Inter*faces*

No. 37 Spring 1998

HANDS ACROSS THE SCREEN
stories of sinister scrollbars

FOREIGN INTERACTIONS
at the University of Waikato

Plus:

HCI'98
  the inside
  story

John Waterworth
  proposes
  idleness

contents

Pre*face*

What's in a name? It has seemed to me for some time now that "Human–Computer Interaction" is a pretty poor description of what we do. In the public mind it equates with "legibility", "screen design" and "posture at the workstation". All these are worthy enough topics but leave out so much else. How do you explain that HCI researchers and practitioners are probably the best-qualified people to advise on the use of electronic communication like email and video? How do you explain that HCI researchers and practitioners know a lot about job design and organisational issues? How would you attract a sixth-former to a university course especially featuring HCI?

In the last issue of Inter*faces* I set out the argument that HCI is now a discipline in its own right. If you accept that argument then you must agree that a discipline with a totally inappropriate name has a serious problem. So what are the alternatives? Jack Carroll has suggested "Psychology: the science of design" on the basis that we are applying science to the design of all sorts of electronic systems. Shortened to "Design Science", it might do for a university course, though for all I know someone may have already bagged that one. I am not sure what industry would make of it. How many companies would employ "design scientists", how many consultants would advertise themselves as such? Terry Winograd has suggested "interaction design" on the basis that we help people design human–human and human–computer interaction. Perhaps "interaction design science" (IDS) is what we do, though I suspect that a successful discipline has to be described in fewer than three words.

Editorial

Assuming that a group of us could decide on a new name, the next question is how we go about adopting it. Can we afford to change our name when commerce is just beginning to realise what we can do for them? Or would they learn much faster if we had the right name?

If you have opinions on this matter, or other suggestions for names, send them to me (A.Monk@psych.york.ac.uk) or, better still, write a letter for publication in Inter*faces*.

Andrew Monk
Chair, British HCI Group

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I'm writing this looking out over snow-capped hills in April, which makes me feel better about a "Spring" issue coming out in May. After all, it's not just Inter*faces* that seems confused about the seasons! The truth is that this issue has been delayed a couple of months because of a lack of material – if we had gone to press on time you would have been reading a very slight volume indeed.

Inter*faces* is your magazine – an opportunity to tell the world what you are working on, share your thoughts on matters of importance – or not – or seek out like-minded souls for collaboration. It is not – and is not intended to be – a refereed journal. Contributions are judged on their relevance and interest to members and can include early results, ideas, lab. overviews, tutorial introductions, case studies – or whatever else you think the rest of the group might be interested in. Please send all contributions to the Editor (or where indicated to the appropriate Series sub-editor) well in advance of the deadline if possible. And maybe we'll get the Summer issue to you before September!

We are taking the theme of HCI and the Web for the next issue. It is left deliberately open and can include discussions of web applications, evaluation of web resources, social implications of the web, design issues or case studies, to name but a few possibilities. There have been a number of requests for this theme and we are expecting a good response, so please send your contributions in as soon as possible. You don't need to wait until the deadline. We look forward to hearing from you.

Janet Finlay
Editor

> **With thanks to:** Commissioning editors: Stella Mills, Andrew Monk. Inter*faces* is looking for additional commissioning editors. Please contact the editor for details.
> To receive your own copy of Inter*faces*, join the British HCI Group by filling in the form on page 18 and sending it to the address given.

NEXT ISSUE

The next Inter*faces* will be another of our themed issues focusing this time on HCI and the Web. The theme is deliberately open – contributions may consider, for example, web applications, evaluation of web resources, social implications of the web, design issues or case studies, but this list is not exhaustive.

If you wish to discuss a potential submission please contact the Editor as soon as possible.

Deadline for the Summer issue is **May 20th**. Electronic versions are preferred: RTF, plain text or MS Word (5/6), 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, Inter*faces* production editor; Email: fiona@hiraeth.com

RIGHT TO REPLY

Also from next issue we are introducing a regular feature to allow you have your say in response to issues raised in Inter*faces* 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.

Preparing for HCI'98

Inter*faces* *gets the inside story*

This year's HCI conference will soon be upon us, and the team are putting together what looks like an exciting programme. We spoke to a source on the programme committee. To protect our source we'll just call him Chris.

Inter*faces*: HCI'98 is less than 6 months away, how are the preparations going?

Chris: Yes, September 1st to 4th are the dates. The preparation? . . . well everything is running like clockwork, I'm completely on top of all the organisation – and it's no problem combining it with my teaching and research commitments.

Inter*faces*: You're making this up, aren't you?

Chris: Uhhh, yes, but things are coming together and we've got a great programme lined up.

Inter*faces*: The call talked about the 'cultural industries' in Sheffield. Will that context make a difference to this year's conference?

Chris: Yes it will. We've got Karen Mahoney as a keynote speaker. Karen's keen to promote cross-fertilisation between academic HCI and the work of design studios. Her company provides consultancy on 'branding' of electronic products. She's been involved in designing 'electronic identities' for companies like the BBC, BT, and Diageo (that's the new company formed when Guinness merged with Grand Met). It's a very different slant on the design problem and it should get people thinking. We've got a site visit to 'The Workstation' to meet people working in the media companies based there, and I hope we'll have a lot of delegates from this type of local company. It should lead to some lively discussion.

Inter*faces*: Who are your other keynote speakers?

Chris: We've got Gary Fitzpatrick. He's been involved in a major European project developing multi-media public information kiosks. More familiar names to Inter*faces* readers will be Joelle Coutaz, Jonathan Grudin and Phil Barnard. We think we've struck a balance between many different aspects of HCI.
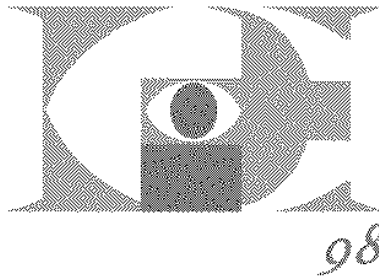
Inter*faces*: Are there any innovations in the conference format this year?

Chris: Well, we want to keep the 'industry day'/'research day(s)' format that's been so successful in recent HCIs. We are considering a new format for some paper presentations in 'research symposia'. We want to get the audience more involved in debating the relationships between the papers presented. We want to spark off debate and send people home with some new research questions. Oh, and we're arranging a computer games exhibition where delegates can analyse the details of complex multimodal, real-time interaction – or you could just play games!

Inter*faces*: What about the papers, can you give us a sneak preview?

Chris: Well, I can tell you it's going to be good. We got an

excellent submission rate, so we should be able to construct a really interesting technical programme, but I've still got a pile of reviews on my desk to work through.

Inter*faces*: We're only here for the beer, what have you got to offer?

Chris: Well you know me – Party, Party, Party. We've got events every night, a barbecue on Tuesday that's to cope with people arriving at different times. There's a ceilidh on Wednesday. The venue is Kelham Island Industrial Museum **–** comes complete with a huge working steam engine, and a chance to see artisans practising traditional Sheffield craft skills like cutlery making. For the conference dinner we're really going upmarket. We're dropping in on the Duke & Duchess of Devonshires' place at Chatsworth House. They haven't registered for the conference yet, but presumably they don't need to worry about the early registration saving.

Inter*faces*: I can't miss that, how do I register?

Chris: You register early (cos it's cheaper), and you can get the form by:

visiting `http://www.shu.ac.uk/hci98`

emailing `hci98@shu.ac.uk`

or phoning +44 (0)114 225 533

GRAPHIC DESIGN COMPETITION
Design the British HCI Group's new logo for Print and Web

Calling all Graphic/Interaction Designers
(especially students) . . .

The British HCI Group is looking for a new logo to express its identity. This is your chance to prove your skills, and add a major item to your portfolio.

The Prize . . .

Your design will be used on the Group's website <http://www.bcs.org.uk/hci/>, all printed publicity (e.g. posters, newspaper adverts), stationery (letterhead), and publications such as Inter*faces* magazine, the proceedings of the annual HCI Conference (published by Springer-Verlag), and all the conference merchandising (bag, T-shirt, etc).

You will be acknowledged as the designer on the website.

Finally, you will receive a copy of the HCI textbook:
HUMAN–COMPUTER INTERACTION (Second Edition)
Alan Dix • Janet Finlay • Gregory Abowd • Russell Beale (Prentice Hall, 1998)
(See <http://www.hiraeth.com/books/hci/> for details)
. . . plus accompanying mouse mat!

The Brief . . .

CONTENT
You can revamp our existing logo, or create something completely new. We have no preference.
The only constraints are that our URL and name must be included:

www.bcs.org.uk/hci
British HCI Group (optionally followed by "British Computer Society" or "BCS")

BACKGROUND
The HCI Group is the largest organisation for HCI professionals in Europe. The issues that concern its members fundamentally concern the relationship of people to technology in all its forms in society. Further details on the Group's website.
The HCI Group's logo is often used in conjunction with the British Computer Society's crest of arms: http://www.bcs.org.uk

MEDIA
The design must look good both on the web and in print. We therefore expect you to submit a web format version (GIF or JPEG) and a printable version (e.g. EPS).

We would like the following versions:

Print media:
• Ideally, an arbitrarily scalable 300dpi EPS file. All fonts, etc., should be included in the file if you can.
• Colour, and black and white/grey versions (we often can't use colour) – printed colours to match those of the web logo
• An A4 headed paper design for official correspondence. This should include the BCS crest of arms

(which will be supplied to the winner – in the meantime, use the GIF from the BCS website), and should present the following information:

British Human–Computer Interaction Group
A Specialist Group of the British Computer Society
British Computer Society, 1 Sanford Street, Swindon, SN1 1HJ, U.K. www.bcs.org.uk/hci
Email: hci@bcs.org.uk Tel: 01793 417417
Fax: 01793 480270

Web media:
• 72dpi GIF or JPEG file – if you use colour, a black and white/grey version is not needed
• it's up to you how big you make the main logo (bearing in mind download speed)
• no animated logos please
• you can produce a small icon version as well if you wish
• no Java, JavaScript or plug-ins to be required – just straight graphics + text

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SUBMISSION DEADLINE
30 September, 1998

Submissions (on 3.5" disk or by email attachment) and queries to Simon Buckingham Shum, address below.

The winner will be decided by the HCI Group's Executive, whose decision is final.

Dr Simon Buckingham Shum
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Medicine meets VR: 6

San Diego, January 1998

This, the sixth conference in the series on Medicine Meets VR, was very well attended, with an estimated 1,000 participants, from the US and Canada, Europe (Germany had a noticeable presence), and Asia (Japan, South Korea, Hong Kong, Singapore). This was a "high visibility" conference at which most of the key players were to be seen, presenting updates of their work.

The conference was a mixture of exhibition show and technical paper sessions. The quality of the technical presentations varied greatly, from interesting new technologies to introductory presentations such as "Applications of volumetric rendering in clinical practices". In general, I felt that there were far too many presentations: some 135, over four days. One had to switch madly between parallel sessions to get to hear papers that were arbitrarily classified under "technology" or "education". Paper acceptance is based on abstracts only, which explains the diversity to some extent, although there also seems to be a philosophy of breadth, rather than depth, in selecting contributions.

The first day was The Richard Satava Show. Col. Satava, MD, formerly with DARPA and now at Yale Medical School, is in charge of granting money to many projects on medical VR and is therefore at the centre of the community. His motto is "I have the vision, you guys realise it". He had two sessions to update the assembly on the progress of his grants: one about DARPA projects and the other about a new wave of funding from Yale-NASA (mostly the same projects that got funding from DARPA now getting the funding from Yale-NASA). They included:

- a "smart" T-shirt that senses the path of the bullet that hit its wearer, monitors his condition and location, etc., so that rescue teams can decide if he's worth rescuing, and be prepared, and combat units can knock out the location from which he was attacked;
- various personal monitoring devices, including a wearable system for astronauts;
- a Limb Trauma simulator using the PHANToM (by MusculoGraphics, in Boston);
- a stretcher with monitoring systems; and
- an enhanced dexterity robot called ParaDex.

In general, for the paper sessions, the presentations were too many to describe all in detail, were allocated only 15 minutes and – surprisingly – no questions were allowed.

Scientific And Clinical/Tools For Minimally Invasive Therapies

There were many endoscopic simulators, for the knee, shoulder, colon, abdomen … And all had some force feedback that wasn't convincing as real tissue (from what doctors said) but apparently helped in training (from what the engineers said).

Tactile tissue simulation was one of the key phrases. Everybody is trying to figure out how to do it, but I didn't see (feel) any convincing implementation. Force feedback is the latest craze, but the sensitivity to model subtle gradations just isn't there yet. An interesting alternative is to use sound as feedback.

Also, many atlases of the whole human body (and one of a frog) were presented. Most used the Visible Human, but there were others (the Japanese) that had their own data sets.

One interesting point that was raised by the team at SRI is that the key problem in training surgeons is not how to convey the locomotive skills needed to manipulate an endoscope or to cut using a scalpel, but how to understand patient anatomy. Training the hands how to use an endoscope takes a week or so, but learning how to interpret a patient's anatomy takes years. I agree with this assessment, and I think that's where rich interaction capabilities combined with real-time volumetric rendering of multimodal data are crucial.

Highlights of the presentations

SRI, of Stanford, have tested their telepresence system with live animals using a 200 metre link. Their results are published in the Journal of Vascular Surgery. Dr. John Hill of SRI presented their first attempts to move towards computer-generated graphics training simulators using their telepresence system. They use a set-up similar to the ISS Virtual Workbench, but with their own interaction devices. They are working on simulating suture of tissue and vessels using an Onyx and 2D texture maps.

