

Interfaces

55 • Summer 2003

British
HCI
Group
www.bcs-hci.org.uk

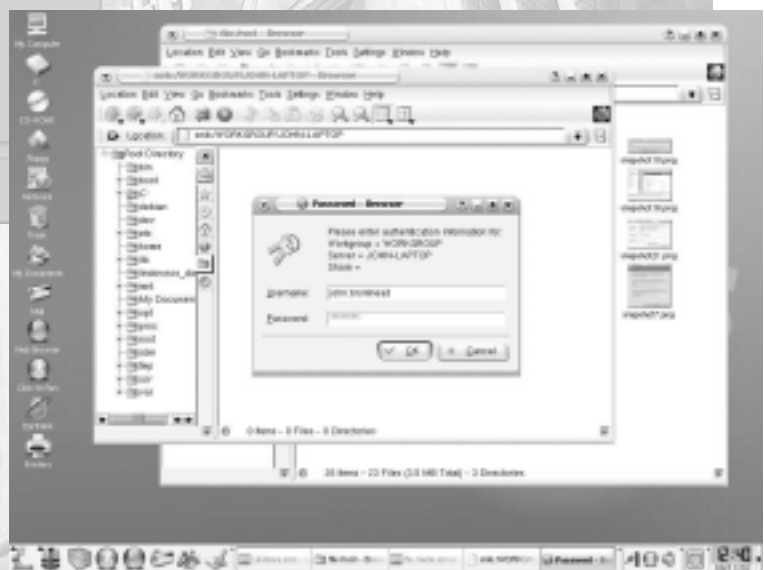
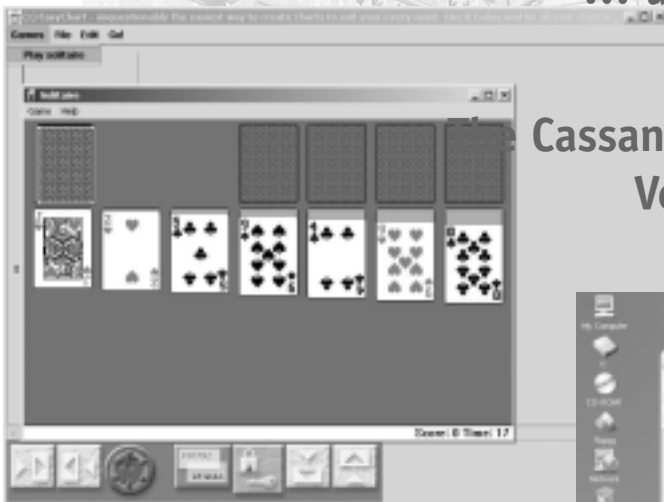


Inside...

HCI Educators workshop 2003
HCI2003: Designing for Society
Interesting interactions
Attitudes to open source software

... and regulars

Deflections
Cassandra Column
Vet's Column





View from the (Comms) Chair Human-Centred Knowledge Transfer

Welcome to my new location. Laura is now firmly embedded as editor and bringing her own knowledge, style and enthusiasm to my old position. I wish her well, and hope you'll help her out as much as possible with articles, reviews, letters for future issues of *Interfaces*.

With the demise of the print version of *CHI Bulletin*, *Interfaces* is arguably the most important magazine of its type, and it will only remain like that with the help of its many contributors, and these require constant refreshment (and not just by taking them to the bar occasionally).

The other change you will notice is that I have stepped into Gilbert's shoes on this page. He now has a larger canvas within to do his thing, speaking for himself rather than as the mouthpiece of the British HCI Group – the job of this column.

In future issues I intend this column to summarise the Executive's varying views of pressing issues in HCI but this time around you get my take on an issue that echoes Gilbert's current and most recent *Deflections* pieces.

In the last few months, following some success with HCI-related versions of what are often called *technology transfer programmes*, I have been considering the emerging nature of knowledge transfer. Members of this community will not be rocked back in their seats if I suggest that *knowledge transfer is a human-centred activity*. Technology transfer used to be about taking a machine, dropping it into a business, bedding it in, and watching it make money. Some ten years ago it shifted into areas such as applying well-proven, standardised quality and marketing techniques to outdated business models, with predictable enhancements. Now we have moved nearer the frontier and we are seeking to transfer more conceptual, though research-proven, ideas, with less predictable results.

This is good; this is what the UK government talk about when they desire to see more practical applications of research, as they prime the pump of third-stream funding for universities, but do we know what to do? Can we just drop a nice lump of knowledge into a business solution and admire the precipitation? Several recent activities confirm that it is people, not business operations, to whom we transfer knowledge. These people have an added value in a business situation, and as soon as there is perceived added value in a business context, it will appear on a balance sheet and someone will be trying to realise that value.

To be fair, technology transfer programmes have always recognised the importance of training employees in the new techniques. In the past this has been about redefining the tasks and immediate goals of the work-force. Now we have to think about the broader and higher-level activities, the conflicting agendas, of the various stakeholders. These are the users of HCI knowledge, and if we want to have any influence, we need to start from their needs.

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Editorial

Welcome to issue 55 of *Interfaces*. As you'll have already noticed, there's been a bit of musical chairs going on around here. Tom has sidled off page 3 and nicked Gilbert's chair. Gilbert, in turn, has sloped off to page 4 where he can have a full page all to himself. And I've managed to bluff my way into the editor's seat where I'm curled up scrawling out this editorial so that Fiona can finish the magazine and get it off to the printers.

Meanwhile, Xristine has passed the book [sic] to Sandra Cairncross, leaving us with a clutch of reviews before finally escaping to her armchair where she can read in peace. Alistair is hanging up his stool with his final Vet's Column, in which he looks back at the evolution of the discipline of HCI. Fortunately, *Interfaces'* other regular contributor, Cassandra, has agreed to stick around for as long as you want to read her stuff. Thank you to both Xristine and Alistair, not only for their many contributions to previous issues, but also for sticking around for my first issue.

A large part of this issue of *Interfaces* is devoted to looking at the field of HCI itself: how HCI is taught and how it is practised. Gilbert Cockton calls for a holistic approach to the HCI discipline, in which researchers, educators, practitioners, customers, students and trainees all work together to increase awareness and uptake. Richard Hetherington reports on the recent HCI Educators workshop, which looked at how and why we teach HCI and included presentations on teaching

different aspects of HCI, such as graphic design and accessibility. Several presentations from HCIE 2003 are represented in this issue and, hopefully, others will come in future issues.

Cassandra Hall tackles gender-politics in HCI and bemoans that absence of female 'gurus'. Paul Curzon, meanwhile, takes up Cassandra's challenge (see *Interfaces* 54) to write about serious stuff in an interesting way. Does he succeed? You decide but consider this: it can't be bad if he's got Star Trek role-playing into an essay on post-completion errors. Take this as an invitation to show that you too can write usable copy for *Interfaces*.

As well as all this, there's the Advance Programme for HCI2003, which lists the accepted papers and tutorials, and some details of the keynote speakers. Diane Murray, editor of *Interacting with Computers*, supplies listings of the contents of the current issue of *IwC* and previews future issues. Alistair Kilgour and Tony Whitmore look at users' attitudes to adopting open source software.

And that, dear reader, is my first editorial, which just leaves my plea for volunteers to write reports, articles, and opinions for *Interfaces* to maintain the quality of the award-winning magazine that Tom has passed on to me.

Laura Cowen

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RIGHT TO REPLY

Make *Interfaces* interactive! We invite you to have your say in response to issues raised in *Interfaces* or to comment on any aspect of HCI that interests you. Submissions should be short and concise (500 words or less) and, where appropriate, should clearly indicate the article being responded to. Please send all contributions to the Editor.

To receive your own copy of *Interfaces*, join the British HCI Group by filling in the form on page 31 and sending it to the address given.

NEXT ISSUE

Interfaces welcomes submissions on any HCI-related topic, including articles, opinion pieces, book reviews and conference reports. The next deadline is **15 July**, but don't wait till then – we look forward to hearing from you.

with thanks to commissioning editors:

Vet's Column: Alistair Kilgour, alistair@realaxis.co.uk
Book Reviews: Xristine Faulkner, Xristine@sbu.ac.uk
Profile: Alan Dix, alan@hcibook.com

cover image credits: Lindows screenshot by permission of Lindows, from www.lindows.com; Bath photo: Tom McEwan; EasyChart screenshot: Laura Cowen

Deadline for issue 56 is **15 July 2003**. Deadline for issue 57 is **15 October 2003**. Electronic versions are preferred: RTF, plain text or MS Word, via electronic mail or FTP (mail fiona@hiraeth.com for FTP address) or on Mac, PC disks; but copy will be accepted on paper or fax.

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and copy email submissions to Fiona Dix, *Interfaces* production editor; email: fiona@hiraeth.com

PDFs of *Interfaces* issues 35–54 can be found on the B-HCI-G web site, www.bcs-hci.org.uk/interfaces.html

Why Only Inclusive Organisations Make Sense for HCI Specialists

With the new organisational structure in place, Tom McEwan takes his rightful role as Communications Group Chair to write the Chair's column. It's thus a good job that I have *Deflections* to retreat to.

So with my newfound freedom, I'll be trying to catalyse debates within our community. In *Interfaces* 54, I asked three rhetorical questions about what we should expect from accredited HCI specialists. Feel free to write your own reply to this, or this *Deflections* column, to appear either in *Interfaces*, or on UsabilityNews.

My first full *Deflections* column applies my experience of economic development to clusters of HCI specialists. From 1998 to 2002, I directed the North East's support project for digital media companies. I started with my technology transfer hat on and left with a new wardrobe of supply chain integration, cluster mapping exercises, competitiveness and adding value. I developed a broader view of the relationship between universities and the regional economy. My understanding of how universities relate to high growth industries in the knowledge economy turns out, surprisingly, to apply to specialist groups such as the British HCI Group.

Within the Digital Media Network (DMN) project (www.dmn.org.uk), we developed an understanding of where digital media companies were positioned within various value chains, not only regionally, but also nationally and internationally. We seek holistic approaches to supporting companies within this value chain, via interactions with suppliers and customers for the region's digital media companies.

While technical and business services, along with content provision and re-purposing, were key inputs to digital media companies, staff are *the* key input in a knowledge-based economy. For companies to remain competitive, they must have access to a supply of skilled personnel. Universities have a key role in developing graduate professionals and updating existing staff. Before directing the DMN project, I had only a loose and limited understanding of the role of universities in a knowledge economy. I quickly came to appreciate how central universities are. Universities supply three critical inputs: knowledge, expertise and people (who deliver the first two). However, their value to companies depends on the fit between what universities produce and what companies need. This is not to say that universities should merely train students for work. However, they will not serve their students well at all if they remain ignorant of, and unresponsive to, industry needs.

So, what's this got to do with the British HCI Group? Well, there's a value chain within HCI just as anywhere else. There are customers for HCI specialists, so there's one end of the value chain. There are also resources for HCI specialists, in terms of knowledge and expertise developed within research *and* practice. These are the initial (and continuously improving/evolving) inputs, which again can only embed themselves in companies through trained staff. This includes both new graduates and staff updated through short courses, part-time

degrees or consultancy. A clustering approach to economic development aims to improve the whole value chain. Indeed, attempts to deal with isolated parts of the value chain are generally doomed to failure (e.g., as supply side initiatives).

OK, so how do we get from all this economic development theory to an inclusive specialist group? Simply because we need to address the HCI value chain holistically. Improvements in the uptake and effectiveness of HCI approaches require co-ordination across the whole supply chain. Educators, trainers, students, researchers, practitioners and customers all need to work together. Having any stakeholders working in isolation will result in supply-side distortions such as irrelevant research, inappropriate teaching, poorly equipped HCI specialists, outdated and ineffective consultancy, unrealistic customer expectations, and ill-informed students. The logic of working across the whole value chain is inescapable, and thus unsurprisingly, supposedly pure practitioner and educator groups expand into research, industrial reach out and student support.

"We all need to work together to work together"

Within the new BHCIG structure, three groups focus on specific parts of the HCI value chain, with integration provided by the events and membership groups and overall co-ordination from COG (Chairs and Officers Group). The Communications Group (Chair: Tom McEwan) has a specific brief for educating customers for HCI products and services, as well as raising awareness among the general public. The Education and Practice Group (Chair: Janet Finlay) seamlessly combines educators' and practitioners' interests within a range of initiatives. The Research Group (Chair: Dianne Murray) looks after our flagship journal *Interacting with Computers*, UK research policy lobbying *and* research students. As ever, our volunteer base limits what we can do, so if you can help with any of these, please do.

Only an inclusive group with representation from the best specialists in education, research and practice can take a holistic approach to the HCI value chain. Narrow groups inevitably bounce between sectional self-interests and lame gestures towards the inclusiveness that they initially rejected (too academic, too much research, too many educators, too many moaning practitioners, ...). So, if we are all ultimately drawn to inclusiveness, why are there so many HCI specialist groups? It is simply inevitable in a multi-disciplinary area, since various engineering and applied human science professions need specialist HCI groups. Every attempt has to be made to work across the boundaries of professional societies to maintain a single community of HCI specialists who can take the broadest view of their discipline and its health. We all need to work together to work together. Going our separate ways will do nothing for the overall health of HCI.

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HCI Educators 2003 Workshop Report

Richard Hetherington

The A-B-C (Appropriateness, Benefits and Costs) of D-E-F (Distributed, Electronic and Face-to-Face) learning in HCI

Late March/early April saw the 6th HCI Educators Workshop take place at Napier University with the support of the Learning and Teaching Support Network centre for Information and Computing Science (LTSN-ICS).

The two-day workshop attracted around 45 delegates including seasoned HCI campaigners, representatives from industry and a clutch of newcomers to HCI teaching (myself included).

The ever-expanding HCI curriculum and the increasing variety of ways to learn were reflected in the choice of themes for the workshop:

- The HCI Domain
- Accessibility
- Graphic Design and Interface Design
- Current Issues in Teaching, Learning and Training for HCI

And all to be covered in a couple of days!

Help was at hand however, with presentations from invited speakers that effectively outlined the state-of-play for each theme followed by a selection of relevant short papers. All of which were successful in providing fodder to fuel fruitful discussions that were extended into coffee breaks, lunch and the evening whisky tasting.

In his invited presentation David Benyon introduced us to Human-Centred Interaction Design (HuCID – to rhyme with lucid) – a proposed emerging discipline that combines the ‘engineering’ tradition of HCI with the creative design background of Interaction Design (ID). HuCID practitioners would then be equipped to take a more rounded and holistic approach towards designing for the whole environment of the information spaces in which people live. This convergence of diverse methods, philosophies and concepts is essential if we are to confront the challenge of designing systems, experiences and whole environments in today’s world of pervasive and ubiquitous computing.

I suspect that much of our present teaching already contains a substantial interweaving of HCI and ID – the multidisciplinary nature of these beasts tends to encourage this. So, is this a repackaging exercise and we’ve sort of been doing HuCID anyway? Or, will this become a viable approach with which to take us into the future? If HuCID is the vehicle to unite the HCI and ID communities, then surely some benefit must be realised. The opportunity for synergism between the HCI and ID disciplines is a particularly interesting prospect HuCID offers up.

