of the System

Outline

The primary purpose of the ACM Digital Library website is to provide access to an online, digital library database for subscribed/registered members, as well as the general public. Subscribed members access a full website service using a username and password. Registered ACM Web Account holders login to use a free, but limited service, whilst the general public can only access a basic and rudimentary service. The ACM Digital Library is an additional relative to its original and fundamental website (www.acm.org/) of which is published by the Association for Computing Machinery, who has been a vital forum in the exchange of information, ideas and discoveries since 1947. The society delivers resources in over 100 countries for art, education, scientific and professional fields, principally to advance the application of information technology and the computing profession. The digital library resources entail electronic publication of magazines, journals, newsletters, reports, conferences, manuals, etc. Most of these resources are downloadable in a PDF format.

Design and Layout

The website on the whole gives a clear and clutter-free layout, but apart from the Portal Logo with the search facility along the top and the footer links, the design has poorly organised grouping. Its lack of headings and especially some explanatory text renders novice or users of little experience, to create errors and develop a loss of interest. This raises an issue with Shneiderman’s rule that prescribes that;

“Systems should allow users to feel they are in control rather than vice versa”

One example of unrelated cosmetic design is on the home page itself, where the FAQs link could be grouped with relation to the Feedback area, so allowing more explanatory detail in full view of the user. The scrolling frame of “Recently loaded issues and proceedings” is a good utility for regular users to view recent additions, but the body has no borders, shading or form. Grouping associated material beneath the search bar is good reference as it implies short mouse or keyboard movement for persistent browsers who consistently search for many or particular articles. However, some searches are duplicated and the Feedback, Report a problem and Satisfaction survey links inconsistently move to different locations. These would probably be better as a secondary footer above the Terms of Usage, Privacy Policy, Code of Ethics and Contact Us links. Although there is an overall clear and good layout in each page, not all pages are consistent in design and do not conform to continuity throughout the site.

Typography and Read Flow

Users scanning the homepage of this website are given a black on white format with two columns, each displaying separate topics and groupings. Users would predominantly read the top banner and search facility, then the left-hand column, so these should convey the most important news and articles as well as a navigating explanation and help topics. The footer is well placed as it links to unexciting, but important legal, copyright, ethical and contact information. Although the site is predominantly textual (due to the informative nature of the site), the formation of text leaves a lot of space wasted and featureless.
"For most interactive systems, the displays are a key component to successful designs, and are the source of many lively arguments. Dense or cluttered displays can provoke anger, and inconsistent formats can inhibit performance."
(Ben Shneiderman, Designing the User Interface, 1992, pp 315)

The use of advertising images and illustrative buttons conveys good communication, but the website lacks structure and texture. By copy/pasting some of the website text into Microsoft Word, I deciphered the text typeface as Arial size 10. Fonts typefaces Arial, Verdana and SansSerif, all conform to a basic font standard of which is approved for informative websites. However, the typeface changes in normal text than that of a link. Surely colour, font-size, boldness and underlining could represent the link typeface. This would be devised professionally in the website stylesheet association. By viewing the website source-code, I found that a stylesheet is referenced, although some inline styling is endorsed.

An example presented from the HTML source code ([www.acm.org/dl](http://www.acm.org/dl)) home page.

```
<link rel="stylesheet" type="text/css" href="css/dl.css">

a:link {text-decoration: underline; Color: #006699;}

a:visited {color: #990033; text-decoration: underline;}

a:hover {color: red; text-decoration: none}

.aLink1:link {color:#336699}
```

**Colourisation and Attention to Detail**

Although I have presented an argument that the website is bland and uninspiring, the majority of what imagery is used, is of excellent quality, and corresponds well to download speed acknowledgment. An example is the xrsSearch2xs.gif image from the website’s home page, which when examined in Adobe Photoshop v8.0, shows a GIF image sized 57 pixels x 74 pixels of 3.58 KB. Graphical representation of buttons and advertising links are well presented, but not supported with the lack of background structure. However, the use of style-sheeting throughout the website supports Shneiderman’s rule of consistency, especially with regard to colour.

