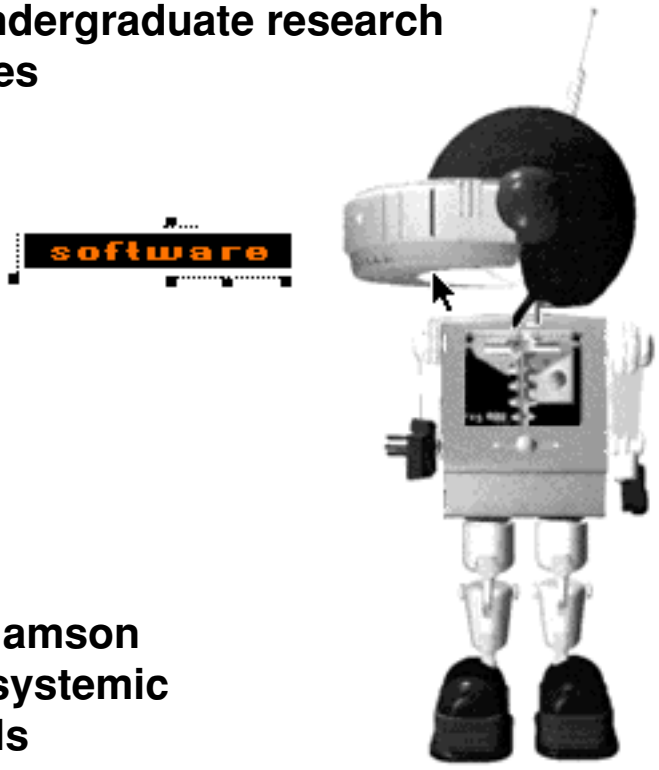
Interfaces

No. 36 Autumn/Winter 1997

Features

Usability criteria in software development
Encouraging undergraduate research
Electronic diaries



Plus:

Adrian Williamson ponders systemic individuals

Alistair Edwards looks into holes in the wall

Published by the British HCI Group ISSN: 1351-119X

contents

Pre*face*

Andrew Monk was elected Chair of the British HCI Group at the AGM this August in Bristol. He takes over from David Jennings. Previously he was Secretary and Membership Secretary, a job now taken by Ismail Ismail.

From the Chair

HCI has now to be considered to be a discipline in its own right. We have our own journals and conferences. We have our own way of judging what is good practice and good research. We know that this is our way and not someone else's because these judgements are often at odds with the criteria applied elsewhere in the places we work. HCI researchers working in Computer Science or Psychology departments face pressures to research or teach in ways they are not entirely comfortable with. Practitioners in industry face similar pressures from the engineers they work with. We know what we want to do. It is time we took control of our future and did it.

The problem is that very few people know about us; even fewer understand that there is an HCI way of doing things. We have two unprecedented opportunities to do something about this at the moment and we should grasp them with both hands. Unlikely as it may seem, they are ISO 9241 and the Web.

ISO 9241 is the *International Standard for Ergonomic Requirements for Office Work with Visual Display Terminals*. It has 17 parts covering diverse issues such as:

- work design, workstation layout, keyboard and display ergonomics;
- design principles for menus, form filling and direct manipulation;
- processes for user-centred design as well as testing conformance to the standard.

Many of the parts have been voted on and have the full status of international standards. All the other parts are close to achieving this status. ISO 9241 is likely to be very influential in the near future as aspects of it will become European law. The very existence of this standard makes the point that there is well accepted HCI knowledge out there and ready to be used.

How hard can it be to design a hole in the wall?

Alistair D. N. Edwards

In fact, HCI standards have had an enormous influence on the computer industry already. I am thinking of the proprietary standards, the Apple Human Interface Guidelines, IBM's Common User Access (CUA) and the Windows style guides. These incorporate years of HCI research and development work. Ten years ago it would have been unimaginable that a secretary could be expected to do a complex task like page layout with a computer. The HCI knowledge encapsulated in proprietary standards for graphical interfaces is what has made it possible for people with no technical background to do tasks like this with computers. This knowledge was hard won by HCI researchers and practitioners and we need to tell the world that it was us that did it. ISO 9241 is much broader in scope than a style guide as it covers the process of design and the nature of the work done with VDTs. It therefore stands to be even more influential.

The Web is our other opportunity. My generation is old enough to remember the large HCI research effort in the 1980s investigating Hypertext, and before that menus. Now when every man and his dog has a web page all this good research appears to have been forgotten. HCI professionals know how to design usable web pages. We know that it is rubbish to insist on a limit of 7 plus or minus 2 links from any page. We know that good screen design is only possible by giving some thought to what purpose the reader of that page has in accessing it. Web users are beginning to realise some pages are more usable than others and that a rating on the 'wow factor' is not the best way to judge a page. This has to be an excellent opportunity to demonstrate what can be achieved by applying HCI knowledge. Conveniently, it offers us a completely new audience to present our ideas to.

Phew! I had not imagined that becoming Chair of this eminent body would change me, but it has. It seems I am becoming an HCI evangelist. So I say to you – go out – spread the word!

Andrew Monk
Chair of the British HCI Group

Where does the average person come into direct contact with a computer interface most often? It is surely the cash dispenser. These machines have been around for over twenty years, and their function is very simple. So why are their interfaces so badly designed? Their designers do not even display common sense, never mind HCI knowledge (at least not in the machines I use).

One of the annoying traits I have observed is their promising what they cannot deliver. The worst case was one which let me go through all the stages of specifying how much money I wanted before telling me that it was unable to dispense cash. Was there some reason why the Welcome screen did not simply say 'This machine is unable to dispense cash, but all other services are available.'?

A slightly less restrictive version is in machines which offer standard amounts of cash. In other words, one can select £20, £30, £40, £50 and so on, by pressing the corresponding button. I have been in situations where I have pressed the £50 button – and then the machine has told me that I can only have multiples of £20! If that is the case why offer me amounts which are not multiples? Similarly a receipt is usually offered with my cash – so it is again annoying to have selected the option and then be told I cannot have the receipt.

The machine has knowledge of its current status (filled with only £20 notes, out of paper in the printer or whatever). So surely it would be a trivial programming task to only offer amounts which it can dispense, or not to offer receipts (perhaps with a note on the screen from which one would expect to select that option)?

Another machine allowed me to submit a request for cash (with a receipt) without having specified what amount I wanted. It eventually informed me that the amount I had entered was not a multiple of £10 – but I had not entered any amount.

My latest experience is still puzzling me. I selected my usual £50 with a receipt and was given the warning 'an unusual document mix may be dispensed'. What does that mean? Might I receive lottery tickets instead of cash, a birthday card instead of my receipt? And note that the message was that I 'may' receive this unusual mix. I still don't know whether I did or not.

I haven't the time or the bank balance to keep teasing these machines to see how else they will surprise me. Perhaps other readers have other stories, but the question remains: Why are these interfaces so naive and badly designed? Designing a cash dispenser interface is the sort of project you might give to undergraduates on an HCI course, and I would penalize anyone whose design had some of the above basic flaws, so why can the professionals not do better? Cash dispensers are ubiquitous, used by large numbers of non-expert people and have been around for over 20 years. Surely their user interfaces could and should be models of good practice, not a source of HCI howlers.

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With thanks to: Commissioning editors: Dave Clarke, Alistair Kilgour, Stella Mills, Andrew Monk. Interfaces is looking for additional commissioning editors. Please contact the editor for details.

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The use of usability criteria

in commercial software development in Great Britain

This regular series on 'Software Support for HCI' is designed to give leading practitioners and researchers the opportunity to discuss how software tools and environments, along with supporting methods and techniques, can aid in the development of effective human–computer interfaces.

Introduction

Usability is becoming more important in the design of computer systems and software, with the emergence of international standards on the one hand and new, interactive multimedia systems on the other. This article examines the extent to which commercial software developers in Great Britain use usability criteria in software development, their understanding of the term usability, and the extent to which they find usability guidelines, standards, etc., themselves usable in the software development process. The results of the survey suggest that while there is consensus as to what constitutes usability, its measurement is largely informal and artefacts such as standards and guidelines are perceived as difficult to use by developers.

Usability and its role in systems development

The last decade has seen a growing emphasis on the human–computer interface in the construction of information systems. The period has seen a transition from text-based visual display terminals and software, such as Lotus 1-2-3 and Ashton-Tate/Borland's dBase, to the current crop of graphical interface Windows software typified by products such as Microsoft Access and Excel. Such moves have been driven by the success of graphical user interfaces such as that of the Apple Macintosh, Open Look and others, and there is general consensus that such graphical interfaces hold out the prospect of greater usability. Recent developments require that software is easy to use, intuitive, easy to learn, adaptable, etc. The International Standards Organisation[1] proposes that:

> The usability of a product is the degree to which specific users can achieve specific goals within a particular environment effectively, efficiently, comfortably, and in an acceptable manner.

The extent to which human–computer interaction experts agree with the ISO 9241 usability proposals has been investigated by Beimel et al.[2] who found:

- 81% felt the standard promoted a user-centred approach
- 64% felt it provided a framework for the design and evaluation of dialogue systems
- 74% agreed with the theoretical foundations of the standard
- 58% felt it was mature enough to be published as an international recommendation
- 66% felt it would promote developments in dialogue systems design.

Another survey[3] of current usability engineering practice in Europe found that software designers saw usability in terms of quick, easy training, intuitiveness and ease of use, but that the concept of usability hasn't been defined adequately for those involved in the design of systems. Such designers showed awareness of the need for usability testing, but this was often conducted in informal and superficial ways. The survey concluded that much usability practice is superficial and that the development of standards would be of benefit to designers.

The debate about how to operationalise usability has been clouded by the lack of actual data from practitioners, and the aim of the current research is to gain a clearer picture of the situation among software developers in Great Britain and to interpret it within the context of the development of system design methods.

In the 1970s informal approaches to systems design gave way to methods which emphasised structured programming rather than 'spaghetti' code; structured systems design with an emphasis on the processes performed on data, and project management to try and reduce the tendency for systems to go way over budget and schedule. Techniques associated with this period included data flow diagrams (DFDs), structure charts and functional decomposition, whereby processes were broken down into their components; decision tables and trees, and mini-specifications expressed in pseudo code.

Methods included the structured analysis techniques of Gane and Sarson[4], de Marco[5], and Jackson Structured Programming/Design (JSP/JSD)[6]. It was this era that gave rise to the 'waterfall' model of systems development, where the outputs of one completed stage flowed into the start of the next stage. In the waterfall model, development proceeds from one stage to the next, in a linear progression. Earlier activities are completed before commencement of each successive stage.

Such structured methods are fairly widely used today in the UK, a recent survey[7] suggesting that 44% of organisations surveyed used a named method, with a further 38% claiming to use in-house methods, leaving only 18% using no method at all.

Alongside the development of these methods there has been a corresponding development of the methods of HCI. Central to this has been the rise of the concept of 'usability' – initially seen as a substitute for notions such as 'user-friendliness' – and subsequently refined through definitions, guidelines and standards. Such developments in HCI have

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not generally been grounded in the practice of software development, but have occurred independently from mainstream work in systems analysis and design, and are discussed in detail in Hill, Crum & Stockman[8] (forthcoming 1997). As a consequence of the free-floating nature of much usability research and its lack of grounding within a method of analysis and design, software developers appear to have treated usability in terms of their own perceptions of its definition, operationalisation and relevance at specific stages of project development, and not as a central activity *per se*.

Survey of usability practice in UK organisations

The aim of the survey was to investigate the relative importance attached to usability by software developers in the UK, with particular emphasis on small systems developers, since accounts of development in large organisations are available elsewhere[9] and there are general tendencies in the economy towards down-sizing and out-sourcing of as many functions as possible.

Determination of the population, sample frame and sample

It was decided to sample mainland British companies marketing themselves as engaging in systems development. While such a definition might omit larger organisations who only engage in in-house development for their own organisation, it was felt that in the light of the comments in the preceding paragraph this was appropriate. Various sample frames were considered, with a shortlist of Kompass and Yellow Pages directories. On inspection, it was felt that Kompass's emphasis on manufacturing organisations who were CBI members would bias it towards larger organisations. On the other hand, Yellow pages were assumed to be extremely well known to all software developers, and were cheap to advertise in, with basic entries costing typically £200 per annum. After inspecting all computing classifications, the 'computer consultancy' category was chosen as best representing the population under study.

Multi-stage sampling was chosen to ensure representation of all geographical regions of mainland Britain, with a first-stage sample of British Yellow Pages telephone directories for mainland areas only being taken, using a random-number generator to choose the sample. Within each sample Yellow Pages directory, sample size was determined by weighting the sample in proportion to the total number of entries in the 'computer consultancy' category. The random-number generator was then used to generate the required number of respondents for that directory, each of which was then sent a postal questionnaire. Resources available limited sample size to 200 questionnaires, of which 29 were completed and returned, a response rate of 14.5%.

In view of the response rate, which is in line with other similar surveys[7] and size of the sample, it is not possible to reliably generalise from these results. However, 90% of respondents described their organisation as a software house/consultancy or computer manufacturer, indicating that an appropriate target group was surveyed.

Analysis of findings

Type of organisation

Figure 1 shows that approximately 90% of respondents described their organisation as a consultancy, software house or computer manufacturer, indicating that an appropriate target group had been sampled.

Primary work role of respondent

Figure 2 shows that 75% of respondents cited roles directly related to analysis, design, project management or human factors, again suggesting that the target group – those engaged in software development – had been reached by the survey.