It hasn’t taken me long to sense that many people perceive a conflict in whether interface design should be regarded as an engineering process or an art. Brent MacGregor from the Edinburgh School of Art reinforced this separatist view, declaring that usability experts and graphic designers live on

two different planets! Much of my teaching and research interests involve user-centred design, with evaluation central in the process. However, I was reminded from Brent’s address that in teaching design centred around accommodating users or clients (as in the engineering tradition), it can be easy to overlook that in certain contexts it is necessary to challenge users in many varied ways (as in the artistic tradition).

So how can the circle be squared? Making trade-offs is a major activity of design. Possibly, the extent to which the ‘artistic’ or ‘engineering’ approach is taken in a project could be viewed as another trade-off, in which case designers need to be equipped with a background of both approaches in order to make the best-informed decision at the time.

In an attempt to “convert the techies” Michael Smyth and Alison Varey reported their experiences of incorporating an Experiential Design module into the undergraduate HCI curriculum. The module aimed to expose HCI students to design in its widest sense and to provide them with a language with which to rationalise and critique design. Results from the first delivery were promising. Student performance indicated the development of a design awareness and ability to critically appraise interactive design. However, the module was delivered to a small class (six students) and its scalability remains to be demonstrated.

The introduction of the Special Education Needs and Disability Act 2001 (SENDA) has highlighted the responsibilities of HCI Educators in contributing to the provision of a more accessible curriculum. Embracing accessibility has progressed from being an altruistic gesture to a legal obligation. It was therefore appropriate for accessibility issues to occupy a high profile in this workshop.

Alison Crerar has experience of 20 years in the rehabilitation field and half as many in HCI. The message in her invited address was that accessibility has finally come of age and must be taken seriously. There are many varied contexts where we have all probably experienced some degree of ‘disability’. A recent case mentioned was that of radio astronomers experiencing difficulties in using software due to their workplace being located at high altitude. This interesting example illustrates the difficulty in predicting where such contexts may arise. None of us can escape the ageing process, and often with ageing comes some form of impairment. So it’s time to take on the challenge of accessibility and follow the call of inclusive design with all its associated wider benefits. As Alison stated: “There is no them and us”.

Applied Computing at the University of Dundee should need no introduction as an internationally recognised centre for developing accessible technologies for the disabled. The culture of accessibility runs wide and deep here in teaching, research and beyond. Lorna Gibson’s invited presentation comprehensively illustrated this, with particular reference to undergraduate computing courses. Accessibility is taught throughout the undergraduate degree programme: first and



Janet and Tom in well-fueled fruitful discussion



second year students are given exposure to accessibility issues and to the idea of designing systems for a diverse range of extraordinary users. In the third year the most in-depth teaching is given, with students taking part in exercises where they are “disabled” in various ways and also gaining practical experience with evaluating techniques for accessibility that they can apply in their own project work. Consequently, many fourth years (this is Scotland remember!) choose to do projects involving the disabled or a diverse range of users. Accessibility is treated in a holistic and pragmatic way at Dundee, and this must surely be a benchmark for us all to strive for.

Meanwhile, consider a lecturer confronted with the prospect of conforming to accessibility legislation in a background of increasing change in higher education, an ever-expanding curriculum, an already heavy workload and other responsibilities to satisfy. Furthermore, the lecturer or the institution could be faced with the possibility of being sued by failing to make ‘reasonable adjustments’ in educational provision. *Interfaces’* very own Tom McEwan gave a personal account of meeting this challenge at Napier University through attending a staff conference entitled “The

Accessible Curriculum” and by benefiting from the experience of the School of Computing Special Needs Advisor, Aileen MacLean. Interestingly, Tom’s assessment of the exercise was that the steps taken to make the curriculum accessible would lead to improved teaching and learning for everyone – exemplifying the Inclusive (Universal) Design ethos.

It’s time to wind up; all I have done is provide my own biased taster of this workshop. But there was much, much, more [1]. With the continuing pressure to satisfy a variety of stakeholders and rationalise our teaching we are all going to be very busy HCI (or HuCID?) educators in future. As for any good conference, its value went beyond the written programme, providing newcomers like myself with the opportunity to network, and access the wealth of knowledge and experience there was available. I feel better able to do my job now.

Further Information

- [1] Effective Teaching and Training in HCI - Proceedings of the 6th HCI Educators Workshop. 2003. (Eds. Sandra Cairncross, Alison Varey, Tom McEwan) LTSN-ICS. ISBN 0-9541927-2-9.

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HCI Educators 2003 Presentations

The full proceedings of the HCIE 2003 workshop are available in *Effective Teaching and Training in HCI – Proceedings of the 6th HCI Educators Workshop*. 2003. (Eds Sandra Cairncross, Alison Varey, Tom McEwan) LTSN-ICS. ISBN 0-9541927-2-9. This publication can be ordered directly from LTSN.

The papers and posters presented at HCI Educators 2003 are listed below. Summaries of a selection of the papers and posters are published in this issue of *Interfaces*. The other papers and posters will be covered in future issues of *Interfaces*.

In this issue

Full papers

Challenges in the expanding world of interaction (p.10)
Russell Beale

Advanced Interaction Group, University of Birmingham
Easy Chart: Exploiting an inverted design process to create an instructional artefact (p. 7)

Paul Englefield, Mark Farmer, Emma Reeves, Nik Mottershead, Mark Tibbits

IBM Usability Competency Centre
Measuring usability in user interfaces: A case of divergent metrics (p. 10)

Thomas Acton and William Golden
Dept of Accountancy & Finance National University of Ireland, Galway

In future issues

Full papers

Accessibility and the HCI curriculum: Improving teaching and learning for all

Tom McEwan, Sandra Cairncross and Aileen Maclean
School of Computing, Napier University, Edinburgh

Experiences of Experiential Design
Michael Smyth and Alison Varey

School of Computing, Napier University, Edinburgh
Problem-based learning in teaching user interface design
Konrad Baumann

School of Information Design, FH Joanneum, Graz, Austria
Student use of web resources in an HCI unit

Jonathan Crellin
Portsmouth University
HCI education and training: Satisfying the stakeholders
Ann Light, Barbara McManus, Shalley Minocha, John Rosbottom
University of Sussex, University of Central Lancashire, Open University and University of Portsmouth

Keynote presentations

Human-centred interaction design
David Benyon
School of Computing, Napier University, Edinburgh

Keynote presentations

Current issues in teaching, learning and training for HCI (p. 8)
Janet Finlay
School of Computing, Leeds Metropolitan University

Posters

Teaching HCI at Stafford (p. 11)
Dr Clive Chandler
University of Staffordshire
Evaluating e-commerce sites by tracking eye movements (p.12)
Ekaterini Tzanidou
Department of Computing, The Open University.

Keynote presentations (cont.)

Including accessibility in undergraduate computing courses
Lorna Gibson, David Sloan, Anna Dickinson and Alan Newell
Applied Computing, University of Dundee
Accessibility comes of age
Alison Crerar
School of Computing, Napier University, Edinburgh
Graphic design and interface design
Brent MacGregor
School of Visual Communication, Edinburgh School of Art

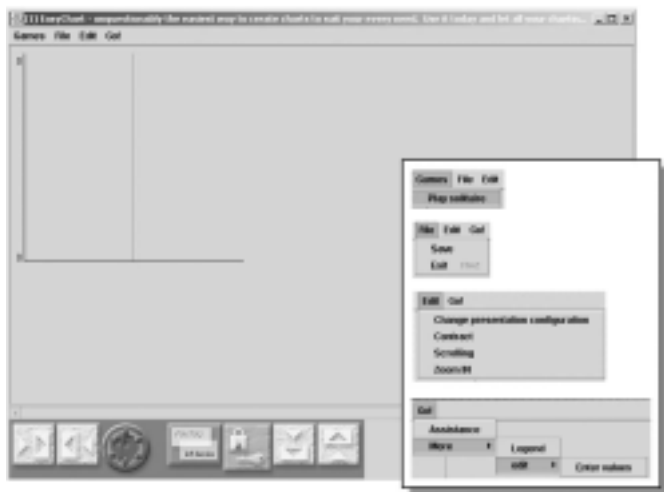
Posters

A case study in the teaching of HCI
Deryn Graham
School of Mathematical and Computing Science, University of Greenwich
Re-thinking HCI education in the context of design theory
Konrad Baumann and Peter Purgathofer
School of Information Design, FH Joanneum, Graz, Austria
Design and Assessment of Technology Institute, University of Technology, Vienna

EasyChart

Exploiting an inverted design process to create an instructional artefact

Paul Englefield, Mark Farmer, Emma Reeves, Nik Mottershead, Mark Tibbits



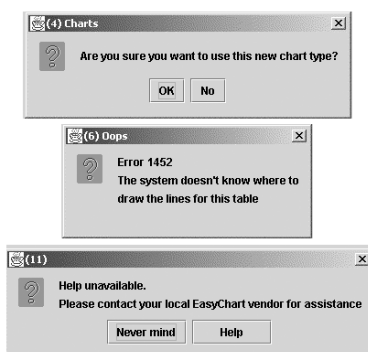
The EasyChart interface. The inset shows the expanded menus to illustrate the options available to the EasyChart user.

Superficially a simple charting utility, EasyChart implements a systematically flawed interaction design in order to present a deliberately frustrating user experience. It supports a variety of instructional strategies by:

- Providing immediate subjective experience of flawed design
- Stimulating critical reflection on the causes and consequences of design failure
- Encouraging identification of related errors in familiar software
- Acting as a vehicle for practising evaluation methods
- Supporting assessment of evaluation skills.

The design was informed by the following anti-design principles:

- It should systematically violate each of Jakob Nielsen's usability heuristics
- Errors should be varied in surface representation



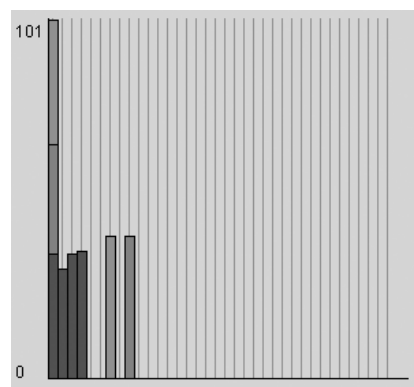
Some of the helpful dialogue and message boxes available to the EasyChart user.

- Individual errors should be typical of those prevalent in commercial software
- Some degree of caricature would be acceptable

The design of EasyChart was evaluated in two phases. An early test showed that the initial design was too challenging to be educationally effective. A second classroom test on a tempered version showed that while generally effective, further work is necessary to tone down the caricature. Feedback from early adopters suggests that the design may still be difficult for direct use by some students.

We currently use EasyChart in two ways in our training curriculum. Firstly, we start our introduction to User-Centred Design with an ice-breaker in which delegates attempt a set of tasks with a variety of hardware and software artefacts. Some are familiar and straightforward, while others are challenging. Instructors draw on the students' experiences to develop fundamental theories and practices of human-computer interaction. We use EasyChart as one of the "hard" applications to ensure that delegates experience the consequences of poor design.

Secondly, we use EasyChart as a warm-up exercise when teaching Heuristic Evaluation. Students follow an informal process to assess EasyChart against a set of heuristics before conducting a more rigorous inspection of a business application related to a case study. The documentation of errors enables the instructors to coach and appraise the "evaluators".



Your editor's best efforts at creating a graph using EasyChart!

If you want to have a go yourself, you can download EasyChart free of charge from www.ibm.com/easy: http://www-3.ibm.com/ibm/easy/eou_ext.nsf/Publish/3072

EasyChart comes with a detailed explanation of the design principles it violates.

Paul Englefield, Mark Farmer, Emma Reeves, Nik Mottershead, Mark Tibbits

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Current Issues in Teaching, Learning and Training for HCI

Janet Finlay *British HCI Group: Education and Practice subgroup*

Four fundamental questions face us as HCI educators. The questions themselves are simple; the answers are perhaps a lot more complex. The aim here is to raise some of the issues; as HCI educators we need collectively to debate and uncover solutions. The questions we need to consider are:

- What should we teach in HCI?
- Who are we teaching HCI?
- Why are we teaching them HCI?
- How should we teach HCI?

The article will conclude with an introduction to the work of the British HCI Education and Practice Group, whose remit is to attempt to find solutions. It is hoped that the paper will stimulate debate on the issues and involvement with the work of the group.

What should we teach in HCI?

The first issue to consider is what we should teach as HCI educators. Is there a fundamental curriculum? As a relatively young and multidisciplinary area, HCI raises a number of issues for curriculum developers. It is a fast-moving field, where technology and applications are changing continuously. New areas become popular and attract attention; new approaches are developed; and our focus changes: from usability to user experience, from single to multi-user systems, from desk top to ubiquitous computing, from work to fun.

So where does all this change leave the HCI educator? It is clear that the area is growing, and only right that we should take account of developments in technology and the way people interact with it. Our focus in HCI is changing, as it has done before to address our changing context. But does that make the discipline itself redundant, as has sometimes been suggested? I think not.

As educators it is sometimes tempting to focus on novel technology and practice, rather than seeking to uncover theoretical bases that will enable a deeper and more robust understanding of the discipline, even as it changes. As a young discipline, much of our theory is borrowed from parent disciplines and this can make the task of teaching more daunting. HCI has always been interdisciplinary, and current challenges may cause us to draw on new disciplines to address our changing needs. Input from cultural media and design disciplines has much to offer us as we move forward in HCI. But drawing on new theoretical perspectives and practices should enrich rather than replace our field and there is much in our heritage as HCI researchers and practitioners that is as relevant now as ever.

If we look back to the curriculum efforts of ten years ago by the ACM Curriculum Development Group (and our own group in 1995), what is striking is not the differences but the similarities. User communities, context, and appropriate technology are all key elements. A design process, capturing rich requirements to inform conceptual design, iterative prototyping and user-focused evaluation are important.

Interestingly a primary focus of the ACM effort was to make the curriculum 'future-proof'. As educators we need to establish core elements of theory and practice that will enable our students to understand not only the technologies and contexts of today but those they will face in the future.

Who are we teaching HCI?

A second key issue is who is our audience as HCI educators? Who is it that we are teaching? As HCI educators we may be located in computing departments or psychology, multimedia or information systems. Few, if any, of us will be located in HCI departments. The students we teach in UK universities are generally not HCI specialists, at least not at undergraduate level. So does it matter that we are teaching HCI to software engineers, systems analysts, psychologists, information scientists, multimedia or business students?

In a university setting it is quite likely that our HCI class will be the only exposure students have to HCI concepts – yet they may go on to write or commission software, develop policy on the use of technology, analyse organisational systems, develop websites and a host of other activities to which HCI can contribute. If we only have 'one shot' at these students, what is our take home message? Does it matter whether non-specialist students can master the detail of specific techniques or notations for user-centred design or evaluation or is it more critical that they take away an understanding of the important issues?

And what about specialist HCI degrees and continuing professional development (both specialist and general)? How do we change our content and approaches to address the needs of these groups? If our audience are current or future HCI specialists, what do they need to know? What are key skills for HCI specialists? How can we provide continued professional development for usability professionals?

Why are we teaching them HCI?

The third issue to consider is why we are teaching HCI. One answer may be because we believe software, multimedia and information professionals (to name a few) need to know about this subject. But apart from this philosophical motivation, what, specifically, are we preparing our students to do?

Are we providing vocational training for usability professionals or software professionals or managers? What is industry looking for in our graduates and how can we address the needs of different industries? This question is clearly related to the previous one: if we are teaching future HCI professionals or researchers, our approach may be very different than if we are teaching future programmers or managers.