"Be consistent in color coding: Use the same color-coding rules throughout the system. If error messages are in red, then make sure that every error message appears in red; a change to yellow may be interpreted as a change in importance of the message. If colors are used differently by several designers of the same system, then users will hesitate as they attempt to assign meaning to the color changes. A set of color-coding standards should be written down for the benefit of every designer”
(Ben Shneiderman, Designing the User Interface, Page 327)

Recently argued statements express that dyslexia causes an issue with websites that use black text on a white background. Other issues with colour blindness and shade distinction have been raised also. In the interest of this topic, I have run the [www.acm.org/dl](http://www.acm.org/dl) website home page through a simulator at [http://colorlab.wickline.org/colorblind/colorlab](http://colorlab.wickline.org/colorblind/colorlab) as displayed below.
The resulting display without ‘Other Options’ is after this paragraph below. It can be seen that not many issues are raised, probably only with the colourisation of images. However, some colours (such as that on the Computing Reviews icon) has had its’ colour changed from red to an olive green. Other icons and images have lost defined colour and the top logo is blank.
The amount of imagery, photos, icons and colour presented on a web-page is not only an issue with download time, as whilst researching one of the other assessment websites www.hcibib.org, Jakob Nielsen argues in a paragraph expressed by The New York Times on the Web.

“Lately, the concept has come full force to the Web. Corporations have moved beyond their initial efforts to just post a Web site and are now hiring consultants to redesign sites to help them attract and retain visitors. The tests include making such basic determinations as discovering what visitors want to find at a site and whether they can find it. Web surfers won't be surprised to learn that those who study "usability" find that most sites don’t make the grade.”

Effectiveness and Affordance

Website colourisation and use of imagery is simple and somewhat neatly presented, but apart from the search facility and grouped listing, it lacks the collaboration of logical items, so endorsing user semantic memory. By listing documents in order of relevance scale is a very effective concept, but is not self-explanatory, especially to inexperienced users. A key should be displayed accordingly. The website reduces implications on ‘chunk information’, and so reduces the reliance of Short Term Memory. However, until a user becomes quite conversant with site navigation, he/she will experience difficulty, unless we can relate previous user experience, but this would be stereotyping out predicted users. Although not so apparent throughout this website, it uses some ‘affordance’ through buttons, icons, hyperlinks and visual prompts – not so much in menus that promote “recognition versus recall”, but gives good selection menus for sorting and displaying search results.

“The superiority that the phenomenon of recognition has over recall has obvious ramifications for interface design. Indeed, during the last decade there has been a shift towards designing interfaces where the amount of information users are required to recall has been reduced in favour of requiring them to recognise the information that is needed to perform a task. For example, many users now employ an extensive range of menus containing text or iconic lists of operations, options, files and so on.”
(Jenny Preece, Human-Computer Interaction, pp 118, 1994)

Further Acknowledgements

Navigation is considerably aided by the use of page jumping numbers and the previous/next links when conducting a search.

When browsing the digital library through the grouped listing (top-right), the user is presented a navigation breakdown, known as ‘breadcrumbs’. This helps the user to perceive where he/she is browsing in the website. This provides good user feedback.

This website gives the user the feelings of “you must know exactly what you are searching for” and presumes that the user is somewhat conversant with navigating literature searches and websites.
2 Task Analysis

2.1 General Tasks Analysis

In this section of Task Analysis, I will generate some typical and rudimentary tasks that a user can accomplish whilst browsing the ACM Digital Library. The following are examples of these.

- A student in his mid-twenties visits the ACM Digital Library website for the very first time, and although quite experienced with using the internet, wants help and information regarding navigation and tips to research material for a dissertation. He therefore browses for help in the FAQs section.
- A lecturer, at a local further education school and college, who is an experienced user of the ACM Digital Library has found a problem researching an area in Conferencing. She therefore completes the form, to Report a problem. Her problem is submitted after finishing questions on the form.
- A senior journalist, who publishes articles in newspapers and magazines nationally, uses the ACM Digital Library for much research and is a subscribed member. In the interest of his profession, before he retires, his company has asked him to complete the Survey. Not too sure of filling in the survey, as his fingers are not as nimble these days, he navigates to the link and after completing the form, submits his answers.
- A web developer of a local company has been told by a colleague to browse The Guide section of the ACM Digital Library as there are good links to literature under Books of the Publication type menu. He has never visited the site, but thinks it may aid his decision when he buys from Amazon after browsing what the site recommends.

2.2 Specific Task Analysis 1

In extending the basic scenarios, as above in 2.1, I have detailed a GOMS methodology to a specific task.