Ramin Shahidi, Stanford University Medical Center, is working on SGI-based volume rendering neurosurgery and craniofacial applications. Their graphics didn't include more than one volume at a time. His presentation was an overview of the use of volume rendering vs. surface rendering, and he didn't include the papers in the proceedings.

NASA-Ames and Stanford University have created the National Biocomputation Center: Dr Muriel Ross was announcing this centre as a resource for collaboration with academics and industry, to promote medical VR. NASA-Ames have an Immersion Workbench (aka Responsive Workbench, aka Immersadesk), and their own visualisation software, and are working on craniofacial "virtual" surgery. It appears that they use polygon meshes for their visualisation.

Henry Fuchs presented work in progress at UNC that uses depth range finders to reconstruct a surface map of the intestines to then guide an endoscope for colonoscopy. All this was added to their augmented reality system, and comprises an interestingly novel approach.

HT Medical presented their VR Simulation of Abdominal Trauma Surgery. They use the PHANToM and some "wet" graphics to remove a kidney. They simulate the "steps" taken by the surgeon. First the surgeon cuts the skin, which then opens, revealing the intestines. A wet graphics effect is used, but this looks more like "cling film" wrapping over everything. The intestines moved quite unconvincingly, in an animation that was slightly under the control of the user (it didn't appear like inverse kinematics were attaching the end-point of the intestines to the user's tool). The kidney

John Waterworth

was removed by simply "reaching into it" and moving it out. I couldn't quite see the point of such a simulation, frankly, unless trainee doctors don't realise that it's a good idea to cut into the abdomen before trying to remove a kidney.

On the other hand, I was very impressed by a paper from Wegner and Karron of Computer Aided Surgery Inc., which described the use of auditory feedback to guide blind biopsy needle placement. Their audio feedback system generates an error signal in 3D space with respect to a planned needle trajectory. This error signal and the preoperative plan are used to motivate a position sonification algorithm which generates appropriate sounds to guide the operator in needle placement. To put it simply, harmonics versus dissonances are used to convey position information accurately along 6–8 dimensions. A nice example of a synaesthetic medium – using one modality (sound) where one would normally expect another (touch and/or vision). Their approach has wide applicability.

Myron Kreuger is President of Artificial Reality Corporation and a claimant to the title of inventor of VR. He coined the term "Artificial Reality" (AR) in the early 1980s but, sadly for him, it didn't catch on – which is perhaps a pity. Here he was describing ARC's work on adding smells to VR. The system he described was a training system for dealing with emergencies, where smells of, for example, petrol, or the contents of the lower intestine, can provide valuable information in a hazardous situation. However, this work seems premature. Smells are messy – they involve molecules, not bits – and so tend to linger after they have been turned off.

Highlights of the exhibition

HT Medical demonstrated CathSim, a simulator that trains nursing students to perform vascular catheterisations. They built a special force feedback device and some simple graphics to provide visual feedback. It was quite good to guide the needle, but had little (no?) feedback once inside the skin. This seemed like "technological overkill" since the procedure is easily learned without VR and is not exactly hazardous.

They also demonstrated a Flexible Bronchoscopy simulator developed with a partnership of pulmonologists and pharmacology experts at Merck & Co. (based on the Visible Human Project). They have a way to track the flexible tip of the endoscope ("a secret", I was told when I asked) and they generate nice 2D texture-mapped graphics of the interior throat using an SRI Impact.

Fraunhofer had two demonstrations from their Providence office:

1. TeleInVivo, demonstrating a PC software volume renderer (a few seconds per rendering for small windows areas) attached to an ultrasound probe.
2. Interventional Ultrasound: a guiding system for biopsy needle insertion using an ultrasound tracking system (not much of an implementation

at the moment), so it's the old idea of using ultrasound to guide a biopsy needle. They overlay the ultrasound view with the biopsy needle path, something that UNC demonstrated at SIGGRAPH, but without the expensive head gear.

Matthias Wapler, of the IPA branch in Stuttgart, described a robot for precise endoscopy and neurosurgical navigation. They have not yet developed planning software for their system.

Immersion Corp.: The people of Loral were at the Immersion booth, presenting a training system using the Immersion Corp.'s force feedback device. The application lets the surgeon guide an endoscope through the nose of a patient. The simulation was "helpful" to surgeons, although it is rather crude and doesn't feel like the real thing.

Prosolvia: A very tall Swede from Prosolvia (Swedish VR company) demonstrated a Virtual Arthroscopy of the shoulder, developed with University Hospital of Linkoping. They used the Immersion Corp. force feedback system, and their own Oxygen software base.

SensAble Technologies: Four demonstrations were shown at their booth:

1. The Ophthalmic surgical simulator. This project combines N-Vision US$25,000 stereo display (binoculars with 1280x1024 resolution; there is a cheaper version for VGA graphics at US$15,000) with the PHANToM, and a nice simulation of the feel of an eye. The computer platform is Intergraph. Since the PHANToM doesn't provide torque feedback, I didn't really appreciate the usefulness of the feedback system while cutting around the cornea. Poking the eye was more fun.

2. MusculoGraphics surgery simulation solutions. Their Limb Trauma simulator didn't have force feedback, so the PHANToM was used as a 3D pointer. The simulation consisted in picking up a bullet and stopping bleeding of a blood vessel. I thought the system was unrealistic and completely pointless.

3. Their IV catheter insertion system had force feedback, and was quite convincing.

4. Spine Biopsy Simulator, by the Georgetown University Medical School, for educational use. The aim is to mimic an actual spine biopsy procedure and improve overall learning by students. Unfortunately, their demo wasn't working.

Virtual Presence: This UK company presented two good tools.

1. VolWin, a volume rendering package (US$700) on the PC that is based on the Voxar API. The performance was really good, running on a plain PC. A 256x256x256 volume was rendered

Medicine meets VR: 6

at some 5–6 fps, with some aliasing effects, but basically usable quality.

2. A package that tests the surgeon's performance using the Immersion Corp. laparoscopy device. No fancy graphics, the idea being to measure performance in hitting targets. Excellent simple idea for laparoscopy training.

Gold Standard Multimedia: They have produced a CD-ROM with a segmentation of the Visible Male. The package volume renders the views and structures chosen. On PC. *Sense8* medical customers are the National Centre for Biocomputation (NASA, Stanford U), Rutgers U, Center for Neuro-Science, and Iowa School of Dentistry.

A knee simulator was presented. Unfortunately, it broke early in the conference and before I could use it.

Vista Medical Technologies: Good head-mounted display to substitute for the microscope. Not head tracked, but it allows the surgeon to look through the microscope and outside. It also allows Picture-in-Picture, so that an endoscope can be used to supplement the microscope.

Lake Acoustics: There was a nice demonstration of 3D sonification from Lake, who were also involved in the 3D sound feedback for biopsy needle placement described briefly above (paper by Wegner and Karron). Using their kit, it is very simple to place sounds in a three-dimensional landscape surrounding the body to the front (as with normal stereo) and to the back (as with cinema surround sound) but using only headphones.

VR And Mental Health

There were several very interesting papers presented in this session, and a few peculiar ones. Unfortunately, few were included in the printed proceedings. It was clear that this is one of the medical areas where VR can most immediately and successfully be applied today. Topics included treatment of phobias, psychological assessment, and cognitive rehabilitation.

The session also provided an opportunity for the launch of the new "CyberPsychology and Behavior" journal, the first volume of which includes a useful summary of the use of VR as a therapeutic tool.

Brenda Wiederhold presented a good paper on using VR to go beyond the standard "imaginal" training of phobic patients. The advantages of VR are, first, that fear can be effectively activated (which is necessary to bring about change) but can be controlled (too much fear reinforces the phobia) and, second, physiological measures can be used to control the display. One simple measure of anxiety, first used by Jung, is a drop in skin resistance.

Similar work on claustrophobia and fear of heights was described by Bulligen of the University of Basle. Another paper on acrophobia (fear of heights) by Huang et al. of the University of Michigan described comparisons of real and virtual environments for emotional desensitisation, and questioned the need for a high level of realism. Using the CAVE environment, they compared the same views in VR

and in reality. See their Web page for views [http://www.umich.edu/~psychvr].

A rather pleasant system from Japan, the "Bedside Wellness" system by Ohsuga et al., allows bedridden patients to take a virtual forest walk while lying on their backs in bed. An array of three video screens presents the unfolding view of the forest as the patient gently steps on two foot pedals. There is also 3D sound of birds, streams and wind in the trees. A slot below the central screen delivers a gentle breeze scented with pine to the "walking" patient.

Rizzo, of the University of Southern California, is using VR to give increased ecological validity to standard tests applied to Alzheimer's Disease patients, such as the mental rotation task (where the patient has to decide if a second figure is a rotated version of an earlier figure, or is different in shape). This Immersadesk application seemed like technological overkill to me. However, a fuller paper by Rizzo et al., in the CyberPsychology and Behavior journal, lists several advantages of VR for cognitive and functional assessment and rehabilitation applications:

1. ecologically valid and dynamic testing and training scenarios, difficult to present by other means
2. total control and consistency of administration
3. hierarchical and repetitive stimulus challenges that can be readily varied in complexity, depending on level of performance
4. provision of cueing stimuli or visualisation tactics to help successful performance in an errorless learning paradigm
5. immediate feedback of performance
6. ability to pause for discussion or instruction
7. option of self-guided exploration and independent testing and training
8. modification of sensory presentations and response requirements based on user's impairments
9. complete performance recording
10. more naturalistic and intuitive performance record for review and analysis by the user
11. safe environment, although realistic
12. ability to introduce game-like aspects to enhance motivation for learning
13. low-cost functional training environments

Also on the topic of psychological assessment, Laura Medozzi et al., from Milan, described what seemed to be high-quality work to compare traditional tests with VR-based testing. The case of a patient suffering frontal lobe dysfunction several years after a stroke was used to make the point that traditional tests often fail to reveal deficits that can be identified with VR. This is thought to be due to the nonverbal and immersive realism of VR, compared to the presence of a human examiner, in traditional testing, who inadvertently provided surrogate control over higher order

John Waterworth

faculties – largely through verbal exchanges. The same group, in collaboration with workers under David Rose at the University of East London, described the use of VR to aid cognitive rehabilitation.

Joan McComas of the University of Ottawa described a VR system for developing spatial skills in children. She had carried out a four-condition study where choice of location to move to was either passive or active, as was navigation to that location. The four were then: passenger (passive choice / passive movement) navigator (active choice / passive movement), driver (active choice / active movement) and navigated driver (passive choice / active movement). The task was to find things hidden at locations, but without going to the same location twice. Measures were percent of correct choices and visit of first error. It occurred to me that I could use this sort of approach in studies of exploration in 3D information landscapes. A paper by Weniger also struck a chord by comparing spatial learning (maze navigation) with exercise of the executive function (the maze with pictograms) and with the use of orientation skills (navigation of landscapes).

Giuseppe Riva, from the Applied Technology for Psychology Lab at the Instituto Auxologico Italiano in Verbania also discussed the use of VR for psychological assessment – particularly the development of the Body Image Virtual Reality Scale. Patients chose which virtual body they think matches their own, and which they would prefer to have instead. The difference gives a measure of body image distortions.

An interesting snippet from a paper by another Italian, Dario Alpini, is that normal people, when asked to rotate on the spot, will usually chose a clockwise rotation, unlike abnormals. I wondered whether this holds true in the southern hemisphere or if, as with bath water going down the drain, the direction there is reversed. His paper was concerned with such differences between normals and others, in real and virtual environments,

Mark Riva, of The Flow Network, evangelised on the joys of flowing, derived from the work in art aesthetics by Csikszentmihalyi (who is President of the company). Flow means optimal experience, flow means maximising your self in autotelic fashion. Flow is A GOOD THING, in fact, the best. Sign up now and never have to think again.

In a somewhat similar vein, Rogers, of the Mythseeker Institute, described a very complicated system loosely based on Jung's ideas of archetypes and their role in myths and human psychology. The idea is to use the system (patents pending) to create your own myth to give your life meaning, overcoming the common problem of people unconsciously choosing a myth that is not right for them. Myth choosing included such things as how to experience time, what visual textures are encountered, and so on, in some ways sounding like a way of adjusting the computer environment depending on the individual's personality type.

Greene and Heeter, of the Michigan State University Communication Technology Lab, described CD-ROMs that contain VR-like stories of cancer sufferers, particularly in relation to coping with pain. Details can be found at [`http://www.commtechlab.msu.edu/products/`]. An interesting paper by Hunter reported the finding that VR can be very effective in helping burn-recovery patients cope with the pain of treatment. Patients in the VR condition reported significant pain reduction and less time spent thinking about pain.

Pope described the use of a VR system called "Viscereal" to provide physiological feedback. Users could control the flow of blood to their hands, and hence could warm or cool them at will. It has also been found to be effective in permitting conscious control of bowel activity, easing clinically harmless but distressing conditions such as Irritable Bowel Syndrome.

The Woodburys, a husband and wife team from the Puerto Rican Institute of Psychiatry, mused on modern cosmology and the origins of our three dimensionality. They gave the conference a useful reminder that the 3D world is in our heads, not in the world "out there". Pathological psychological states – especially various psychoses – and altered states of consciousness produced by certain hallucinogenic drugs, make this clear as the world around the experiencer, and his sense of his body and its place in that world, fall apart in typical psychotic panic states. Following Pribram, the Woodburys view the 3D world we know so well as a holographic projection, formed in the brain according to principles established through evolution as aiding survival. While recognising that this world is an illusion, psychiatrists work to restore it in patients whose world has literally collapsed.

The author of a mystifying paper from Italy, Gabriele Optale, suggested that while impotence and premature ejaculation are topics which fascinate women, they terrify men. The latter seems plausible, at least. An animation with unbelievably poor graphics addressed these problems, but it was not clear why watching a bizarre story of chopping through foliage, broken swords, and magic restorative potions would help.