But is our role simply to attempt to match our students to the needs of various professional sectors? In many sectors, HCI is not considered central even where interactive products are being developed. Might we therefore also have a part to play in raising broader and deeper awareness of HCI through our graduates? And how would such an aim influence the curriculum we teach?

How should we teach HCI?

The final question for consideration is how we should teach HCI. What pedagogic approaches are most appropriate and how can learning technologies be used to support our teaching? Should the way we teach be informed by HCI practice and, if so, how? Do our practitioners have a role to play in HCI education, perhaps through providing industrial practice or mentoring?

HCI is a multidisciplinary subject that draws not only subject matter but method and pedagogy from its contributing disciplines. Science, engineering and design all adopt very different approaches to both practice and education. So what is the most effective approach for HCI? Should we be focusing on the laboratory or the studio, for example? Is it more important for our students to learn design skills or evaluation skills or are they equally important? Can a problem-based approach, where problem solving drives the learning process, be an effective motivator in teaching HCI, and, if so, what kinds of problems are appropriate? Should we be using industrial case studies with all their complexity, or problems specifically designed to draw out a particular issue? And if we use real case studies, can we make HCI education a cooperative venture with usability practitioners, through project work or mentoring?

Learning technology provides a unique opportunity for HCI education, since the learning technology itself provides an illustration of the concepts being learned as well as a medium for learning. Perhaps we should be making more use of Managed Learning Environments, such as WebCT or Blackboard, as HCI case studies? Can we get our students to design their own learning support?

British HCI Education and Practice Group

An article raising more questions than it answers leaves something to be desired, albeit that the intention is to promote debate rather than present solutions. This postscript, therefore, is by way of some suggestions for action. The British HCI Education and Practice Group has a remit to develop strategy and action with regard to education and practice within the British HCI group. It currently has four main areas of focus: curriculum development, professional development and accreditation, awareness raising, and sharing practice amongst educators.

Curriculum Development

The British HCI Group last developed an HCI curriculum in 1995, and this was incorporated into the BCS examination curriculum. As mentioned earlier, much of it is still relevant but we need to review it thoroughly to ensure that it addresses our needs as educators at all levels. We have established a curriculum development sub-group which will be exploring HCI curricula from foundation level through to masters and within continuing professional development – as well as making recommendations of teaching practice suitable to HCI.

Accreditation

Although a fully fledged professional accreditation scheme in HCI may be some way off, we need to address how HCI is represented within other professional accreditation and development schemes, and to develop ways of benchmarking HCI skills and knowledge. There is also the possibility of developing an accreditation scheme for courses based on the curriculum development activity, through which the British HCI Group would provide some form of recognition for courses (including short courses) that satisfy some agreed criteria.

Raising awareness of HCI

We need to identify who it is that we are trying to reach in terms of education and practice and how we should go about it. Students range from undergraduate to PhD; practitioners from usability professionals to professionals in other disciplines. We may also wish to 'educate' the general public about HCI issues. We aim to identify ways of raising awareness of HCI within each of these groups.

Sharing practice

The HCI Educators Workshop is to become a biannual activity with a workshop in April and one as part of the September conference. This will provide a focus for sharing practice and experience within the educational community. We hope that practitioners will also contribute to the workshop to ensure that our teaching remains relevant to the needs of industry. We are also exploring a range of new projects. These include: providing annotated and reviewed HCI resources via the web site; developing a student portal with access to job opportunities and a mentoring scheme to allow shadowing of professionals at all levels; a master class programme aimed at practitioners.

These activities are of importance to the whole community so we encourage widest participation. If you are interested in being involved in any of these activities, or would like more information on the Education and Practice Group, please contact the author!

Janet Finlay

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Call for Book Chapters

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Challenges in the Expanding World of Interaction

Russell Beale

HCI faces a new set of challenges. In the expanding world of interaction, in which it seems practically everyone now uses high technology in some form or another, be it mobile phones, tablet PCs, handhelds, notebooks, the web, Playstations or the like, HCI is in danger of falling off the bleeding edge. It is okay at analysing, not bad at measuring, and has some basic theorising, but it fundamentally fails to convince people that it is useful in designing, or that it is useful at all.

Many people, academics and public alike, view much of HCI as common sense, with the little bits that are more complex as only marginally relevant, and then usually only later in the lifecycle. Students particularly see little merit in studying HCI – it's all too obvious for them. It's not that they like the logic of databases and compilers so much, more that they fail to see the relevance of what we teach them. And when you look at many of the HCI syllabi, it's understandable – the issues that we often address, the world has moved on from. GUI's are common, feedback and response times are obvious if you consider gaming, they use mobiles so understand the issues of screen size – they are uninspired by most of what we offer.

HCI needs to become more constructive, more able to usefully contribute to the initial development of products and systems in a rigorous way. It has to be able to talk meaningfully and insightfully about new interaction devices, giving more than simple common sense can offer. It has to become more than evaluative. It has to offer theories that shed light on how new systems should work, how they will actually be used, and how they will be integrated into and affect society.

It has to be able to comment on the new generations of users who are used to error recovery, wimp interfaces, resource-limited devices, and ubiquitous internet access. These are users who have access to machines so fast that inefficient code is hardly an issue but who simultaneously communicate in only 160 character chunks with each other because of network restrictions. It has to be able to develop

meaningful theories that can explain, be tested, proved and used, yet still cope with the complexities of human cognition and the rapidly expanding abilities of machine intelligence.

Sure, it is harder to tackle many of these problems, but they have to be faced up to. People are addressing them in different ways; methodological approaches are developing teeth when combined with patterns, offering more than boxes to tick off along the way. Research into interactions with new devices is providing insight.

People now tend to use a wider variety of technologies and are exposed to many different systems, and their improved experience allows them to be more selective and discerning. In turn, they offer more educated insights, and we are improving our ability to capture these insights, and are working on completing the circle by using this information to develop concrete suggestions for improvement. Software tools are aiding consistency and starting to contribute to the process, but whilst there is an acceptance that software engineering lacks the user element, it is still much better supported with software tools than usability is.

The greatest thing we can do, though, is to take our skills, methods, craftsmanship, intuition, guidelines, psychology and perceptions out into the wider world, demonstrating the benefits we can bring. We have to fire up our students, embarrass the purveyors of confusion, and provide concrete approaches that can be modified, adapted and above all used to create better systems. We must develop our theories and present them in a comprehensible manner, so that they can be used to guide and inform intelligent debate and technological advancement.

HCI has to convince colleagues, students, and the world in general that it has something positive to contribute. It does – there is some great stuff out there. But we have a bit of catching up to do.

Russell Beale

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Measuring Usability in User Interfaces

A case of divergent metrics

Thomas Acton and William Golden

The user interface comprises the boundary between the user and information systems. A common problem associated with computer-based systems is the relatively small window through which an information space can be viewed. In particular, devices with small output screens, such as mobile phones, are restricted in the quantity of data that can be displayed on screen at a given time, and also in the means by which such data can be presented effectively. The small size of such screens necessitates acute attention to methods of maximising the display area, and industrious application of interface design techniques [6].

Usability is a major component of HCI. Small screens compromise usability [7]. One solution to the maximisation of limited screen space on small devices may be through interfaces that 'layer' simultaneously displayed on-screen objects [3]. Such nesting of on-screen objects may be realised through user interface translucency, where the user can visibly see through displayed objects to those 'beneath' them [4]. As such, translucency may help to increase the usable screen area on small devices. Physical 'translucency' of an interface screen object is the user's ability to visually see through, or partially see through, that object when present on

screen [1]. Authors such as Bier et al [1], Encarnação et al [2], and Kramer [5] have utilised on-screen translucency of objects and menus in graphical user interfaces as a method of maximising the available display area.

Our research studied the effect of translucent menus on both the actual and perceived usability of a prototype third-generation mobile phone screen interface. The study utilised a questionnaire-based survey, together with laboratory experiments, which used a prototype interface containing menu translucency, and a control interface lacking translucency. Separate metrics assessing actual and perceived usability were gathered quantitatively. Conclusions regarding actual usability measures were drawn from a positivist viewpoint (that is, a stance whereby research is considered to be objectively verifiable, using measures such as times to complete tasks, or numbers of errors made; and excludes subjective factors such as perceptions of ease-of-use or usefulness). On the other hand, measures for perceived usability were examined in a more interpretive (subjective) manner, considering perceptive attitudes towards ease-of-use, usefulness, enjoyment, and attractiveness of the interface.

Results from the objective, positivist viewpoint indicated that menu translucency had no effect on usability. However, subjective measures indicated that menu translucency did indeed influence perceptions of ease-of-use, usefulness, attractiveness, and enjoyment. Either 'type' of measure, as a standalone tool used in isolation, did not provide a rich picture of the usability of translucent menus on a small device. It was only through the triangulation of methods, by the implementation and analysis of both objective and subjective measures of usability, that a more complete and accurate set of findings was identified. We conclude that

objective and subjective measures must be considered as complementary methods to provide rich and meaningful usability metrics.

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Teaching HCI at Stafford

Clive Chandler

HCI is a fundamental part of our core subjects and as such is included wherever a design of any software or hardware component is discussed or produced. This includes web modules, software analysis and design methodologies, and multimedia (to mention three).

Subjects at degree level at Stafford are module based and regular reviews occur during which module structure such as assessment criteria, etc., can be altered by the teaching teams involved and agreed by the university. Minor changes such as the inclusion of a new topic in the module structure are entirely a matter for the teaching team and the final decision lies with the module leader.

The most important praxis in my opinion is to teach that the user is the main goal and target of any interface design. If they are not happy, they will have a bad user experience and therefore the design is unsuccessful. Testing by the user and involving them from the initiation of the design therefore become fundamental requirements.

As such, over the past decade, we have seen a difference in the way we approach interface design: initially we would produce a prototype and might, if all goes well and costs are low, test this prototype with the users to ascertain if it matches their requirements. More normally we would have taught a testing phase towards the end of the project to see if the requirements were met. This would of course leave us no time to correct the errors and the results would be relegated to a 'wish list' for the next upgrade.

Our Interface Research Group directly feed into the teaching content to reflect new research themes, ideas and discoveries. As HCI has become more prominent, the shift in teaching has been towards involving the user and so the testing phase becomes a relevant part of every design stage. At Stafford we have developed methods to expose our students to this approach.

Dr Clive Chandler
University of Staffordshire



Evaluating E-commerce Sites by Tracking Eye Movements

Ekaterini Tzanidou

The usability evaluation technique of user observations involves observing end-users or representative users interacting with multimedia interfaces to determine usability problems with the user interface designs. However, if the user has difficulty interacting with the user interface to complete a task it is not always obvious from the evaluation data where and why the usability problem occurred. Additional information, such as the user's cognitive processes and eye movements across the interface as he interprets the information on the display, can be useful. Eye movement

data can enrich the evaluation data from user observations and reveal detailed and precise information of what the user looks at on an interface. In our poster we aimed to demonstrate the potential of using the eye movement data as a usability evaluation technique, and to show how we are planning to apply this technique in our research programme at the Open University, UK.

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Culture and HCI Workshop June 18 2003 • University of Greenwich, UK

Following on from the successful workshop, Cultural Issues and HCI, at the University of Luton in December 2000, comes the second BCS HCI Group workshop, on June 18th, with the important and very relevant theme *Culture and HCI: Bridging Cultural and Digital Divides*.

The workshop is sponsored by the School of Computing and Mathematical Sciences at Greenwich University (www.gre.ac.uk) and will take place at the university's beautiful maritime campus, which is part of the Old Royal Naval College in Greenwich.

Aims of the workshop

Given both the great expansion in software globalization offered through the Internet, and the multimedia nature of many websites, effective strategies for design and evaluation that address cross-cultural issues are now seen to be critical to the success of many applications. Cultural diversity makes it unrealistic for designers to rely on intuition or personal experience. However, designing multiple web sites or portal applications for different user groups adds significantly to the cost of development. This makes it essential to focus on website characteristics which are sensitive to key differences within the user base.

The workshop will include speakers from, and is aimed at delegates from, industry and academia. As in the previous workshop, the aims are to provide a thought-provoking discussion and the opportunity to share insights into practical solutions for cross-cultural usability.

The workshop will consider the challenges posed by new and emerging communication technologies, such as mobile technologies. It will take a broad view of cultural differences; too often cultural differences are seen to be designated by linguistic or national boundaries. This ignores the wide range of sub-cultural needs and preferences dictated by, for instance, age or disability.

Themes of the workshop

The workshop's themes are:

- Cross-cultural issues in human-computer interaction
- E-commerce trust and credibility perception across cultural boundaries
- Globalization/localization of products and services
- Sub-cultures and their impact on design and usability
- Sociological and ethnographic approaches to cross-cultural design

Registration and further information

The registration fee is £50 for the day including a book of the published proceedings, and lunch. There will also be an informal social event in the evening which is not included in the cost.

To register, please send cheques made payable to *School of CMS, University of Greenwich* to:

Dr Karen Gunter
Maritime Greenwich Campus
University of Greenwich
Old Royal Naval College
Park Row
Greenwich
London SE10 9LS
Tel: +44 (0)20 8331 8503

To pay by credit card, please contact: Miss Kirsty Girard on +44 (0)20 8331 8504 or email gk14@gre.ac.uk

For up-to-date information about the HCI and Culture Workshop, see <http://www.nimm.demon.co.uk/hci/cultureworkshop.html>

For a tourist guide to Greenwich, see www.greenwich-guide.org.uk/

Karen Gunter

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Out of the Mouths of Babes...

The Cassandra Column

Cassandra Hall

Doesn't time fly as Pink Floyd so aptly noted? You laze around wasting the stuff and before you know it ten years have gone. All that fuss over HCI 2002 and now in a twinkling you're sitting in the committee for HCI 2003 and trying to decide what you want the programme to look like and arguing over workshops and tutorials. Plus ça change, plus c'est la même chose.

I've been thinking of Pink Floyd a lot this week as their 30th Anniversary edition of *Dark Side of the Moon* hit the shops, reminding me of what I believe to be one of the most poignant lines of banality ever written: 'thought I'd something more to say'. I bet there's many a paper writer found that to be true as the acceptance and rejections rattled into inboxes all over the HCI world.

Our beloved former editor has been putting bits of Pink Floyd to the test as well since he's discovered what it's like to be obscured by clouds. The yellow fog it seems, rather than doing its lickings into the corners of streets, had him licked into a corner at some obscure airport northwards. And thereby obscured the escape route to our lovely Roman city in the west, causing his dip in Bath to be somewhat belated for the HCI 2003 meeting. He'll be gutted to know that he missed all of the bits involving sums and algorithms.

But I digress and I've only just started so I'll press on. I'm trying to turn over a new leaf for the new editor to whom I feel obliged not to give a hard time. I expect it'll wear off though. Novelty always does. But my real questions this time are about sex and HCI and speculation. It all started when I read *Leonardo's Laptop* after reading the review of the same in the last issue. It set me thinking that HCI really has started to climb out of the cradle and stand on tottery speculative feet.

And the speculations are coming from diverse places and not just from the mouth of the enfant terrible of HCI, Don Norman. The latest comes from JR Fogg and a book of his called *Persuasive Technology*. Visions and speculations are there thick and fast. But there's something scary about Fogg which is never scary about Norman or even Shneiderman's visions in *Leonardo's Laptop* which by comparison are innocent, childhood dreams.