A teacher at a local secondary school needs to research documents related to Journals for her part-time, post-graduate course so she can progress to a higher level within the school. With interruptions from friends and work colleagues on her mobile, she browses the ACM Digital Library at home whilst waiting for her ready-meal to cook in the microwave. Although she has browsed the site before, she is not too sure of what is best to include or reference. All she knows she needs some recent information regarding law in the area of e-commerce.
Experimental GOMS Analysis for STA1

**GOAL**: Retrieve a relevant article in law in e-commerce in the Journal section
- **GOAL**: Find Journal articles
  - Click link to Journal section
    - move cursor to hyperlink
    - click mouse button
    - await response
- **GOAL**: Search Journal articles on ‘law + e-commerce’
  - Use Search utility
    - Move cursor to search textbox
    - click mouse button whilst inside textbox
    - Type ‘law + e-commerce’ into textbox
    - Click ‘Search’ button
    - Await response
- **GOAL**: View specific article
  - Scan page for relevant article
    - Scroll page
    - Click link to view document in full
    - Await response
- **GOAL**: Print copy of Full Text document
  - Download document and print
    - Click ‘pdf’ link
    - Await response time to download
    - Move cursor to PRINT icon
    - Click print icon
    - Move cursor to OK button on printer dialog
    - Click ok button

I have not included selection rules in this task analysis, as apart from using the mouse, the teacher could use the ‘TAB’ key, but this would take considerably more time.

### 2.3 Specific Task Analysis 2 (incl. KSLA)

The following task analysis involves both the **GOMS** analysis technique and then extending it to conduct a **KSLA** technique, focusing on low-level tasks to estimate time to perform the operation.

I have included **KSLA** references in **RED** and a **Reference Chart** at the end of this section. I must state that the *keystroke* press, *mouse scroll movement* and *mental* action are derived from averages published in lecture notes and library books. Response times are also dependant on the internet connectivity and hardware of the computer system used.

A young art student, who is finishing her final undergraduate year, wants some information from the **ACM Digital Library** website regarding ‘Interface Design’, looking for the techniques used to develop the paramount. She has used the internet somewhat but is just getting to grips with research and referencing. She basically needs to browse of what maybe of interest using a low-resolution library computer, and forgetting her contact lenses so relying on her old glasses from her car’s glove box.
GOMS and Keystroke Level Analysis for STA2

GOAL: Research documents on development techniques regarding ‘Interface Design’
- GOAL: Initiate ACM Digital Library search
  - Main ‘Search’ from home page
  - ensure radio button for ACM DL is checked (M)
  - hand to mouse (H)
  - move cursor to textbox under search (P)
  - mouse click on textbox (B)
  - hands to keyboard (H)
  - enter ‘Interface Design’ into textbox (K x 18)
  - hand to mouse (H)
  - move cursor to search button (P)
  - mouse click on search button (B)
  - await response (R)
- GOAL: Reform Layout to compact results to view easier
  - Select menu ‘Condensed Form’ from listbox
  - move cursor over display results arrow-down button (M+P)
  - mouse click arrow-down button when highlighted (B)
  - move cursor to Condensed Form selection (P)
  - mouse click button (B)
  - await response (R)
- GOAL: View specific item and note description
  - [Select Goal: using mouse wheel method]
  - mouse click empty area of screen (M+B)
  - scroll page with mouse wheel to show item number 9 (M+P)
  - read item and ascertain suitability (M x 2)
  - mouse click html link to display Full Text details (B)
  - [Select Goal: using mouse/scroll-bar method]
  - move cursor to right-hand website scroll bar (M+P)
  - mouse click and hold mouse button (B)
  - lower page to view to show item number 9 (M+P)
  - read item and ascertain suitability (M x 2)
  - mouse click html link to display Full Text details (B)
  - [Select Goal: using cursor key method]
  - mouse click empty area of screen (M+B)
  - scroll page by holding down cursor-down key (B)
  - lower page to view to show item number 9 (M+P)
  - read item and ascertain suitability (M x 2)
  - mouse click html link to display Full Text details (B)

In using the most common of the selection methods for average users (i.e. – using mouse wheel method), a calculation of usability time can be presented.

\[(M)+(H)+(P)+(B)+(H)+(Kx18)+(H)+(P)+(R)+(M+P)+(B)+(P)+(R)+(M+B)+(M+P)+(M+P)+(Mx2)+(B) = ???\]

\[1.2+0.4+1.1+0.1+0.4+(0.3x18)+0.4+1.1+0.1+2.0+1.2+1.1+0.1+1.1+0.1+2.0+1.2+0.1+1.2+1.1+(1.2x2)+0.1 = 23.9\] (approx. 24 seconds)
I believe that the mental action behind choosing menus, links and especially navigating would increase this figure in real term. Also the system response time may fluctuate due to internet connectivity. Remember the disability of using her old glasses and the small monitor resolution of the library computer?