Although not mentioned by presenters, one of the audience, Rita Addison, talked about the use of VR to communicate the reality of mental deficits to other, normal, people. Rita has visited the VRLab in Umea and is well known for her "Detour: Brain Deconstruction Ahead" which reproduces for others her visual problems since a car accident a few years ago. See [`http://www.babelweb.org/virtualistes/galerie/detoura.htm`]. She was also the only person at the conference to use the word "synaesthesia".

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Human Factors in Safety Critical Systems

Felix Redmill & Jane Rajan

Redmill, Felix and Rajan, Jane, editors, 1997, *Human Factors in Safety Critical Systems,* Oxford: Butterworth Heinemann, 354 + x pages, ISBN: 0-7506-2715-8, £55 approx.

Safety critical systems have traditionally been written about from a design viewpoint and references to human factors issues are not easy to locate. Consequently, this book is a welcome addition to the literature in that it appears to fill a need for a text devoted solely to aspects of user involvement. However, a first glance reveals that the text gives a traditional approach to human factors of safety critical systems in that Part 1 is devoted to human reliability and causes of human error and has three chapters (authored by Felix Redmill, Deborah Lucas and Carlo Cacciabue respectively). Part 2 deals with human–computer interaction (HCI) with five of the twelve chapters covering an introduction (Chapter 4, authored by Graham Storrs), specification with a brief summary of risk analysis, fault tree analysis and hazard analysis (Chapter 5, authored by Jeremy Clare), interface design (Chapter 6, authored by Jane Rajan) and training and operator support (Chapter 7, authored by Andrew Shepherd). The final chapter (authored by Jonathan Berman) in this section details issues in abnormal situations. Part 3 has four chapters covering socio-technical considerations (Chapter 9, authored by Ron Westrum), such as learning from incidents at work (Chapter 10, authored by Florus Koornneef and Andrew Hale), procedural violations (Chapter 11, authored by Steve Mason) and safety cases (Chapter 12, authored by David Collier). A brief biography of the authors and an index completes the book. References are given at the end of each chapter.

Readers of Inter*faces* will no doubt be particularly interested in the section on HCI and it is unfortunate that more care has not been given to chapter titles. For example, Chapter 4, 'Introduction to HCI in safety-critical systems' discusses the shortfall of user-centred design in traditional analysis and design methodologies such as SSADM (Structured Systems Analysis and Design Methodology) and Yourdon but uses only Norman's Model (Norman, 1986) as an example of user-centred development. Equally, the idea of usability metrics is dismissed since 'current human performance is almost never known in sufficient detail for anyone to be able to do more than guess at what the required performance should be'. One can take issue here as areas of safety-critical systems such as those used in aircraft cockpits and on marine vessels usually are used by certificated personnel so that the user possesses a basic minimum level of knowledge and experience. For example, fishing skippers in charge of vessels over 16.5 metres registered length in the UK will have an electronic navigation systems certificate covering operational skills (Olsen, 1998).

Chapter 6, on interface design, authored by Jane Rajan, covers many topics from the system's characteristics to principles of screen design but no reference is given to such principles derived by the Governments of both the UK and US, e.g. F1166 (1988), MoD (1996). Such works relate directly to critical systems and give useful and specific

information. Perhaps this is the 'problem' with this book – it tries to cover too much and consequently becomes rather superficial at times, although the editors accept this by stating that the coverage is 'broad'. Another quibble is that references are often rather old, for example, Chapter 7, on training and operator support, has its most recent reference from 1994 and this is typified throughout the book although there is the occasional later reference, for example in Chapter 1. However, in that the aim of the book is to be of value to 'practitioners … in safety engineering, software engineering, and management', the book is successful. However, HCI experts in safety-critical systems will find little new in this book.

References

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Norman, D A, 1986, 'Cognitive Engineering', in Norman, D A and Draper, S W, eds, 1986, *User-centred System Design: New Perspectives on Human-Computer Interaction,* London: Lawrence Erlbaum Associates.

Olsen, 1998, *Olsen's Fisherman's Nautical Almanack*, Scarborough: Dennis Print and Publishing.

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Wanted – articles on Software Support for HCI. The Software Support series gives leading practitioners and researchers the opportunity to discuss how user interface software tools, along with supporting methods and techniques, can aid in the production of good human-computer interfaces. Possible topics include:

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

This list is not exhaustive: any article that fits under the heading 'Software Support for HCI' will be considered for publication. Please send submissions to: Dave Clarke; email: Dave@visualize.demon.co.uk (or on disk c/o Inter*faces*, address on back cover). Articles should be sent in RTF, MS Word or straight ASCII format. Length should not exceed 3000 words. Figures and references may be included where appropriate.

My Thesis

Caroline Gale

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Title of Thesis
The effects of Gaze Awareness on communication in video-mediated manipulation tasks

Supervisor, department and institution
Andrew Monk, Department of Psychology, University of York, Heslington, York YO1 5DD

What my thesis is about
'Gaze awareness' is knowing someone else's focus of visual attention. This might be expected to be an important communication resource as an aid to grounding in conversation that video technology should support.

How I got into this
After a 'false start' looking at deindividuation in e-mail, I read a paper by Ishii and Kobayashi describing their shared drawing system 'Clearboard', which introduces the concept of gaze awareness. Although the authors claim that Clearboard supports gaze awareness and that gaze awareness will be an important future design goal, neither concept has ever been empirically examined.

My contribution to HCI research
My overall hypothesis is that knowing where someone else is looking can make conversation more efficient. For example, in telemedicine, a nurse-practitioner might request a second opinion about a diagnosis from a remote hospital-based doctor over a video link. In this case, gaze awareness could be used to quickly detect misunderstandings. For example, if the doctor referred to the patient's right knee and saw that the nurse-practitioner looked at the left knee, he would be aware that the instruction had been misunderstood. However, before recommending that video technology should be configured to permit gaze awareness, two things have to be established. Firstly, how accurately people are able to tell where someone else is looking, and secondly, assuming that this is possible, whether or not they actually use this information when communicating with one another. Investigating the answers to these two questions has been the main focus of my research.

My first three experiments measured how accurately people are able to estimate another's gaze focus, both face to face and in video-mediated conditions. These were essentially psychophysical; the only HCI-related element was the video mediation. Working in pairs, a 'gazer' gazed at a number of points on a flat target placed on a table in front of them. An 'estimator', sitting either directly opposite the gazer or viewing them remotely over a video link, guessed at which point the gazer was gazing. Results showed that the estimators were extremely accurate in their guesses, and that video mediation has no negative effect on this. Both findings were replicated across all three experiments.

My fourth and fifth experiments address the second question of whether or not availability of gaze awareness affects communication. Both of these involve pairs of participants completing a shared task in a variety of video configurations, some of which allow gaze awareness. The task devised for Experiment 4 was a manipulation task called the 'Circuit Board Task'. One participant, the 'Repairer', sat in front of a flat (paper) circuit board with 17 'terminals' separately labelled. The other participant, the 'Expert', had a list of pairs of terminals for the repairer to 'test'. The Expert's task was to describe, from the image of the circuit board that they could see on a TV monitor, the location of each particular pair of terminals. The Repairer's task was to test these. Each conversation was recorded, and transcriptions made. From these transcriptions, a dialogue analysis ('Conversational Games Analysis') was carried out on each conversation. In addition, other measures of task performance and communication process (e.g. number of turns, number of words used) were examined. Although results were somewhat disappointing, this was attributed to the fact that only the Expert had gaze awareness available. Experiment 5 was therefore a modification and refinement of Experiment 4, with one video configuration making gaze awareness potentially available to both participants. A videotunnel was constructed to achieve this and to allow participants eye contact, and the gaze target was changed from a flat, paper 'circuit board' to a clear, vertical line-drawing. The same techniques were used for analysis, and at present the data is partially analysed. Preliminary results are very encouraging and it seems likely that differences in communication depending on availability of gaze awareness will be shown.

What I want to do next
Nothing to do with gaze awareness, ever, as long as I live. (Only joking.) I'm currently writing up my thesis and applying for research positions in universities and commercial laboratories.

These short articles are now a regular feature in Interfaces. The idea is to offer a platform to Ph.D. students who have just submitted their theses, or who are about to do so. The articles are intended to be short narrative explanations of what the thesis is about, rather than formal summaries. They will allow other research students and researchers working in similar areas to make contact with the author; who knows, they may even lead to offers of employment.
If you would like to contribute to this series, please contact ***Andrew Monk (01904 433148; AM1@york.ac.uk)*** *for instructions.*

Case Study: Usability Healthchecks @ Thames Water

F.I.GROUP PLC is a UK-based supplier of computer software services to major organisations whose businesses depend on information technology. It is a market leader in the expanding standalone applications management market.

As part of F.I.GROUP's strategic outsourcing partnership with Thames Water, FI has provided a range of services including Usability Healthchecks.

Introduction

The goal of the FI Usability Team is to enhance the performance of business processes by ensuring that design solutions capitalise on user strengths and minimise the effects of user weaknesses.

A Usability Healthcheck is a targeted field analysis of a business system or process in context, often taking only one day to identify significant problems with existing process/system or likely problems for integration of new systems.

While system developers, psychologists, ergonomists and HCI specialists would agree that the context in which users carry out their tasks is important, they may not agree on the best method for collecting, interpreting and integrating this knowledge into the business world.

Currently the workshop method is very popular, where a small group of analysts and empowered users, aided by a facilitator, seek to creatively solve business needs. While the workshop method has many advantages it does tend to overlook some of the important contextual issues affecting business performance which cannot be taken out of the work context and into the meeting room.

To provide a balance, we employ a Usability Healthcheck. These Healthchecks have been successfully applied across Thames Water including the Customer Information System, Job Management System and Meter Reading System. This Case Study reports their use in the Thames Water Laboratories.

Business Challenge

Thames Water is the largest water company in the UK, serving seven million direct water supply customers, and over 11 million sewerage customers.

The Thames Water Laboratories, known as the Water Quality Centre, provide scientific analysis services for the business. The testing turnover is phenomenal, with over 300,000 samples and two million tests per annum. A range of software systems are used to support these activities, with around 200 users in total.

The systems are classic mainframe 'green screen' systems and the Business Systems Division of Thames Water were keen to find out how these systems could be improved within the current constraints of the mainframe 'green screen' environment.

Approach

Our Usability Healthchecks normally follow the following steps:

Step 1 Initial briefing from project sponsor – often from the IT department. Covers the scope of the systems under study, their context, user base and characteristics of system performance.

Step 2 Identify key tasks to review and key users to observe and interview. A good selection of user types and roles is required to give a comprehensive overview. For many systems 3–6 interviews should provide an initial survey view and this can normally be completed in one day, especially if two usability analysts are available.

Step 3 Arrange visits and coordinate interviews.

Step 4 Visit day – see Figure 1 for the contents of the Healthcheck toolkit. The exact formulation of a day's visit varies depending on the required outputs, e.g. process review, job design, error identification, comparative assessment, etc. Most visits combine observation with interviews.

We have found that it can be very fruitful to interview a couple of users who work in similar roles together. This helps them to reflect upon their activities and provide us with a richer set of data and insights.

| Organisational Context
– Management Structure
– Communication Structure
– Group Working
– Outline Key Process Flows
– Organisational Aims
| Attitudes to Information Technology
| Ergonomic Checklist
| Operator Modifications
| Allocation of Function
| Job Design
| Human Computer Interaction
– Memory
– Errors
– Interoperability
– Workflow
| Critical Incident Analysis

Figure 1 **Healthcheck Toolkit**

Step 5 Rapid summary report and feedback to project sponsor. This can include Risk Analysis – using our in-house assessment

Alan Arnfeld & Brian Buck
F.I.GROUP PLC

against eight Human Factors risks enables the prioritisation of the many issues discovered.

Step 6 Review further analysis and design advice requirements.

Step 7 Project performance review.

Results

The laboratory has a range of systems and Usability were invited to carry out a Healthcheck on LIFE (Laboratory Information For the Environment) and QUARTS (Quality Analytical Results Transfer System).

The LIFE and QUARTS visits were so successful, identifying 22 issues which were both broad and wide-ranging, that Usability were also invited to carry out further Healthchecks for other laboratory systems: SoCKS (Sewerage Operational Contracts System) and TAPS (Thames Advanced Prescheduling System).

Figure 2 illustrates a typical issue that might be identified during a Healthcheck. In this case, workflow is under analysis.

> If users want to move on from recording a complaint to completing the associated workorder, they must go out to the main menu and then select the menu items necessary to navigate to the next screen. This is clumsy and wasteful of resources. It means that users do not carry out tasks in a meaningful manner, but work through all the complaints as a batch and then all the work orders as a batch.
> This fragments the task/business process making it less meaningful to the user, more time consuming and more prone to errors.

Figure 2 **A workflow issue identified in SoCKS**

When should Healthchecks be used?

Healthchecks are designed to be used regularly in two types of environment:

1. For existing in-service systems, and after any major changes to systems and process. Healthchecks should be conducted on a yearly basis.

2. For new developments, whether Bespoke or Package Selection – Healthchecks are an essential part of the process and should be used as soon as the project is initiated.