What scares me about Fogg and doesn't scare me about Shneiderman and Norman is that actually Fogg can realise these nightmares of his which he explains in horrid graphic detail, making John Carpenter's *The Thing* look like a day at an RSPCA rescue centre. And Fogg understands only too well the impact they will have too. Shneiderman seems blissfully unaware of what might happen if his dreams of a technological blooming don't become nipped in the bud. He's far too nice to think people could be that bad given half the chance. And Norman is only slightly perturbed by implications. But certainly not enough to cause him a sleepless night, raiding his Gulf of Execution fridge. His nightmare vision of the Teddy for example still retains some of its cuddly aspect. Fogg would soon turn that into something even Big Brother would blanch at and would make the Borg look like Little Miss Muffet.

Fogg is pure *Nightmare on Elm Street* with no vampire slayer in sight. Fogg is the philosophical half of the

Frankenstein of HCI: a sort of cerebral chorus to Stelarc's highly physical response to re-imaging man in a different form by rewiring some of the easy bits. Don't get me wrong, apart from Fogg's dubious and somewhat irritatingly immature creation of the term 'captology' which looks like something Granny Weatherwax would be at home with, it's a fascinating book his *Persuasive Technology* and I'm sure he's on to something. It's certainly the most exciting HCI book I've read this year and it'll be required reading for my students as of next year. But Fogg worries me in that I've never seen an HCIer shout from the rooftops with such enthusiastic abandon that HCI advances are neutral in the face of such overwhelming evidence that they aren't.

Now gentle reader I fear I'm about to say things you won't like. But this set me thinking. HCI has its share of women and its women HCIers have actually got into print in quite large numbers. You can reel off famous names of HCIers which would naturally include a whole batch of women and you can do that without even putting your brain out of neutral. And they are real women, with 'arms that are braceleted and ... bare' and not those slightly frightening ones that science often breeds who 'fix you in a formulated phrase' and look as though they might grow beards if you turn your back for 2.4 seconds. Some of them have written nice useful books with a gentle sense of humour and a slant on life that is somehow refreshingly different from what men turn out.

But where are the female sages? Where's Donna Norman? Benita Shneiderman? And whatever the equivalent of JR Fogg is? He doesn't seem to have a name. Perhaps his parents gave him the initials and left the rest to his imagination? (And what an imagination!) Where are the female visions of a future? Where are the women speculators, dreamers, savants? I have this mild hope that they might be a good deal less scary and uncompromising than the Walden visions offered by the men. And hopefully more accurate as well.

And actually, this and my best friend's ongoing struggle with one of the most dinosauric of the new universities forced me to ask questions about academia and sexism. It's not a huge leap from that to a question even closer to my heart. Is HCI sexist? Alright, early interfaces were sexist and often chauvinistic. They were constructed by male builders for male operators. The terminology was male. A friend taught on an MSc in Man [sic] Computer Systems so don't you all start writing in objecting to that! There were toolboxes to get your tools from and hammer about on the desk top to your heart's content. The system itself often referred to gear boxes, oil changes, and engine tuning.

OK, calm down. Stop thinking that I'm a menu bar short of an interface and ask yourself why applications have to use a tool box symbolised by hammers and what's it at all? Are applications really 'built' and if they are, built in that way? Ada Lovelace suggested they would be woven – a much more artistic metaphor than the masculine building metaphor we've had thrust down our throats.

You may be asking what has brought this on and I'll explain. The BBC has recently reported that computer games have still failed to attract the female audience and there is



still speculation about why that should be. The games industry is an amazing growth area and remains energetic and lively in the face of downturn and recession in other technological segments. All this when female game players are still on the rare side. So, here is a huge potential market that hasn't been plumbed.

So, why don't women play games? Why don't women immerse themselves in the escapism of gaming? Are we slow to be involved in gaming or aren't games designed for us? If women designers designed games for women would more women be involved? Are computers actually so male in their language that in fact anyone who isn't male is partially excluded? Or is there something fundamentally (sorry about that pun) different about women's attitude to life and computers that means they don't view them in the same way as their male counterparts? Do women cease to be playful as they come of age? And if they do, where does that leave us?

And that leads me on to an even more important question. Why aren't women HCI writers speculating? Why don't women have dreams and visions they are willing to share? Or do they and they just aren't making it into print?

For me the lack of women gamers seems tied up with the lack of women HCI speculators. And I can't help thinking that society and the shape of the computer must be to blame. And more than that, I think it's something we should be tackling. OK, I admit HCI can't tackle the problems of the socialisation of girls but it can make interfaces that appeal to women or at least don't exclude them and it can influence the development of games that women will like and enjoy playing. It can make sure that the terminology on the desk top does not assume a male guise. And it can create a technology and a technological language that is inclusive whatever the user – and I don't just mean gender here either.

Let's face it, children start using computers by playing with them and even if you refuse to face up to the fact that this is still a very sexist society we live in, you can't miss the

male bias in current games. Even when you can choose the gender of your character in a role playing game, for example, there is the odd moment when quite clearly the designer had a male character in mind. One strategy game I know of calls everyone King, for example. OK maybe I don't mind being King Cassandra (it does have a ring to it) but it isn't nice to know that actually the game wasn't designed for you. That really you aren't 'supposed' to be playing this. It's like wearing men's clothes. Sure, I look sexy in my boyfriend's pj's but it's actually the dichotomy that makes for the sexiness.

There seems to me to be something wistfully sad about the idea that women may not be encouraged or even be allowed to be as joyfully playful or as speculative as men. That the coming of age might bring the inability to step into a fanciful world of make believe and future projection. If it's true of my generation then our endeavour now must be not to leave that as a legacy to our daughters. To me, intelligence and playfulness are impossible to separate. A playful, speculating brain hosts a lively, learning mind. Not for our future daughters simply the drudgeries of life made easier by the advances we have made in HCI. May technology bring them fun, enjoyment and speculation too.

Postscript: So the *THES* says that industry is hitting out at the diluted degree. '... we don't mind whether someone can use PowerPoint or not. We are interested in whether they are scientifically able.' So they say. Obviously none of them has tried to use PowerPoint. Only the most scientifically astute can get anywhere near making the wretched thing work. Witness every conference I've been to so far. Still, they're on to a safe thing. Only the scientifically able will manage to reply to that article! The rest will be struggling with recalcitrant mailers and the vagaries of word processors.

Cassandra Hall
The Invisible University

Call for Papers

IEEE International Workshop on Knowledge Media Networking

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a forum for researchers and practitioners involved in the design and development of knowledge media networking spaces, agent applications, knowledge management systems and 3D media architectures.

Paper submission deadline July 1 2003

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Call for Papers

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a forum to discuss the efficient representation, processing, interaction, integration, communication, and retrieval of multimedia information. In particular, MMM2004 will concentrate on common modelling frameworks for integrating the diverse fields of visual, audio, video, and virtual world information.

Submission of abstracts Fri, 27 June 2003

Submission of full papers Fri, 4 July 2003

<http://sky.fit.qut.edu.au/~chenp/APBC2003/>

Call for Papers

PerCom 2004

Second Annual IEEE Conference on
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Orlando, Florida • March 14–17 2004

<http://www.percom.org>

Co-sponsors: IEEE Computer Society and the University
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Important dates

Paper submission September 1 2003

Demonstration proposal October 31 2003

Contributions are solicited in all pervasive computing research and applications. Topics include, but are not limited to the following feature topics:

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Personal area networks
Enabling technologies such as Bluetooth, 802.11, etc

Mobile/wireless computing systems and services
Context based and implicit computing
Speech processing/advanced computer vision
User interfaces and interaction models
Wireless/mobile service management and delivery
Ad hoc networking protocols and service discovery
Resource management in pervasive computing platforms
Security and privacy issues of pervasive computing systems

HCI2003: Designing for Society, Bath, 8–12 September

Keynote presentations

Hiroshi Ishii

Hiroshi Ishii first came to widespread international attention with the publication of his research in the field of Computer Supported Co-operative Working (CSCW). TeamWorkstation sought to explore how both physical and digital media could be seamlessly fused together in the support of distributed collaborative working. Ishii's next contribution to the field of CSCW was ClearBoard. Based on the metaphor of 'looking through and drawing on' a glass screen, this application utilised a novel combination of media to support both eye-to-eye contact and communication with and through drawings and text. During the development of the ClearBoard system three prototypes were created. This iterative approach enabled both communication about, and reflection on, the nature of the problem, and was a strategy that would become familiar in Ishii's later work.

In the mid-1990s, Ishii moved from NTT, via the University of Toronto, to the MIT Media Lab, where he currently directs the Tangible Media Group. Tangible Media seek to explore the relationship between physical and digital media. Indeed many of the concepts that have shaped Ishii's approach can be traced back to the ideas generated by the Team Workstation. The Tangible Media Group has been active for six years and during that time has created a variety of prototypes that investigate the relationship between the physical and the virtual, the display of ambient information, and, latterly, the support of distributed collaboration through synchronised objects.

The members of the Tangible Media Group, under Ishii's direction, have published widely and continue to have a major influence on the field of Human-Computer Interaction (HCI). Most significantly, the group's research has contributed to the ongoing debate concerning the role of embodiment in interaction and the need for such interaction to be grounded in physicality. Ishii's work is in the vanguard for the re-unification of form and function in a new generation of information artefacts.

Michael Smyth
Napier University, Edinburgh

Bob Regan

Bob Regan is the senior product manager for accessibility at Macromedia. In that role, he works with designers, developers and engineers from around the world to communicate existing strategies for accessibility as well as develop new strategies. He works with engineers and designers within Macromedia to develop new techniques and improve the accessibility of Macromedia tools.

He has a Masters degree from Columbia University in Education. He is currently a doctoral student in Education at the University of Wisconsin – Madison. His dissertation research looks at accessibility policy implementation strategies.

Bob spent six years as a teacher and technology leader in Chicago and New York City. Working with teachers and students across a range of ages and subject matter, he has extensive knowledge of elementary and secondary education.

He spent two years teaching web design and accessibility at the University of Wisconsin – Madison. His publications include:

Constructing Accessible Web Sites
Dynamic Dreamweaver MX
Flash Usability Guide
Webmasters Handbook

Gordon Smilie

Gordon Smilie is the Senior Director of the Strategic Business Group at Microsoft. He is the executive responsible for the sales, technical and marketing to markets in Microsoft's .NET strategy. These include the management and revenue responsibility for the telecommunications industry, wireless carriers, ASP and DotCom companies, as well as cable and TV operators.

Gordon has been a member of the Microsoft UK Executive for over three years. Since joining Microsoft in April 1994, Gordon has held a number of management positions, including Enterprise and Corporate Sales, Alliance Partners, Industry Sales, Channel management and most recently was Manager, Business Solutions Group. Prior to joining Microsoft, Gordon has held various sales and management positions in Trinzic, IBM and Kodak.

A Business Studies graduate, Gordon holds a Diploma in Marketing and is Microsoft's representative in the House of Commons. He is married with two children, and lives in Berkshire.

Adapted from <http://www.ifti.ie/hit/gordonsmilie.htm>

Fourth keynote speaker to be confirmed





Call for Student Volunteers for HCI2003

So, you're a student researching in an HCI-related field and after reading the HCI2003 Advanced Programme you're itching to go along. However, as a student, you're a bit short of cash and you feel that there's no way you'll be able to afford to go. What do you do? Well, aside from selling your dearest possessions, your family members, or your body, you could volunteer to help out with the day-to-day running of the conference and help make it a success.

Why be a Student Volunteer?

As a Student Volunteer, you get:

- Free registration for HCI2003
- A free copy of the HCI2003 conference proceedings
- A free HCI2003 t-shirt
- Free meals, except for dinners on Monday, Tuesday, and Wednesday
- To attend sessions when you aren't on duty. The organisers do make every effort to allow you to attend the sessions that interest you, although it can't be guaranteed because you might be needed elsewhere.
- Accommodation provided, if required

What does a Student Volunteer have to do?

In return for the benefits listed above, as a Student Volunteer you have to:

- Be at the HCI2003 conference in Bath from the afternoon of Sunday 7th September to the afternoon of Friday 12th September (please note that HCI2003 cannot pay your travel expenses)
- Wear your free t-shirt so that people can easily find you when a crisis strikes
- Carry out a range of duties, including, but not limited to:
 - Filling conference bags with free goodies for delegates
 - Sitting at the reception desk to register delegates and give them their conference bags
 - Giving directions to delegates and answering their questions
 - Helping presenters work their laptops, presentation software, and microphones during sessions

How to apply to be a Student Volunteer

To apply to be a Student Volunteer at HCI2003:

- 1 Get a letter, on headed paper, from your supervisor confirming:
 - You are a student
 - Your area of study
 - You have permission to attend the HCI2003 conference as a Student Volunteer
- 2 Write a letter that clearly states:
 - Your name
 - Your area of study
 - Your contact address and email address
 - Why you would be a good student volunteer, including evidence of any relevant experience you might have
- 3 Before the 1st July 2003, send both letters to:
Dr Jo Hyde
HCI2003 Student Volunteers Co-ordinator
Dept. Computer Science
University of Bath
BA2 7AY

The organisers will review everyone's applications and draw up a shortlist of candidates. If your name is on this shortlist, you will be emailed by the 1st August 2003 and asked to confirm your availability for the conference. There will also be a reserve list of candidates. If you have any questions about all this, email Dr Jo Hyde at j.k.hyde@bath.ac.uk but please do not send your application by email.

HCI2003 Advance Programme

Tutorials

Systemic task analysis

Full-day

Dan Diaper

Bournemouth University

ddiaper@bournemouth.ac.uk

Fundamental to HCI, task analysis concerns work performance. STA is an understandable approach to task analysis. STA is scaleable and usable anywhere in the software lifecycle within most software engineering methods.

Using design space analysis to facilitate more effective interaction design meetings

Half day

Paul Englefield

Ease of Use group, IBM UK

paul_englefield@uk.ibm.com

Interaction design meetings can be tough to attend and tougher to facilitate. This tutorial presents practical facilitation techniques using design space analysis to provide structure and promote creativity and rigour.

Who needs this technology, and why? New ways of discovering applications and estimating benefits

Full day

William Newman

University College London Interaction Centre

wmn@pobox.com

Innovators in R&D and user organizations will learn advanced diary-study methods for identifying applications and modelling their performance, making possible systems that solve real user problems and deliver measurable benefits.

Phone usability – getting high quality feedback on prototypes or web sites

Full day

Julie Ratner & Anne-Laure Negri

Iterative Design, Seattle WA, USA & Consultant, Sophia Antipolis, France

jratner@iterativedesign.com

Add another testing method to your toolbox; learn the pros and cons of the phone usability method. Complete five exercises to master this synchronous remote data collection method.

Creating highly satisfying user experiences using software engineering techniques to model users and design

Full day

Dave Roberts & Claire Paddison

Ease of Use group, IBM UK

daveroberts@uk.ibm.com

In commercial situations design must be driven by stakeholders' goals and expectations in a methodical way. This tutorial teaches a proven approach that uses UML-based models as an unambiguous specification.

Information visualization

Full day

Robert Spence

Imperial College, London

SpenceKathybob@aol.com

Your database may conceal valuable information that you could discover simply by viewing a graphical representation of that data. That is what information visualization is about: and it works!