2.4 Specific Task Analysis 3 (incl. KSLA)

The task analysis that follows is a repeated process of the methodology used in 2.3, but with a different scenario and analysis layout.

An editor of a computer magazine considers reporting a monthly newsletter regarding computer professionals and their research. He can get background information from colleagues and other web sites, but requires literature to reference with his article. As newsletters will be published monthly and articles are to be focused on latest events, he may consider subscribing to an ACM Digital Library membership. In his brief research he has discovered ‘Lauren Weinstein’, an interesting individual, being the co-founder of People for Internet Responsibility (PFIR). He therefore researches articles by the name.

GOMS and Keystroke Level Analysis for STA3

GOAL: Research article on a computer professional to reference in newsletter

- **GOAL**: Browse ACM Digital Library Bibliographic collection
  - Navigate using ‘Go to the Guide’ link (Total = 4.8 seconds)
    - home hand to mouse (H) = 0.4
    - scan screen for link (M) = 1.2
    - move cursor to link (P) = 1.1
    - mouse click on hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

- **GOAL**: Browse to Author index section
  - Navigate using ‘Author index’ link (Total = 4.4 seconds)
    - scan screen for link (M) = 1.2
    - mouse cursor to link (P) = 1.1
    - mouse click hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

- **GOAL**: Search author index by name
  - Use search by name utility (Total = 11.8 seconds)
    - scan screen for search utility (M) = 1.2
    - mouse cursor to textbox (P) = 1.1
    - mouse click on textbox (B) = 0.1
    - home hands to keyboard (H) = 0.4
    - type name (shift-key+space) (Kx18) = 5.4
    - home hand to mouse (H) = 0.4
    - mouse cursor to search button (P) = 1.1
    - mouse click search button (B) = 0.1
    - await response (R) = 2.0
- **GOAL**: View interesting/relevant article
  - [Select Goal: using mouse wheel method (Total = 6 seconds)]
    - Scan screen for text (M) = 1.2
    - mouse click empty area of screen (B) = 0.1
    - scroll page with mouse wheel to show item number 12 (K) = 0.3
    - read article and ascertain suitability (M) = 1.2
    - move cursor to link (P) = 1.1
    - mouse click hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

  - [Select Goal: using mouse/scroll-bar method (Total = 5.6 seconds)]
    - move cursor to right-hand website scroll bar (P) = 1.1
    - mouse click and hold mouse button (B) = 0.1
    - lower page to view to show item number 12 (P) = 1.1
    - read article 12 and ascertain suitability (M) = 1.2
    - mouse click hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

  - [Select Goal: using cursor key method (Total = 4.8 seconds)]
    - mouse click empty area of screen (B) = 0.1
    - scroll page by holding down cursor-down key (K) = 0.3
    - lower page to view to show item number 12 (P) = 1.1
    - read article 12 and ascertain suitability (M) = 1.2
    - mouse click hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

- **GOAL**: View article in full
  - Download article from Html/Pdf link (Total = 4.4 seconds)
    - scan screen for link (M) = 1.2
    - mouse cursor to link (P) = 1.1
    - mouse click hyperlink when highlighted (B) = 0.1
    - await response (R) = 2.0

As the editor prefers to use the mouse/scroll-bar method, a calculation of usability time can be presented.

Goal 1: Browse ACM Digital Library Bibliographic collection
**Total = 4.8 seconds**

Goal 2: Browse to Author index section
**Total = 4.4 seconds**

Goal 3: Search author index by name
**Total = 11.8 seconds**

Goal 4: View interesting/relevant article (Selection: mouse/scroll-bar method)
**Total = 5.6 seconds**

Goal 5: View article in full
**Total = 4.4 seconds**

**Grand Total = 31 seconds**
Although our editor is a competent user of the ACM Digital Library website, he is still able, like anyone, to make spelling mistakes; especially of unfamiliar names. Diagnostics help to recover mistakes but the editor may feel some frustration. Some previous knowledge and perceptual processes maybe unrecognised as the flow of sequences are altered. We can surmise that the editor has already logged into his web account and so is offered extended facilities. Pondering to set up subscription first, it may take some time to locate good material to publish. Again the system response time may fluctuate due to internet connectivity.