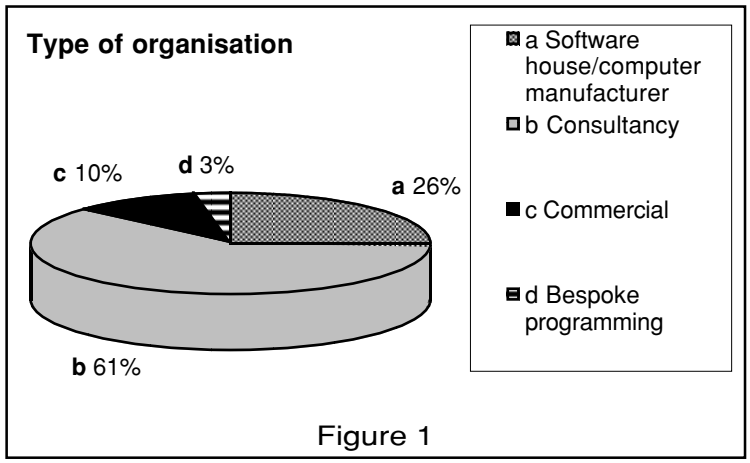

Figure 1

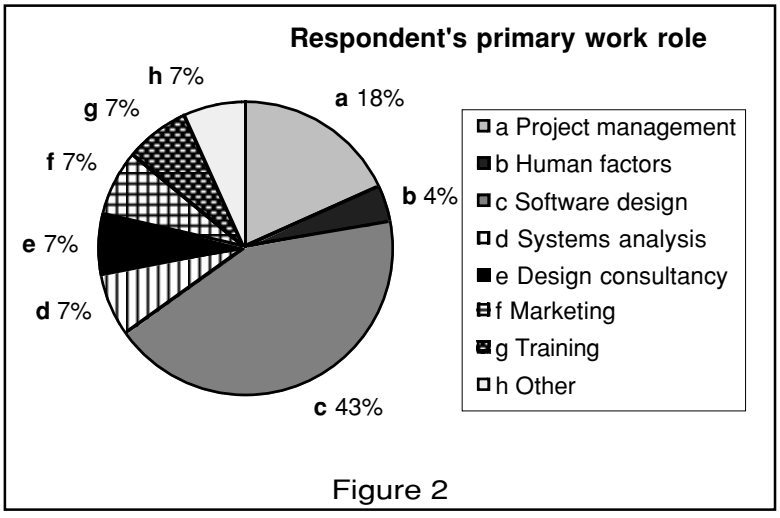

Figure 2

The use of usability criteria

Definitions of usability

Figure 3 shows that most respondents (96%) defined usability in terms of ease of use/minimum of training needed, indicating a high degree of consensus.

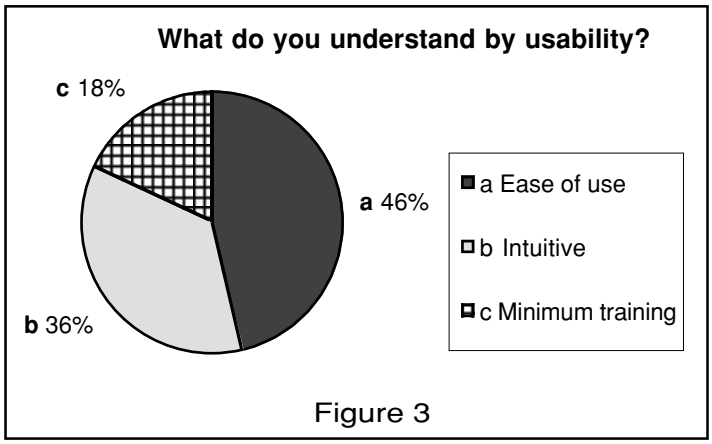

Figure 3

Need to evaluate usability

Figure 4 shows that 83% thought it important or essential to evaluate usability, with only 11% not considering usability evaluation to be essential or important.

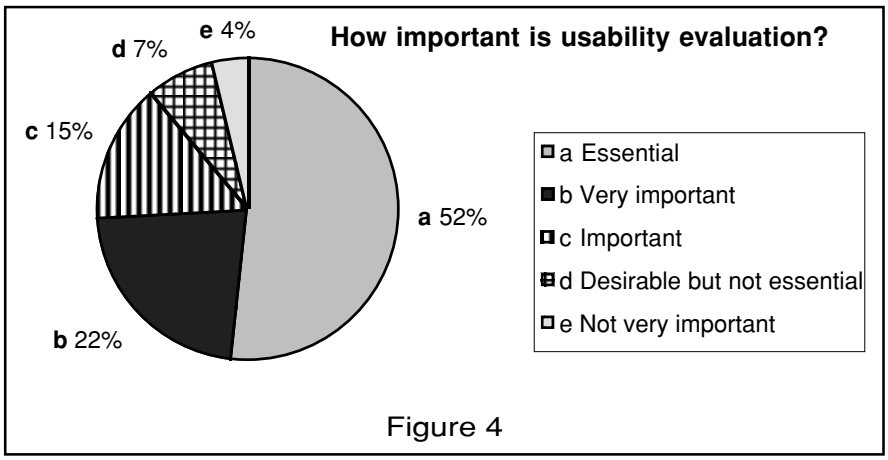

Figure 4

Need to take account of the context of use

Figure 5 shows that 69% rated this as important or essential, demonstrating an awareness of the need to evaluate products in their context of use rather than in isolation. Only 17% didn't regard contextual information as important.

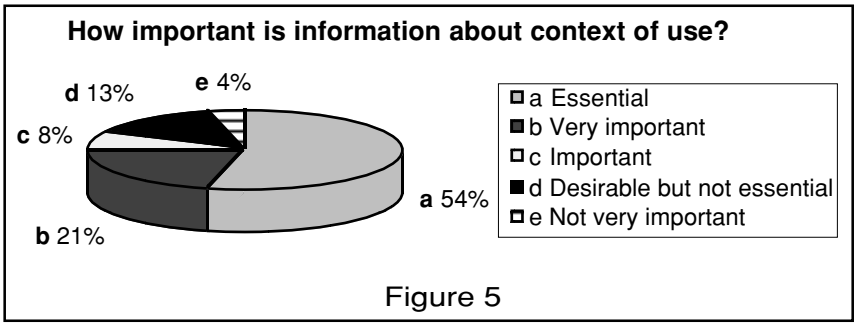

Figure 5

Dedicated usability staff and facilities

Only 14% had dedicated usability staff, and only 7% dedicated facilities, indicating a reliance on informal usability evaluation methods.

Stage at which usability assessed

52% assessed at all stages of development, 24% at the specification stage only. These figures suggest that, as far as usability assessment is concerned, an iterative design approach with prototyping is practised by only around half of respondents, a somewhat surprising finding given the availability of rapid prototyping tools such as Visual Basic etc.

Types of evaluation

Figure 6 shows that only 14% used formal usability testing with end-users, while 70% used informal or system designer evaluation. It would have been useful to have obtained further information on the informal methods used, since this is far and away the dominant form of usability 'testing' used.

Usability of artefacts used for evaluation

Figures 7 and 8 show that 62% used either guidelines or standards, with guidelines rated as relatively easy to use by 70% of those using them, compared with 80% of standards users rating them as relatively difficult to use. Guidelines were far and away the first choice for assessment of usability, being rated in first place by 55% of respondents. Human factors experts were cited by 35%, but interestingly 60% of respondents rated them as difficult to use! However, studies[10,11,12] that have attempted to evaluate ways of measuring usability have found that compliance with guidelines and/or standards are poor predictors of actual

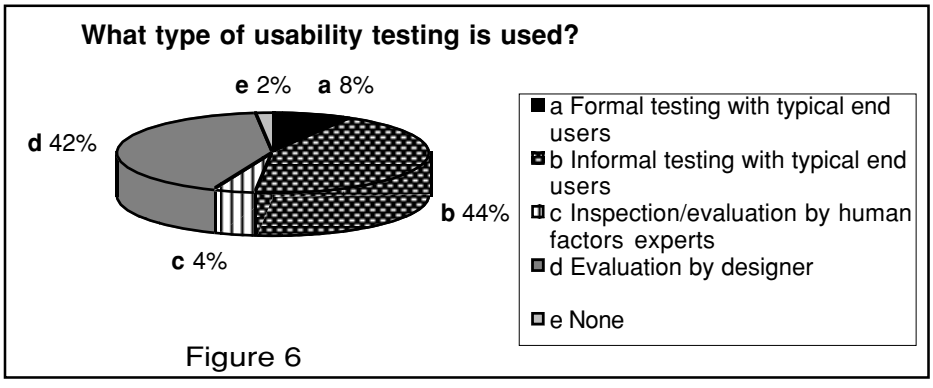

Figure 6

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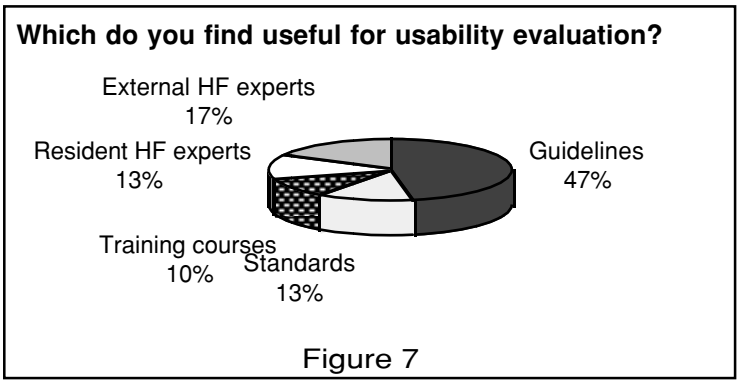

Figure 7

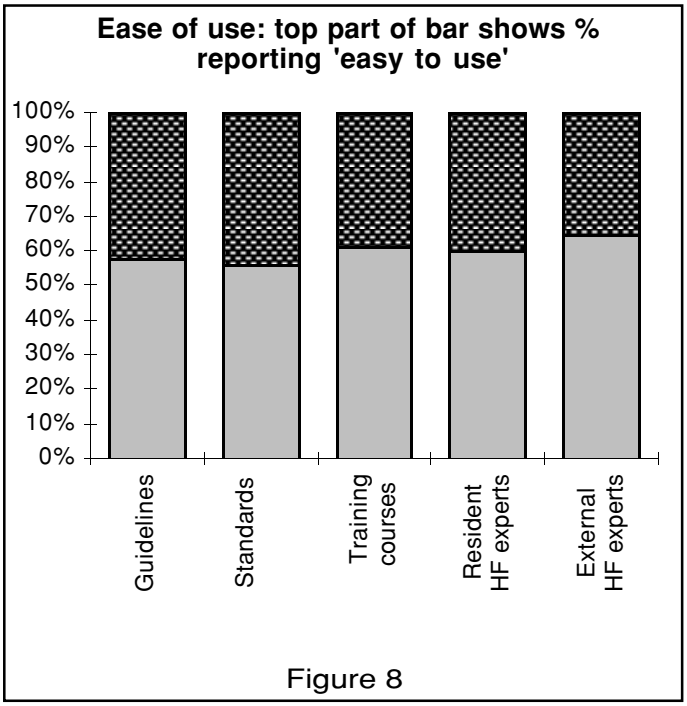

Figure 8

usability. Usability standards would appear to lack ease of use according to respondents.

Rating of importance of contextual factors

Task and environmental factors were rated as more important than user factors in a ratio of about 2:1. Task procedures and goals were rated highest. Social structure and gender factors were seen as the least important factors.

Methods of collecting contextual information

Figure 9 shows that user information was mainly collected by interviews, site visits, observation or was provided by the client.

Task information was mainly collected by information provided by the client, by observation, site visits and by the system specification.

Environment information was mainly collected by site visits, observation or was client provided.

Human factors consultants were rarely used for collecting contextual information.

Factors limiting ability to evaluate usability

69% cited limited time/resources, 31% the lack of suitable metrics and 21% the lack of skilled human factors staff.

Discussion and conclusions

The survey results indicate that there is widespread consensus as to the definition of usability, and the importance of its measurement in ways that take account of the context of the system rather than just evaluating products in isolation, but that evaluation practice is largely informal in nature, using guidelines, which studies[10,11,12] have shown to be poor predictors of usability, in a background where lack of resources is seen as the main impediment to more thorough usability evaluation. Usability standards (as distinct from guidelines), training courses on usability and human factors experts were all rated poorly on ease of use, a somewhat paradoxical finding. Despite the lack of research evidence supporting the use of guidelines, they are far and away the preferred choice of evaluation artefact amongst respondents.

The above results are largely consistent with Dillon, Sweeney & Maguire's findings[3] of a lack of rigour in usability evaluation and a demand for guidelines and standards to aid the evaluation of usability. Given the evidence that guidelines are difficult to apply and poor at measuring actual usability, it may be more appropriate to publicise more widely amongst systems developers the use of heuristics[13] and walkthroughs[14]. In

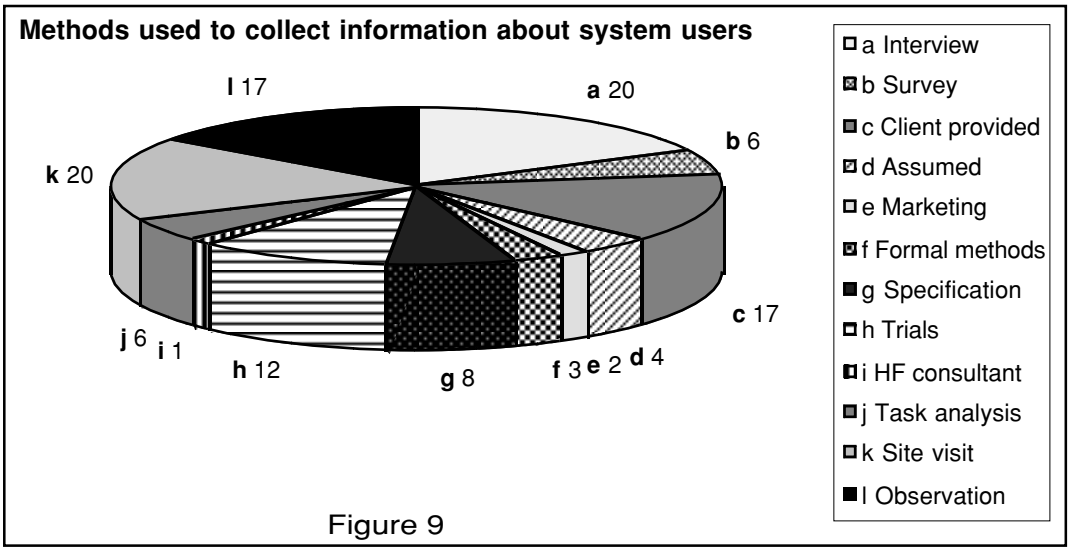

Figure 9

Continued overleaf...

The use of usability criteria

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particular, it may be possible to develop (and evaluate) guidelines that build on and extend Molich & Nielsen's heuristics[13] into an easy to use, reliable and valid method for design and evaluation of usability of systems.

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The authors all teach information systems within the HCI group of the School of Computing, Staffordshire University, and have worked in a variety of information systems environments.

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Interested in writing an article on Software Support for HCI? We are always on the lookout for interesting articles for publication. This particular series is designed to give leading practitioners and researchers the opportunity to discuss how user interface software tools, along with supporting methods and techniques, can aid in the production of good human-computer interfaces. Possible topics include:

- User interface specification, design and construction tools
- Specification and design methods to support their use
- Tools which aid in interface evaluation and testing
- Case studies on such tools and their success (or not, as the case may be!)
- Intelligent and adaptive front-ends
- Visual Programming
- Programming by example and demonstration systems

The list above is by no means an exhaustive one, and any article submitted which fits under the heading of 'Software Support for HCI' will be considered for publication. Please send your submissions to: Dave Clarke; email: Dave@visualize.demon.co.uk (or on disk c/o *Interfaces*, address on back cover). Articles should be sent in MS Word, RTF or straight ASCII format. Length should not exceed 3000 words. Figures and references may be included where appropriate.