The art of seeing: practical observation methods for software development

Full day

Susan M. Dray / David A. Siegel

Dray & Associates, Inc., Minneapolis MN, USA

dray@acm.org

Naturalistic observation uncovers information about users and their behaviour that you cannot possibly learn in the usability lab. This tutorial provides a hands-on, practical introduction to observational methods for learning about users in context

Working with and analyzing qualitative data

Full day

David A. Siegel / Susan M. Dray

Dray & Associates, Inc., Minneapolis MN, USA

david.siegel@acm.org

Learn how to ensure that findings from field user studies are valid and truly useful in design, while avoiding drowning in your data. We will teach strategies and tools to maintain focus, archive data, and explore data rigorously.

Setting usability performance requirements

Full day

Nigel Bevan

Serco Usability Services

nbevan@usability.serco.com

How to set usability performance requirements based on effectiveness, efficiency and satisfaction, which can be measured once a prototype is available. Includes practical examples of how the approach has been implemented in industry.

Full Papers

An Exploration of Facial Expression Tracking in Affective HCI

Robert Ward, Dennise Bell & Phil Marsden

Improving the Acquisition of Small Targets

Andy Cockburn and Andrew Firth

Comparing Speed-Dependent Automatic Zooming with Traditional Scroll, Pan, and Zoom Methods

Andy Cockburn & Joshua Savage

Social and Cultural Obstacles to the (B2C) E-Commerce Experience

Liisa Dawson, Shailey Minocha & Marian Petre

Two Phenomenological Studies of Place

P. Turner & S. Turner

WebTouch: an Audio-tactile Browser for Visually Handicapped People

M. Macías, A. Reinoso, J.L. García, J. González, J.C. Díaz & F. Sánchez

The Character of Actions for Computers in Co-located Collaboration

Mattias Arvola

Trust at First Sight? A Test of Users' Ability to Identify Trustworthy e-Commerce Sites

Jens Riegelsberger, Angela Sasse & John D. McCarthy

Two Falls out of Three in the Automated Accessibility Assessment of World Wide Web Sites: A-Prompt v. Bobby

Dan Diaper & Linzy Worman

M-RSVP: Mobile Web Browsing on a PDA

Oscar de Bruijn & Chieh Hao Tong

Towards VoiceXML Dialogue Design for Older Adults

Mary Zajicek, Richard Wales & Andrew Lee

Look or Listen: Discovering Effective Techniques for Accessing Speech Data

Steve Whittaker & Julia Hirschberg

A Method for Organizational Culture Analysis as a Basis for the Implementation of User-Centered Design into Organizations

Netta livari, Kaisu Juntunen & Ilkka Tuikkala

A Directional Stroke Recognition Technique for Mobile Interaction in a Pervasive Computing World

Vassilis Kostakos & Eamonn O'Neill

Expressive Image Generator for an Emotion Extraction Engine

A.C. Boucouvalas, Zhe Xu & D. John

Could I Have the Menu Please? An Eye Tracking Study on Conflicting Design Guidelines

John McCarthy, Jens Riegelsburger & Angela Sasse

The Application of Urban Design Principles to Navigation of Information Spaces

David Benyon & Bettina Wilmes

Evaluation of a Prototype Interface for Structured Document Retrieval

Mark Dunlop & Jane Reid

Fancy Graphics Can Deter Older Users: A Comparison of Two Interfaces for Exploring Healthy Lifestyle Options

Patricia Wright, Steve Belt & Chris John

Ontological Sketch Modelling: Highlighting User-System Misfits

Iain Connell, Thomas R. G. Green & Ann E. Blandford

How Knowledge Workers Gather Information from the Web: Implications for Peer-to-Peer File Sharing Tools

Jennifer Hyams & Abigail Sellen

Effective Web Searching on Mobile Devices

Kerry Rodden, Alan Blackwell, Natasa Milic-Frayling & Ralph Sommerer

Changing Analysts' Tunes: The Surprising Impact of a New Instrument for Usability Inspection Method Assessment

Alan Woolrych, Gilbert Cockton, Lynne Hall & Mark Hindmarch

MovieLens Unplugged: Experiences with a Recommender System on Four Mobile Devices

Brad Miller, Istvan Albert, Shyong Lam, Joe Konstan & John Riedl

Understanding Task Grouping Strategies

Peter Wild, Hilary Johnson & Peter Johnson



A Student Volunteer's Perspective on CHI2003

Linda Little

I was one of the 'lucky' ones this year and was accepted on the 'Student Volunteer (SV) programme' at CHI. This was only my second visit to a CHI conference and, I must admit, I didn't really know what to expect apart from the free t-shirt!

To become a volunteer you have to register with the SV programme about eight months prior to the actual conference. If you are accepted (apart from the t-shirt) you are entitled to free conference registration and, as I have found out, several other 'perks'.

At the conference you have to commit 20 hours of your time by signing up to undertake a variety of tasks on site. The tasks are varied and include such things as helping at registration or paper presentations, giving people directions, working in the press room or Internet area – the list goes on. One downside of the task allocation was not finding out until 6.30pm what your tasks were for the following day.

So is it worth it? ... I have to say 'yes' it is. You can sign up to help at presentations in areas of research you're interested in. Although you're not guaranteed that particular task, I would say that the majority of the time you get what you ask for. Another important aspect of the SV programme is that it does help you to 'network' not only among your peers but also with nearly everyone at the conference. The SVs can invite 'famous' people to lunch. Although you cannot guarantee they'll come, I think the majority that were invited did attend.

Tip: carefully look through the conference proceedings and see if anyone 'famous', whose research you're interested in, is at CHI and invite them along.

I would say to any student out there wondering whether or not to volunteer – go for it. The benefits of becoming an SV at almost any conference are worth it; not only do you get the free t-shirt but you meet some very interesting HCI professionals. Along with the free breakfasts and lunches that SVs are entitled to at CHI, you also come away with lots of free pens and increased enthusiasm! What more could a student want!!!

Linda Little

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Special issue of *Personal and Ubiquitous Computing* **TANGIBLE INTERFACES IN PERSPECTIVE**

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Important Dates

November 1, 2003: Paper submission deadline
February 1, 2004: Notification for authors
March 1: Revised versions due

more information from

<http://www.zib.de/ullmer/cfp/puc-tui.html>

Interaction Design and Children – IDC2003: 'Small Users Big Ideas'

1 – 3 July 2003, Preston, UK

The second IDC event, IDC2003, will be hosted by the Child-Computer Interaction Group (www.chici.org) at the University of Central Lancashire, Preston, England, in July 2003.

Children are using increasingly complex interactive devices and software products, for both entertainment and education. Internationally, interactive technology for children is now a very significant economic sector. Hence, in recent years, there has been a growing interest in methods for the design and evaluation of these products, both in commercial Research and Development departments, and in a range of academic disciplines.

Conference (2nd and 3rd July)

This conference runs over two days, (2nd and 3rd July) and continues the theme of the very successful International Workshop on Interaction Design and Children, held in Eindhoven, Netherlands, in 2002. The conference will bring together commercial developers and academic researchers in this multidisciplinary field, and will include presentations of research findings, case studies, and practical experience.

There are two keynote speakers;

Yasmin Kafai, University of California, USA

Alan Dix, Lancaster University, UK

Details of the conference programme and the accepted papers can be found on the conference website at www.idc2003.org.

Special events (1st July)

We are pleased to announce two special events for 1st July, the day before the conference itself. In the morning Daniel Lutz and Madelon Evers, from Human Shareware, present their Pirate Workshop. This is an extended version of a workshop that was presented at the Interaction Design and Children Workshop in Eindhoven last year. It includes an opportunity to do a group design exercise with children.

In the afternoon Allison Drui, Allison Farber, and Mona Leigh Guha, from the University of Maryland, present a tutorial entitled Methods for Partnering with Children to Develop New Technologies. This includes explanations of methods used by the presenters in their work on involving children as partners in the design process, and opportunities to try out some of the methods.

Submissions

Tutorial and workshop submissions are now closed.

Registration

Registration is now open for the Conference as well as for the workshop / tutorial programme (www.idc2003.org).

Prices

Discounts are available to members of our two co-operating organisations: the British HCI Group and the ACM SigChi. There are also discounts for students.

For members of the British HCI group:

Conference: £222

Workshop / Tutorial: £106

Workshop and tutorial: £190

These prices include VAT. Student prices and prices for non-members are available on the web site (www.idc2003.org).

Location

Preston is easily accessible by road and rail and is served by a regular rail service to Manchester Airport. Affordable accommodation (£35 a night) is available in the University Halls of Residence, and the city has a range of hotels to suit all budgets.

Janet C. Read

jcread@uclan.ac.uk



Interesting Interactions

The Dog, Hen, and Corn... and post-completion errors

Paul Curzon

In the spring 2003 issue of *Interfaces*, Cassandra Hall bemoaned the lack of interesting HCI reading. I would not presume to be a Richard Dawkins but here is an attempt at an essay. So that Cassandra approves, it is a homage to Stephen J Gould (well sort of) and specifically includes mention of baseball since she likes it so much.

I dedicate the essay to Cassandra Hall. Since she is not a loved one I hope that it does not make her too sick as a result :-)

The great essayist in Natural History, Stephen J. Gould, is famous for using baseball examples in his essays about evolution, due to his passion for the game. He does this in an essay on the way pictures of snail shells are often printed back to front in text books. He argues that mental errors are unforgivable and the essay searches for a reason for it being done on purpose to absolve the culprits.

Baseball players make a proper distinction between physical errors, which can happen to anyone at any time and should engender no shame and mental errors – bonehead judgements – forgetting the rules – which should never occur ... No excuses possible.

No excuses possible? This is a common view: mental errors are beyond the pale.

Gould's view and, if he is to be believed, that of baseball players, is a dangerous view for a computer scientist to hold. Mental errors can also happen to anyone and should similarly engender no shame. The common belief otherwise can lead to deaths. When planes crash, it is often blamed on 'pilot error': end of story. The pilot responsible is the villain. One class of airline crash involves the pilot flying the plane straight into the ground despite no apparent physical problems. This kind of error is called 'Controlled Flight into Terrain'. The ultimate bonehead judgement surely? The fact that such errors deserve a name is an indication of how common they are. This suggests there is some underlying cause that means that they are bound to happen eventually. If so, the focus moves to the system designer to prevent them.

Software engineers and other computer scientists involved in software development need to understand human psychology as well as technology. To see why, let's start with a puzzle. Solve it, writing down your answer, before you read on.

A farmer is on her way to the market with her dog, Shep. The market is across a deep ravine. Getting to market always used to involve a long detour down the ravine and back up the other side. However, the local inventor who lives at the edge of the ravine decided to rig up a contraption to allow them to get straight across. It consists of a rope slung between pulleys on either bank, with a seat just big enough for one person hanging from it.

By local convention the seat is always left at the market side where the inventor lives so that it is easy for her to take it in each evening (after all she is not charging anyone for the service). On arriving at the ravine when going to market the farmer pulls the seat across from the far side using the rope. She gets in, hugging Shep, who goes with her everywhere, tightly on her lap. She then pulls herself across the ravine and continues into the village.

On the occasion in question she buys a new hen and a sack of corn. Returning home later in the day she arrives back at the ravine and quickly realises she has a problem. She can only carry one thing across with her at a time on the seat. She will have to make more than one trip. That is normal when she travels to market.

However, this time it is worse. If she leaves the hen and the corn alone on either side, the hen will eat the corn. If she leaves Shep and the hen together on one side the dog will worry the hen and may mean it stops laying eggs. Shep is not interested in eating corn so it will come to no harm with him.

Write down the steps that she must take to get everything across uneaten and continue on her way. We will return to the answer later.

In the meantime, I am in trouble again. I made the most wonderful peanut butter and tomato pasta sauce for dinner. I timed it to perfection: it was just ready as my wife walked in from work. As I was serving it onto the plates she told me all about her nightmare day. We ate it and everything was going fine until we returned to the kitchen to sort out the strawberries. It was then that she noticed I had done it again. I forgot to turn the gas ring off.

How could I be so stupid? I know it is important. I could burn the house down, gas us, and even without such disasters, think of all the energy I waste (and saving the environment is supposed to be important to me!). Yet I did it again. Bonehead! I cannot claim I did not know. Maybe I should stick to microwave cooking. I never leave that on after serving the food! Whenever I make that mistake I try to persuade my wife it is not completely my fault. It may be a mental error but it is not a bonehead one. After all, why don't I ever do it with the microwave? Does the gas affect my memory? Or is it that the design of the microwave prevents me from doing it? This kind of error is a feature of the way my (and every other human's) brain is wired. We are prone to that kind of mistake. Not every time of course but often enough to be a pain.

Never done it? Have you ever forgotten to switch off your car headlights, returning later to find you have a flat battery? Or taken the copy from a photocopier and forgotten the original? Have you used a vending machine and forgotten your change? They are all, along with many other similar



and common mistakes, the same error, psychologically. They even have a name: they are called *post-completion errors*.

Here is one answer to the puzzle above (the other possible answer is similar).

- 1 Farmer travels across with Hen (Dog left with Corn but that is okay)
- 2 Farmer returns
- 3 Farmer travels across with Dog
- 4 Farmer returns with Hen (otherwise Dog will worry it)
- 5 Farmer travels across with Corn
- 6 Farmer returns (leaving Dog and Corn again)
- 7 Farmer travels across with Hen
- 8 Farmer sends the seat back to the other bank

You may (or may not) have forgotten the last step – returning the seat. If you did forget it, you just made a post-completion error. The goal was to get everything across so the farmer could continue on her way home. However, once that was done you had to put the seat back to the side it came from. If you made the mistake you cannot claim you did not know. It was there in the instructions, and you were even told why it was important.

What is it that makes all these errors in apparently different circumstances the same? They all involve trying to complete a primary goal (getting to a destination, making a copy, getting chocolate, getting to the other side of a ravine, etc.). However, in achieving that goal something about the way things originally were must be disturbed and then restored (lights that were on switched off again, put the seat back to the right side of the ravine, etc.).

What makes a post-completion error possible is that the extra tidying-up tasks must be completed after the goal has been achieved. You must remember to do them after you have achieved the thing you set out to achieve. Humans have an unfortunate tendency to concentrate on the main goal and forget about such completion tasks. The name ‘post-completion error’ arises because they all involve failing to do something after completing the thing that the person had set out to achieve.

In a series of experiments that must have been fun to take part in, Michael Byrne and Susan Bovair showed that the post-completion error is not just a random, bonehead mistake. It can be made to happen even in lab conditions. They also found that they could control the likelihood of it occurring. Making the mistake depended on at least two things: a person’s working memory capacity, and how much else they had to think about at the same time.

Your working memory is your short term memory: the immediate memory you have for recent things, for things you are currently working on, but that you do not need to remember for long. If I tell you my phone number so you can go away and dial it, you store the number temporarily in your working memory. Twenty minutes later it will be gone, but you should be able to retain it long enough to make the call. The greater your working memory capacity, the longer the telephone number you will be able to remember.

The post-completion error experiments involved subjects taking the role of a *Star Trek* helmsman (the fun bit!) using a computer simulator. The most complicated task was to fire a phaser to destroy a Romulan ship. Firing the phaser involved:

- 1 Charging a phaser bank
- 2 Setting the focus

- 3 Turning on tracking
- 4 Tracking the ship and firing
- 5 Once destroyed, turning off the tracking (the post-completion part)

Two different versions of the phaser controls were used. In one, the helmsman had to remember to turn off the tracking after seeing they had destroyed the ship. In the other (control) version they were not told whether the Romulans had been destroyed until the tracking was switched off. That meant that they only discovered they had achieved their goal once the whole task was done.