Keystroke Level Analysis Reference Chart

<table>
<thead>
<tr>
<th>P</th>
<th>Point with MOUSE to a target on display (1.1 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Press or Release MOUSE BUTTON (0.1 seconds)</td>
</tr>
<tr>
<td>BB</td>
<td>double click MOUSE BUTTON (0.2 seconds)</td>
</tr>
<tr>
<td>H</td>
<td>home hands to KEYBOARD/MOUSE (0.4 seconds)</td>
</tr>
<tr>
<td>M</td>
<td>MENTAL act of routine thinking or perception (1.2 seconds)</td>
</tr>
<tr>
<td>R</td>
<td>RESPONSE time (to be calculated - use 2.0 seconds for internet connection)</td>
</tr>
<tr>
<td>K</td>
<td>KEYPSTROKE time (0.3 seconds)</td>
</tr>
</tbody>
</table>

3 Usability Analysis

3.1 User Characteristics Analysis

It can be assumed that the majority of users visiting the ACM Digital Library website would be included in the follow list;

- subscribed members in areas of academic, scientific, computing, engineering, sociology, psychology or even medical, who regularly use advanced facilities.
- individual web account holders who use the website frequently, but not with such necessity as subscribed members.
- the intermediate user that has used the website for informative material with the intention to reference his/her research and literature.
- the one-off user who, after eventually finding what was required (or that which was suitable), may only return on the very odd occasion.
- a user who after unsatisfactorily not finding relevant information, or who found the website hard to navigate and confusing, probably will not return in the near future.

We can recall in the Specific Task Analysis 2.3, the young art student was somewhat ‘disabled’ by using the small resolution monitor of the library computer as well as only having access to her old pair of spectacles. The retiring senior journalist may find mouse navigation gradually harder due to aging, especially in the quite lengthy process the ACM Digital Library gives for users to complete their survey form.
Throughout the real task examples I have touched upon earlier, it can be assumed that the users;

- are aged between 18 to 65.
- have no extreme physical disabilities.
- have no issues with poor lighting, screen flicker, vision fatigue, colour blindness, require sub-titling or audio output, require keyboard only input.
- gender has no advantageous effect on website usability performance or navigation.
- have a well educated background and understanding of English phrases and linguistics.
- have an adequate, if not proficient, interaction with website usability and approach.
- an appropriate background of IT systems and computer language and jargon.
- require no other specific output than that of a standard computer VDU.
- Are not using the website under extreme pressure, time constraint, noise, disturbances, power failures, emotional distress and anxiety.

Due to the ‘audience’ the website is specified toward, we can distinguish that the majority of users (although may prematurely require cognitive and navigational help) will become competent after several experiences of website usability and feedback, due to their previous experience and IT knowledge.

We can predict that users will be come from numerous professions including students, lecturers and professors, medical and engineering personnel, journalists and researchers; but a majority would be IT, computer science and computing professionals. As the website is predominantly composed of textual presentation, the natural language throughout the website is commercially and academically oriented.

“While it may not yet be possible to develop systems that can understand natural language as it is typed, several kinds of expert system and intelligent tutoring system have been developed using some form of structured subset of a natural language. A user is required to learn how to use such a subset language unambiguously and to phrase sentences in a way that the target system can understand. Another problem with natural language interaction is the amount of typing that has to be undertaken. For a user who is a novice at the keyboard it can be quicker to use a menu-driven system. For an expert computer user, a command language that requires minimum key-pressing may also be quicker. Although natural language promises flexible and easy communication with computers, most natural language systems developed in the foreseeable future will be limited to well-defined domains with a limited vocabulary.”

(Jenny Preece, Human-Computer Interaction, pp 270, 1994)

3.2 Interface Design Analysis

It has been previously mentioned that the informative language expressed within the website pages reflects on the evidential and potential users that visit the system. With the exception of a few scroll bars and drop-down menus, the notion of ‘affordance’ is considerably represented by textual format and some image links. The content and expression of the ACM Digital Library website reflects well for its prescribed users, although some personal criticism to its primary design and layout must be expressed. As approximately 80% of the website pages have a text-driven outlay, its inability to adhere to some enlargement facility may prevent good usability to visually impaired or elderly users.
As shown in my *Specific Task Analysis 2.3*, a user only references the website for research, as in comparison; the user in *Specific task Analysis 2.4* maybe influenced by using extra utilities, so to be encouraged to subscribe or set up a web account as usability may well become mandatory for his job. Evidently the site is devoted to web account holders and subscribed members as this is proved as it refuses to download particular publications for intermediate/experimental users.