...continued from page 7

A hard day at the office

a light-hearted look at some day to day HCI problems…

Lon Barfield

I can remember General Design's first ever contract way back in 1994. It was to design the user interface of a publicity floppy for a pan-European financial product that was to be distributed throughout several European countries. It was a frightening thing, designed and built by programmers to be used by ordinary people. Full of those little tricks that programmers love to point out to you but that without the programmer looking over your shoulder you would never be able to understand. The programmer is actually a vital component of the user interface. Without him there it is unusable. I can imagine it in the shops. 'Oh here's your CD-ROM encyclopedia and here's the free programmer that accompanies it, don't forget to feed him lots of crisps.'

The usability was rendered more difficult by the instructions. Sounds strange, but I'll explain. Part of the simulation on the floppy was that you could go (simulated) to another country and use the financial product. When you clicked on 'Go to Italy' everything became Italian, the graphic design, the colours, the images. The problem was that even the instructions suddenly appeared in Italian, meaning that to use the demo effectively you had to be well up on your technical Italian and French and German etc. If you weren't then you were stuck for ever in Italian mode until someone told you the Italian for 'go to Britain'. (You must have heard the one about the mobile telephone with the 'switch to Japanese display mode' – the owner tried it and didn't know enough Japanese to be able to switch it back to English display mode.)

Anyway we did a good usability work-over and collaborated closely with the programmer who had built (and designed?) the first version. One of the features of the first version was the language choice at the beginning. You could click on six little buttons depicting countries to choose the language of the instructions (until, that is, the system started imposing other languages upon you as you travelled through Europe).

One of the buttons depicted Belgium. Now, Belgium is an example of a European country where the inhabitants speak two different languages, and it is not simply that everybody speaks both languages. No. The top half of the land speak one language (Flemish) and the bottom half speak another (French). When we questioned the fact that these two languages were represented by one button the programmer described (with pride in his voice) how they once had someone ring up from the Flemish half to complain that when they clicked on the Belgium button everything was in French. They explained to him that it depended which half of the button you clicked on; click on the top half and it's Flemish, click on the bottom half and it's French! What a neat trick. Two choices disguised as one in such a way that no one except the development team knows how it works. Here was this programmer proud of the fact that someone in another country had been insulted enough by the demo to pick up the phone and complain about it.

Well we went to work on the problem and quickly discovered that 10% of our effort was going into designing the solution and the other 90% was going into trying to persuade the wily programmer to implement our solutions. 'It's not my fault that they speak two different languages there' he complained at one point.

In my imagination I heard a chorus of programmers saying 'It's not my fault that the user can't understand hard disk partitioning', 'It's not my fault that the user can't convert from hexadecimal to RGB in their head', 'It's not my fault that the user can't quickly fathom out interfaces devoid of logic', 'It's not my fault that...'

Anyway, we eventually reached a compromise. Belgium was two buttons squished together as one. It was still a case of which half you clicked on (happy programmer) but the visual design made it clear that the top and bottom were two distinct choices (happy user interface designers).

Important lessons learned were that it is vital to separate the different language/country choices in an interface. Here there were three choices: the land you live in (governing your stating currency), the language you want (governing the language of the interface) and the country you were visiting (governing language/design elements in the context). The other important thing was a first lesson in programmer oriented diplomacy (POD), a vital skill for user interface designers.

Lon Barfield (lon@design.nl) is a usability expert working at General Design Internet Solutions and lecturing at the Utrecht School of the Arts and the University of Delft. He is author of 'The User Interface, Concepts and Design' (Addison-Wesley) and has a regular column in the SIGCHI Bulletin.

Human–Computer Interaction INTERACT '97

S. Howard, J. Hammond & G. Lingaard
Chapman & Hall 1997

Howard, Steve, Hammond, Judy and Lingaard, Gitte, 1997, Human–Computer Interaction INTERACT '97, IFIP TC13 International Conference on Human–Computer Interaction, 14th–18th July, 1997, Sydney, Australia; London: Chapman & Hall on behalf of the International Federation for Information Processing (IFIP), 713 + xxv pages, £115.00.

As one who would have liked very much to be able to go to INTERACT '97, had commitments allowed, this book is the next best thing, at least as far as the academic aspect is concerned. The book contains 116 papers, made up of three keynote summaries, 82 technical papers, 19 poster sessions, three video papers and nine doctoral discussions, as well as summaries of 16 tutorials and eight workshops. As one would expect most aspects of Human–Computer Interaction (HCI) are covered but perhaps the difference between this book and most other conference proceedings is that the topics are virtually all leading-edge. This does not only apply to the key-note addresses (Part 1) but also to the papers in general. Thus choosing fairly randomly from the main body of papers (Part 2) but listing in ascending order, yields papers on supporting the individual in navigation (Paper 7), three-dimensional graphical user interfaces (Paper 12), three-dimensional animation (Paper 17), making interfaces complicated (Paper 30), Earcons (Paper 62), guidelines for wearable computers (Paper 75) and browsing the world wide web using collaborative virtual environments (Paper 81). Of course, more traditional areas are included such as special needs (Papers 39 to 41) usability aspects (Papers 4 to 6 and 13 to 15) and design issues (Papers 29 to 31 and 49 to 51). Also included are summaries of panel discussions and forum sessions.

The general high level of work is continued in the poster papers (Part 3), videos (Part 4) and doctoral consortium (Part 5). The tutorials (Part 6) are summarised and cover more well-known methods and ideas such as task analysis for design (Paper 118) and the MUSE method (Paper 128). Part 7 is devoted to workshops which again are summarised sometimes in the form of their notification details rather than an account of the findings which could have proved to be useful for the HCI community. There are indices of contributors and keywords.

Remarkably in a book with such a large number of contributors, the production is accurate with negligible grammatical and typographical errors. A small gripe is that the index is very limited. For example, I was looking for references about safety critical systems and while I was directed by the keyword index to the correct part of the book, it failed to inform me of some useful points made in another paper classified under the section on Issues in Design 1. Given the width of these papers generally, their use may be somewhat restricted as this is a book for referring to for up-to-date information rather than reading like a novel! Even so, it should be on the bookshelf of all persons interested in HCI and I am sure it will soon become well used by those actively researching in any applicable area. Should the (rather steep) cost make this understandably impossible for you, then the library will surely benefit from having a copy.

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Auditory User Interfaces

T. V. Raman
Kluwer Academic, ISBN 0-7923-9984-6

There are a number of reasons for a growing interest in the possibility of using auditory displays. Not the least is that they can provide a means of access to computers for people who are blind, which is the main motivation of the author of this book.

It is common for authors and publishers to promise more in the title of a book than in its content. Contrary to its title, this book is not so much about auditory user interfaces in plural, but about an auditory interface. The introductory chapters do give some useful background on auditory interfaces in general, but thereafter it is mainly about the particular Emacspeak interface.

Raman presents his own paradigm for auditory access to visual interfaces. He points out the shortcomings of the conventional screen-reader approach and instead advocates one based on 'conversational gestures'. The problem is that while he demonstrates what the resultant Emacspeak interface does, he says little about how it does it, what the principles are that he has applied.

Emacspeak software is freely available on the Internet, so it is likely to have a wide user base, but no objective evaluation is mentioned in the book, so that one cannot help wondering to what extent it reflects just the personal opinions and ideas of the author. Some of the designs presented contradict principles

suggested by other researchers but then there is scant reference to any other related work. While the author may think that other auditory interfaces (such as Mathtalk, Mercator, or Guib) are examples of the inadequate screen-reader paradigm, he might have compared them with Emacspeak – even if only to point out their shortcomings.

Access to the Web is an important current topic and people with visual disabilities are the most disadvantaged at the moment. The book has a contribution to make in that area. It describes a Web browser extension to Emacspeak. This is based on the concept of audio cascaded style sheets (ACSSs) which are themselves an extension of cascaded style sheets (CSSs) for HTML. As new concepts, those interested in making the Web accessible may find their description in chapter 5 useful.

The book comes to an abrupt stop in the chapter on the Web. I genuinely made a check against the contents list to see whether the pages of some concluding chapter had been omitted in error.

The book would be quite useful to anyone working in the field, perhaps contemplating building an auditory interface. The early chapters do provide some succinct background and some pointers to related work. Thereafter, however, such a reader might regard this as an exposition of one way of designing an auditory interface against which they might compare their ideas and designs.

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HCI'97

Mark Treglown

HCI'97, the 12th annual meeting of the British HCI group, was held on the Frenchay campus of the University of the West of England in Bristol in sweltering heat, making the traditional late-night opportunities for re-hydration doubly missed. Five years ago the conference subtitle denoting the invited aims and themes of papers and work finally presented was left off the cover of the HCI proceedings. This year attempts to group and classify papers within sessions were also abandoned, session chairs sometimes struggling to segue presentations. Far from being the result of poor planning, however, this was a reflection of the wide range of issues explored by researchers and the suggestions of the keynote speakers to examine the wider context in which HCI is located.The keynote speakers were from a far greater range of disciplines than in previous years and than might be expected to appear at an HCI conference: Bonnie Nardi (Apple), Darrel Rhea (Cheskin & Masten/ ImageNet), Rosalind Picard (MIT Media Lab), David Lyon (Queen's University Ontario), Robert Kraut (Carnegie Mellon) and John Worthington (University of York).

Despite the disparate backgrounds of the keynote speakers, a coherent notion of the wider issues HCI researchers should be aware of was formed. Darrel Rhea, an advertising and marketing consultant, spoke on the considerable efforts undertaken to 'understand culture' and to follow trends and behaviour of fairly unconventionally classified groups within the principal target market for most computing products. Some relief was felt at the news that the 'stoners and drop-outs' group, typified by a photograph of an American teenager upon whom the movie 'Taxi Driver' had clearly had quite an effect, did not buy computing machinery and did not need closer study. There was also interest expressed in the efforts needed to develop systems for markets other than the traditional consumers of software.

Bonnie Nardi of Apple continued the theme of needing to understand context in design and reminded delegates of attempts to apply activity theory in understanding the wider context of use and as a design process. Robert Kraut was able to provide much valuable data from an ongoing project providing households with access to the internet. His comments on the uses of email and the web by people unlike those who create technology were received with interest. Particularly his claims that email is more popular than the world-wide web and remains useful even after other uses of the internet have stopped. Email grows in use and perceived usefulness, even after periods of intensive communication with others, whereas the web seems to diminish in appeal after information has been sought for specific needs. The unchanging content of most web pages was found to lead to internet users having no reason to visit pages again, usage statistics showed how little attention most sites receive, with only indexes and search engines receiving frequent visits. Email, from Kraut's data, provides increased opportunities for communication, and opens

Continued overleaf…

HCI'97

Mark Treglown

channels of communication between individuals where none existed before. The most visible (and audible) reaction came though to the news that a surprisingly high percentage of the participants in Kraut's study now use the internet for an average of 37 hours a week, almost as high a figure as for average television viewing in the United States.

A number of attempts to make analogies between architecture and user interface software development were heard during panel sessions. John Worthington discussed the direct relationship between building and workplace design and information and communications technologies. Again, the need to understand the culture and context, in this case of the workplace, in which technology is used was stressed. In particular the need to plan ahead was noted, the lifespan of the technological infrastructure being shorter than the time it may take to construct the building in which it is to be installed.

The other two keynote speakers discussed a far closer relationship between humans and computers, the sociologist David Lyon spoke on the changing notions of self-identity in a technological age, and the ethical considerations HCI practitioners should be aware of. The best-received talk, however, was given by Rosalind Picard who presented work by herself and graduate students at the MIT Media Lab on wearable computers, and those systems of which she sees wearable computers being a subset, affective computers. Affective computers are those that have a closer relationship with the human body than just a flat screen, sound and pressure on mouse buttons, and are aware far more than existing systems of the user's emotional state, and which can alter their behaviour to suit the user. Many potential sources of user input were described, facial gestures, direction of gaze, heart rate, and so forth as well as the difficult pattern-matching problems that remain to be solved if computers are to understand us better and become more usable.

The usual mix of theoretical, empirical and systems papers can be found in the two volumes of papers, the proceedings proper and the adjunct proceedings containing short papers, doctoral consortium summaries, keynote abstracts and papers; but reflections of the wider context were apparent in much of the work presented by authors. The use of sound, in the forms of earcons and sonic browsing, was discussed and applied to real tasks performed by an intended user population. User interface problems encountered in the workplace were also examined; the management of email, the use of passwords, understanding ambulance control, and people's anxiety about using computing equipment. The user interface design process itself received attention, with theories, techniques and tools for planning, domain knowledge capture, validation and interaction design being presented. The world-wide web still attracts considerable research effort, and was the most popular topic of papers presented. In addition to questions of web site usability and navigation, authoring of web sites and the use of the web as an educational device were also popular issues.

Considering distributed and group working systems in general accounts for half the total conference papers, and it was on these themes that the largest contributions and the messages of the conference were presented. Chris Johnson of Glasgow University discussed his involvement in the use of mobile computing equipment by engineers of a major utility company, and introduced the importance of place in addition to the known and important factor of time in attempting to predict and understand the behaviour and usability of interaction in distributed systems. His message, echoed by a panel session on how HCI can be made effective, is that HCI designers should plan ahead. HCI practitioners can change the world as well as understand with hindsight how technologies failed. The messages sent out by the HCI'97 conference are that a far wider context of use must be understood, and with many of the predicted technologies of importance, HCI designers should explore the problems of these technologies' use in the wider context now and make a positive difference, if, contrary to the worst-possible prediction made during a panel session, HCI is to survive as a credible, effective, and funded discipline.

The next HCI conference will be held at Sheffield Hallam University on 1–4 September 1998.
See: http://www.shu.ac.uk/hci98

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...continued from page 11

The HCI Professional: a systemic individual?

Adrian Williamson

One of the discussions at HCI'97 focused on the question of the HCI professional, who they were and how they were created. Further questions arose about the nature of the profession: is it a science; a discipline; or some nebulous witchcraft practised by people with digging instruments and aprons? Perhaps a good starting point is what an HCI professional most certainly is not. They are most certainly not the creature with three heads each covering a particular specialism. The factors significant to the HCI profession might be recognised as: Evaluation; Human Factors and Psychology; Interactive programming. A fourth head concerned with formal representation and reasoning would not be unwelcome. The resulting HCI Professional with many heads would be extremely cumbersome, difficult to talk to at parties and a terror to educate unless the heads are kept separate. At work we can imagine the arguments and discussions amongst the heads lasting long into the night, a big drain on the world's coffee stocks …

So the HCI Professional is not the beast with many heads. Where do they come from? I suggest that a look at Systems Thinking may provide the framework to recognise the true nature of the elusive individual that we recognise but can't assemble. Applying Systems Theory to the problem allows us to describe the HCI Professional as greater than the sum of their parts by virtue of emergent properties. It is when the components of Evaluation, Human Factors & Psychology, Interactive programming and Formal Techniques et al. are absorbed within the single mind that the HCI Professional can emerge as a distinct character. If we take any component away, then we see immediately a bias which turns us into an anorak or happy clappy arm waver.