The trial for real did not start until the participant had been trained and could do the task without error. The subjects then did a series of trials (doing a simpler task, setting the shields, in between). Errors that the participants made, of whatever kind, were recorded.

The participants made many post-completion errors with the first design, which made it possible to forget to turn off the tracking after destroying the Romulans. Thirteen out of 14 participants made that mistake on their first training trial despite the manual explicitly telling them what to do at that point. More to the point, the errors were made more frequently than can be explained by it being a random error. If it is a bonehead error, the world is full of boneheads! Whilst with the second, control design, in which post-completion errors could not be made, post-completion errors disappeared but other errors were just as likely to occur. Clearly the design of a computer artefact can prevent or encourage human error.

In a further, similar experiment, also using *Star Trek* tasks, Byrne and Bovair proved that working memory was instrumental in the making of post-completion errors. This time, the capacity of the helmsmen’s working memory was measured before the experiment. They discovered that the better the working memory a person had, the less likely they were to make post-completion errors. The need to do the completion task has to be remembered in working memory while you do the rest of the task. A person can only remember a limited number of things at once. With limited working memory capacity, they are more likely to forget completion tasks.

The importance of working memory was demonstrated further. During the experiment some participants were required not only to kill Romulans but also to do other mental tasks at the same time – remembering information given through headphones. This required working memory. Those people who were mentally loaded in this way were more likely to make post-completion errors – as their working memory was filled with other tasks, the completion task was more likely to be forgotten. If enough else was happening, even those with the largest working memory capacity would make post-completion errors. Experience only had a minor effect, suggesting the errors may not be something that training can get rid of.

Making post-completion errors is a feature of the way that the human mind works. Individuals cannot be personally blamed for making them. In the wrong situation anyone can do it. That gas ring was not my fault, honest! The fact that I was being so sympathetic, listening to all my wife’s worries probably meant I was filling my limited working memory with all the concerns of her day at the time, increasing my chances of making the error.

If training cannot get rid of the errors, can anything? Yes! Designers can often completely eradicate them, or can at least make them less likely to occur. Byrne and Bovair demonstrated this in the lab, but it is demonstrated every day in high streets and in homes up and down the country. Buy a different car and you may find you no longer forget to turn off the headlights if the new car beeps when you open the door with the headlights on. Good design. You may not forget your change from that vending machine if it gives the change before the chocolate. Good design again.

There are several approaches that designers of hi-tech gadgets and other everyday objects can take to reduce the likelihood of this kind of error. The first possibility is to eradicate it altogether by redesigning the order of actions to be taken in the interaction. Post-completion errors occur because there are still things to do after the goal has been achieved. Ensure that the goal cannot be achieved until everything else has been done and the problem disappears.

When the first cash machines appeared in walls around the country, the sequence you had to follow was:

- 1 Insert your card and type in your PIN.
- 2 Select the amount.
- 3 Take the money.
- 4 Take the card.

Guess what? People walked off with their money (the point of using the machine), leaving behind the card. They were making post-completion errors. Leaving a debit card lying around is not a good thing to do. However, it does not happen any more, in Britain at least, and it is not because people have learnt from their mistakes. The design of the machines in Britain (though not in all other countries) has changed. Now you always get the card back before any money. The order of doing things has been changed. The new order is:

- 1 Insert your card and type in your PIN.
- 2 Select the amount
- 3 Take your card.
- 4 Take the money.

With this ordering you cannot take the money and leave the card – you can of course forget the money but as getting money is your goal it is less likely to occur, though still possible due to distractions.

The phaser controls in the *Star Trek* experiment used a variation on the above approach. Tracking could not be turned off before the Romulan ship was destroyed, so the goal would always be achieved before the completion task was done. Instead the helmsman's knowledge of whether the goal was achieved or not was controlled. They could not find out whether they had fulfilled their goal of destroying the ship without doing the completion task first.

Rather than change the order of things, a radical solution is to *eliminate* the completion tasks. They arise because the state of the world has been disturbed to achieve the task. Alter the interaction design so that the perturbation does not happen in the first place and the problem goes away. This approach is taken with some credit card payment machines – phones and petrol pumps, for example. If you give up your card by inserting it in the phone at the start of a phone call, by the time you put the receiver down you are likely to have forgotten all about it and make a post-completion error. A solution is to not give up the card in the first place. Instead of inserting it, swipe it. The state is not perturbed and there are

no completion tasks to do at the end as you never let go of the card.

A post-completion error that occurs commonly in everyday life, just because the task is done so often, is that of forgetting change: when using coffee machines, ticket machines, etc. Credit cards are a way of redesigning the task to remove the error – with a credit card you do not need to remember change as you do not over-pay in the first place (a different post-completion error arises instead but we just saw how to fix that). In fact the example of change shows that post-completion errors are not to do with gadgets as such – like me you have probably walked out of shops in the past without your change too. If you are lucky the shopkeeper runs into the street and prevents you leaving without it. If you are unlucky they pocket the money.

Another way of making post-completion errors impossible is to automate the completion tasks. They may or may not still be done after the goal is completed, but are done by the gadget rather than being left to the person. This only works if there is a way of telling when the goal has been achieved. This is the solution that ensures I have never forgotten to switch off the microwave. Because of the way microwaves work and the danger, unlike with a normal cooker, when you open the door, it automatically switches off. You cannot physically get the food out without turning it off.

Another solution is, rather than to alter the tasks or their order, to give a warning. This is the approach often used in cars over headlights. When you open the car door the loud beep, given if the headlights are still on, is hard to ignore. On hearing the beep you remember the lights. Unlike the microwave solution, giving warnings is not foolproof, however. The shopkeeper chasing out of the shop after you is also this kind of solution, but you may have disappeared before they get to the shop door or you might ignore the shouts.

The warnings have to occur quickly enough and be insistent enough that you cannot miss them or ignore them. The person being warned also has to understand what they mean. I often use hire cars and every so often I have a car that beeps if I leave the headlights on. The first few times I had no idea why it was beeping. When I got out and shut the door, the beeping went away. That's OK then! Problem gone? No the lights are still on. Why do the cars not just switch the lights off for you? Presumably because there are situations when you need to leave a car with its headlights on, such as if you break down.

The same cash machines that now give you cash after your card do still in fact allow the same mistake to happen when used for other tasks because they use the warning solution. I recently opened a new deposit account. A really helpful member of staff of the bank showed me how to use the machine with my new card. Getting money out involved taking the cash last (one post-completion error solved), but making a deposit involved taking the card last (oops). The last thing the bank clerk said was 'Oh and do not forget to take your card back after you have made the deposit – people are always forgetting their cards'. We know why.

The solution adopted this time was for the card to be taken back at the end and just print a message on the machine saying 'Please take your card' whilst after a slight delay emitting a beep. In that situation the solution is obviously not good enough as the person may already be walking away and their attention may be elsewhere. They may be in a noisy street so barely hear the beep.



The warning approach works better in the car as it takes time to climb out of the car after the beep has started. As it is a loud beep it is hard to miss, unlike a written message. A solution that works in one situation may not work in another that appears to be the same.

If messages and beeps cannot guarantee a human doing what they are told, more physical reminders can be used. In supermarkets, the cashiers often have to sign on and off, using a key to lock and unlock the cash till. On finishing their shift it would be easy to forget to remove the key – it is a post-completion error. It would leave the till vulnerable to thieves, so preventing the error occurring is important. The solution is to attach the key to the till operator's belt. They cannot physically leave the till without removing the key and so locking the till. The completion action must still be done and it must be done last. However, it cannot be omitted (except perhaps intentionally by the till operator removing it, but then the problem would not be a post-completion error).

This kind of solution is known as a forcing function. The design forces you to do the right thing as you physically cannot do the wrong thing. Petrol caps are often designed in a similar way – they are fastened to the car so that you cannot leave them behind. Here it is only a partial solution – you can still forget to screw it back on. The ramifications of the error have been lessened though.

So what is the solution for the design of the seat for getting across the ravine? Altering the order does not work – the seat must be returned last or the person will be stuck on the wrong side. It could be eradicated altogether by just scrapping the convention that the seat must be returned to the inventor's side. That may not be fair on her. Why does she take the seat in every night though? If it is just to keep the seat out of the weather, perhaps the seat could stop in a hut (like a cable car) on either side so that it did not need to be put away. Then it could just be left on either side. Too expensive perhaps?

Alternatively, if the inventor's side is lower, perhaps gravity could be used so that the chair automatically returns to that side when you let go of it. Maybe an automated recording could remind the person to return the seat whenever it got to the other side, though we have seen that that is not 'foolproof'.

Which is the best solution may depend on things we do not know about. Perhaps you can think of an even better design. Or maybe in this instance the inventor does not mind occasionally pulling the seat back, so it is not worth the bother and expense of solving the problem. Leaving the post-completion error there is always a possible solution, but if so it should be chosen with an understanding of the issues involved. If that is the solution chosen, just don't call anyone who then makes the mistake a bonehead!

Human error is pervasive. We are not infallible but not all errors are random. Some, like post-completion errors, happen for systematic reasons, are persistent, and cannot easily be eradicated with training. However, designers can design in ways that reduce the likelihood of them occurring. Many designers do understand this aspect of human psychology and design appropriately. However, the number of situations in which such errors are still possible suggests that not everyone has got the message.

As computers become pervasive, it is computer professionals who are the designers. Many of the situations in which we make these errors are minor irritations, though a

major reason for bringing in computers in the first place is to make things better for people, not more irritating. What is more, in many situations it really does matter. People can die. It is therefore increasingly important that such professionals understand human psychology as well as technology. We have to hope that those responsible for the systems that really matter, such as nuclear power plant, airline flight deck software and air traffic control systems, do. Computers are good at following plans, but the humans that use them are not. Computer scientists really do need to know psychology too.

Further Reading

M.D. Byrne and S. Bovair (1997), A Working Memory Model of a Common Procedural Error. *Cognitive Science*, 21(1):31–61

S.J. Gould (1997). Dinosaur in a Haystack, Chapter 16, *Left Snails and Right Minds* pp206–207. Penguin.

Acknowledgement

This article was inspired by discussions with, and unpublished research by, Ann Blandford on designing to avoid post-completion errors.

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Information Visualization

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Interacting with Computers

Volume 15:2, May 2003

Special issue: *Interaction design and children*

Dianne Murray

Interaction design and children

Dr. P. Markopoulos

Vol. 15:2, pp 141–150

The international children's digital library: viewing digital books online

Dr. J.P. Hourcade

Vol. 15:2, pp 151–167

Using 'tangibles' to promote novel forms of playful learning

Dr. S. Price

Vol. 15:2, pp 169–185

KidReporter: a user requirements gathering technique for designing with Children

Dr. M. Bekker

Vol. 15:2, pp 187–202

Using peer tutoring in evaluating the usability of a physically interactive computer game with children

Dr. J. Hoysniemi

Vol. 15:2, pp 203–225

On the assessment of usability testing methods for children

Dr. P. Markopoulos

Vol. 15:2, pp 227–243

Commentary paper: Symbiosis and Synergy? Scenarios, Task analysis and reuse of HCI Knowledge

Dr. A. Sutcliffe

Vol. 15:2, pp 245–263

Regular paper: Exploring the potential unobtrusive proactive task support

Dr. J.Y. Mao

Vol. 15:2, pp 265–288

Also included in this volume is the latest riposte in *lwc*'s ongoing debate started by an extended commentary review of John Carroll's book, *Making Use*. The sequence of these papers is:

Scenarios and task analysis

Prof. D. Diaper

Vol. 14:4, pp 379–395

Scenarios and the HCI-SE design problem

Dr. D. Benyon

Vol. 14:4, pp 397–405

Commentary on "Scenarios and task analysis"

Dr. F. Paterno

Vol. 14:4, pp 407–409

Commentary on "Scenarios and task analysis"

Dr. T. Carey

Vol. 14:4, pp 411–412

Making use is more than a matter of task analysis

Dr. J.M. Carroll

Vol. 14:5, pp 629–637

Task scenarios and thought

Prof. D. Diaper

Vol. 14:5, pp 619–628

Symbiosis and Synergy? Scenarios, Task analysis and reuse of HCI Knowledge

Dr. A. Sutcliffe

Vol. 15:2, pp 245–263

We are more than happy to consider any new series of commentary papers, based on an original and extensive review of a current important text in HCI, or as a response to any papers published in *lwc*, whether as a regular paper or as part of a Special Issue. One of

these is forthcoming this summer: a response to our highly successful Special Issue on Emotion. Look out for a follow-up to these highlight papers.

From doing to being: bringing emotion into interaction

Dr. G. Cockton

Vol. 14:2, pp 89–92

Frustrating the user on purpose: A step toward building an affective computer

Dr. J. Scheirer

Vol. 14:2, pp 93–118

This computer responds to user frustration theory, design, and results

corresponding author Dr. J. Klein

Vol. 14:2, pp 119–140

Computers that recognise and respond to user emotion:

Theoretical and practical implications

Dr. R.W. Picard

Vol. 14:2, pp 141–169

The next volumes in production for the journal are a mixture of new papers by authors and part Special Issues. These regular papers are forthcoming:

"What was I looking for?" The influence of task specificity and prior knowledge on students' search strategies in hypertext

Dr. J.F. Rouet

What is this evasive beast we call user satisfaction?

Dr. G. Lindgaard

Integrating work environment considerations into usability evaluation methods – the ADA approach

Dr. C. Aborg & Dr. J. Gulliksen

Hidden Messages: Evaluating the efficiency of code elision in program navigation

Dr. A. Cockburn

And Special Issues in production during the remainder of 2003 and early 2004 are:

HCI with Mobile Devices, Guest Editor: Fabio Paternò

From Artefact to Instrument, Guest Editors: Yvonne Waern and Viktor Kapelinin

Cultural Determinants of Usability, Guest Editors: Andy Smith and Fahri Yetim

For any information about *lwc*, including submission details, please see the journal website or email me directly. *lwc* is now abstracted by all major indexing and abstracting services, can accept electronic submission in PDF or rtf formats, provides the extensive services of Elsevier's Author Gateway, including alerts to the contents of current volumes, allows submission of multimedia and file-based material and has a constant high impact factor (soon to be re-calculated and published on our website). *lwc* is available to download at Elsevier's Science Direct (<http://www.sciencedirect.com>).

In the next issue of *Interfaces* I shall report on the plans we finalised at the editorial board meeting at CHI 03 – *lwc* will be celebrating Volume 16 (fifteen years as the journal of the British HCI Group) with some format changes and a great selection of papers specially written by members of our international editorial board.

Dianne Murray

General Editor, *Interacting with Computers*
<http://www.elsevier.nl/locate/intcom>



Attitudes to Open Source Software

In the last issue of *Interfaces* (54), I attempted to bluff my way in the 'cool' world of Linux distros. In this issue, however, Alistair Kilgour (below) calls my bluff and argues that, actually, 'uncool' is the new 'cool'.

Alistair also shows that he is far more dedicated to the transition to Open Source Software than I am. While I had all good intentions to 'really give Linux a go' and edit *Interfaces* in Open Office Writer on a Red Hat platform, that all went out the window (no pun intended!) when I couldn't make 'columns' work. So I returned to the old faithfuls, Windows and Word.