“Rather than expect the user to learn how to perform tasks and what the commands mean through rote learning, which requires much practice, an interface should be designed to encourage the user to acquire the various skills of interaction as quickly as possible. Menu-based mouse-driven interfaces are a good example of this approach since all a learner needs to know initially is how to use the mouse and select an option. In fact, this action in itself requires minimal declarative information since much can be learned simply by moving the mouse and exploring its effect on the screen.”

*(Jenny Preece, Human-Computer Interaction, pp 165, 1994)*

The most positive feature the website upholds is the home/advanced search facility complemented with a relevance key and functionality to change layout using drop-down menus. This helps an experienced user to retrieve information relatively quickly. I have listed some advantages and disadvantages that may prove interesting.

**Advantages**

- quick access to information through search elements for experienced users.
- although somewhat laborious, provides positive feedback through survey and reporting a problem forms.
- conforms well to HTML and CSS standards.
- provides reasonable feedback on navigation, although not consistent.
- gives good features for expert and frequent users.
- references a vast database for subscribed members and web account holders.
- error handling is provided and reinforced with help.
- good presentation on displaying search results with breadcrumbs and page jumps.

**Disadvantages**

- slow cognitive development and help for novices.
- website does not sell itself attractively.
- layout continuity and perceptual options can confuse learning.
- user can lose control of system through frustration and complexity of help tools.
- learning system processes is time-consuming.
- naked space is wasted on many screens.
- little tooltips and roll-over dialogue

Some features revealed in the disadvantages above maybe reflected in the ‘*Heuristic Evaluation*’ that follows and also violate some of Shneiderman’s Eight Golden Rules.
3.3 Heuristic Evaluation with Process Description

Heuristic Evaluation is a technique that enables us to examine interfaces without involving other users and to inspect usability issues by focusing on key principles and guidelines.

The following Heuristic Evaluation is split between the two Specific Task Analyses used previously – the first concentrates primarily on the flow from screen to screen and the second, inspects each screen the user browses to complete the task. Both Problem Record Sheets that follow are recorded with a sequential hierarchy.

A combined Heuristic Rule Chart and a Severity Rating Chart follow for reference.

<table>
<thead>
<tr>
<th>Heuristic Rule Chart</th>
<th>Severity Rating Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Visibility of system feedback</td>
<td>0</td>
</tr>
<tr>
<td>(2) Match between system/real world</td>
<td>1</td>
</tr>
<tr>
<td>(3) User control and freedom</td>
<td>2</td>
</tr>
<tr>
<td>(4) Consistency and standards</td>
<td>3</td>
</tr>
<tr>
<td>(5) Error prevention</td>
<td>4</td>
</tr>
<tr>
<td>(6) Recognition rather than recall</td>
<td></td>
</tr>
<tr>
<td>(7) Flexibility and efficiency of use</td>
<td></td>
</tr>
<tr>
<td>(8) Aesthetic and minimalist design</td>
<td></td>
</tr>
<tr>
<td>(9) Help users recognise, diagnose and recover form errors</td>
<td></td>
</tr>
<tr>
<td>(10) Help and documentation</td>
<td></td>
</tr>
</tbody>
</table>
**Problem Record Sheet One**