Whilst this view gives us insight into the structure of the individual, this is not sufficient to describe the whole – we must also consider the associated processes. We have all met the bright youngster who knows many things about our identified structural components, but still cannot apply them holistically. I would suggest that the main component in transforming the disparate collection of knowledge into an effective practitioner is reflective working. This is hardly a revelation but it does emphasise the need to prepare knowledge, opportunities for exploration, experimentation and discussion on the relative significance of the activities undertaken.

The next stage of the analysis, therefore, might be to examine the knowledge structures of existing HCI professionals and then discuss their reflective processes which have brought about the fusion of the disparate disciplines. This should guide us away from people-who-know-about HCI, towards the true HCI professional.

Is our HCI Professional a stable system? One could argue that the HCI profession is transitory. In the days of Charles Atlas, bodybuilding and fitness were explicit activities requiring recognition and planning, and specialist knowledge from nutritionists, physiologists, psychologists, etc. Similarly, our awareness of the computer at present is extremely explicit. Meanwhile back with fitness, the hordes of people down the exercise suite at my local tennis club think nothing of the hybrid fitness regimes of the past, it has been absorbed into our culture. In 50 years time it won't be necessary for the HCI Professional to be on hand to chastise the anoraks, or inform the arm wavers. Just as fitness regimes combining diet, exercise and mental strength are designed by Tennis coaches, Badminton coaches, Football coaches, Rugby coaches, etc, best HCI practice will permeate life and leave small hubs of research and design in the established engineering and science structure. My conclusion, therefore, is that HCI's purpose, and consequently the future of its professionals, is to ensure that computer technology is absorbed into our culture, and that they achieve the levels of transparency advocated by Mark Weiser, Bill Buxton et al. In 50 years' time HCI issues will be absorbed and studied as human factors, technology and management. Mmmm. I don't know about you, but I'm increasing my pension payments ...

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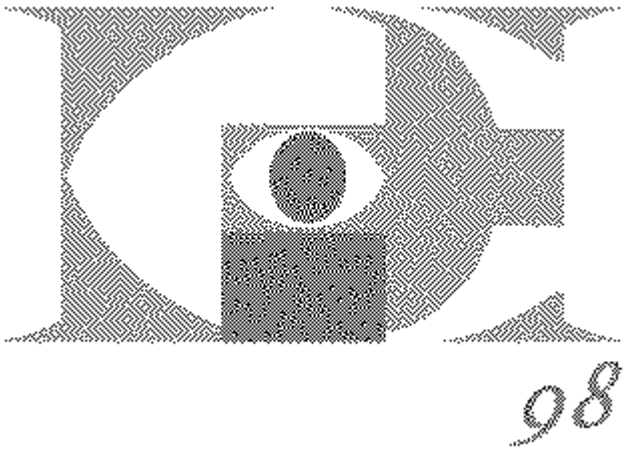

Invitation to Participate HCI '98

1st – 4th September 1998
Sheffield Hallam University
Sheffield

The Venue

The conference venue is the campus of Sheffield Hallam University, within the vibrant heart of the city of Sheffield. The campus lies within the rapidly developing cultural industries quarter which houses many media design studios and the newly developed National Centre for Popular Music. Site visits are being arranged in this interesting and exciting area, as well as a full programme of social events

Important Dates

23/1/98	Submission deadline for full papers and tutorials.
27/3/98	Full paper notification.
8/5/98	Submission deadline for demonstrations, doctoral consortium, organisational overviews, panels and posters, short papers and videos. Full paper camera ready copy due.
22/5/98	Industry day submissions deadline.

Industry and Academia

The HCI annual conference prides itself on recognising the relevance of both industry and academia to the field of human–computer interaction. HCI'98 is keen to promote the broadening of understanding between industrial and academic perspectives within the field.
Industry day will include invited keynote addresses, panel discussions, technical papers and organisational overviews.
A new innovation is the inclusion of research symposia, at which full technical papers will be discussed in a highly interactive format.

Publishing

As in previous years it is planned that conference proceedings will be published by Springer-Verlag, and that an ISBN listed conference companion will be produced containing other programme elements.

Refereeing

HCI'98 welcomes researchers and practitioners within the HCI community to referee full paper submissions. Referees receive ten pounds off the conference cost per submission refereed. If you are interested in refereeing, contact the conference coordinator providing: your name, affiliation, contact details and a short list of keywords reflecting your skills and interests within the field of HCI.

Contact Details

HCI'98 Conference Coordinator
Conference 21
Sheffield Hallam University
Sheffield S1 1WB
UK.

Telephone: +44 (0)114 225 5334
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E-Mail: hci98@shu.ac.uk
http://www.shu.ac.uk/hci98

HCI '98 is sponsored by the BCS-HCI group

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The Second International Workshop on CSCW in Design

26–28 November, 1997, Bangkok, Thailand

Further Info: URL: http://www.chinavigator.co.cn/edu-sci/cscwd97.htm
Summary: Sponsored by National Electronics and Computer Technology Center (NECTEC), Thailand. Co-sponsored by Institute of Computing Technology (ICT), Academia Sinica, University of Technology of Compiegne, France Institute No. 23, National Space Bureau of China HangZhou, Topper Electronic Corp. The International Workshop on CSCW in Design provides a forum for the latest ideas and results on the theory and application of CSCW, the research of multi-agent systems, CSCW in design, concurrent engineering and other topics. The first workshop was successfully held in Beijing last year. The second workshop will be held in Bangkok, Thailand.
Topics include (but are not limited to): CSCW system architecture - multi-agent systems - Computer supported cooperative design - Concurrent Engineering - Interface for human–human interaction - Detection and resolution of conflicts - Internet, Intranet and CSCW - Applications of CSCW

ESSCS – ECS-MMS 97: 2nd Multidisciplinary Workshop on Cognitive Modeling and UI Development

15–17 December 1997, Freiburg, Germany

Further Info: ESSCS (Dr. G.J. Dalenoort), Dept. of Psychology, University of Groningen, P.O. Box 41 096, 9701 CB, Groningen, The Netherlands; Tel: +31-50-3636448 / 3636454 (or 3636472); Fax +31-50-3636304; Email: <G.J.Dalenoort@PPSW.RUG.NL>
Summary: EUROPEAN SOCIETY FOR THE STUDY OF COGNITIVE SYSTEMS (ESSCS) in cooperation with EACE (European Association for Cognitive Ergonomics)
In December 1994 a special workshop was held on the cognitive aspects of man–machine interaction, especially on modeling. In December 1997 a follow-up will be held, with emphasis on the aspect of social cognition. All aspects of man–machine interaction are welcome, as far as they may be considered as relevant for cognitive science. The workshop is not intended as a forum for purely technical papers. The central idea is that the way one communicates with another system depends on the representation, or image, one has of the other system. One communicates in a different manner with a young child than with a colleague, apart from the level of knowledge involved. For verbal communication this was expressed by Grice in rules. For communication with computers we are in a very different position as compared to communication with our fellow human beings. To what extent do our explicit and implicit assumptions on the system with which we communicate influence the way we communicate? Must a machine have different modes, and levels of communication, dependent on the person with whom it communicates? What technical consequences may this have for the design of systems?

CMC'98: Second International Conference on COOPERATIVE MULTIMODAL COMMUNICATION

28–30 January, 1998; Tilburg, The Netherlands

Further Info: Anne Adriaensen, Computational Linguistics and Artificial Intelligence Group, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands; Tel: +31 13 466 30 60; Fax +31 13 466 31 10; Email: denk@kub.nl; URL: http://cwis.kub.nl/~fdl/research/ti/Docs/CMC
Summary: The principal aim of the conference is to bring together researchers involved in the design, implementation and application of forms of cooperative human–computer communication where natural language (typed or spoken) is used in combination with other modalities, such as visual feedback and direct manipulation. The conference will focus on formal, computational, and user aspects of building cooperative multimodal dialogue systems.

WSCG'98: The Fifth International Conference in Central Europe on Computer Graphics and Visualization 98

9–13 February, 1998, Plzen, nr Prague, Czech Republic

Submissions by 30 September, 1997
Further Info: Vaclav Skala, Computer Science Dept, Univ. of West Bohemia, Univerzitni 22, Box 314, Plzen, Czech Republic (http://yoyo.zcu.cz/~skala); Tel: +420-19-2171-188; Fax: +420-19-2171-188; Fax: +420-19-7822-578; Email: skala@kiv.zcu.cz (Subject: WSCG INFO); URL: http://wscg.zcu.cz
Summary: IFIP working group 5.10 on Computer Graphics and Virtual Worlds

2nd EUROMICRO WORKING CONFERENCE on SOFTWARE MAINTENANCE AND REENGINEERING

9–11 March, 1998, Florence, Italy

Submissions by 15 September, 1997
Further Info: Email: csmr98@ozon180.ing.unifi.it; URL: http://www.isst.fhg.de/csmr; http://www.dsi.unifi.it/~nesi/csmr98.html
Summary: The purpose of the working conference is to promote discussion and interaction about a series of topics which are as yet underrepresented. We are particularly interested in exchanging concepts, prototypes, research ideas, and other results which could contribute to the academic arena and also benefit the business and industrial community. Researchers, practitioners, technology transition experts, project managers, developers and users of tools are all welcome.

Workshop on Effective Training and Education for Human Computer Interaction

23–24 March, 1998, Glasgow, Scotland

Further Info: Prof. Chris Johnson, Department of Computer Science, University of Glasgow, Glasgow, G12 8QJ, Scotland; Tel: +44 141 330 6053; Fax.: +44 141 330 4913; Email: johnson@dcs.glasgow.ac.uk; URL: http://www.dcs.gla.ac.uk/~johnson/HCI_workshop.html
Summary: Human Computer Interaction now has an established place in the curricula of many University departments. It is a necessary component in the professional development schemes advocated by the British Computer Society, the ACM, the IEEE and the IEE. Co-chaired by Steve Draper, Phil Gray and Chris Johnson, and sponsored by the British HCI group and the CTI Centre for Computing Science, this workshop will provide a forum for practitioners to discuss 'leading edge' techniques for HCI training in higher education.

SECOND EUROPEAN CONFERENCE ON COGNITIVE MODELLING (ECCM-98)

1–4 April, 1998, Nottingham, UK

Full c.f.p. pending
Further Info: Email: Richard Young<R.M.Young@herts.ac.uk>; Frank Ritter<Frank.Ritter@nottingham.ac.uk>; URL: http://www.psychology.nottingham.ac.uk/staff/ritter/eccm98/
Summary: The conference will cover all areas of cognitive modelling, including symbolic and connectionist models, evolutionary computation, artificial neural networks, grammatical inference, reinforcement learning, and datasets designed to test models. Papers that present a running model and its comparison with data are particularly encouraged. This meeting is open for work on cognitive modelling using general architectures (such as Soar and ACT) as well as other kinds of simulation models.
These meetings were introduced to establish interdisciplinary co-operation in the domain of cognitive modeling. The first meeting held in Berlin in November 1996 attracted about 60 researchers from Europe and USA working in the fields of artificial intelligence, cognitive psychology, computer linguistics and philosophy of mind.

ASSETS'98, the 3rd ACM/SIGCAPH Conference on Assistive Technologies

15–17 April, 1998, Los Angeles, California, USA

Further Info: Email: General Chair: Arthur I. Karshmer<arthur@cs.nmsu.edu> or Program Chair: Meera M. Blattner<blattner@llnl.gov)>; URL: http://www.acm.org/sigcaph/assets
Summary: To take place at the Marina del Rey Hotel in Los Angeles, back-to-back with CHI'98. This is the premier international forum where researchers and developers from academia and industry meet to exchange ideas and report on new developments relating to computer-based systems to help people. The conference scope spans disabilities and special needs of ALL types; there are no parallel sessions, in order to encourage total group participation throughout the meeting (even meals are taken together). For complete details, please see the conference web site.

CHI'98: ACM SIG-CHI 1998 Conference on Human Factors in Computing Systems

18–23 April, 1998, Los Angeles, California, USA

Submission Deadlines
8 January 1998: Special Interest Groups (SIGs), Student Posters, Late-Breaking Results
1 February 1998: Student volunteers
Further Info: CHI 98 Conference Office, CHI 98 Conference Administrator, 703 Giddings Avenue, Suite U-3, Annapolis, MD 21401 USA; Tel: +1 410 263 5382; Fax: +1 410 267 0332; Email: chi98-help@acm.org; URL: http://www.acm.org/sigchi/chi98
Summary: The annual CHI conference is the premier worldwide forum for exchanging information on all aspects of how people interact with computers. Researchers, practitioners and educators, students and professionals from academia, industry, health care and the arts, from around the world, will join in exploring the future of Human–Computer Interaction. This year's theme is "Making the Impossible Possible".
CHI 98 seeks the active participation of those who want to make the world a better place. CHI 98 will include the successful program tracks and focus areas of the past CHI conferences, including Human–Computer Interaction and Society, New Applications and User Populations, Devices and Displays, and Design and Evaluation. In addition, CHI 98 will present an innovative focus on Education, Entertainment and Health Care application domains. Submissions in all areas are welcome.

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The 20th International Conference on Software Engineering

19–25 April, 1998, Kyoto, JAPAN

Further Info: Koji Torii (NAIST); Email: torii@is.aist-nara.ac.jp; URL: http://icse98-info@itc.aist-nara.ac.jp

Summary: Sponsored by Science Council of Japan, Information Processing Society of Japan, Japan Society for Software Science and Technology, IEEE Computer Society, ACM Special Interest Group on Software Engineering; Corporate Sponsors (Tentative): Nippon Telegraph and Telephone Corporation; Nihon Keizai Shimbun, Inc. Since ICSE's founding, politics and technology have converged to shatter once formidable barriers to international cooperation. The collapse of the Berlin Wall symbolizes the end of the Cold War, and links in a Web page are a metaphor for our enhanced capacity for global information exchange. In this spirit, we have worked hard to ensure that ICSE98 will see an unprecedented increase in the level of international participation. In particular, we will give a greater voice to members from the Asian-Pacific region, an area under-represented in the past. Yet our outreach must extend beyond geography. As we continue to build bridges to other software disciplines, researchers and practitioners in allied fields will benefit from an understanding of the contributions that software engineering can make to their work. In turn, we must address their problems in our research. New collaborations between academia and industry will also enrich ICSE98 and our profession as a whole.