Figures 3 and 4 illustrate where the Healthcheck fits into the lifecycles of traditional WATERFALL and RAD methodologies.
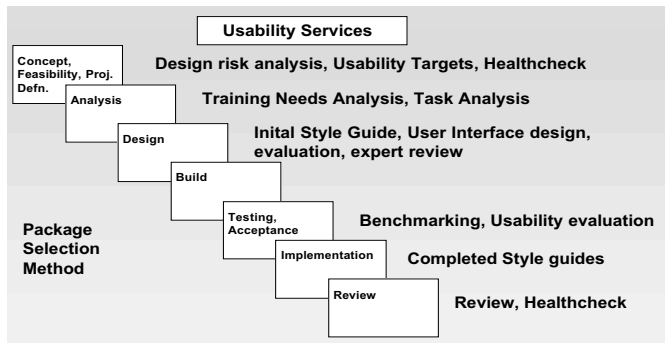

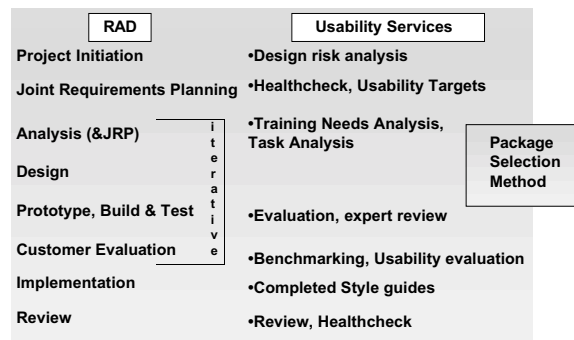Figure 3 **Healthcheck in Waterfall lifecycle**

Figure 4 **Healthcheck in RAD lifecycle**

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Jan Noyes

Dr Jan Noyes is a lecturer in the Department of Experimental Psychology at the University of Bristol, UK. She is a Fellow of the Ergonomics Society and currently chairs the IEE Professional Group on human–computer interaction. She has published extensively in the area of HCI, particularly in relation to her work on interface design for advanced and emerging technologies.

What is your idea of happiness?
An ergonomically designed bed.

What is your greatest fear?
Undergoing psychological tests and not knowing why.

With which historical figure do you most identify?
The old woman who lived in the shoe . . . .

Which living person do you most admire?
Mo Mowlam.

What is the trait you most deplore in yourself?
Saying 'yes'.

What is the trait you most deplore in others?
Lack of attention to detail.

What vehicles do you own?
1950s red Raleigh bike, blue Citroen, white Serena with lots of seats to spread the children out.

What is your greatest extravagance?
Pre-washed carrots and other veg.

What makes you feel most depressed?
Unwashed carrots and other veg.

What objects do you always carry with you?
The kids.

What do you most dislike about your appearance?
Short nails as a result of always hitting the keyboard.

What is your most unappealing habit?
Continuing to hit the keys on the keyboard whilst others are talking to me.

What is your favourite smell?
My new PC.

What is your favourite word?
Serendipity.

What is your favourite building?
Restormel Castle.

What is your favourite journey?
The one I make each day.

What or who is the greatest love of your life?
My family.

Which living person do you most despise?
The person who stole my laptop.

On what occasions do you lie?
When answering these questions (and completing psychological tests).

Which words or phrases do you most over-use?
Isn't it time you went to bed, now?

What is your greatest regret?
Not writing earlier.

When and where were you happiest?
As an undergraduate at Loughborough.

How do you relax?
Writing, cooking carrots and other veg.

What single thing would improve the quality of your life?
A wife (who stayed at home).

Which talent would you most like to have?
Ability to run a marathon.

What would your motto be?
All things pass.

What keeps you awake at night?
Children playing musical beds.

How would you like to die?
When the time is right.

How would you like to be remembered?
Isn't it time you went to bed, now?

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How To Use Scenarios And Use Cases In The Systems Development Process
14 May, 1998, London, UK

Further Info: Liz Bromley, Centre for HCI Design, City University, Northampton Square, London, EC1V 0HB; Tel: 0171-477-8427; Fax: 0171-477-8859; Email: E.M.Bromley@city.ac.uk

Summary: Despite the considerable recent interest in the use of scenarios and use cases in the systems development process, there is a lack of scenario-based methods, techniques and guidelines available to practitioners, or even agreement about the definition of use cases and scenarios in the first place. Jacobson has done much to introduce use cases into the systems development process, but even he has left us with some loose ends. As a result, discussions about use cases and scenarios often lead to more questions than answers.

This symposium aims to provide some concrete answers. It brings together practitioners, vendors and academics with different interests in scenarios and use cases in the systems development process. Experts from the United States and Europe will present and explore the diverse uses of scenarios and use cases, examine effective methods and guidelines, report on experiences and good practice, and propose a common path for the development and application of new scenario-based systems development methods.

The 3D Information Worker
19 May, 1998, London, UK

Further Info: Ian Benest, Department of Computer Science, University of York, Heslington, YORK, YO1 5DD; Email: idb@minster.york.ac.uk

Summary: This colloquium is organised by the IEE Informatics Professional Group A5 (Human Systems Engineering) and is co-sponsored by the BCS HCI Group, the BCS Computer Graphics and Displays Group, the Eurographics Association UK Chapter, and the Virtual Reality Society. This meeting will provide an opportunity for practitioners and researchers in Virtual Reality to discuss approaches to those factors that influence the acceptability of the user-interface. Is there a universal three-dimensional interface lurking in a laboratory somewhere, waiting to be publicised, just as the two-dimensional desktop interface remained hidden at Xerox Parc Laboratory in the 1970s?

Workshop on Human Computer Interaction with Mobile Devices
May 22, 1998, Glasgow, UK

Further Info: Chris Johnson, Department of Computing Science, University of Glasgow, Glasgow, G12 8QJ, Scotland; Tel: +44 141 330 6053; Fax: +44 141 330 4913; Email: johnson@dcs.glasgow.ac.uk; URL: http://www.dcs.gla.ac.uk/~johnson/mobile.html

Summary: The last 3–4 years have seen the development and marketing of a vast array of mobile computing devices. These systems herald what we believe to be a new era of 'ubiquitous' computing. Unfortunately, there has been relatively little work into the development of effective interaction techniques for these systems. The utility of these devices is reduced by the problems of accessing information resources through tiny displays. This can be especially problematic where that information is 'perishable'; where its value is only relevant to particular locations and times. The utility of mobile devices is further reduced by the problems of manipulating miniaturised versions of 'standard' keyboards and pointing devices. Users are also forced to perform numerous, delicate operations by selecting very small icons. This workshop will provide a forum for academics and practitioners to discuss the challenges and potential solutions for effective interaction with mobile systems.

C O O P ' 9 8 – Third International Conference on the Design of Cooperative Systems
26–29 May, 1998, Cannes, France

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

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

DSV-IS'98: 5th International Eurographics Workshop on Design, Specification and Verification of Interactive Systems
3–5 June, 1998, Abingdon, England

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

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

FOIS'98 – International Conference On Formal Ontology In Information Systems
6–8 June, 1998, Trento, Italy

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

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

First International Workshop on Innovative Internet Information Systems (IIIS'98)
8–9 June, 1998, Pisa, Italy

Further Info: David Schwartz, School of Business Administration, Bar-Ilan University, Ramat-Gan, Israel; Email: dschwar@mail.biu.ac.il

Summary: The Internet is quickly moving from a marketing tool in which businesses and organizations promote sales and awareness, to a core element of any information system architecture. The advent of the Internet as a fundamental infrastructure for the delivery of advanced business information systems has opened up a wide range of questions for the design and development of such systems. This workshop focuses on Information Systems that utilize the Internet as their primary architectural base or as a secondary extension to existing information systems. This workshop will serve as a forum to present and discuss early results and challenges of innovative Internet-based applications.

The workshop will last two days and it will take place immediately before CAiSE98. All participants in the Workshop are expected to register for CAiSE98.

Workshop on Presence in Shared Virtual Environments
10–11 June, 1998, BT Labs, Ipswich, UK

Further Info: Email: A.Steed@cs.ucl.ac.uk; URL: http://vb.labs.bt.com/SharedSpaces/Presence/

CE98 – 5th ISPE International Conference On Concurrent Engineering
15–17 June, 1998, Tokyo, Japan

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

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

Collaborative Virtual Environments 1998 (CVE'98)
17–19 June, 1998, Manchester, UK

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

Summary: A Collaborative Virtual Environment (CVE) is one that actively supports human–human communication in addition to human–machine communication and which uses a Virtual Environment (including textually based environments such as MUDs/MOOs) as the user interface. This is an exciting field with much potential for inter-disciplinary collaboration particularly in the fields of computer science, psychology, sociology, architecture & urban planning, cultural & media studies and Artificial Intelligence.

Following on from the highly sucessful CVE'96, CVE'98 aims to present the current state of the art in Collaborative Virtual Environments and foster inter-disciplinary links between researchers in this field. Compared to CVE'96, CVE'98 will have a larger and more varied programme committe to ensure high quality and varied content and full papers (rather than extended abstracts) will be published in the proceedings.

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ED-MEDIA / ED-TELECOM 98 – World Conference on Educational Multimedia and Hypermedia and World Conference on Educational Telecommunications

20–25 June, 1998, Freiburg, Germany
Further Info: ED-MEDIA 98/AACE, P.O. Box 2966, Charlottesville, VA 22902 USA; Email: AACE@virginia.edu; Voice: 804-973-3987; Fax: 804-978-7449; URL**:** http://www.aace.org/conf/edmedia
Summary: ED-MEDIA/ED-TELECOM 98 – World Conference on Educational Multimedia and Hypermedia and World Conference on Educational Telecommunications are jointly held international conferences, organized by the Association for the Advancement of Computing in Education (AACE). These annual conferences serve as multi-disciplinary forums for the discussion and dissemination of information on the research, development, and applications on all topics related to multimedia/hypermedia and distance education. ED-MEDIA/TELECOM, the premiere international conferences in the field, span all disciplines and levels of education and attract 1000+ attendees from 50+ countries.

Asia-Pacific CHI (APCHI'98)

July, 1998, Kanawaga, Japan
Further Info: URL: http://apchi.softlab.is.tsukuba.ac.jp
Summary: Foremost HCI conference serving Asia and the Pacific rim.

Sixth International Conference on Human Aspects Of Advanced Manufacturing: Agility & Hybrid Automation (HAAMAHA '98)

5–8 July, 1998, Hong Kong University of Science and Technology
Further Info: http://www.spd.louisville.edu/~ergonomics/haamaha98.html

First World Congress on Ergonomics For Global Quality And Productivity (ERGON-AXIA '98)

8–11 July, 1998, Hong Kong University of Science and Technology
Further Info: URL: http://www.spd.louisville.edu/~ergonomics/axia98.html

Workshop on User-Interfaces to Theorem Provers (UITP'98)

13–14 July, 1998, Eindhoven, Netherlands
Further Info: N. Merriam, Dept. of Computer Science, U. of York, York YO1 5DD; Tel: (+44/0) 1904 434755; Fax: (+44/0) 1904 432767; Email: Nicholas.Merriam@cs.york.ac.uk; URL: http://www.win.tue.nl/cs/ipa/uitp/
Summary: This international workshop provides a forum for the exchange of ideas and research on the analysis and design of user interfaces for theorem proving assistants. In particular it facilitates cross-fertilisation between the fields of human–computer interaction (HCI) and mechanised theorem proving. The series was started in recognition of the fact that the difficulty in using powerful theorem proving software frequently lies with a poor user interface. There are gaps between the knowledge required by designers of such interfaces and present state of the art in general interface design technology. Effective solutions require the collaboration of HCI practitioners and the authors and users of existing theorem proving software.

ECAI'98

23–28 August, 1998, Brighton, UK
Further Info: ECAI-98 Secretariat, Centre for Advanced Software Applications, University of Sussex, Brighton, BN1 9QH, UK; Tel: +44(0)1273 678448; Fax: +44(0)1273 671320; Email: ecai98@cogs.susx.ac.uk; URL: http://www.cogs.susx.ac.uk/ecai98
Summary: ECAI-98 is organised by the European Coordinating Committee for Artificial Intelligence (ECCAI) and hosted by the Universities of Brighton and Sussex on behalf of AISB.

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

31 August – 4 September, 1998, Vienna and Budapest
Further Info: Email: ifip98@ocg.or.at; URL: http://www.ocg.or.at/ifip98
Summary: The Congress will consist of seven carefully selected conferences, most of which boast long traditions, with paper presentations and poster sessions. Each conference is organized in close cooperation with the relevant Technical Committees and Working Groups of IFIP. The structure of the International Programme Committee and the Programme Committees of the seven conferences with well-known IT experts make sure that the participants of the congress will enjoy a high quality scientific program that will give an excellent outlook of what can be expected in the future. Although participants register for one conference, they will be allowed to switch between the conferences:
Telecooperation – The Global Office, Teleworking and Communication Tools
ICCHP '98 – 6th International Conference on Computers Helping People with Special Needs
SEC '98 – 14th International Information Security Conference
KnowRight '98 – 2nd International Conference on Intellectual Property Rights and Free Flow of Information
Fundamentals – Foundations of Computer Science
IT & KNOWS – Information Technology and Knowledge Systems
Teleteaching '98 – Distance Learning, Training, and Education

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

31 August – 4 September, 1998, Vienna and Budapest.
Further Info: Dr. A. D. N. Edwards, Department of Computer Science, University of York, York, ENGLAND, YO1 5DD; Tel: + 44 1904 432775; Fax: + 44 1904 432767; Email: alistair@minster.york.ac.uk; URL: http://www.ocg.or.at/VERA/IFIP98/ICCHP/icchp.html
Summary: Part of the 15th IFIP World Computer Congress, this conference is concerned with all aspects of the use of computers by people with disabilities. That includes both the adaptation of the human–computer interface to enable the persons to access the computer for everyday use and the development of computer-based aids to reduce the handicapping effect. Experience from the previous five ICCHP conferences has shown that computers have positively affected the lives of disabled people in many different ways. The conference aims to promote discussion with all relevant disciplines.