**Interface Evaluation**: ACM Digital Library (www.acm.org/dl)

**Evaluator**: Colin Hopson  
**Date**: 18th April 2006

**Task Description**: Search for items on ‘Interface Design’ (STA2.3)

<table>
<thead>
<tr>
<th>Screen No.</th>
<th>Description of Problem</th>
<th>Heuristic Violated</th>
<th>Frequency</th>
<th>Impact</th>
<th>Persistence</th>
<th>Severity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Page (Screen 1)</td>
<td>Scans screen for basic screen instructions</td>
<td>10</td>
<td>intermediate</td>
<td>overcome with experience</td>
<td>on-going</td>
<td>2</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Read flow and quick understanding</td>
<td>2</td>
<td>moderate</td>
<td>overcome with experience</td>
<td>numerous times</td>
<td>1</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Presses Search button but no text in Search textbox</td>
<td>5</td>
<td>rare, only by user mistake</td>
<td>overcome with relative ease</td>
<td>one time problem</td>
<td>0</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Presses Search button with misspelt text in Search textbox</td>
<td>9</td>
<td>intermediate</td>
<td>system recovers and diagnoses</td>
<td>dependant on user mistake</td>
<td>0</td>
</tr>
<tr>
<td>Search Results (Screen 2)</td>
<td>Return to home page</td>
<td>3</td>
<td>common</td>
<td>use browser button</td>
<td>repeated</td>
<td>2</td>
</tr>
<tr>
<td>Search Results (Screen 2)</td>
<td>Decipher where in website user is browsing</td>
<td>1</td>
<td>intermediate</td>
<td>overcome, but not clear</td>
<td>requires experience</td>
<td>0</td>
</tr>
<tr>
<td>Search Results (Screen 2)</td>
<td>Read relevant articles of interest</td>
<td>8</td>
<td>common</td>
<td>difficult for novice</td>
<td>repeated until understood</td>
<td>1</td>
</tr>
<tr>
<td>Browsing Item (Screen 3)</td>
<td>Return back to original search screen</td>
<td>3</td>
<td>rare</td>
<td>use browser button</td>
<td>repeated</td>
<td>1</td>
</tr>
<tr>
<td>Browsing Item (Screen 3)</td>
<td>Download/Browse text in full</td>
<td>9</td>
<td>common to non-members</td>
<td>difficult for novice</td>
<td>bothered until understood</td>
<td>2</td>
</tr>
<tr>
<td>Browsing Item (Screen 3)</td>
<td>Recognise and navigate familiar links</td>
<td>2</td>
<td>common</td>
<td>difficult at beginning</td>
<td>repeated</td>
<td>1</td>
</tr>
<tr>
<td>Browse text in Full (Screen 4)</td>
<td>Click link then navigate with aid of breadcrumbs</td>
<td>4</td>
<td>common</td>
<td>difficult</td>
<td>repeated</td>
<td>2</td>
</tr>
<tr>
<td>Browse text in Full (Screen 4)</td>
<td>Click link to navigate to Search</td>
<td>6</td>
<td>common</td>
<td>intermediate</td>
<td>repeated</td>
<td>1</td>
</tr>
</tbody>
</table>
**Problem Record Sheet Two**

**Interface Evaluation**: ACM Digital Library (www.acm.org/dl)

**Evaluator**: Colin Hopson  
**Date**: 23rd April 2006

**Task Description**: Search relevant material of Author Name under Author Index (*STA2.4*)

<table>
<thead>
<tr>
<th>Screen No.</th>
<th>Description of Problem</th>
<th>Heuristic Violated</th>
<th>Frequency</th>
<th>Impact</th>
<th>Persistence</th>
<th>Severity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Page (Screen 1)</td>
<td>Navigation through recognising icons, pictures, etc.</td>
<td>2</td>
<td>quite common</td>
<td>awkward for novices</td>
<td>overcome with experience</td>
<td>1</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Navigate for explanatory help and information</td>
<td>10</td>
<td>regular</td>
<td>difficult to ascertain</td>
<td>requires extensive practice</td>
<td>2</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Navigate to required section (<em>i.e. Go to the Guide</em>)</td>
<td>7</td>
<td>common</td>
<td>requires rigid navigation</td>
<td>overcome but some mistakes</td>
<td>1</td>
</tr>
<tr>
<td>Home Page (Screen 1)</td>
<td>Navigate directly using author name and ‘The Guide’ section</td>
<td>3</td>
<td>common</td>
<td>system errors generated</td>
<td>repeatedly bothered</td>
<td>3</td>
</tr>
<tr>
<td>The Guide (Screen 2)</td>
<td>Navigate to prioritised links without repeated information</td>
<td>8</td>
<td>intermediate</td>
<td>waste of screen space</td>
<td>user can chose to ignore</td>
<td>1</td>
</tr>
<tr>
<td>The Guide (Screen 2)</td>
<td>Motivation and anxiety to navigate to correct section</td>
<td>1</td>
<td>intermediate</td>
<td>user feels anxiety</td>
<td>requires navigation knowledge</td>
<td>0</td>
</tr>
<tr>
<td>Author Index (Screen 3)</td>
<td>Find required author’s listings</td>
<td>3</td>
<td>rare</td>
<td>easier every time</td>
<td>only for first time user</td>
<td>0</td>
</tr>
<tr>
<td>Author Index (Screen 3)</td>
<td>Navigate to correct author name</td>
<td>6</td>
<td>rare</td>
<td>overcome with ease</td>
<td>difficult first time</td>
<td>1</td>
</tr>
<tr>
<td>Search Results (Screen 4)</td>
<td>Layout not in listed order or consistent</td>
<td>4</td>
<td>rare</td>
<td>expected layout</td>
<td>repeated</td>
<td>1</td>
</tr>
<tr>
<td>Search Results (Screen 4)</td>
<td>Access membership only information</td>
<td>5</td>
<td>intermediate</td>
<td>overcome using dialogue</td>
<td>one-off problem</td>
<td>0</td>
</tr>
<tr>
<td>Search Results (Screen 4)</td>
<td>Types incorrect spelling of author</td>
<td>9</td>
<td>intermediate</td>
<td>system recovers and diagnoses</td>
<td>dependant on user</td>
<td>1</td>
</tr>
</tbody>
</table>
4 Conclusion