COOP'98 – Third International Conference on the Design of Cooperative Systems

26–29 May, 1998, Cannes, France

Submissions:
Full papers, 15 December, 1997
Short papers, 31 December, 1997

Further Info: Monique Simonetti, INRIA, COOP'98, Bureau des Relations Exterieures, 2004 route des Lucioles, BP 93, 06 902 Sophia-Antipolis Cedex, France; Tel: + 33 - 4 93 65 78 64; Fax: + 33 - 4 93 65 79 55; Email: simoneti@sophia.inria.fr; URL: http://zenon.inria.fr/acacia/Coop/Coop98/

Summary: The main goal of COOP'98 is to contribute to the solution of problems related to the design of cooperative systems, and to the integration of these systems in organizational settings. The Conference is sponsored by a number of French and international organizations, and brings together researchers from distributed AI, decision-making, distributed cognition, management studies, computer science and CSCW. The conference is international yet intimate, and provides a useful forum for debate about methodologies, conceptual frameworks and case material. The main language of the conference is English.

DSV-IS'98: 5th International Eurographics Workshop on Design, Specification and Verification of Interactive Systems

3–5 June, 1998, Abingdon, England

Submissions by 6 February, 1998

Further Info: Panos Markopoulos, Department of Computer Science, Queen Mary and Westfield College, University of London, Mile End Road, London E1 4NS, UK
Tel: +44-(0)171-975 5257; Fax: +44-(0)181 980 6533; Email: markop@dcs.qmw.ac.uk; URL: http://www.dcs.qmw.ac.uk/research/hci/dsvis98

Summary: The workshop will provide a forum for the exchange of ideas on diverse approaches to the design of interactive systems. The particular focus of this year's event is on models (e.g. of devices, users, tasks, etc.) and their role in supporting the design and development of interactive systems. As in previous years we maintain our interest in the use of formal representations and their role in supporting the design, specification, verification, validation and evaluation of interactive systems. Contributions pertaining to less formal representations of interactive system designs and model-based design approaches are also encouraged. The workshop aims to encourage an exchange of ideas between these different research fields.

FOIS'98 – INTERNATIONAL CONFERENCE ON FORMAL ONTOLOGY IN INFORMATION SYSTEMS

6–8 June, 1998, Trento, Italy

Submissions by 19 December, 1997

Further Info: Organization Chair: Alessandro Artale, ITC-IRST, Povo, I-38050 Trento, Italy; Email: artale@irst.itc.it; URL: http://mnemosyne.itc.it:1024/fois98/

Summary: Research on ontology is becoming increasingly widespread in the computer science community. Its importance has been recognized in fields as diverse as qualitative modelling of physical systems, natural language processing, knowledge engineering, information integration, database design, geographic information science, and intelligent information access. Various workshops addressing the engineering aspects of ontology have been held in the past few years. However, ontology – by its very nature – ought to be a unifying discipline. Insights in this field have potential impacts on the whole area of information systems. In order to provide a solid general foundation for this work, it is therefore important to focus on the common scientific principles and open problems arising from current tools, methodologies, and applications of ontology. The purpose of this conference is to take a first step in this direction. The conference will have a strongly interdisciplinary character. Expected participants include computer science practitioners as well as linguists, logicians, and philosophers. Although the primary focus of the conference is on theoretical issues, methodological proposals as well as papers addressing concrete applications from a well-founded theoretical perspective are welcome.

CE98 – 5th ISPE INTERNATIONAL CONFERENCE ON CONCURRENT ENGINEERING

15–17 June, 1998, Tokyo, Japan

Further Info: Professor Shuichi Fukuda, Department of Production, Information and Systems Engineering, Tokyo Metropolitan Institute of Technology, 6-6, Asahigaoka, Hino, Tokyo 191, Japan; Tel: +81-425-83-5111 Ext. 3605; Fax: +81-425-83-5119; Email: fukuda@mgbfu.tmit.ac.jp; URL: http://www.bath.ac.uk/Departments/Eng/CE98/home.html

Summary: CE98, the 5th ISPE International Conference on Concurrent Engineering, is a major forum for the international scientific exchange of research results in the development of novel methodologies, information technologies and business practices in achieving concurrency and integration in engineering.

Collaborative Virtual Environments 1998 (CVE'98)

17–19 June, 1998, Manchester, UK

Submissions by 31 October, 1997

Further Info: Dr. Dave Snowdon, Dept of Computer Science, The University of Nottingham, University Park, Nottingham NG7 2RD, UK; Email: <d.snowdon@cs.nott.ac.uk>; URL: http://www.crg.cs.nott.ac.uk/~dns/conf/vr/cve98/

Summary: A Collaborative Virtual Environment (CVE) is one that actively supports human–human communication in addition to human–machine communication and which uses a Virtual Environment (including textually based environments such as MUDs/MOOs) as the user interface. This is an exciting field with much potential for inter-disciplinary collaboration particularly in the fields of computer science, psychology, sociology, architecture & urban planning, cultural & media studies and Artificial Intelligence.
Following on from the highly sucessful CVE'96, CVE'98 aims to present the current state of the art in Collaborative Virtual Environments and foster inter-disciplinary links between researchers in this field. Compared to CVE'96, CVE'98 will have a larger and more varied programme committee to ensure high quality and varied content and full papers (rather than extended abstracts) will be published in the proceedings.

ED-MEDIA/ED-TELECOM98 – World Conference on Educational Multimedia and Hypermedia and World Conference on Educational Telecommunications

20–25 June, 1998, Freiburg, Germany

Further Info: ED-MEDIA 98/AACE, P.O. Box 2966, Charlottesville, VA 22902 USA; Voice: 804-973-3987; Fax: 804-978-7449; Email: AACE@virginia.edu; URL: http://www.aace.org/conf/edmedia

Summary: ED-MEDIA/ED-TELECOM 98 – World Conference on Educational Multimedia and Hypermedia and World Conference on Educational Telecommunications are jointly held international conferences, organized by the Association for the Advancement of Computing in Education (AACE). These annual conferences serve as multi-disciplinary forums for the discussion and dissemination of information on the research, development, and applications on all topics related to multimedia/hypermedia and distance education. ED-MEDIA/TELECOM, the premiere international conferences in the field, span all disciplines and levels of education and attract 1000+ attendees from 50+ countries.
We invite you to attend ED-MEDIA/ED-TELECOM 98 and submit proposals for papers, panels, roundtables, tutorials, workshops, demonstrations/posters, and SIG discussions. All proposals will be reviewed for inclusion in the conference program, proceedings books, and CD-ROM proceedings.

15th IFIP World Computer Congress 'The Global Information Society on the Way to the Next Millennium'

31 August – 4 September, 1998, Vienna and Budapest

Further Info: Email: ifip98@ocg.or.at; URL: http://www.ocg.or.at/ifip98

Summary: The Congress will consist of seven carefully selected conferences, most of which boast long traditions, with paper presentations and poster sessions. Each conference is organized in close cooperation with the relevant Technical Committees and Working Groups of IFIP. The structure of the International Programme Committee and the Programme Committees of the seven conferences with well-known IT experts make sure that the participants of the congress will enjoy a high-quality scientific program that will give an excellent outlook of what can be expected in the future. Although participants register for one conference, they will be allowed to switch between the conferences:
Telecooperation – The Global Office, Teleworking and Communication Tools
ICCHP '98 – 6th International Conference on Computers Helping People with Special Needs
SEC '98 – 14th International Information Security Conference
KnowRight '98 – 2nd International Conference on Intellectual Property Rights and Free Flow of Information
Fundamentals – Foundations of Computer Science
IT & KNOWS – Information Technology and Knowledge Systems
Teleteaching '98 – Distance Learning, Training, and Education

diarydiarydiarydiarydiarydiarydiary

ICCHP '98: the 6th International Conference on Computers Helping People with Special Needs

31 August – 4 September, 1998, Vienna and Budapest

Submissions by 16 January, 1998

Further Info: Dr. A. D. N. Edwards, Department of Computer Science, University of York, York, ENGLAND, YO1 5DD; Tel: + 44 1904 432775; Fax: + 44 1904 432767; Email: alistair@minster.york.ac.uk; URL: http://www.ocg.or.at/VERA/IFIP98/ICCHP/icchp.html

Summary: Part of the 15th IFIP World Computer Congress, this conference is concerned with all aspects of the use of computers by people with disabilities. That includes both the adaptation of the human–computer interface to enable the persons to access the computer for everyday use and the development of computer-based aids to reduce the handicapping effect. Experience from the previous five ICCHP conferences has shown that computers have positively affected the lives of disabled people in many different ways. The conference aims to promote discussion with all relevant disciplines.

HCI'98

1–4 September, 1998, Sheffield, UK

Submissions by 23 January, 1998

Further Info: HCI'98 Conference Coordinator, Conference 21, Sheffield Hallam University, Sheffield, S1 1WB, UK; Tel: +44 (0)114 225 5334; Fax: +44 (0)114 225 5337; Email: hci98@shu.ac.uk; URL: http://www.shu.ac.uk/hci98

Summary: The HCI annual conference is the primary European conference on human–computer interaction. The conference regularly brings together researchers and practitioners concerned with the effective utilisation of computing and communication technology by humans, organisations and society. This year's conference, HCI'98, is to be held at Sheffield Hallam University. In addition to the usual presentation formats, an innovation at this year's conference is the inclusion of research symposia, at which full technical papers will be discussed in a highly interactive format. The field of human–computer interaction is multidisciplinary and includes contributions from the human and social sciences, computer science, technology, education and design. With the widespread adoption and integration of computing and communication technology, the relevance of HCI is more significant than ever before. In addition, the current advances in technology present further opportunities and challenges for practitioners and researchers within the HCI community. Specifically, the professional exploitation of multi-media technology provides a rich domain which is creating new demands for effective methods and tools. HCI'98 provides an opportunity to further investigate and develop theory and practice within all of these areas.

Designing Effective and Usable Multimedia Systems: IFIP 13.2 Working Conference

9–11 September, 1998, Stuttgart, Germany

Submissions by 13 February, 1998

Further Info: Professor Alistair Sutcliffe, Centre for HCI Design, School of Informatics, City University, Northampton Square, London EC1V 0HB, UK; Tel: +44-171-477-8411; Fax: +44-171-477-8859; Email: a.g.sutcliffe@city.ac.uk

Summary: As the multimedia marketplace becomes more crowded ease of use is becoming a key competitive advantage. Usability and effective communication are vital to ensure the success of multimedia designs and to avoid problems of information overloading. Multimedia systems are used in a wide variety of contexts such as computer-supported learning, entertainment, decision support and process control. The increasing diversity of applications raises complex design issues. For example, in educational applications sound design is necessary to promote learning with maintaining the user's attention; while in decision support systems representing key information is important. This conference will bring together researchers and practitioners from a variety of backgrounds to exchange current knowledge in the area, discuss design problems and solutions for improving product usability and shape future research agendas. The aim will be to advance understanding of usability issues, quality assurance and the design process for multimedia.

To receive more information via email on all these events and others, together with full details of many industrial, academic, and research studentship posts, subscribe to our electronic mailing list by sending the following two-line message, filled in appropriately, to the mailbase server:
mailbase@mailbase.ac.uk

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stop

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Please print or type. If renewing your membership, please indicate any changes to your details.

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The data on this form will be treated as confidential to the BCS. However, the name and address will be used for British HCI Group mailings and statistical information on group membership may be collated from these data, although individuals will not be identified.

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Getting Involved...

We are always looking for people interested in contributing to HCI group activities by, writing for Inter*faces* magazine, helping run the annual conference or joining the executive. If you are able to contribute in this way or if you have ideas for 1-day meetings or new activities please contact the membership secretary, Andrew Monk (AM1@york.ac.uk; Fax. 01904 433181).

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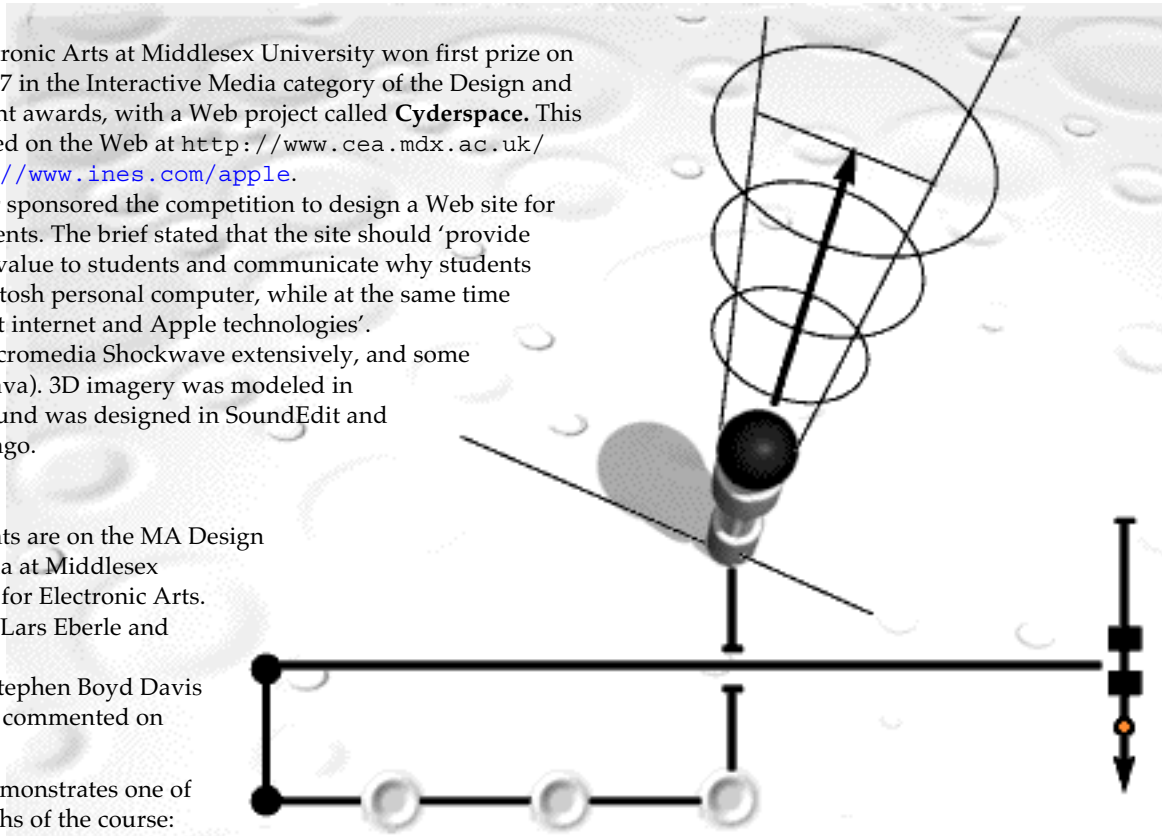
Cyderspace

What?