HCI'98

1–4 September, 1998, Sheffield, UK
Further Info: HCI'98 Conference Coordinator, Conference 21, Sheffield Hallam University, Sheffield, S1 1WB, UK; Tel: +44 (0)114 225 5334; Fax: +44 (0)114 225 5337; Email: hci98@shu.ac.uk; URL: http://www.shu.ac.uk/hci98
Summary: The HCI annual conference is the primary European conference on human–computer interaction. The conference regularly brings together researchers and practitioners concerned with the effective utilisation of computing and communication technology by humans, organisations and society. This year's conference, HCI'98, is to be held at Sheffield Hallam University. In addition to the usual presentation formats, an innovation at this year's conference is the inclusion of research symposia, at which full technical papers will be discussed in a highly interactive format. The field of human–computer interaction is multidisciplinary and includes contributions from the human and social sciences, computer science, technology, education and design. With the widespread adoption and integration of computing and communication technology the relevance of HCI is more significant than ever before. In addition, the current advances in technology present further opportunities and challenges for practitioners and researchers within the HCI community. Specifically, the professional exploitation of multi-media technology provides a rich domain which is creating new demands for effective methods and tools. HCI'98 provides an opportunity to further investigate and develop theory and practice within all of these areas.

BCS – Formal Aspects of Computing Science: Formal Aspects of Human Computer Interaction Workshop

5 /6 September, 1998, Sheffield, UK
Submissions by 29 May
Further Info: Prof. Jawed Siddiqi, Sheffield Hallam University, School Of Computing and Management Sciences, Sheffield, S1 1WB, UK; Tel: +44 (0) 114 225 3171; Fax: +44 (0) 114 225 3161; Email: j.i.siddiqi@ shu.ac.uk; URL: http://www.shu.ac.uk//fahci/
Summary: One particular thread in HCI, that's been around for less than a decade and is the focus of this series of workshops, is application of formality to HCI. What does formality have to offer in this debate about the foundations and nature of HCI? What types of formality are relevant? What are the benefits and limitations in applying formality to HCI? Formality has a recognised place in computer science in general, and software engineering in particular, and the arguments have been frequently stated. The workshop will ask: Are the arguments justifying the use of formality in constructing software systems pertinent to HCI? To what extent does the use of formality make explicit the concerns of human factors? How do broader characterisations of formality assist in modelling and analysing interaction?

Reliability and Safety of Human-Machine Systems

6–13 September, 1998, Knossos Royal Village, Crete
Further Info: Reliability and Safety Summer School, Virginia Bocci, Laboratorio Multimediale, University of Siena, Via del Giglio, 14, 53100 Siena, ITALY; Fax: +39 577 298461; Email:school@media.unisiena.it; URL: http://www.media.unisi.it/school
Summary: There is an increasing use of automation in contexts where humans and machines interact in process control, transportation, medical systems and many other fields. The dependability analysis and evaluation of these systems requires an integrated approach, considering the hardware, software and human components and their interactions. Aim of the summer school is to help researchers and practitioners in developing the interdisciplinary competencies that are needed for the design, analysis and evaluation of human–machine systems. Lecturers will be expert senior researchers from the different disciplines concerned (human reliability and cognitive science, hardware and software dependability). They will introduce common goals, needs and problems of the different disciplines, and will describe the existing methods for quantitative and qualitative analysis and evaluation of human–machine systems. Practical work groups on case studies will help young students to link this information across discipline boundaries.

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Designing Effective and Usable Multimedia Systems: IFIP 13.2 Working Conference
9–11 September, 1998, Stuttgart, Germany
Further Info: Professor Alistair Sutcliffe, Centre for HCI Design, School of Informatics, City University, Northampton Square, London EC1V 0HB UK; Tel: +44-171-477-8411; Fax: +44-171-477-8859; Email: a.g.sutcliffe@city.ac.uk
Summary: As the multimedia marketplace becomes more crowded ease of use is becoming a key competitive advantage. Usability and effective communication are vital to ensure the success of multimedia designs and to avoid problems of information overloading. Multimedia systems are used in a wide variety of contexts such as computer supported learning, entertainment, decision support and process control. The increasing diversity of applications raises complex design issues. For example, in educational applications sound design is necessary to promote learning with maintaining the user's attention; while in decision support systems representing key information is important.This conference will bring together researchers and practitioners from a variety of backgrounds to exchange current knowledge in the area, discuss design problems and solutions for improving product usability and shape future research agendas. The aim will be to advance understanding of usability issues, quality assurance and the design process for multimedia.

5th International Conference on Object-oriented information systems
9–11 September, 1998, La Sorbonne, Paris, France
Further Info: G. Grosz, OOIS,98, C. R. I., University of Paris 1 Pantheon-Sorbonne, 90, rue de Tolbiac, 75013 Paris, France; Tel: +33 (0)1 40 77 46 34; Fax: +33 (0)1 40 77 19 54; Email: OOIS98@univ-paris1.fr; URL: http://panoramix.univ-paris1.fr/CRINFO/OOIS98
Summary: OOIS'98 addresses recent research in object-oriented concepts and principles, object-oriented methods and ools, as well as industrial projects.

7th IFIP Working Conference on Engineering for Human–Computer Interaction (EHCI'98)
14–18 September, 1998, Heraklion, Crete, Greece
Further Info: Len Bass, SEI/CMU, 5000 Forbes Avenue, Pittsburgh, PA 15213-3890, U.S.A.; Email: ljb@sei.cmu.edu; ehci98@imag.fr; URL: http://iihm.imag.fr/EHCI98 or http://www.sei.cmu.edu/~EHCI98
Summary: EHCI'98 will take place at the Knossos Royal Village, in Heraklion. It is a single-track conference organised by IFIP Working Group 2.7 (13.4). Participation is limited to 60 persons and will be by invitation: authors of accepted papers will be expected to participate. Others may attend by invitation of the General Chair. Accepted papers will be included in the Conference Proceedings, published by Chapman and Hall.

First Workshop on Embodied Conversational Characters
12–15 October, 1998, Tahoe City, California, USA
Submissions by 15 June
Further Info: Joseph W. Sullivan, FX Palo Alto Lab, USA; Email: sullivan@pal.xerox.com; Justine Cassell, MIT Media Laboratory, USA; Email**:** justine@media.mit.edu; URL: www.fxpal.com/wecc98/
Summary: Recent advances in several core software technologies have made possible a new type of human–computer interface: the conversational character. Conversational characters are autonomous, anthropomorphic, animated figures that have the ability to communicate through multiple modalities, including spoken language, facial expressions, and gestures. The primary goal of this workshop is to advance the state of conversational character research and development by identifying novel approaches to the topics and issues listed below, and integrating them into a framework for embodied, conversational human–computer interaction.

13th IEEE International Conference on Automated Software Engineering (ASE'98)
13–16 October, 1998, Honolulu, Hawaii
Submissions by 8 May
Further Info: Alex Quilici, Department of Electrical Engineering, University of Hawaii at Manoa, 2504 Dole Street, Honolulu, Hawaii 96822, USA; Tel: +1 808 956-9735; Fax: +1 808-956-3427; Email: alex@wiliki.eng.hawaii.edu; URL: http://www.ics.uci.edu/~ase98
Summary: The IEEE International Conference on Automated Software Engineering brings together researchers and practitioners to share ideas on the foundations, techniques, tools and applications of automated software engineering technology. Both automatic systems and systems that support and cooperate with people are within the scope of the conference, as are computational models of human software engineering activities. ASE-98 encourages contributions describing basic research, novel applications, and experience reports.

Fifth International Conference on Auditory Display (ICAD'98)
1–4 November, 1998, Glasgow, UK
Submissions by 6 June
Further Info: Email: For registration queries contact: icad98_registration@santafe.edu; For paper submission queries contact: alistair-icad@minster.york.ac.uk; URL: http://www.santafe.edu/~icad/ or http://www.dcs.gla.ac.uk/icad98/
Summary: Continuing the work of the successful series of ICAD Conferences, ICAD'98 will be held at the University of Glasgow, UK (previous proceedings of ICAD are on-line at http://www.santafe.edu/~icad/). This is the the first time the ICAD conference will be held outside the USA. ICAD is the premier forum for presenting research on the use of sound to provide enhanced user interfaces, display data, monitor systems, and for computers and virtual reality systems. It is unique in its singular focus on auditory displays, and the array of perception, technology, design and application areas that these encompass. Like its predecessors, ICAD'98 will be a single-track conference. Attendance is open to all, with no membership or affiliation requirements.

WebNet 98 – World Conference Of The WWW, Internet & Intranet
7–12 November, 1998, Orlando, Florida
Further Info: WebNet 98/AACE, P.O. Box 2966, Charlottesville, VA 22902 USA; Voice: 804-973-3987; Fax: 804-978-7449; Email: AACE@virginia.edu; URL: http://www.aace.org
Summary: WebNet – the World Conference of the WWW, Internet, and Intranet is an international annual conference that serves as a multi-disciplinary forum for the exchange of information on the development, applications, and research on all topics related to the Web. This encompasses the use, applications and societal and legal aspects of the Internet in its broadest sense. Organized by AACE – Association for the Advancement of Computing in Education – in cooperation with WWW/Internet businesses & industry.

ACM 1998 Conference on Computer Supported Cooperative Work (CSCW'98)
14–18 November, 1998, Seattle, Washington State, USA
Submissions by 3 April
Further Info: Tower Building Suite 1414, 1809 Seventh Avenue, Seattle, WA 98101 USA; Email: cscw98-info@acm.org; URL: http://www.acm.org/sigchi/cscw98/
Summary: The CSCW Conference is the preeminent venue for presenting research and development achievements covering the design, introduction, and use of technology that affects groups, organizations, and society. Since its inception a decade ago, CSCW has been on the leading edge of our extraordinary expansion in the uses of technology. CSCW'98 will play an important role in framing and extending the discussion about technology's role in work and the home.

EuropIA'98 CYBERDESIGN: Media, Communication and Design Practice
28–29 November, 1998, Paris, France
Submissions by 12 June
Further Info: Delia Atherton, University of Paisley, Department of Computing and Information Systems, Paisley, PA1 2BE, Scotland, UK; Tel: 44 41 848 3300; Fax: 44 41 848 3542; Email: ATHE-CI@paisley.ac.uk; URL: http://www-cis.paisley.ac.uk/europia98/
Summary: This conference brings together researchers in design, architecture, engineering, construction management, cognitive science, computer science, artificial intelligence, sociology, geography and education as well as industry partners, practitioners and other users of media communications.
The focus for this diverse group is media communications in design practice – what type of media we use in design practice and what types of media communications tools are available to us – appropriating recent exciting developments in media communications for local area and/or wide area networks, new media types for interaction, and communications tools for multimedia.

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Getting Involved…

We are always looking for people interested in contributing to HCI group activities by, writing for Interfaces magazine, helping run the annual conference or joining the executive. If you are able to contribute in this way or if you have ideas for 1-day meetings or new activities please contact the membership secretary, Ismail Ismail (I.Ismail@cs.ucl.ac.uk; Fax. 0171-387-1397).

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Hands across the screen

why scrollbars are on the right and other stories

Alan Dix

Why are scrollbars on the right, and is it the best place for them? There are good reasons to think that the left-hand side may be the better choice, but in virtually every interface since the Xerox Star the scrollbar has appeared on the right-hand side. In this short paper we'll look at this issue and also at the design of a browser several years ago, which raised similar issues in the placement of on-screen buttons. In both cases, the best placement does not look right when you see it statically, but feels right when it is used. The reason for this discrepancy is an aversion to virtual hands across the screen.

Just another scrollbar

After typing, using a scrollbar must be one of the commonest actions in a graphical interface. As with all common widgets, it is easy to assume that there is nothing interesting in its design. Of course, there have been extensions to the basic scrollbar, such as Ahlberg and Shneiderman's (1994) Alphaslider, or Brewster et al.'s (1994) auditory-enhanced scrollbar, and if you look back at older scrollbars, the mode of interaction is sometimes quite different. Also there are variations in current scrollbars: in the buttons placed at top and bottom (one arrow top and bottom, both at one end, both at both ends), in the information added to the scrollbar itself (e.g. miniature view of the document lines), in the feedback from the window (continuous while the scrollbar is being moved or jump scrolling when it is released). However, the basic current scrollbar design is taken for granted.

Sinister positioning?

Think of the reason for using a scrollbar. You have a document or list and want to find something. So you scroll a bit, examining the document as you go until you find the required position in the text or list. Now, consider your eye movement throughout this. For English and European languages the text is read from left to right and, furthermore, for lists of titles or names, it is usually the first few characters or words that are significant in identifying whether you are at the right place. So, your eye has to constantly scan from the scrollbar on the right (which you are controlling with a mouse and thus need to look at) to the start of the text on the left. To feel this in the extreme, try resizing a window to make it very wide and short and then scroll to find something.

Brewster et al. describe 'kangarooing'. This happens on scrollbars where the user can click on the scrollbar below the handle (or 'thumb') causing the window to jump down a screenful. However, when doing this, at some point the handle jumps below the current mouse position and so the page jumps back *up* on the next mouse click, then down again, etc. If the material is being quickly scanned it may not be apparent at first that this is happening and it is certainly confusing for both novice and expert. As Brewster et al. point out, the feedback of the moving scrollbar can be quite small, hence is easy to miss *even if you are looking at it*, which, given the important information is on the left of the screen, it is highly unlikely you will be.