I guess that supports Tony's observations (right) that users don't care what software they use, as long as they can complete their tasks. I wanted to try out Red Hat Linux and OO Writer, not because I don't like Windows and Word (I do), but because I just wanted to give them a go. In the end I went with the software that worked for me (though I will try again with my new Red Hat upgrade!).

I'd be interested to know what other readers think about how easily and willingly ordinary users will take up Linux as their main operating system in preference to Windows (or even Mac OS). So, come on, make *Interfaces* interactive, and email me with your observations, studies, and opinions.

Laura Cowen

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Response to A Bluffer's Guide to Linux

Hi Laura

I really enjoyed your article in *Interfaces* 54, but I believe the tide has already turned, and the defenders of the ultra-cool are well and truly in retreat – thanks both to the advent of systems like Lindows, which you mentioned, and also to Mac OS X, which is Linux with a pretty face. Deserters from the arctic wastelands of the Linux world are flocking to the Aqua domain – OK they focus initially on the Darwin skeleton, but gradually they get seduced by the Aqua exterior, which is on the way to becoming the defining symbol of the new cool.

I find there is a nice irony in the fact that I am now running Linux (Darwin variety) on my iMac, and Linux (Debian variety) inside Lindows on my (very cheap) PC. Although I am still having trouble getting my inkjet printer to work under Lindows, I find that with CrossOver Office from CodeWeavers, the Lindows system supports MS Office and other MS applications very effectively, and looks set to become the real threat to the Mac, once people realise they can do (almost) everything on a Lindows machine they can do on a Mac, at about 25% of the cost. (As you might know, Walmart are selling Lindows PCs in the US for \$199, and the e-scape Li Lindows PC I bought recently from Evesham cost £249 including VAT.)

I am also running the Linux version of Open Office under Lindows on the PC, the same version under Mac OS X thanks to the XonX additions recently distributed by Apple, and the Windows version of OpenOffice, also on the Mac, in a virtual Windows PC environment enabled by Connectix's wonderful Virtual PC system (so wonderful, indeed, that Microsoft have had to buy over the company).

However, for the time being I have no intention of abandoning my iMac for the really important stuff... and for some of the work I do as an OU tutor there is unfortunately still no substitute for a 'real' (i.e. Windows) PC.

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"Just work"

Tony Whitmore

The implementation of Open Source Software (OSS) faces many hurdles; logistical, technical and political. But one of the most interesting is the human hurdle. Dramatic increase in the use of OSS could be seen in an unexpected market: People who have no idea what software they use.

That may seem a little bizarre. Using OSS is a statement against monopolies, about freedom to control your own software, right? Maybe, but only people who are aware of the arguments for and against OSS will make a decision based upon them. For the vast majority of users, the functionality that software provides is more important than how it is developed.

I work at a secondary school and have noticed this bias towards functionality among the students. There are more computers in schools than ever before, but familiarity has bred, if not contempt, certainly a lack of curiosity. As long as the students can perform their tasks, the software that they use to do it is of little importance to them. For example, I asked one girl what software she used on her home computer. Her reply? "I don't know, I go on it for chat rooms."

I attended the Open Source Software in Education conference this April and, whilst there, I discovered that people working in other schools had made similar observations. Chris Dawkins of Felsted School told a revealing anecdote. Two French exchange students visiting Felsted sat down at Linux machines to check their e-mail. One commented, 'This screen looks a bit odd.' The other replied, 'Oh, this must be the version of Windows they use in England.' Both then got on with checking their mail and surfing the web. Because the software 'just worked', the exchange students didn't take any further interest in it.

Further confirmation came from the experience of Corpus Christi Catholic College in Leeds. They have set up a batch of low-spec PCs as Linux terminal clients, with excellent results. The window manager is IceWM, skinned to look like Windows XP. The school's network manager maintains that most pupils don't notice that they're not using Windows XP itself. They can log on, surf the web, check e-mail and work on office documents without encountering any problems. If the pupils do notice any difference in operating system, they seem happy to accept that the new software does what they need.

Some Linux distributions, like Lycoris Desktop/LX and Lindows, are designed for the non-technical user, the user who just wants to sit down and surf the web, play with photos or write a letter to the bank. Systems running OSS are cheaper to purchase than MS Windows based machines, so the financial appeal is clear. If the next generation of computer buyers interact with software only on the most superficial level, they are more likely to accept OSS, perhaps without even realising it. As long as the software 'just works'.

A more general review of the OSS in Education Conference is available at
<http://www.tonywhitmore.co.uk/ossconf2003.html>

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Book Reviews

Edited by Xristine Faulkner

This is my last set of book reviews as book reviews editor. I've enjoyed reading and reviewing the many new books that have come my way over the last few years. I've also enjoyed mail from readers of *Interfaces* saying that they have read a book on our recommendations and enjoyed it. That has made it all worthwhile.

However, the time has come to hand over the role to someone else and now, with the departure of my second editor, this seems as good a time as any! I'm intending to do the odd review in the future but the overall responsibility for turning the screws on people in order to make them review things now passes from me to Sandra Cairncross <s.cairncross@napier.ac.uk>.

I know what a responsibility it is making sure you have copy for the next issue of *Interfaces* and we do rely on contributions from readers. I can only say yet again that if you enjoy the reviews then please have a go at one yourself. If you don't like them then show us how you want them done! I'm sure Sandra will be as delighted to receive copy from you as I was.

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Usability Testing and Research
Carol M. Barnum
Allyn & Bacon Series in Technical
Communication, 2002
pp 368. £27.99
ISBN 0202 3151 94

It's been a long time since we've had a new textbook on usability testing. Dumas and Redish came out in 1993, Rubin in 1994, and, although I still use both of them constantly, I've been looking out for a solid textbook that has more awareness of the web in it. Carol Barnum's new book meets that need.

The book opens with chapters on 'What is Usability and What is Usability Testing', 'Other Methods for Getting Feedback About Product Usability', 'User and Task Analysis', and 'Iterative Testing for User-Centred Design'. I can see that Carol wants to set user testing in context, but I was concerned that if you're really new to usability testing then you might be put off by Chapter 2 'Other Methods', as it is a very densely written chapter that describes many techniques very briefly.

The meat of the book starts at Chapter 5 with 'Planning for Usability Testing' and continues through 'Preparing for Usability Testing',

'Conducting the Usability Test', and 'Analysing and Reporting Results'. The book then changes course slightly with a chapter on 'Web Usability', giving some design principles as well as details of applying the methods to the web.

Our Open University students love the plentiful examples in our course on User Interface Design and Evaluation. Carol Barnum's book should also appeal because of its extensive use of examples. She gives lots of detail from a student team's test of Hotmail (Microsoft's web-based e-mail service) so you can see the process as they tackled it. I found it a little frustrating that there weren't any screen shots of Hotmail as it stood at the time of the test. As well as the Hotmail example she uses excerpts from a test of a University web site, and has lots of anecdotes and smaller examples as well, many of them aimed at testing documentation – a neglected area. Perhaps the amount of space taken up by the examples means that there is less meat in the core of the book, but if I were a beginner I'd find it very reassuring. Conversely, though, experienced practitioners might find Chapter 5 onwards a bit basic.

Academics and practitioners who like to follow up interesting ideas will be glad to know that there is extensive referencing. The appendices placed in context with the chapters broke the flow for me somewhat when I was reading the book at a sitting, but I think they would be more convenient placed where they are when using the book to actually plan and conduct a test. Each chapter closes with questions/topics for discussion and exercises which looked helpful to me if you were planning to use this as a textbook, or if you are a new practitioner who is using the book as a guide through your first usability tests.

Carol Barnum's style is clear and easy to read, as you would expect from a Professor in Technical Communication. She often uses comments from Chauncey Wilson, a very experienced practitioner, to give some practical tips and insights, but I sometimes found myself wishing that she had put more

a more personal touch, more of her own practical experience, explicitly into the book. Apart from a couple of anecdotes, the word 'I' hardly appears until we get some of her own opinions on web usability at the end of Chapter 9. We can guess at one of her concerns because she includes an interesting appendix on 'Making it work as a team', which I thought was a good, concise introduction.

I would recommend this book as an introductory text for undergraduates because of the extensive examples, fairly reasonable price and referencing. I think it would also be good for practitioners – for people who are getting started with user testing – to help them through their first test. I think that I'll find myself recommending that readers should start with Chapter 5, and then come back to Chapters 1 to 4 later.

I'd like to thank Debbie Stone for her help with this review.

Caroline Jarrett

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Persuasive Technology
B. J. Fogg
Morgan Kaufman, 2003
pp283. £22.22
ISBN 1558606432

This is a nice new book for you and one that is as entertaining as it is interesting. It won't send you to sleep and make you miss your station if, like me, you travel long distances by train. I found it an appealing and useful book which has made me think and has suggested some activities I can do with the students.

It's, as I say, an entertaining read. It has nice advice for site builders about how they can keep people on their sites and channel them in the directions e-commerce wishes them to go. It's a non-pompous book with lots of relevant illustrations, some taken from Fogg's own experiences – and there emerges an enthusiastic and captivating writer who is safe to let loose on even the most anti-reading of students.

It's nicely laid out and clear though some of the explanations are rather oddly placed. For example, there is a section dealing with micro and macro persuasion but only one of them gets a



heading. Stuff like that always unnerves me when I think about giving books to students. However, as I say, I can imagine e-commerce and internet computing students getting more than their money's worth out of this one.

I think developers will enjoy it as well. It is a very practical and helpful text and one that will be worth dipping back into after a read. Yes, you can read this one all the way through without needing a huge box of chocolates to cheer you up afterwards. It really is a most captivating read and it'll make you think!

Gripes? I have a few. But then, as they say, too few to mention in any great detail. Fogg has abandoned references altogether in the favour of footnotes. I blame Don Norman for this, really, just because I remember he did some very odd experimentation with footnotes and references in one of his books which made the thing something of a struggle. Fogg puts a whole mass of footnotes after each chapter and of course making sense of them is difficult. I particularly loathed the one that said 'in his book', but didn't say who he was. However, I suspect younger, less fussy and pedantic readers will not feel as irritated as I do.

Buy it! You'll be enthralled and pleased to have read it. Get the library to put a good armful of copies into the library and any e-commerce related students who have money to spare should get this one. Morgan Kaufmann have a nice little series in Interactive Technologies and this is a very worthy and thought-provoking addition to the collection. After I read Fogg, I found myself wondering if Don Norman might have to move over in my affections as most revered author on HCI matters. Perish the thought.

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Maintaining and Evolving Successful Commercial Web Sites
Ashley Friedlein
Morgan Kaufman, 2003
pp 418. £28.58
ISBN 1558608303

This is a book that deals with web site maintenance – and it hasn't arrived a moment too soon. There are two things that really scare me when people use computers for the first time. The first is how many people buy systems

without worrying about how their files will be backed up. I know that perhaps the average householder may not have to worry about that too seriously and a hard copy of most things may suffice. But it's amazing how many businesses don't back up their files sufficiently.

The second rather frightening New Frontier aspect is people who build web sites and don't even consider how they intend to maintain them. They treat a web site like a completed entity that won't need anything else done to it. Just as I think it's wrong to sell systems without telling buyers about backup so I think it's unethical to sell web sites without mentioning maintenance and figuring out how that will be done. Anyway, Friedlein tries to put that to rights.

I like the shift in emphasis in the book from building to evolution, that somehow sites gradually evolve into something else and this process is ongoing, not a series of abrupt starts and stops. Also, in starting with 'maintaining' Friedlein is firmly pinning his colours to the mast.

The book is divided into four parts: Change Management, Content Management, Customer Relationship Management, and finally the heftiest part of the book is left to Site Measurement. You can perhaps already see why I think this book will be very useful for e-commerce students.

Part 1 looks at how the web site will be reported on and reviewed during maintenance and what will be done with the documents produced during that phase. It suggests ways in which site risks and other issues can be flagged and assessed. It looks at ways in which changes can be managed and carried out with the least possible disruption. I just wish all of those sites I regularly see with road works signs on them – sometimes for months on end – read this book. Each part concludes with a very brief summary by the way, so those of you who want to get the gist of the book without having to read everything, could scan there and then dip into the bits that really interest you.

Part 2 explains the concept of content management, why it is needed and what it can't do. There is a practical example in this section which is illustrated with plentiful screen dumps. The author goes on to look at content management systems as well and to explain what they can do for

you, how you should go about choosing one and the pros and cons of developing your own. The section concludes by showing the reader how they should go about tackling a content management project. This is another hefty section of the book and is very detailed and supportive.

Part 3 examines customer relationship management. This is a short section but it covers the ground well and provides some interesting insights. It should fascinate those of you interested in e-commerce and how it works, since it provides a view of the user which is not always what we think about in HCI. There is also a definition and examination of community. Friedlein seems to be arguing that developers shouldn't over-estimate what they can achieve in terms of community and it shouldn't be attempted unless there really is something to have a community about. Again, these are interesting views and should set your e-commerce students thinking.

Part 4 is, as I've already said, a hefty part of the book and looks at how you can measure the success or otherwise of your site and hopefully make improvements on the basis of what you've learned. There's a nice section on metrics and how to do them. There's a slightly confusing repetition of 'metrics' once under the main heading of Site-Centric Measurement and the second time under User-Centric Measurement. I know it's pedantic but the repetition of the type of metric might be just as well there though it makes for an ugly long title. It isn't helped because of the way the second title is split on the contents page.

This is a very thorough book which site owners should find useful and is a must for e-commerce students. I tried it out on a couple of project students who found it useful. The many case studies, tips and examples make this a very good book for students who often like to have things explained to them in the form of examples. It's a lively and honest read, and I think developers will enjoy it as well. So, definitely get some for your libraries and if you have contact with internet computing students and e-commerce students then this is definitely one for their reading list.

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Books Reviewed in *Interfaces* Issues 43–54

If you are interested in writing a book review for *Interfaces*, please check the following list to make sure that you don't end up writing about a book that has already been reviewed in a previous issue.