The Centre for Electronic Arts at Middlesex University won first prize on Thursday 3 July 1997 in the Interactive Media category of the Design and Art Direction student awards, with a Web project called **Cyderspace.** This project can be viewed on the Web at `http://www.cea.mdx.ac.uk/DandAD` and `http://www.ines.com/apple`.

Apple Computer sponsored the competition to design a Web site for them aimed at students. The brief stated that the site should 'provide information of real value to students and communicate why students should buy a Macintosh personal computer, while at the same time employing the latest internet and Apple technologies'.

The site uses Macromedia Shockwave extensively, and some Javascript (but no Java). 3D imagery was modeled in StrataStudio; the sound was designed in SoundEdit and controlled using Lingo.

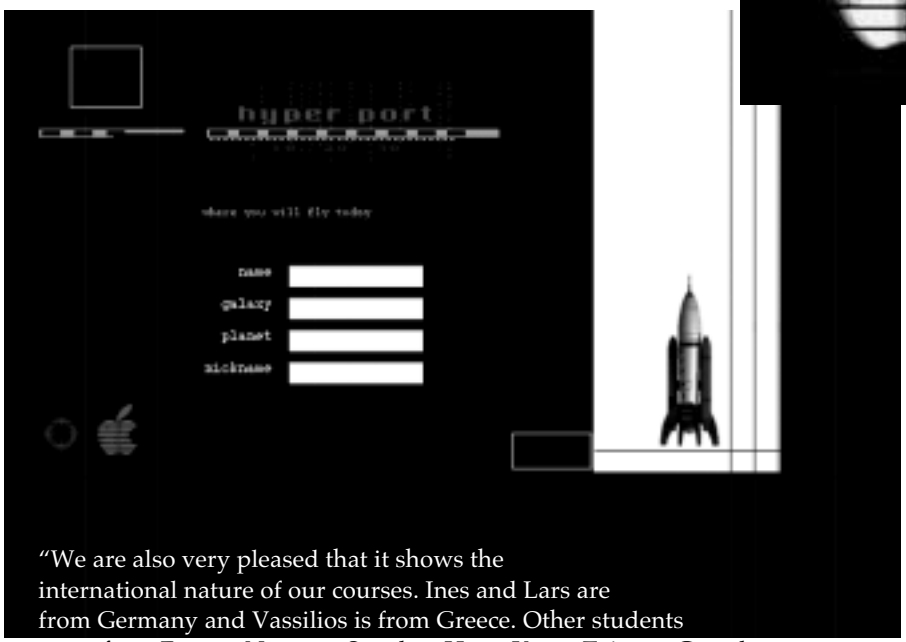


Who?

The winning students are on the MA Design for Interactive Media at Middlesex University's Centre for Electronic Arts. They are Ines Pach, Lars Eberle and Vassilios Alexiou.

Course leaders Stephen Boyd Davis and Gordon Davies commented on their achievement:

> "This success demonstrates one of the great strengths of the course: bringing together students from a wide range of backgrounds to work on projects together. Ines has a background in language and communication, Lars studied communication design, and Vassilios studied software engineering and graphic design before he came to Middlesex."



> "We are also very pleased that it shows the international nature of our courses. Ines and Lars are from Germany and Vassilios is from Greece. Other students come from France, Norway, Sweden, Hong Kong, Taiwan, Canada, Mexico, Brazil and the United States as well as the UK."

The judges' response:

Compared with last year there was a far better understanding of the medium. The winner used a lot of research and addressed the relevant issues about Apple and technology in amusing ways.
The standard of this piece is as high as professional entries in this category.
These students are in a league of their own: the navigation is very sound, the choice of the colours gives superb image quality and the graphics show an excellent use of the new technology. A great deal of imagination and talent as animators and conceptualisers has gone into this piece.

My Thesis

Name and address of researcher
Joerg Wagner
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Germany
Tel +49/345/5523611
Fax +49/345/5527107
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Title of thesis

Miscommunication. Strategies and forms of verbal action in human–computer-interaction at non-, partial, and misunderstanding

Supervisor, department and institution

Prof. Dr. Gerd Antos, M.A.
Department of German Linguistics
Martin-Luther-University Halle-Wittenberg, Germany

What my thesis is about

The thesis is a holistic linguistic approach to errors and breakdowns in human–computer interaction. The errors I am interested in arise from poorly devised verbal interface elements.

How I got into this

Anyone working with (DOS-)computers knows this one:

> Non-system disk or disk error
> Replace and press any key when ready

I have seen so many (German) novice users getting panic-stricken, not knowing what to do. Most of the time it helps, not to replace but to remove the disk ...

My contribution to HCI research

Modern graphical interfaces tend to be designed as conversational partners to their users. A great deal, if not most, of the information necessary for interacting with computers is conveyed via language not graphics. Nevertheless, the importance of the verbal elements of interfaces still seems to be underestimated in their importance for different types of users of graphical user interfaces (GUI). This is particularly true for novice users or experts learning to use a new application who often tend to rely on verbal elements (e.g. menus) more than on graphical elements (e.g. icons).

Programmers and software engineers often look at human–computer interaction as paralleling human–human communication. It is assumed that humans always interact successfully. Yet, human–human communication is inherently flawed and understanding is never complete. A great deal of partial, mis- or non-understanding is not even acknowledged by the participants. Nevertheless, human–human communication is sufficient on a large scale, even without negotiating acknowledged misunderstandings. This seems not to hold true for human–computer interaction. My hypothesis is that breakdowns in human-computer interaction are quite often the result of non-, partial and misunderstandings of verbal interface elements (e.g. menus, dialogues, error messages, help files, etc.) by the user. But misunderstanding in human–human communication and human–computer interaction differs in a number of aspects. Deficient understanding in human–human dialogue:

- can go unnoticed,
- can be detected by speaker and hearer;
- can be repaired by speaker and hearer;
- can be negotiated if necessary.

In human–computer interaction the user's defective understanding often directly leads to an ultimate breakdown of the interaction with the system, leaving the user helpless, because:

- in most cases only the user can detect it (s/he has to monitor him/herself);
- only the user can initiate repair actions;
- meanings are not negotiable.

In order to test my hypothesis, users were observed working as pairs so that they have to interact with the system, but also with each other about the system. Errors and breakdowns occurring in the interactional process are analysed on the basis of transcriptions of the human–human dialogue and the human–computer interaction. Linguistically caused breakdowns are interpreted and categorised. Recommendations will be made how to redesign the misleading verbal interface elements in order to possibly avoid errors and breakdowns. The final goal of the thesis is to make suggestions how methods for usability engineering can be refined by integrating methods from applied linguistics to enable us to design interfaces that allow for more successful interaction.

These short articles are now a regular feature in Interfaces. The idea is to offer a platform to Ph.D. students who have just submitted their theses, or who are about to do so. The articles are intended to be short narrative explanations of what the thesis is about, rather than formal summaries. They will allow other research students and researchers working in similar areas to make contact with the author; who knows, they may even lead to offers of employment.

If you would like to contribute to this series, please contact ***Andrew Monk (01904 433148; AM1@york.ac.uk)*** *for instructions.*

Joerg Wagner and Anita Dutt

Name and address of researcher
Anita Dutt
Indian YMCA Student Hostel
41 Fitzroy Square
London
W1P 6AQ

Title of thesis

Reusable Schema Toolset

Supervisor, department and institution

Professor Peter Morse and Mr Colin Myers
Westminster University

What my thesis is about

Development of a design support tool for reusing existing database designs and the study of its usability.

How I got into this

I worked on a research project at Westminster University to develop a system for reusing designs of existing database schema. This work formed the basis for the PhD.

My contribution to HCI research

Originally the goal of the PhD was to develop a system for reusing designs of existing database schemas. To do this the software design task was analysed in terms of data collected from empirical studies on how designers work ([1], [4], [5], [10], [11]). The data suggested that a design support system should store specialised schema information (i.e. specialised knowledge about families of related software systems). An investigation into software design reuse led to the proposition that a design tool can reuse existing designs by refining and instantiating frameworks [6], which describe high-level designs for classes of similar database applications such as inventory or reservation systems.

A prototypical system was implemented. It incorporates a design reuse strategy which states that applications can be refinements of general database designs and general database designs can be abstracted from applications. This results in a hierarchical arrangement of database schemas where the top-most schemas represent a group of reusable designs at the most general level and the end-leaves represent applications [3]. The prototype displays database schemas in meaningful categories and allows users to create applications or frameworks by selecting and refining multiple frameworks (the 'selection by user' approach is also used in Taligent's CommonPoint [7], but in systems such as Desire [2], IDeA [8] and Ira [9] components for reuse are selected automatically).

We are currently evaluating the prototype. As well as considering the validity of the prototype, we will consider its usability in terms of how well it supports the software design task (i.e. does it match or interfere with users' views of the task) and the usability of its reusable design components. The latter means studying the extent to which users understand and interpret correctly information represented by reusable components, and know how and when to reuse components. The prototype currently provides a search facility to support keyword matching and usage examples for frameworks, both of which aid user comprehension and reuse. Our studies into the HCI aspects may also show that more mechanisms are needed to improve user interaction, and indicate the form these mechanisms might take. It is expected that these studies will generate a contribution to HCI research as related systems like Taligent CommonPoint do not yet address the usability failures of their reuse artifacts.

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Janet Finlay

I studied English Literature for my first degree, discovered the realities of unemployment amongst Arts graduates and 'converted' (in action if not in spirit) to computing via an MSc in Information Processing and a PhD in Computer Science at York. My interest was in HCI from the start – initially user modelling and adaptivity, latterly evaluation, CSCW and education. After 8 years at York (not including my undergraduate 'other life') as student, researcher and lecturer, I moved in 1993 to Huddersfield, where I currently lead the HCI research and teaching centres. I am co-author of a number of books, including an HCI text book of which a second edition is imminent, and am editor of Interfaces – doing this profile is the price I pay for getting a new sub-editor for the Profile series!

What is your idea of happiness?
A new puppy. Being with good friends. Ideally both.

What is your greatest fear?
Spiders

With which historical figure do you most identify?
Christina Rossetti

Which living person do you most admire?
Not a single individual but people who stand up for others at risk to themselves

What is the trait you most deplore in yourself?
Not finishing what I start

What is the trait you most deplore in others?
Intolerance

What vehicles do you own?
1992 Diesel Escort Estate

What is your greatest extravagance?
Books

What makes you feel most depressed?
Genocide

What objects do you always carry with you?
Keys, dog treats and a poop-scoop!

What do you most dislike about your appearance?
The waist down

What is your most unappealing habit?
Chewing around my fingers

What is your favourite smell?
Lilac, fresh coffee, horses and wet dogs

What is your favourite word?
Maremmano

What is your favourite building?
The house in Cumbria where I grew up

What is your favourite journey?
The M6 North to Cumbria

What or who is the greatest love of your life?
My Maremma sheepdogs – Bruno, Florence and Grace

Which living person do you most despise?
Those who abuse children and animals

On what occasions do you lie?
To avoid trouble

Which words or phrases do you most overuse?
Bizarre

What is your greatest regret?
Negative equity

When and where were you happiest?
Wetheral 1971, York 1983, PEI 1988, Italy 1995 and many times in between

How do you relax?
Walking with the dogs away from the crowds

What single thing would improve the quality of your life?
A house without neighbours

Which talent would you most like to have?
To be musical

What would your motto be
I'll get it to you tomorrow

What keeps you awake at night?
A 90lb Maremma on my feet

How would you like to die?
Quietly amongst friends

How would you like to be remembered?
As having made a difference

Reading and writing in electronic diaries

Patricia Wright & Nick Rogers

Memory Aids

All of us have problems at times remembering to do things and we enlist the help of devices as varied as knots in handkerchiefs, 'post-it' notes, calendars and electronic alarms to circumvent these problems. Sometimes these memory aids fail because we forget what the knot stands for or we are too busy to look in our diary. In such instances memory aids need to be both attention getting and informative (Kapur, 1995). This is particularly true of compensatory techniques used by people whose memory problems are much more severe, either as a result of the ageing process or brain injury (Wilson & Watson, 1996).

Having a poor memory is not a problem as long as you do not forget things. The recent *Interfaces* article by Aldrich (1997) highlighted the pioneering work of Wilson and colleagues in the UK in which a pager rings at preset times and the visual message displayed reminds people of what they should be doing now (Wilson et al., 1997). They have evidence that electronic memory aids can play a vital role in helping people cope with the problem of remembering when to do things. The NeuroPage messages result from patients telephoning a central location and asking for the message to be sent at a particular time. Some of Wilson's patients mentioned that they would welcome a device that let them enter their own reminders because it would restore their highly valued independence. Could pocket computers have electronic diaries that were simple enough for patients to read and write in? In principle they could be tailored to the specific needs and capabilities of the patient. Their alarm bleep prevents users ignoring them. Indeed some devices allow different alarm sounds to be attached to different categories of message. Another potential advantage of a pocket computer is that the message display can be more extensive than the pager, even including graphics if necessary. Moreover the opportunity for diary users to look ahead and see whether a certain time slot was free could also increase their ability to plan their daily lives. But are they inevitably too complex and require too much new learning to be practical solutions for people with memory problems? A few of Wilson's patients had tried to use commercially available electronic organisers or pocket computers but found them too complicated and difficult to master. Reading and writing diary entries requires a cluster of control operations.

Reading diary entries

Moving on to the next page is such an incidental part of our reading behaviour that few of us pay much heed to it. Our fingers know what to do and when. When reading electronic documents, the involvement of our fingers becomes much greater and the navigation skills may require new learning and deliberate attention (Wright et al., 1994). These problems did not arise with the NeuroPage system in which just one message was given at a time. Until 1997 almost all electronic diaries relied on an interaction via the keyboard, not just for entering data but also for reading entries. This makes reading difficult. The diary user must know which keys to press when wanting to check an evening appointment if the screen is showing morning times. The arrow keys seem a natural choice but they may just move the cursor up and down the hours within the times currently on view. Further navigation issues concern viewing tomorrow's events and next week's. Creating a simplified interface means enabling any entry to be read with almost no additional learning by the diary users. This would be much easier for a diary having a touch-screen display than it is with a keyboard.