My first personal impression of the website’s home page was its lack of colour, and that it displayed a bland layout with few instructional text and complimentary images or buttons. Although I could argue that this websites’ home page should be attractive in order to hold a browsers’ attention and interest in order to encourage further site navigation, I realised the purpose of the website was to simply convey and support literal and informative data regarding published material (i.e. – a digital library). If this were an online bookshop, the necessity of complimentary images (such as publications front/back covers, plus chapter outlay and content) would be considered a priority.

The primary service of this website is to deliver requested information from digital publications. However, I personally feel the website portrays wasted space, clutter of unrelated text links with few navigation aids or grouped patterns supplying little instructional feedback. Inter-application consistency is not 100% throughout the ACM Digital Library and when linking from the digital library website to its partner www.acm.org, the intra-application consistency is completely different. If these two websites are to be recognised as complimentary partners, there should be design, colour and style continuity and similarity.

Following the issue of style and colourisation consistency, can I recite the second Shneiderman quotation in my section Colourisation and Attention to Detail. With this I could assume that web developers instigated cascading stylesheets for web authoring in order to comply with Shneiderman’s colour-coding standards. Therefore CSS standardisation would induce style and colour consistency and continuity throughout website design.

“HTML 4 supports many types of style sheets, including cascading style sheets (CSS), W3C’s proposed way to format text on Web pages, which allows various levels of style sheets to work together. A corporate Web site could use one corporate-wide style sheet to set standard styles for all Web pages on the Web site, for example. The technical documentation department could have an additional style sheet that defines other styles used only in the Web pages for that department. A particular Web page might contain more definitions of styles used only on that page.”

(Margaret Levine Young, Internet: The Complete Reference pp 678, 1999)

Finally, my critical discussion should state that in the evaluation of this website, the GOMS and KSLA is a detailed and more hierarchical analysis, but results have no relevance unless you can test them against other websites that run almost identical system functionalities. However, a more in depth Heuristic Evaluation of the same task, conducted by numerous users of differing knowledge and experience, would ideally ‘iron out usability issues’.
5 Bibliography

The following list shows published material and websites of which I researched to enhance my understanding of *Human Computer Interaction* techniques, along with other technical information.

Prentice Hall
Harrison Learning Centre (University of Wolverhampton)
ISBN: 0130461091

PREECE, A., SHARP, H., BENYON, D., HOLLAND, S., CAREY, T., (1994) HUMAN COMPUTER INTERACTION
Addison-Wesley Publishing Company, Inc.
Harrison Learning Centre (University of Wolverhampton)
ISBN: 0201627698

WOLVERHAMPTON ONLINE LEARNING FRAMEWORK (2006)
‘CP2024 – Introduction to HCI’ [on-line]
(Modified 9th April 2006 23:34:34) [Last Cited 24th April 2006]
http://wolf-nt.wlv.ac.uk/common/newframeset.asp?modid=wlv2155
### Reference A : Internet Reference Listing

The following list references websites of which I have used in my report, either cited quotations or linked pages. Included is also a link to an image used within my report.

<table>
<thead>
<tr>
<th>Website</th>
<th>Details</th>
</tr>
</thead>
</table>

### Reference B : Published Reference Listing

The following list references quotations cited from published material, of which I have used in my report.

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
<th>ISBN</th>
</tr>
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