Title	Author	Pub. date	Interfaces no.	Reviewer
<i>Advances in Automatic Text Summarization</i>	I Mani, MT Maybury (eds)	1999	43	AC
<i>Cyberethics: Morality and Law in Cyberspace</i>	R Spinello	2000	48	SC
<i>Designing Web Usability</i>	J Nielsen	1999	42	XF
<i>Don't Make Me Think</i>	S Krug	2000	52	XF
<i>The Essence of Computing Projects: A student's guide</i>	CW Dawson	2000	43	XF
<i>The Essence of Professional Issues in Computing</i>	R Ayres	1999	43	XF
<i>The Essential Guide to User Interface Design</i>	WO Galitz	2002	53	XF
<i>Handheld Usability</i>	S Weiss	2002	52	XF
<i>Homepage Usability: 50 Websites Deconstructed</i>	J Nielsen, M Tahir	2002	51	XF
<i>Information Appliances and Beyond: Interaction design for consumer products</i>	E Bergman (ed.)	2000	43	DO
<i>Interaction Design: Beyond human-computer interaction</i>	J Preece, Y Rogers, H Sharp	2002	54	SC
<i>The Invisible Computer</i>	D Norman	1998	43	CH
<i>The Language of New Media</i>	L Manovich	2001	54	XF
<i>Leonardo's Laptop</i>	B Schneiderman	2002	54	XF
<i>Making Use: Scenario-Based Design of Human-Computer Interactions</i>	JM Carroll	2000	47	IM
<i>Mechanizing Proof: Computing, Risk and Trust</i>	D MacKenzie	2001	53	MT
<i>Model Based Design of Interactive Appliances</i>	F Paternò	1999	45	PW
<i>Myth of the Paperless Office</i>	A Sellen, R Harper	2001	50	XF
<i>The New SocioTech</i>	Coakes, Willis, Lloyd-Jones (eds)	2000	54	XF
<i>Perpetual Contact</i>	JE Katz, M Aakhus (eds)	2002	53	XF
<i>Pleasure with Products: Beyond Usability</i>	WS Green, PW Jordan (eds)	2002	54	JK
<i>Shaping Web Usability</i>	AN Badre	2002	52	XF
<i>Skip Intro</i>	D McAlester, M Capraro	2002	52	AK
<i>Software Design - Cognitive Aspects</i>	F Detienne, trans. & ed. by F Bolt	2002	54	MT
<i>Sorting Things Out: Classification and its Consequences</i>	GC Bowker & S Leigh Star	2000	47	XF
<i>Supercade: A Visual History of the Videogame Age 1971 to 1984</i>	Van Burnham	2001	49	XF
<i>The Usability Business: Making the Web Work</i>	J Bawa, P Dorazio and L Trenner (eds)	2001	53	AK
<i>Usability for the Web</i>	T Brinck, D Gergie, S Wood	2001	50	XF
<i>User-Centred Design of Systems</i>	J Noyes, C Barber	1999	44	SM
<i>User-Centred Requirements Engineering</i>	A Sutcliffe	2002	54	XF
<i>User Centred Web Development</i>	J Lazar	2001	47	XF
<i>User Interfaces for All: Concepts, Methods and Tools</i>	C Stephanidis (ed.)	2001	49	XF
<i>Web Site Usability: A Designer's Guide</i>	J Spool, T Scanlon, W Schroeder, C Snyder, T DeAngelo	1999	42	XF
<i>Wireless World</i>	B Brown, N Green, R Harper (eds)	2002	53	XF
Interfaces issues				
43 Summer 2000	49 Winter 2001	AC Alison Cawsey	MT Mark Treglown	
44 Autumn 2000	50 Spring 2002	AK Arlene Kline	PW Peter Wild	
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Vet's Column

'A valedictory retrospect'

Alistair Kilgour

For this my last contribution under the 'Vet's Column' strap line, which Tom McEwan initiated what now seems like many years ago, I would like to look back on some of the turning points in the development in the field of endeavour we currently call, for the time being at least, 'human computer interaction'.

When did HCI begin? A strong case could be made that it started with the publication of Ivan Sutherland's 'Sketchpad' thesis at CalTech — a circuit drawing program using a point-plotting display driven by a million-dollar mainframe. This short thesis pioneered many of the techniques and much of the language which we take for granted today in describing graphical user interfaces, such as menus, buttons, tracking, pointing and dragging. Of course the subject that this work gave birth to was then called computer graphics, and it was many years later that the expression 'man-machine interaction' first appeared, to cover command line and natural language as well as graphical communication between human and computer. (All humans were male in those days.) I think the first time I saw the term was in the title of a book by James Martin, always one to spot a trend and anticipate a market. That was probably around 1973, ten years after Sutherland's thesis, and 5 years after the presentation of William Newman's ground-breaking Fall Joint Computing Conference paper 'A System for Interactive Graphical Programming', which many would argue marked the real start of HCI. (The paper is included in Ernest Edmonds valuable collection of pioneering contributions on interactive system architecture, entitled *The Separable User Interface*, Academic Press 1992.)

If we accept the Sutherland thesis as the start point, then 2003 marks an important anniversary — forty years of HCI. By coincidence this year also marks the fortieth anniversary of my starting work in the computer industry. In May 1963 I abandoned after 8 months a PhD in physics to join the Bureau Division of English Electric at Kidsgrove. I was of course completely unaware of the simultaneous birth of computer graphics on the other side of the Atlantic — I was, like most other programmers in those early days, a numerical analyst, working on the iterative solution of partial differential equations. The nearest I got to graphics was writing a plotting package for the display of lines of equipotential in an electric field.

All that changed in 1966 when I moved to Edinburgh to join John Oldfield's Computer Aided Design group. In collaboration with other groups in Cambridge and London, we developed graphics software for the DEC Type 340 display system, hosted on a PDP-7 mini-computer — with a total core memory (and it was real ferrite core in those days) of 8K 18bit words, shared between a basic operating system ('executive'), and a 'display file', a set of instructions cyclically executed by the 340 display processor, in order to generate and maintain the picture on the high-resolution monochrome CRT. The fact that the PDP-7 CPU and display processor shared the memory of the host processor made possible lots of dynamic graphics

techniques, including dragging, tracking, rubber band lines (or rubber-band rectangles, or even conics), as well as 3D rotation of wire-frame surface representations, as pioneered by Charles Lang and Robin Forrest at Cambridge. The Rainbow project at Cambridge, led by Neil Wiseman, developed the first example I know of of what would now be called 'contextual menus'. In the hands of an experienced user their circuit drawing system seemed almost magical — the connection paths and component symbols seemed just to flow out of the light pen as it moved effortlessly over the surface of the display. In retrospect this system represented a pinnacle of usability that was not reached again for several years' time after the raster revolution had been established.

Although the display processor of the kind represented by DEC's Type 340 used a discrete co-ordinate system (typically 1024 by 1024) to address points on the screen, it is important to remember that vectors were generated by what was in effect analogue circuitry — the deflection voltages generated caused the electron beam to traverse a true straight line between start point and finish point, not necessarily passing through any addressable points on the way. So there were no problems of 'jaggies', or 'aliasing' it would now be called — a term I did not encounter till much later. When so-called 'raster scan' displays first began to appear, a range of terms was used to distinguish the original type of display system from these new-fangled (and originally low-resolution) raster devices. One was 'vector drawing' — although of course raster displays could draw vectors as well, albeit by software not hardware. Another was 'random-scan', which again was a bit misleading — the electron beam on a vector-drawing display did not move randomly, but as directed by the drawing commands in the display file. (Indeed an alternative term that was sometimes used was 'directed beam'.) A third term was 'refreshed', also misleading because both types of display were of course refreshed — though the maximum refresh rate of a vector-drawing display was determined by how long the display processor took to execute the complete display file. If this took substantially longer than 20 milliseconds, as it frequently did with complex pictures, noticeable flicker would develop — a major disadvantage of this type of display, which improvements in long-persistence phosphor technology never completely solved.

Two more terms that were used have interesting etymological associations (or at least they seem interesting to me!). The first was 'calligraphic' — meaning akin to handwriting, I guess. The second was 'cursive', the term generally used to describe 'joined up writing'. These two terms are not synonymous of course — not all calligraphy is joined up — in fact probably most is not. But I began to wonder when I first reflected on these terms (while teaching computer graphics in Glasgow in the seventies) what might be the opposite of 'cursive'. The nearest I could get, after a lot of research, was the word 'uncial' — though that really refers to the separate small letters on hand-written manuscripts, as opposed to the (often decorated) capitals. What then might be the opposite of 'uncial'? Not 'cursive',

it appears, but 'majuscule'. And the opposite of majuscule, as every student of French knows, is minuscule — which in English now of course is used to describe anything very small (and is often misspelt 'miniscule' in betrayal of its provenance), not just lower case printed text, which is its meaning in French. [Of course it's then a small step from 'minuscule' to 'groupuscule', one the words I proposed last time for adoption into English — not realising (as all of you no doubt knew, but were too polite to point out) that it is already there. I even heard 'groupuscule' used by a contributor to John Peel's Saturday morning 'Home Front' programme a few days after I had dispatched the article — which proves if proof were needed that it's already mainstream.]

It's difficult looking back now to appreciate how great was the revolution brought about by raster graphics. The idea was of course not new, though it was always dismissed as infeasible, and not worth further thought, by early graphics pioneers because of the huge amounts of memory required. Indeed early raster graphics systems often had a display memory — the so-called 'frame store' — which was larger and faster than the main memory of the host machine. Although the change could be seen as one from analogue to digital, it was not quite as simple as that. At another level it was a change from specification to sampling. The display processors of calligraphic systems executed a specification or model of the object directly. To generate a representation on a raster system, it was necessary to sample the model at each position on the screen where a 'pixel' appeared — a process of 'scan conversion' for 2D models, or 'ray tracing' for 3D. Prior to the advent of raster graphics, classic solutions to the 'hidden line' and 'hidden surface' problems (which dominated much of computer graphics research in its early years) had already been proposed, based on both scan conversion and ray tracing. However, these algorithms found their most natural and elegant incarnations in the raster graphics environment. And when memory became cheap enough for the Z-buffer algorithm to be mapped directly onto a dedicated memory with 16 to 24 bits per screen position, the solution to the hidden surface problem became essentially trivial. The moral I suppose is that in the end size does matter — the availability of large amounts of cheap memory, here as elsewhere, changed forever the domain in which the major research challenges lie.

A brief digression on the 'pixel' might be warranted here. As every schoolchild now knows, 'pixel' is a contraction of 'picture element'. As in the domain of external storage, where IBM insisted on calling a 'diskette' what everyone else called a 'floppy', so in graphics IBM for a while promoted the term 'pel' for what everyone else was beginning to call a 'pixel'. But although the word 'diskette' is still in use, 'pel' has happily disappeared without trace. 'Pixel' was of course an entirely new coinage, but dictionaries prior to the seventies already contained the word 'pixillated' (a variant of 'pixie-led') to mean 'bewildered' or 'away with the pixies' (i.e. in common parlance, drunk). It's fascinating to see how this word has been retrofitted with a new meaning (albeit with a slight change of spelling), by extension from the newly coined pixel.

Whichever date we accept as the starting point for HCI, I guess most would agree that the field is at least thirty years old. So it's surprising and slightly disappointing that we should still be arguing both about what to call it, and about

what it does and does not include — especially at a workshop ostensibly concerned with what to teach and how best to teach it. At the 6th HCI Educators Workshop in Edinburgh at the end of March, David Benyon in his keynote address suggested 'HuCID' (Human Computer Interface Design, pronounced to rhyme with 'lucid') as a new name for our discipline. Persuasive though his presentation was, and convincing his arguments for a change in focus from former preoccupations with single-user single-application systems, I somehow don't see the new name catching on. In fact I was much more taken with the analogy with architects, the range and variety of whose work and skill focus was discussed by Brent McGregor at the workshop the following morning.

Brent reminded us that some architects are effectively civil engineers, some specialise in materials, some in industrial buildings, some in domestic. Some are experts in space use and management, some will be skilled graphic designers, others specialists in structural design, or in the design of heating and lighting systems. But they are all called architects. So perhaps we should take a leaf from their book and import their terminology — who's for the new profession of 'interface architect'? Or perhaps that should be 'interactive system architect'? The latter is in any case a more accurate description of the rôle of the well-rounded software engineer — since a large proportion of the new software systems being commissioned today are fundamentally interactive, 'interactive system architecture' is exactly what today's software engineers are, or should be, engaged in. The 'interface architect' would still be a specialist with particular skills in interface design, but one with a working knowledge of all the other specialisms relevant to designing and building any computer-based system or artifact.

Finally, another arresting thought sparked off by another of Brent McGregor's remarks. While head of the school of visual communication at the Edinburgh College of Art (he is now vice-principal) he was asked to suggest a slogan for the school, and came up with 'Tomorrow's clichés today'. In the early days of computer graphics, research in a range of universities and research laboratories in the US, Canada and the UK pioneered what later became the interaction clichés of the eighties. I look forward to a time when university research on interaction is once again at the leading edge, rather than trailing on the coat tails of industry-led technological innovation. In my view that will only happen if we lift our eyes from the minutiae of the interface and, working in close integration with other system architecture specialists, apply our imagination and insight to creating the indispensable artifacts and environments needed to facilitate and enrich the work and leisure of all tomorrow's citizens.

It has been a real pleasure having the opportunity through this column to follow my obsessions and air my prejudices, and I hope you have found at least some entertainment and diversion there. After forty years in the industry, though, I think it's time to lay down my pen (I do still do use one sometimes for first drafts) and maybe actually do something useful, like develop software which speaks for itself. I look forward, though, with undiminished enthusiasm to the emergence of the fully formed interactive system architect from the ashes of the HCI practitioner — I give it about ten years.

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Profile Laura Cowen



The new editor of *Interfaces*, Laura Cowen, is an information developer (writes online documentation for software) in IBM's Software Development Laboratories at Hursley, near Winchester.

Originally from Darwen in Lancashire, she went to Lancaster University to study Psychology. She, unknowingly at the time, became interested in HCI when, in her first term at university, Tom Ormerod lectured about how users perceive icons on computer screens. Nearly two years later when she was deciding what to do for her final year project, she remembered the lecture and asked Tom to be her supervisor.

Having enjoyed doing her final year project, looking at the ease of navigating

different information structures in websites, she started to apply to do a PhD with Tom. However, he scuppered that idea by starting a new Masters by Research course in the Design and Evaluation of Advanced Interactive Systems (HCI to you and me), which seemed like more fun. So in Autumn 2000, she started the Masters course and joined the British HCI Group. She spent the summer of 2001 on a placement at Enterprise IDU, an information design company in Milton Keynes. Enterprise IDU had an eye-tracking system, so her Masters research project looked at the validity of using eye tracking to evaluate website usability. A few months later, she returned to Enterprise IDU to work as a usability researcher. At about the same time, her MRes thesis supervisor, Linden Ball, suggested that they write up her dissertation to submit to HCI2002. It seemed like a good idea and regular readers will know that it worked out pretty well.

She moved to Hampshire in June 2002 with her boyfriend Tony.

What is your idea of happiness?

Sunshine and trees in rural France

What is your greatest fear?

Hating my job – if I've got to spend the majority of my waking life there, I might as well enjoy it

Which living person do you most admire?

J.K. Rowling for writing addictive books

What is the trait you most deplore in yourself?

Procrastinating instead of actually writing

What is the trait you most deplore in others?

False modesty

What vehicles do you own?

In reality, an old, red Ford Fiesta and a newer, red office wheely chair. In my dreams, a nice BMW convertible...

What is your greatest extravagance?

A leather lazee-boy-style settee

What makes you feel most depressed?

Me feeling sorry for myself

What objects do you always carry with you?

Purple shimmer Doc Martens

What do you most dislike about your appearance?

All my life I've wanted long hair like Princess Leia but it must be easier to look after if you're a princess

What is your most unappealing habit?

Thinking about work when I'm not there

What is your favourite smell?

Summer in the countryside

What is your favourite word?

Dunno

What is your favourite building?

Home

What is your favourite journey?

To see my family (and dog) up North

What or who is the greatest love of your life?

Tony

Which living person do you most despise?

Not sure but Bush the Younger comes close at the moment.

On what occasions do you lie?

When necessary, but I'm not very good at it

Which words or phrases do you over-use?

I'll do that if you want

What is your greatest regret?

Not sure but I hope it won't be taking on *Interfaces* (please keep the submissions flooding in)

When and where were you happiest?

Now and here

How do you relax?

Yoga, cinema, tv, reading

What single thing would improve the quality of your life?

More sunshine

Which talent would you most like to have?

Ability to sing

What would your motto be?

Leave your work at work

What keeps you awake at night?

Thoughts

How would you like to die?

Happy, successful, old, and with all my marbles

How would you like to be remembered?

Fondly

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