So for both drag scrolling and jump scrolling the position of the scrollbar is problematic and it seems likely that the left-hand side is a better design choice. Why then are virtually all scrollbars on the right?[1]
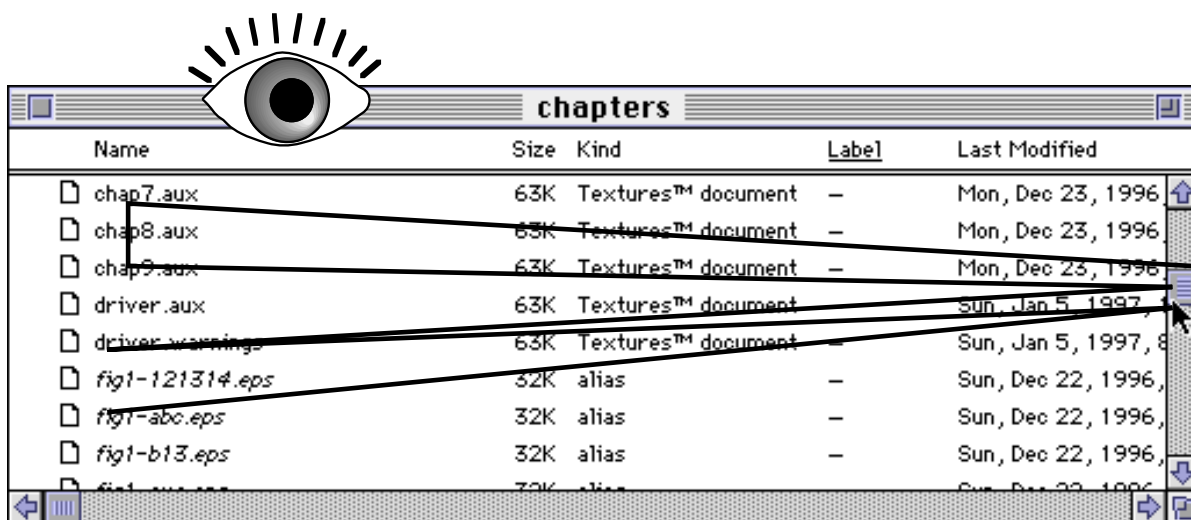

Figure 1 **Rapid eye movement**

1   See the appendix for an exception with a left-hand scrollbar.

Hands across the screen

Origins?

In fact, the early scrollbars in the Smalltalk and Interlisp environments (the direct ancestors of our current WIMP interface), had user-configurable scrollbars, which could be made to appear either side. But the default and norm was on the left. In fact, the Interlisp scrollbar had a quite different interaction from current ones, with velocity-based scrolling, and the curious behaviour whereby the scrollbars appeared as you moved off the left of a window. The design choices around the latter were one of the early examples studied using QOC design rationale (MacLean et al. 1991).

The history of the change from left to right puzzled me for some years, but it was only recently, on a visit to Rank Xerox's Cambridge laboratory, that I first saw a demonstration of GlobalView, the Xerox Star desktop interface. Its scrollbars were on the right (see right here). So the right-hand-side scrollbar appears to have begun there and has been inherited since by the Apple Lisa, followed by the Macintosh, and is now in virtually all windows interfaces.

Of course, this still leaves the question of *why* the scrollbar moved to the right.

A digression – arrows

While examining the Star scrollbar it is worth noting two differences from many current scrollbars. First of all note the '–' and '+' buttons. These scrolled back to the top of the current page, or on to the top of the next page respectively. This feature is available on some current scrollbars (e.g. Microsoft Word 6.0). Less obvious is the direction of the arrows. Compare them with your screen. Current arrows tend to point outwards, whereas the Star arrows pointed inwards. It is not that the functionality has swapped round, just the icon and the action metaphor. In the Star interface the arrows pointed in the direction the text would move in the window, the current designs point in the direction the window will move in the document. This is a fundamental problem that cannot be removed: as the text goes down, the handle goes up. The only scrollbar I have seen that avoids this paradox was in the Spy editor (produced by Rutherford Appleton Laboratory for the PERT workstation), which had the scrollbar arranged horizontally across the top of the document!

A similar problem

Before returning to the question of why the scrollbar is now on the right, I'll recount a design story with a similar problem.

Some years ago I worked on a project that,
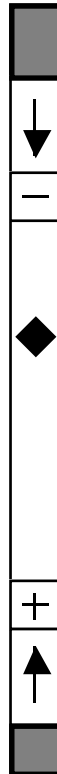
amongst other things, compared various designs for browsers. The first experiments compared a hypertext browser with one using an outliner style and one using a plain scrolling window (Monk et al. 1988). The last of these was to have two forms of navigation (Figure 2), a scrollbar and page up/down controls. Along the top of the screen was a scrollbar that showed the current position in the document. The user could move to any location by clicking on the scrollbar (no dragging) and was helped in this by the display of section numbers at appropriate points. Now, this was not too long after the publication of Card, Moran and Newell's (1983) classic and the performance implications of KLM were foremost in the minds of the psychologists on the project. In particular, they wanted to avoid the 'homing' time between mouse and keyboard and so we made all controls screen based, using the mouse, with no keyboard controls or short cuts. For page up/down scrolling we thus eschewed the keyboard and decided to put arrow buttons (yes, much agonising over the arrow directions) on the screen. These were positioned to the bottom right as seen in Figure 2.

From the beginning something 'felt' wrong with the page up/down buttons. The keyboard seemed easier to use even though you had to move back and forth from the mouse. However, to give a level playing field with the other browsers the scrolling browser was limited to screen-only controls.

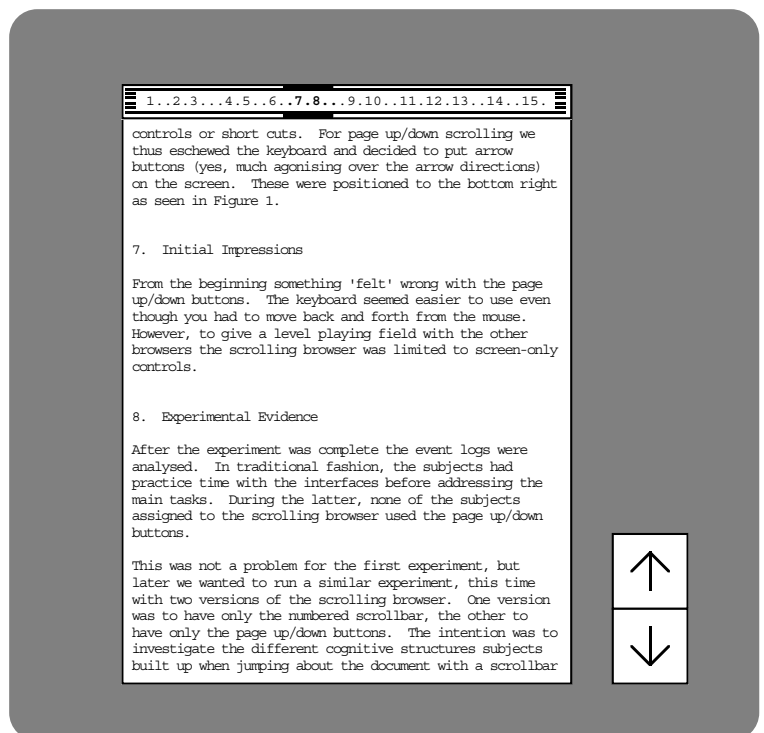After the experiment was complete the event logs were

Figure 2 **Browser – initial design**

Alan Dix

analysed. In traditional fashion, the subjects had practice time with the interfaces before addressing the main tasks. During the latter, *none* of the subjects assigned to the scrolling browser used the page up/down buttons.

This was not a problem for the first experiment, but later we wanted to run a similar experiment, this time with two versions of the scrolling browser. One version was to have only the numbered scrollbar, the other to have only the page up/down buttons. The intention was to investigate the different cognitive structures subjects built up when jumping about the document with a scrollbar compared with scrolling through the document sequentially. However, to be a valid com-parison the two designs had to be equally usable, but the users had very clearly voted with their feet (or at least mice) and it was evident some redesign was necessary.

At this point we needed to move from a vague feeling that something was wrong to a critical analysis of the problem. First of all, why did the keyboard 'feel' OK, despite having to move back and forth from the mouse. A little self analysis showed that one could glance down at the keyboard and then return one's eyes to the screen without watching for the finger to strike the right key. After having fixed the button in space, our well-honed motor system is well able

Figure 3 **Browser – redesign**

take over in parallel. Furthermore, it was very easy to re-fixate on the place where one left the screen. It is almost as if one had a visual stack, or hypertext 'back' button to return to the last gaze point. In contrast, to 'press' the on-screen page up/down buttons, one had to position the mouse over the correct button. This positioning task appeared to interfere with the ability to re-fixate. Also, until after the positioning was complete, one could not return one's eyes to the screen and this typically happened after the button was clicked.

These differences with the buttons were aggravated by the disorienting nature of bitmap scrolling. On older character-map terminals the screens would often scroll line-by-line upwards or downwards allowing the user to see where text was going to or coming from. In fact, Bornat and Thimbleby (1986) deliberately designed screen update policies to promote the correct feeling of movement. In contrast, bitmap screens tended to flash between one view and the next. This has not improved and the word processor I am currently using always redraws lines from the top to the bottom no matter which direction you scroll!

Having realised that the crucial issue was disorientation we were able to create a design for on-screen buttons by two simple expedients. First, the page up/down function was modified so that a section heading always snapped to the
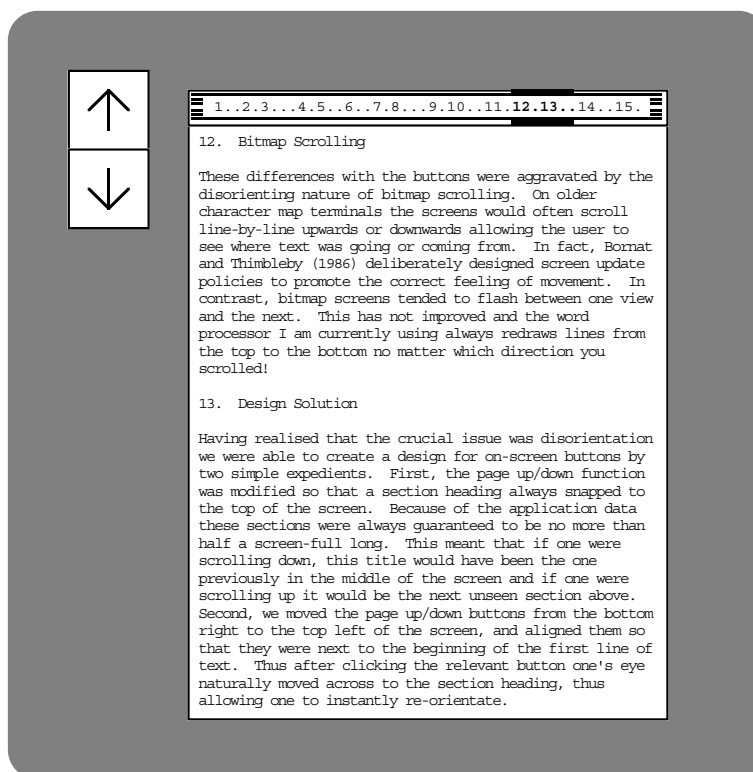
top of the screen. Because of the application data these sections were always guaranteed to be no more than half a screenful long. This meant that if one were scrolling down, this title would have been the one previously in the middle of the screen and if one were scrolling up it would be the next unseen section above. Second, we moved the page up/down buttons from the bottom right to the top left of the screen, and aligned them so that they were next to the beginning of the first line of text. Thus after clicking the relevant button one's eye naturally moved across to the section heading, thus allowing one to instantly re-orientate.

The difference was phenomenal. Suddenly it became natural and easy to use. This design issue was not the focus of our work, so we never verified the difference experimen-tally. However, the effect was so marked that experiment was unnecessary.

Success! But why did we automatically put the buttons at the bottom right and why, even after verifying that it 'felt' right, did it still look wrong at the top?

Hands across the screen
Alan Dix

Hands across the screen

It was only years later when considering the right-handed scrollbar that the answer to both conundrums became clear. The right-hand side looks right because to grab a scrollbar on the left, or to press a button on the left would mean your hand would have to move across the screen. Wait – of course your hand doesn't really have to move across the screen, the mouse does, but it feels as if it would have to! In fact, for a touchscreen, light pen or stylus, the right-hand side is a good idea, but not on-screen. Anyway, what about the left-handed user…?
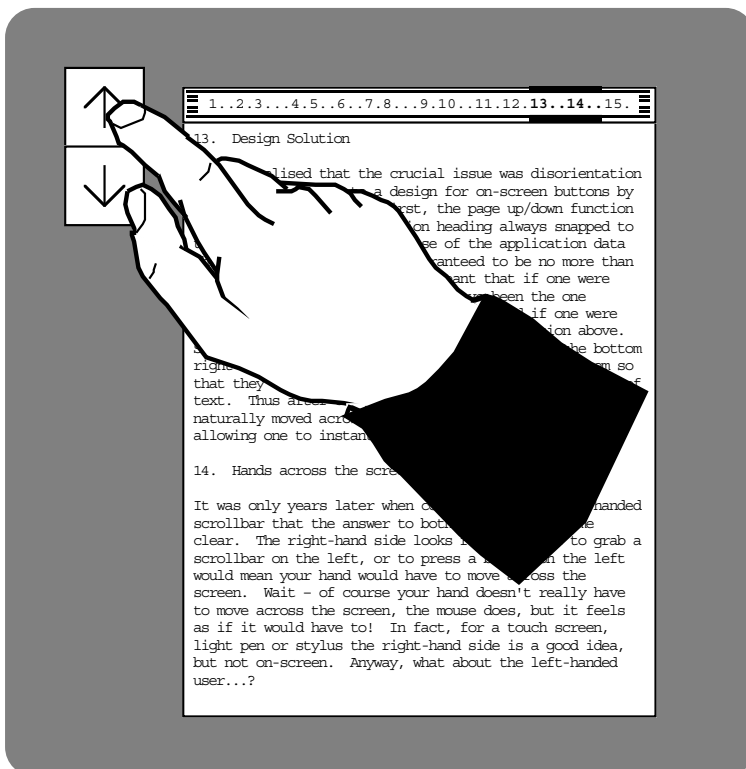
Figure 4 **Hands across the screen?**

C. Ahlberg and B. Shneiderman (1994). The Alphaslider: a compact and rapid selector. *Proceedings of CHI'94*, Boston, ACM Press. pp. 365–371.