When using an electronic diary that has a touch-screen, people only have to learn to 'tap' a diary entry or an on-screen button. Admittedly these taps may call for more precise movements on the small screen than some patients find easy, but there is much less to remember. Unfortunately a single tap will not suffice if the display divides into active and inactive windows. The need for double taps in some circumstances but not others may cause confusion. A design solution that made window activation an explicit recurrent action might be more easily mastered by people with memory problems, since it leads to a uniform one-tap style of interaction. However, consistency, like all simplistic rules, can be a false friend (Grudin, 1989) and we hope to explore such issues empirically within the context of the use of electronic diaries.

Related to reading an entry is the activity of setting or unsetting the alarm linked to it. If a keyboard is the only means of interacting with the computer then the alarm function could be accessed via a special key that simply toggled the alarm on and off when the cursor was alongside the appropriate entry. Although special keys may suffice for the alarm, they do not offer a generic solution for the range of functions that can be needed when reading a diary. Consider how the number of keys escalates if special keys are needed to change day, week, month and year, plus using extra functions such as Find or Notes. Sophisticated users easily learn to tab between alternative menus listing subsets of available functions, and would only need one key that gave access, for example, to all Change Date Displayed options. However, for patients with memory problems it may be difficult to learn a tabbing concept with its one-to-many mapping and its apparent similarity to the function of the cursor keys. The confusion is heightened if the vertical cursor keys are used for selection within menus. With drop-and-stay menus people also need to learn an additional 'selection' command to indicate which of the menu options is required. The issue being emphasised is that keyboards can be demanding and clumsy reading tools for electronic diaries.

For a diary with a touch-screen display, within a single window only one tap is necessary to toggle on and off an alarm icon beside any diary entry. Arrows at the top and bottom of the window strongly cue their scrolling function to move the display through the hours of the day. A bar strip labelled with the days of the week (see Figure 1), in which the day being viewed is highlighted, may afford a similarly obvious cue to tap on the day you want displayed

Continued overleaf…

Reading and writing in electronic diaries

in order to view another day in this week. Tapping on a number in a conventional month calendar (see Figure 2) may be easily remembered as a way of viewing a day outside the current week. Interfaces with these features are already instantiated in touch-screen products such as the US Robotics Pilot™ and the Apple Newton™, both of which have diary and alarm functions but also offer a great deal more.

Figure 1 **Bar strip for selecting days of the week.**

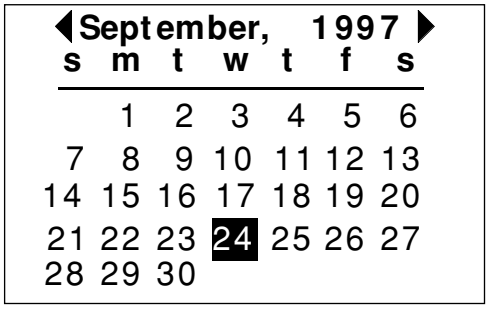

Figure 2 **Month calendar for changing day displayed**

Writing diary entries

Could patients with severe memory problems regain more independence by using one of the commercial electronic touch-screen diary systems, even if they needed the help of carers or friends to keep the information up to date? The NHS R&D South and West is funding a research project to investigate this possibility because while the touch-screen may facilitate reading a diary, it may introduce difficulties for 'writing' if there is no keyboard (Wright et al., 1997). When people have displayed the appropriate time, they need to add the message. With the keyboard machines this is scarcely a problem. Diary users align the cursor with the time slot then just press keys, editing and retyping as necessary. In contrast, with a touch-screen diary the available screen space is already limited. Giving up part of this area to a permanently displayed on-screen keyboard does not seem ideal. Space can be saved if the electronic diary recognises handwritten input. Both the Newton™ and the Pilot™ offer this functionality. However, it is unlikely that patients with memory problems will be able to learn a special script such as Graffiti™ which the Pilot™ requires. These patients will need to remember how to display the keyboard, which may require two commands – one for alpha characters and another to display a keyboard for numeric entries. This is the solution adopted for the Pilot™. It enables the on-screen keyboard to be larger and more legible but reduces the ease of entering mixed alpha-numeric sequences and increases the amount of learning needed to master keyboard entry. Even with the slightly larger keyboard some patients may have a tremor or impaired control of motor movements which makes delicate tap-typing impractical.

Hybrid interaction

Fortunately help is at hand. New products reaching the pocket computer market include machines such as the Psion 5 and products having the Windows CE operating system, all of which combine keyboard and touch-screen inputs. It seems highly probable that this combination, the keyboard for writing and the touch-screen for reading and navigating through the diary, may enable patients to regain their independence and empower them to plan and organise their own reminders. Of course, these patients will need devices that offer fewer distractions and opportunities for confusion than exist in the widget-rich pocket computers currently available. It might also be hoped that the price of a simplified diary + alarm device would be less than that of a pocket computer running word processing, spreadsheet, database, fax, modem and internet software.

It remains an empirical question whether hybrid interfaces involving both pen and keyboard are suitable for people with severe memory problems. When such a diary is opened it immediately confronts the diary user with decisions about using the pen or keyboard. Other work by Wilson and colleagues suggests that it greatly assists patients learning new procedures if they can be guided to the right actions without making errors (Wilson et al., 1994). This important feature of errorless learning may be easier to achieve within the constraints of a touch-screen-only interface than with the hybrid display, because the screen display can reduce the options currently available and so reduce the opportunities for error, whereas with the keyboard available keys may be pressed that result in changes that were not intended by the user. This may result in confusion and distrust of the diary aid. The visual salience of the keyboard when the electronic diary is opened may make it difficult for patients to remember to take out the pen if all they want to do is read through tomorrow's events. So an important part of the design challenge is to see if this problem can be overcome, perhaps by a reminder alongside the display of times and events which is shown when the diary is opened on each occasion.

Over the horizon is the possibility that voice recognition may remove any need for a keyboard for 'writing'. This could reduce the bulk and hopefully the cost of electronic diaries. Even with voice recognition there remains a problem of 'modedness'. When the diary owner says 'Up' this could be a text entry or a cursor command or a window scroll command. Hoping that patients will remember specific word combinations (e.g. Cursor Up; Page Up) may

be optimistic. One interim solution might be to remain a little closer to the NeuroPage's separation of the reading and writing functions. Memory clinics or friends or carers might help initially to enter the main diary entries. It is likely that at this initial stage many of the alarms will be set for events that recur on a regular basis, such as taking medication daily or attending a regular clinic. Having been set once they will remain continuously available. Manually entering each repeating event seems unnecessarily tedious. Whether a dialogue can be devised that is within the grasp of patients with memory problems remains to be seen, but from examination of the commercial products currently available this should certainly be possible for family/friends of the patient.

Exploring how interface design can be recruited to provide patients with as much functionality for the management of their own personal information and planning of daily life as they wish to use is one of the objectives of the project we have just started in Cambridge. Other studies of the long-term use of personal electronic notebooks have emphasised the importance of the interface being customisable to suit the information needs of the user (Erickson, 1996). This may well be true of electronic diaries which reflect our idiosyncratic life styles. Moreover, the ability to customise the display, and perhaps the interaction style, may be particularly important for patients who will vary in the combination of cognitive problems they experience during the course of rehabilitation.

Although we are focusing on the support needed by Wilson's patients, memory problems are so common that it is hoped that the project will yield electronic diaries that we all find easier to customise and use. Certainly the work done so far has highlighted the ways keyboards and touch-screens have widely differing affordances in the complementary activities of reading and writing diary entries. Contact with other readers of *Interfaces* who are interested in the design and use of electronic diaries, in any context, would be very welcome.

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Acknowledgements

The preparation of this article was funded in part by the NHS National R&D Programme for People with Physical and Complex Disabilities through the NHS Executive South & West and benefited from the comments and experience of Prof. Barbara Wilson, Mr Jonathan Evans and Dr Hazel Emslie.

Further design issues

Basic Diary + Alarm

1. General discussion of screen: portrait/landscape; separate 'function' space, etc.
2. Optional views – e.g. all hours vs only appointments
3. Detailed discussion of repeating alarm settings – every day, every week, next Friday
4. Snooze alarm options
5. Training issues – initially and subsequently (print/online?)
6. Format of on-screen keyboard
7. Role of menus in accessing diary functions (because initially we can manage without)

Additional functions

8. Find
9. Notes attached to entry
10. Untimed To Do's
11. Links to 'address book'
12. Views of address book – form page vs menu access

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Encouraging students to carry out research

Introduction

One of the problems educators face when developing courses for undergraduates is how to develop their study skills. One purpose of education is to develop intellectual curiosity and to provide those skills needed to ensure continued self development (Dearing 1997). As educators we would all like to provide our students with the ability and desire to delve more deeply into their chosen field of interest during their study and afterwards. From the student's point of view the ability to undertake research might prove a more immediate necessity than as a means of maintaining skills, since many final year students studying for degrees in computer science, computer studies or related fields are asked to carry out a project as part of their final year submission. Also, some students concluding their undergraduate program would like to go on to a masters program or perhaps work towards a doctorate. These postgraduate courses require research experience. The field of human factors is still very young and it needs good researchers. It was in order to try to address this problem of encouraging student research and individual thought that the author carried out the exercise described in this paper.

Background to the Research Exercise

This exercise was carried out with two cohorts of students during the 1996/7 session. The School of Computing at South Bank University runs undergraduate degree programs in Business Information Technology (BIT) and in Computer Studies (CS). During the second year of the Computing Studies degree the students are allowed to choose options. The author runs a Foundations of Human Factors (FHF) unit which is offered as a prerequisite for the Human Information Processing and Cognitive Modelling (HIPCM) unit in the final year of the degree. This unit is offered to both non honours and honours students but during the 1996/7 session the Foundations of Human Factors unit was offered for the first time to HND and HNC students.

The Foundations of Human Factors unit is primarily designed to prepare students for the final year option of the BSc Computing Studies degree. During the final year students are expected to build and test a real application (Faulkner and Culwin, 1995, 1997) so the Foundations course attempts to prepare them for this by introducing them to work with users. The final year unit also expects the students to work effectively in small groups and as a cohort.

The BSc BIT students also opt during the second year. The unit concerned is Ergonomics for Computerised Environments (ECE).

The Research Specification

The same coursework was set for both cohorts. The FHF cohort consisted of about 45 students, while the ECE cohort consisted of about 25. The students were asked to divide into groups of between 3 and 5. Each group elected its own chairperson. The groups were told to keep minutes of all their meetings and all their rough work as this would form part of the assessment process. The groups were assigned research areas at random, offered in a draw with more subject areas than there were groups. The FHF students were given subject areas suitable for Human Computer Interaction (HCI), whereas the ECE students were given topics slanted towards ergonomics, but there was some overlap. Some of the subject areas (colour on the screen, text type on hard copy and the screen) were areas where research has been done but others (left-handed users, adjustment of controls) were less well documented. The criterion for subject inclusion was that the student groups would be able to carry out the research within the university environment or its nearby environs. Table 1 shows the topic areas.

Foundations of Human Factors	Ergonomics for Computerised Environments
Font size – legibility and size on screen	Font size – legibility and size on screen
Font size – legibility and size on hard copy	Font size – legibility and size on hard copy
Font family – legibility of font families on hard copy	Font family – legibility of font families on screen
Font family – legibility of font families on screen	Font family – legibility of font families on hard copy
Colour associations – can colour be used for easier spotting of items?	Colour recognition and labelling – how do people classify different colours?
Menu labels – how easy is it to classify menu choices into headings?	Colour and VDUs – which colours are easiest to use on screen?
Icons – do people know what they are or mean?	Gaps – what grouping of letters/numbers makes for easier reading/memory?
Short-cut keys – how memorable are they?	Adjusting chairs – how many students adjust chairs?
Short-cut keys and mouse – which is faster?	Do left handed students move the mouse?
Colour recognition and labelling	Do people touch type for programming? How many students adjust controls before using the system?

Table 1 **Research subject areas**

At the same time as the draw for subject areas, the students were given details about what they should submit. Each group was expected to set its own timetable and to keep to this schedule. Each group was at liberty to set up the research in any way it chose though the contents of the submission were fixed.

The final deliverable was to consist of:

1. A formalised research question.
2. A description of the research method chosen.
3. The findings.
4. The recommendations.
5. Comments on the work carried out by the group.
6. The minutes and rough work.
7. A presentation of the research to the cohort.

The BSc students were expected to show details of their reading and how their research fitted into established research. For the HND/HNC students the author was more concerned about how they tackled the task of research than its theoretical content.

The final submission was a group submission but each student was expected to submit a one page description of what his/her contribution had been and to make any individual comments on the process. If a particular student had dissented from majority decision then this would be noted in the individual submission. The presentation to the cohort was simply a means of encouraging students to talk about their work to other people, and also to give students an opportunity to find out what other groups had been doing and to question their processes.

The coursework was supervised in class time. During each class the supervising lecturer went round every group and spent time checking on progress, answering questions and making recommendations. In the early stages this consisted mostly of making sure that groups had thought of a suitable research question and had properly formulated it. For example, two groups drew a subject area of colour identification. One group turned this into a research area of how men and women classify particular colours, whereas the second group examined how many colours people could identify easily on the screen. Once the research question had been properly formulated and approved the students designed their own research method. Some decided to carry out experiments, others used questionnaires, some used interviews and some used more than one method. Most students ran a pilot study to test their research method or their questionnaire. The pilot study formed part of the final submission. Classes were given on research methods and questionnaire design and the various groups were encouraged to try out their research methods on other groups prior to carrying out the real research.

The Completed Work

The finished coursework was of a high standard. Students found the formulation of a suitable research question/hypothesis difficult. Even when a suitable question was decided upon they found it difficult to phrase the question. Once the question was formulated most opted for a suitable form of research to test the question. Most groups carried out some form of questionnaire. Students had been warned that questionnaires must have a suitable research question behind their design and all questions should be relevant. This was to prevent questionnaires from becoming impossible to analyse within the time. Most questionnaires were of a good standard, though all groups, even when they had used a pilot questionnaire, admitted that there were still some problems with the finished article. One group carrying out work on how easy it was to interpret icons found that their wording of the initial question which formed their 'experiment' had caused subjects to think that they, rather than the icons, were being tested and were at fault.

Some groups were left with more questions after their research than they had started with. Most found their studies inconclusive and were only too well aware that they needed to do more work. The groups seemed to have enjoyed working with real subjects and setting up their own research agenda. Most students found it easy to get suitable volunteers though one group carrying out their research in a particular area of the university found students who had been paid for taking part in a commercial research project and who thus expected payment!

Comments

The students acted in a professional manner. They set up their research and their research methods with due regard to their subjects' feelings and privacy. Subjects were all volunteers and the groups took great care to ensure that subjects knew they were free to abandon the research. They met with a lot of enthusiasm but that was likely because they undertook their research with enthusiasm. They learned a lot; much more than they would have learned in classes. Most realised that it was more difficult than it looked. All knew that the next time round they would be more able to carry out research. All learned, most important of all, that research is not about trying to prove yourself right, that proving yourself wrong or coming to no clear conclusion can be just as useful.

The students were honest and very self critical. The group that had phrased its initial research question badly commented that one subject treated the questionnaire like an examination. The group members were concerned that they may inadvertently have caused even minor distress. They learned to watch and listen. Much of the work in the field of HCI and ergonomics depends on the ability of the practitioner to observe and listen. By the time students had completed their research they had begun to learn how new research is formed by watching what is happening.

This work will continue with the next cohort and a different set of problems.

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Time and the Web

Graphics, information, waiting, … java, multimedia, waiting, … hypertext, waiting, … global networking, waiting, … waiting, … waiting …

Time and the Web was a workshop of the British HCI Group held on 19th June 1997 at the Octagon, Staffordshire University. The organisers were Dave Clarke, Devina Ramduny, Dave Trepess and myself. I'll try to give a flavour of the day in this report, but for the full papers see the web site:

http://www.hiraeth.com/web97/

For me this workshop brought together two fascinating areas in HCI, first of all the study of temporal issues of user interaction, a focus of my own research for many years, and second the Web which has affected us all dramatically.

Modern user interface paradigms depend on direct manipulation, rapid response and immediate semantic feedback. Up until the early 1980s response time was a recognised problem. But, with the advent of personal computing and graphical interfaces, user interface designers have often assumed that machines will be fast enough. Response delays were no longer an interesting problem: ever faster computers would make the problem go away. I have previously called this assumption the 'myth of the infinitely fast machine' [1].

The web has given the lie to this assumption – exponential growth in traffic has lead to ever-increasing network delays and bottlenecks at overused servers. Even if we imagine that network capacity could overtake growth in usage, we are ultimately faced with the fundamental limitations of the speed of light. Delays are here to stay.

All this has highlighted the role of temporal issues in human–computer interaction:

- How do people cope with delays?
- Is direct manipulation the correct paradigm for computer or network intensive tasks?
- How do people interact over extended timescales?
- What architectural infrastructure do we need to support effective interfaces over slow or unreliable networks?

The workshop began to address these issues, building on the growing interest in this area, in particular on the popular workshop on *Temporal Aspects of Usability* held at Glasgow in 1995 [2], and recent meetings on *Hypermedia Usability* [3] and on user interfaces and CSCW for the Web [4].
The day was split into three main parts:

1. Setting the agenda: studies and issues – with studies and analysis defining and establishing problems for time and the Web.
2. Attacking the problem: theory and mechanisms – with papers more concerned with potential solutions.
3. A panel discussion, led by Richard Bentley (Rank Xerox), Nigel Birch (EPSRC)

Of course, as with all such divisions, the rationale was as much governed by the timetable as the content, but in general the day did move from problem statement, through theories, to partial solutions.

Setting the Agenda: Studies and Issues

Chair: Dave Trepess

The Use of Critical Parameters in the Design of Web-based Interactive Systems

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Critical parameters are performance measures which by common agreement can be used as a basis of assessment. For example, adverts for cars may quote fuel consumption at 70 km/hour, or even drag coefficient; countries are often discussed in terms of their GNP, population size or land area. Such critical parameters cannot capture the full subtlety of design trade-offs but they do allow the design space to be represented more succinctly and hence more tractably.

William gave examples of the use of critical parameters in applications, including airline reservation, medical record-keeping and calendar maintenance. He discussed the potential effect of porting applications to the Web in terms of critical parameters. He did not attempt to define the full set of critical parameters for the Web, thus leaving a challenge to the workshop participants.

Some critical temporal parameters at a low level are obvious: network bandwidth and latency. Those familiar with my own work will know that I would say that often the most critical temporal parameter is pace, that is the rate at which users can act and expect to receive some response to their actions [5].

Is Time Out To Be the Big Issue?

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This paper reported the results of a web-based questionnaire. The questionnaire was created from a large initial set of candidate evaluation criteria using sorting techniques. The questionnaire was made available to the Web community, enabling users to provide their views on the usability of four nominated web sites after browsing each one. The survey data were analysed and results interpreted to place the perceived importance of delay in context with other usability issues in Web environments. The survey aimed to establish the subjective views of users performing browsing activities, rather than on measurements of the user performing allocated tasks.

The sorting exercise ascertained that delay was regarded as important by users, although issues of navigation and web page design are still dominant. Also, the survey revealed that delays provoked criticism from users, although delays appeared to be acceptable for local web sites where download times are faster.

Alan Dix

I found it interesting to contrast these results with a similar small-scale study discussed in a short paper at HCI'97, *Heuristic Evaluation of Web Site Usability* by Jones and Hewitt [6]. In their paper, delays were found not to be important. Perhaps this reflects the difference in evaluation styles: user questionnaire vs. heuristic evaluation, perhaps simply the different web sites used in the evaluations. Whichever is the case, it clearly demonstrates the difficulty in even quantifying the problem of web delays.

Compensatory Actions for Time Delays

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This paper described observations of students engaged in web-design assignments during a period of poor network performance. Users were observed using various types of 'compensatory actions', that is techniques which alleviate the effects of the slow response time. For example, some users kept several browser windows open so that they could work with one window whilst other windows were loading, some expert users extended the browser's cache size and other users simply avoided graphics-rich sites. The type of compensatory actions depended on the expertise of the user, expert or novice, and the kind of task, directed or exploratory.

In my own work, I have observed users adopting similar techniques to deal with a variety of time-based problems and called these 'coping strategies'. At first these often start as breakdown situations where the user explicitly acts to compensate for delays or unexpected behaviour. Later the actions become automatic and users are often unaware that they are using them, but of course the additional cognitive and physical loads remain.

Temporal Usability and Disturbance Management in Interaction

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This paper was based on Helen's extensive review of work on temporal issues within the HCI and psychology literature. She focused on two definitions of 'just right' timing in the user interface:

1. The timing of behaviour conforms to users' expectations based on prior experience or current status information.
2. The experienced user never has to devote conscious attention-directed awareness to the timing of interface behaviour.

The first definition emphasises the importance of 'temporal affordances', ways of making the user aware of the likely and ongoing delays. In a network system like the Web this may mean deliberately not being location transparent – Helen talked of 'spatial' navigational aids to aid temporal awareness.

The second definition emphasises the importance of 'disturbance management' techniques, whereby delays in one activity can be filled with another (as in the case of multiple browser windows as observed by Barbara) and whereby the original activity can be resumed with minimal effort.

Attacking the problem: theory and mechanisms

Chair: Devina Ramduny

What's the Web Worth? The Impact of Retrieval Delays on the Value of Distributed Information

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Linking ideas from different fields often leads to new and powerful insight. Chris has taken aspects of utility theory, an important branch of economics, and applied them to the way retrieval delays affect users' perceptions of the value of information. This can both give potential measures of these effects and also suggest design directions, for example to help users estimate the utility and retrieval cost (delay) of as yet unseen information.

Chris's work in this area is expanded further in his HCI'97 paper, *The impact of marginal utility and time on distributed information retrieval* [7]. Also there are parallels in Grudin's use of cost–benefit analysis for discussing CSCW success factors [8], which I have used myself in assessing the success of the Web as a CSCW infrastructure [9]. Another similar approach is the Xerox PARC work on 'information foraging theory', which uses an ecological rather than economic metaphor [10]. A problem that still has to be addressed by both the economic and ecological models is how to accommodate the rather different and strange behaviour of information compared to real solid food and goods.

An Adaptive Caching and Replication Mechanism for WWW

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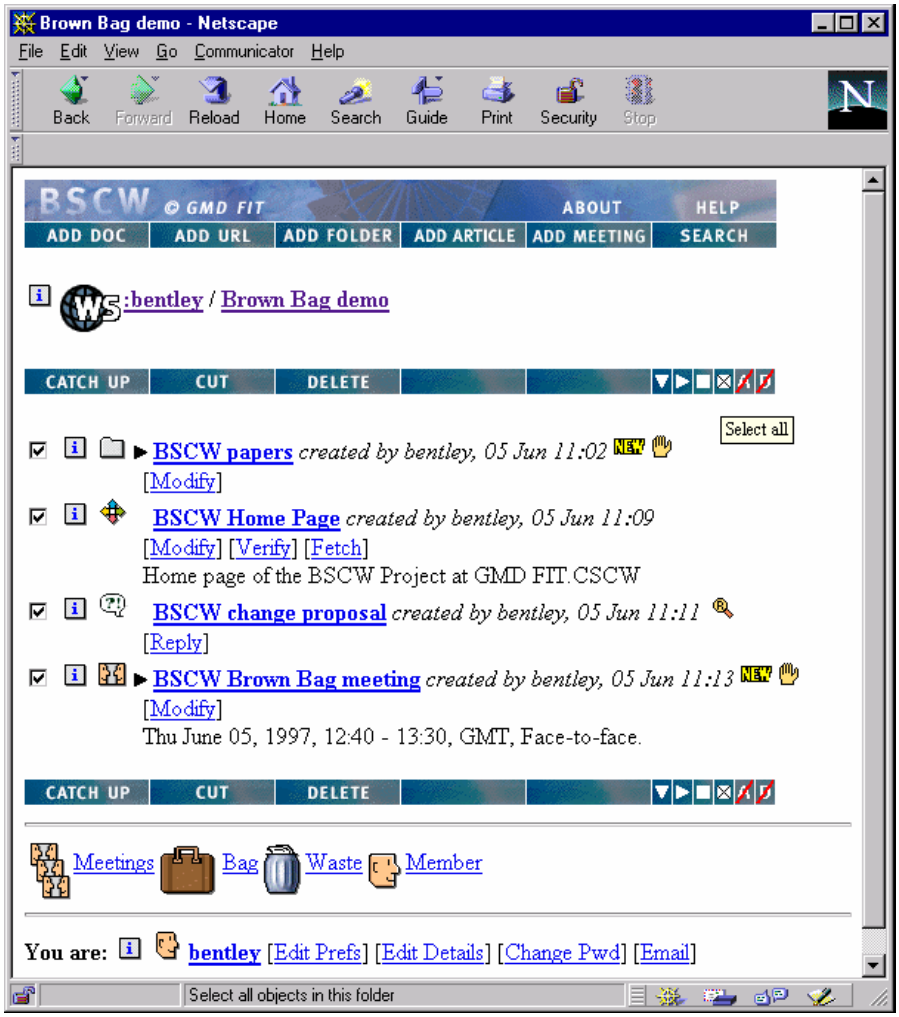
One of the few redeeming features of web browsers when dealing with slow networks or servers is that they use caching – local copies of recently visited pages. So, although the first visit to a page may take some time, subsequent reloads only need to read the copy off your own disk.

Continued overleaf…

Time and the Web

Typically caching takes place at two levels. First, the browser itself keeps copies on your local disk. Second, the browser may use a 'proxy', that is it accesses pages through an intermediate machine. Proxy servers can allocate much more space to caching. Also, because the proxy is used by many web clients, there is a good chance the page you want has recently been accessed by another user and is in the proxy's cache.

Cristian and Maria described a caching mechanism based on more levels of proxy-like servers. They propose that the hierarchy of proxies should follow the DNS hierarchy given by the domain name of the machine. For example, my local machine might access a 'soc.staffs.ac.uk' proxy initially, which itself may ask for pages from the 'staffs.ac.uk' server and then an 'ac.uk' server, etc. The advantage of this as a structure is that users within the same domain name grouping are likely to have similar access requirements.



Basic Support for Cooperative Work – GMD's Web-based shared workspace

Quality of Service Requirements for Multimedia Communications

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Different media demand different levels of timeliness and accuracy. If a set of company accounts is being transmitted it must be accurate (no wrong figures), but a delay of a few seconds mid-transmission is no real problem. In contrast, a delay of even a few hundred milliseconds in the middle of an orchestral performance would not be acceptable, although an occasional loss of sound quality may be. Even within the same media there are different demands for, say, video-conferencing as compared with television broadcasting, and speech transmission compared with music.

These complex user-level demands give rise to the concept of Quality of Service (QoS) at the network level. The paper particularly addressed translation of QoS demands between levels, starting at the user level (Perceptual QoS), which leads to application QoS demands upon the lower levels of communication software, such as the TCP/IP stack used by the Internet, and finally the QoS demands upon the actual physical networks.

At present the web protocol (HTTP) does not support such levels of QoS and indeed during discussion it was noted that even different web media types such as text and images should be treated differently for caching purposes (arguably the use of progressive images makes some moves in this direction). Systems on the Web sending other media use lower-level Internet protocols (such as UDP) although, for home use, many Internet service providers optimise their dial-up connections in ways that conflict with UDP. The next generation of low-level Internet protocols will have better provision for specifying QoS, but in order to use this to its best advantage clear models of the required behaviour at the user level are essential.

Alan Dix

Panel led discussion

Chair: Alan Dix

Panellists:

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Richard was one of the chief architects of GMD's BSCW (Basic Support for Cooperative Work) Shared Workspace system, which is one of the most well known and widely used CSCW systems on the Web. He gave a brief overview of BSCW and then used the experiences from the project to suggest some general lessons to initiate discussion.

One of the initial reasons BSCW was built using the web infrastructure is that it offers a homogenous virtual platform – no more PC/Mac/UNIX versions! Unfortunately, this is only partially successful – differences between browsers clearly cause problems, but also different network characteristics can make a web interface usable or unusable.

A non-BSCW example of this is the oft-cited advice to make web pages fit onto one or two screens … (i) Whose screen? We now have handheld computers with web browsers! (ii) This isn't good advice when the latency is low but the bandwidth high (as is often the case for transatlantic connections). In these cases it is best to get a reasonable amount downloaded in one go and then use the rapid delay-free interaction with the scrollbar!

Nigel is responsible for Human Factors at EPSRC, the UK research council that funds university research in computing. One of his most interesting remarks was that, despite the large amount of excitement surrounding the Web, there were few high-quality grant applications in this area. Those that did arrive often addressed short-term issues and not deeper theoretical understanding.

Possibly the Web highlights a general problem in HCI, that of defining a discipline which is closely tied to technology yet which must transcend the short-term aspects of that technology. Academic research on the Web cannot outstrip Netscape and Microsoft in building web applications, but should instead use these technologies as ways of examining deeper fundamental problems that will continue to be applicable when the next wave of technology hits us.

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Vol 30, No 1 (Jan 1998)

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Interfaces is published quarterly by the British HCI Group.

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