R. Bornat and H. Thimbleby (1986). *The life and times of ded, display editor*. Queen Mary and Westfield College, University of London.

S. A. Brewster, P. C. Wright and A. D. N. Edwards (1994). The design and evaluation of an auditory-enhanced scrollbar. *Proceedings of CHI'94*, Boston, Massachusetts, ACM Press, Addison-Wesley. pp. 173–179.

S. K. Card, T. P. Moran and A. Newell (1983). *The Psychology of Human Computer Interaction*. Lawrence Erlbaum.

A. MacLean, R. Young, V. Bellotti and T. Moran (1991). Questions, options and criteria: elements of design space analysis. *Human–Computer Interaction*, **6**: 201–250.

A. F. Monk, P. Walsh and A. J. Dix (1988). A comparison of hypertext, scrolling and folding as mechanisms for program browsing. *People and Computers: From Research to Implementation – Proceedings of HCI'88*, Cambridge University Press. pp. 421–436.

Appendix – the exception proves the rule

Although most scrollbars are now found on the right, I have come cross one recent exception, the scrollbar on the Anubis Mounter control panel. This is a Macintosh utility for mounting SCSI devices whilst the Macintosh is running, avoiding having to shut down and restart the machine every time a device is added. The control panel has a 'designer' style very different from the normal Macintosh look and feel. Because of this it does not use the standard Macintosh built-in widgets and hence the builders had free reign.

In fact the left-hand scrollbar is particularly important in this control panel. With scrolling text the reader's **locus of attention** is on the initial letters of each line – on the left. In the Anubis Mounter, the interface has an outliner style showing a hierarchy: SCSI bus – drive – partition. To hide or reveal items within this hierarchy the user clicks on the small triangles to the left. That is, not only is the locus of attention on the left, so also is the **locus of action**. Thinking back to Figure 1, if Anubis Mounter had a right-hand scrollbar, this would be the pattern of not just eye movement, but mouse movement as well!
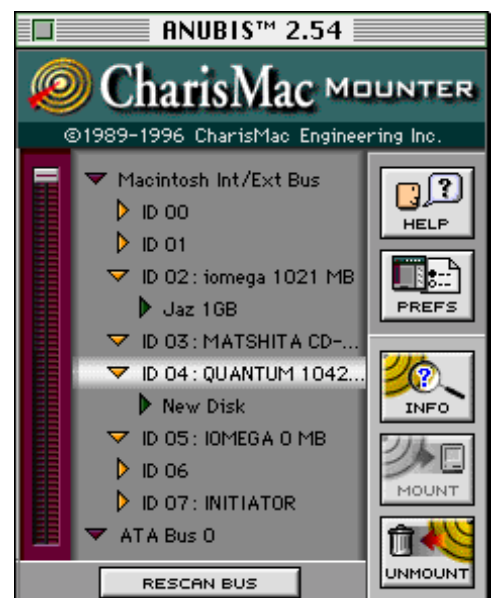
Alan Dix
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email: A.J.Dix@soc.staffs.ac.uk
http://www.soc.staffs.ac.uk/~cmtajd/

Foreign interactions

Russell Beale

Aotearoa – "land of the long white cloud", the Maori call New Zealand; soaring mountains, lush valleys, fire and ice, surf and ski. If you're lucky, you'll spot a Weka – a small, flightless bird that forages mainly at dusk, in a wide range of habitats. Alternatively, your Weka experience may be because you're involved with the machine learning project of the same name at the University of Waikato. Not all the projects at the University have such environmentally inspired names: another big project there is called NZDL – no feathery mascot for that project! Combine these projects with the climate, the wonderful outdoor opportunities the country offers, add in other research in CSCW, graphics and visualisation, and an invite to the University of Waikato proved too irresistible to miss.

I was at the Department of Computer Science from February for 6 months last year (1997). The NZDL and machine learning groups shared a recently refurbished lab, and I spent much of my time in there, despite being provided with my own office. Well-equipped and lively, the lab was a cauldron of ideas, activity and life. Research students, some undergraduates doing projects, a smattering of research associates, and a regular wander-through of staff contributes to a rapid interchange of ideas, thoughts and gossip, and I was rapidly absorbed into that community.

The style and pace of life in New Zealand was good. I roller-bladed to work in shorts and tee-shirt, cap on head and sunblock on my nose and lips. We sauntered to the café for lunch barefoot, sunglasses firmly in place. I roller-bladed back from work – but that was a mistake. I could go forwards, and turn right. Left wasn't so hot, and stopping was a definite no-no. Back from work had a long downhill in it; there I was, all bent knees and balanced arms – and there was a bump, and there I was, all bent knees and flailing arms, and there was a bend, and there I was, all green knees and scratched arms, parallel furrows stretching across a lawn, bits of ex-hedge scattered behind me.

Situated in Hamilton, an hour and a bit south of Auckland, we were well served with restaurants, barbecues, parties and hospitality. The beer's

great too. Waikato has a fair smattering of ex-Brits who have left the RAE-race behind them, and liked nothing better than to sit in the pub and sup away as the Conservatives lost power in Britain. People are really friendly – within an hour of arriving in the University, someone who I'd never met had arranged to lend me their car for a week whilst I got myself sorted out with transport. It was a classic car, too – a Volvo, faded to powder blue by the sun, of roaring engine and some amazing mechanism by which the power that bellowed from the bonnet was somehow stopped from actually driving the wheels. It had a resident spider, great at spinning webs over the windscreen. It went well in a straight line, but cornering wasn't its strong point. Still, I got to work, to the shops, to town – and to the second-hand car yards pretty quick. Thanks Geoff!

With administration hassles left behind, I could concentrate on my personal research agenda (AI in HCI, learning to turn left on blades, that sort of thing), and was given a free hand to dabble in interesting aspects of the ongoing research of the various groups. The New Zealand Digital Library is a huge effort of collation and dissemination in both English and Maori of technical and newspaper information. Based upon the MG database engine ("Managing Gigabytes"), the NZDL offers a web-based interface to a number of collections of digitised material,

indexed at the word level. We discussed the issues that offering a web-based interface to the NZDL presented, and the specific problems raised by digital libraries. Much time was spent on examining strategies for dealing with search requests containing multiple words. In a full-text indexed system, deciding the granularity of search scope is a non-trivial matter. For example, if the document in question is a book, there is a high chance of the search words occurring within it somewhere. Should there be a notion of adjacency? If so, is it at the next word level, or within the same sentence, or paragraph, or page, or chapter. Or do you weight these differently? And if you do, how do you rank two documents, one of which contains all the search terms somewhere but not close, with the other having most of the terms within a page, but missing a few vital ones. And if this seems a trivial issue, examine your own behaviour on the web search engines. How often do you look at the third or subsequent pages that a query has returned? I know I rarely do – I use those systems that return my sort of results on the first page, and am happy to ignore, if not damn out of hand, those that do not. The NZDL team ran a number of informal user trials on different strategies, and developed their own ranking policy. To see if it works, try it yourself! Check it out at <http://www.nzdl.org/>.

Foreign interactions

Figure 1 **The NZDL web interface
presenting query results**

Searching the NZDL promoted us to take a closer look at people's strategies for electronic searches; this scenario is typical:

"let's look for stuff on *visualisation* – hey, more than a thousand hits, let's be more specific…

visualisation and graphics… let's flick down this list of things… hmmm, I like that, and that one could be useful, but I'm not sure about these.

Let's try '*visualisation and graphics and animation*' to cut those out…

Oh, no, that's far too specific – I don't want any of those. Back to '*visualisation and graphics*' but let's add '*colour*' too – now, that's better…"

Russell Beale

Essentially a process of selective refinement, queries start off fairly general and get added to in order to be more specific and return a manageable number of documents. However, the addition of terms to one query often doesn't return the type of results we are looking for, so we return to an earlier query and try to refine that. There is little support for this type of strategy; the best that is offered is a shorthand for an earlier query, which can have terms added or can be combined with another query. Whilst this speeds up the process of iterative refinement, it offers no help in actually relating the results of the different queries to one another. We

decided that, since people often backtracked through their query history, and explored alternative paths, offering some form of support for this process would be beneficial. In addition, people actually look at a subset of the documents returned in order to decide if their query has been successful or not – any support system should recognise this.

We developed a visualisation of users' search strategies that offered a wider perspective on the search. For more information see "Visualising sequences of queries: a new tool for information retrieval", Beale R, McNab R.J. and Witten I.H. (1997) *Proc. IEEE Conf. on Information*

Visualisation, pp 57–62, London, England, August. <http://www.dlib.org/>

A visualisation of a simple search is shown in Figure 2. This is a 3-D "dandelion head" – the central node represents the query, and the outlying spheres the documents returned by that query. The size of the node represents the document size: the closer the node is to the centre, the higher the degree of match between the document and the query. Clicking on a node takes you to the NZDL copy of that document. A second query can be issued, and the visualisation alters to that of Figure 3.

Figure 2

Figure 3

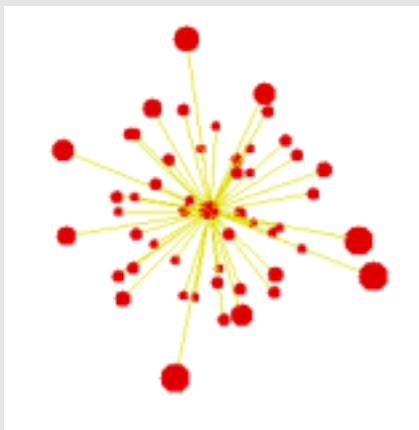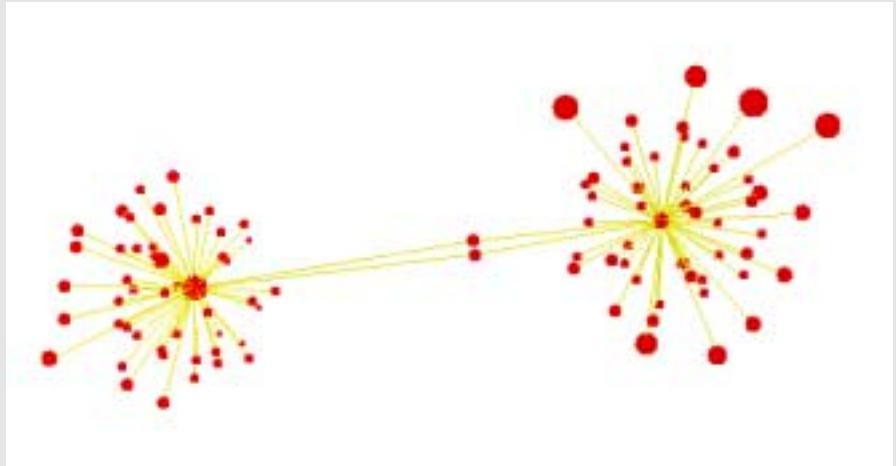The original query is on the right, the new one on the left. Note that two documents match both queries, hence are linked to both. However, they match the first query more exactly than the second. Figure 4 shows two more queries issued after the first couple, new queries appearing to the left each time. More documents are in common, though never with more than two queries at any one time.

Figure 4

The Usability Maturity

Foreign interactions

These 2-D static representations are useful: the full system is animated 3-D and much easier to interpret. The results of query combinations can be seen easily; it is simple to backtrack to an earlier query and refine that; the number and relevance of documents returned can be easily seen, and so on. And users liked the system!

This system was produced using an agent-based approach developed at Birmingham: the agent observed the standard NZDL queries, processed them and sent the visualisation system the relevant instructions. It also interpreted input from the visualisation and controlled the NZDL engine. This approach allowed us to integrate existing systems relatively easily. The agent-based work was also discussed with the CSCW group, led by Mark Apperley, who are working on developing a CSCW IDE. This project is in the process of being expanded to consider collaborative information gathering in the large unstructured electronic environments becoming common today, and looks likely to produce some important results.

More information on the department can be found at `<http://www.cs.waikato.ac.nz>`. Space limits further discussion of their work here, and I've not even mentioned the bungy jumping, jet boating, underground rafting, mountain climbing or sailing that went on. My thanks to Prof. Mark Apperley for the invite, to the machine learning and digital library groups for putting up with me, and to Steve, Steve, Ian, Stuart, Geoff, Roger, Kirsten, Dave, Mark and Marion (and also their partners) for such a great time. Thanks also the School of Computer Science at the University of Birmingham, who seemed to manage just fine in my absence.

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1. Summary: The INUSE Usability Maturity Model

The EC INUSE project has developed the Usability Maturity Model (UMM). This is a model of the processes which make a system human-centred. The UMM is based on ISO 13407 and complies with ISO 15504. It includes a scale for measuring an organisation's attitude towards human-centredness. The UMM has been reviewed widely and is undergoing a programme of evaluation and trials with a range of industrial organisations.

2. Background: usability maturity modelling

A wide range of usability engineering methods are available. In order to make best use of these methods they need to be integrated into an organisation's product development process. This integration should take account of the current state of the organisation's usability process and its overall attitude to usability. This requires an assessment of the capability of the organisation against a reference model of human-centred process. The EC INUSE[1] project (IE 2016) has developed a range of process assessments designed to suit the wide variety of organisational approaches to process issues. These are based around a scale of human-centredness and a model of human-centred processes. The scale and the processes can be used in combination with general process assessment techniques to carry out a range of assessments.

2.1 Selection of a suitable assessment approach

There are several approaches to assessment of usability maturity. Which is appropriate for an organisation will depend on the resources available, the degree of management commitment and the importance of usability in the systems produced. Rigorous approaches are likely to find acceptance in organisations which already carry out process assessment. Lightweight, organisational assessment against the human-centredness scale is likely to be a first step by an organisation. First party assessment is likely to be used in problem solving, or by organisations used to total quality approaches. The following sections describe the range of alternatives. The following two sections describe the tools available from INUSE and the next three sections describe different levels of rigour in assessment.

2.2 Organisational human-centredness assessment

This is a fast evaluation of an organisation's attitude to usability and the users of its systems. The assessment uses the *scale of human-centredness* and is checklist-based. It gives a rating in the form of a level of maturity on a scale of *Avoidance* to *Innovation*. The result is an overview of how important user issues are to the organisation. The result of an assessment would be used as a 'health check' of the organisation, as a diagnostic tool by a HF consultant or in planning a more detailed assessment.

2.3 Human-centred process assessment

This is a capability assessment against the *human-centred process model*, a model of the activities carried out during the development and use of a system. The model is compliant to ISO 15504, Software Process Assessment. The 15504 capability scale is used to give a measurement of how well the organisation carries out the human-centred activities. One or more projects are assessed and the results averaged to give a clear picture of how well the organisation is doing and managing human-centred activities. In order to give a more complete picture of the organisation's activities, selected processes from other models can be added to the processes covered by the assessment.

2.4 First party assessment

A first party assessment is a workshop-style consultative activity in which HF experts work together with a project or department. The *human-centred process model* is used as a description of good practice. How these activities are enacted by

Model

A new, public-domain model of human-centred processes   ***Jonathan Earthy***

the project or department is discussed by the participants. The group then decides if improvements are required and undertake actions to bring them about. Several HF consultants may be involved in order to lead the discussion and provide on-the-spot technical advice.

2.5 Second party assessment

A second party assessment is more formal and structured. The *human-centred process model* and a capability scale, such as the ISO 15504 scale, are used as the basis of interviews with a range of project staff. A record is made of the degree to which each process is carried out, and how well the processes which are fully-performed are carried. This recording is either on a specially prepared *assessment instrument* or with a computer-based assessment tool. The results are collated and presented in a formal feedback session. The management of the department and the process improvement consultants discuss the findings and prepare a process improvement plan. The department or project is re-assessed after the plan has been carried out. The benefit of a second party assessment is improved accuracy of result and a greater degree of certainty that the results obtained reflect actual practice.

2.6 Third party assessment

A third party assessment is a more rigorous version of a second party assessment. It is carried out by a separate organisation (neither the assessee or the process improvement consultants). This form of assessment is most often performed to benchmark a set of organisations or, more commonly, to certify an organisation's level of capability as a service provider or sub-contractor. Third party assessments tend to be more rigorous, are formally reported, run to a required level of quality and take longer than second party assessment. Repeat or surveillance assessments are made at regular intervals.

3. The product: The INUSE Usability Maturity Model

The INUSE Usability Maturity Model, also known as the UMM, is a synthesis of ISO DIS 13407 *Human-centred design processes for interactive systems*, IBM's work on *Usability Management Maturity*, the BAeSEMA *Total Systems Maturity Index* (TSMI), the Philips *HumanWare model*, the British Computer Society HCI Group *Industry structure model*, and Eason and Harker's *Human system maturity model*. Examples of the use of an HC maturity model are:

- a high level plan for setting up usability activities
- the basis of improvement activities to identify and resolve barriers to effective exchange of usability information
- assessment of the capability of sub-contractors or service providers
- benchmarking of usability processes within an organisation or in relationship to its competitors.

The model is sufficiently based on the structure of SPICE to make it compliant to ISO TR 15504 *Software Process Assessment*. However, in order to make it understandable and more flexible in use it is presented as a set of processes based on the processes described in the forthcoming international standard for human-centred design activities for interactive systems ISO 13407. These processes cover the core activities common to the management, planning, specification, design, testing and support of systems. The five ISO 13407 processes are augmented by two extra processes, one covering activities associated particularly with commercial products and one covering activities associated with large, long-term, more socio-technical projects such as management information and defence systems.

To further assist in flexibility the model is presented in two forms:

1. as a process model, **UMM:P**
2. as a scale for the measurement of organisational human-centredness, **UMM:HC**.

The former is intended for use by fairly mature organisations with established HF processes. The latter is more suitable for organisations which are new to human factors or which have a more TQM-orientated approach to system development. The two forms are described in the following sections.
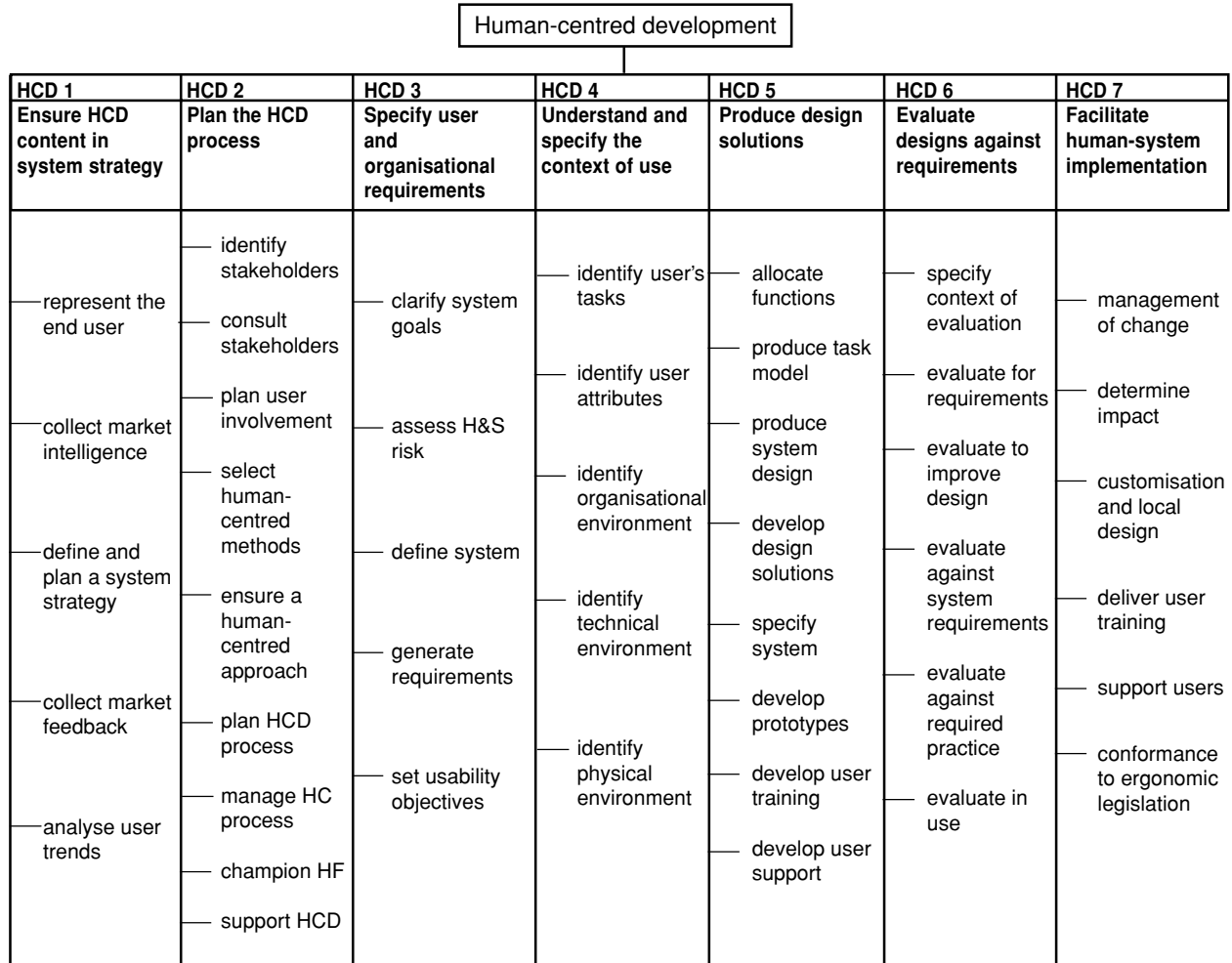
3.1 The process model – UMM:P

The process part of the model consists of seven sets of Base Practices. These practices describe what has to be done in order to represent and include the users of a system during the lifecycle. The contents of the model can be summarised as a process hierarchy (see overleaf).

Assessment of capability in any process is made using the standard ISO 15504 capability scale. The processes in the model are linked and human-centred lifecycles are iterative.

For users who wish to add UMM processes to software process assessments the model includes mappings to ISO 15504, the Capability Maturity Model (CMM) and the Systems Engineering CMM. It should be noted that the mapping of the UMM processes onto other processes extends well beyond the engineering process in the CMM or ISO 15504. Human-centredness in a project or organisation affects many areas including the customer–supplier relationship, the support of the development

The Usability Maturity Model

Human-centred development						
HCD 1	**HCD 2**	**HCD 3**	**HCD 4**	**HCD 5**	**HCD 6**	**HCD 7**
Ensure HCD content in system strategy	**Plan the HCD process**	**Specify user and organisational requirements**	**Understand and specify the context of use**	**Produce design solutions**	**Evaluate designs against requirements**	**Facilitate human-system implementation**
— represent the end user	— identify stakeholders	— clarify system goals	— identify user's tasks	— allocate functions	— specify context of evaluation	— management of change
— collect market intelligence	— consult stakeholders	— assess H&S risk	— identify user attributes	— produce task model	— evaluate for requirements	— determine impact
— define and plan a system strategy	— plan user involvement	— define system	— identify organisational environment	— produce system design	— evaluate to improve design	— customisation and local design
— collect market feedback	— select human-centred methods	— generate requirements	— identify technical environment	— develop design solutions	— evaluate against system requirements	— deliver user training
— analyse user trends	— ensure a human-centred approach	— set usability objectives	— identify physical environment	— specify system	— evaluate against required practice	— support users
	— plan HCD process			— develop prototypes	— evaluate in use	— conformance to ergonomic legislation
	— manage HC process			— develop user training		
	— champion HF			— develop user support		
	— support HCD					

process and the management of the project and organisation. The model also has a wider scope than the CMM or ISO 15504. It covers all of system engineering, not just software development.

3.2 The Human-centredness Scale – UMM:HC

The Human-centredness Scale is more concerned with measuring organisational attitude to human-centred design activities. It concentrates on how human-centred work is managed in projects and by the organisation in general. The Human-centredness Scale comprises the levels shown (right), each of which comprises one or more attributes.

These levels are based on the

ID	Title/attribute	Management attitude (pace Crosby 1978)
Level X	**Avoided** (no indicators)	*"We don't have problems with usability".*
Level A A1 A2	**Needed** Problem recognition Performed processes	*"We don't know why we have problems with usability."*
Level B B.1 B.2	**Considered** Quality in use awareness User focus	*"Is it absolutely necessary to always have problems with usability?"*
Level C C.1 C.2 C.3	**Implemented** User involvement Human factors technology Human factors skills	*"Through management commitment and improvement of human-centred processes we are identifying and resolving our problems."*
Level D D.1 D.2 D.3	**Integrated** Integration Improvement Iteration	*"Usability defect prevention is a routine part of our operation."*
Level E E.1 E.2	**Institutionalized** Human-centred leadership Organisational human-centredness	*"We know why we do not have problems with usability."*

Test Scenario

Jonathan Earthy

For the application of human-centred tools, methods or metrics

BAeSEMA TSMI levels, but the model realises and describes the attributes of each level in terms of sets of organisational management practices which are performed at each level. Assessment against the scale is similar to assessment against the ISO 15507 capability scale.

4. Availability and development

The whole model is described in two documents. These have been reviewed extensively through trials and the Human-Centred Process Improvement Group (a forum of leading industrial usability practitioners established by INUSE). The model and supporting fact sheets are available on the INUSE www site (**www.npl.co.uk/inuse**). The UMM processes will be proposed as a New Work Item to ISO TC159/SC4/WG6 in April 1998 and are to be included in the forthcoming Systems lifecycle process standard ISO 15288.

5. Source documents

ISO DIS 13407, Human-centred design processes for interactive systems.

ISO TR 15504 Part 2, Software process assessment - A reference model for processes and process capability.

ISO TR 15504 Part 5, Software process assessment - An assessment model and indicator guidance.

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Sherwood-Jones B. (1995) Total Systems Maturity. Internal report, version 2. BAeSEMA, 1 Atlantic Quay, Broomielaw, Glasgow G2 8JE.

Requests for information about the model should be directed to its lead developer:
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How to use this scenario

There is a great deal of activity in the HCI, Human Factors, Usability Engineering community concerned with tools, methods and metrics. In order to demonstrate that such tools, methods and metrics are usable in the context of a real project, it was felt helpful to propose a hypothetical context of use. Clearly the scope of describing use of a specific tool, method or metric depends on *its* scope, thus ISO 9241 or SSADM 4+ would affect many aspects of the whole life cycle and many stakeholders, while a workload prediction tool might have a much more localised context of use.

Readers are invited to submit entries to show how a specific tool, method or metric might be used in the context of the scenario given here. The most promising entry and the most entertaining entries will be awarded prizes (Whisky) by a panel made up of members of the Human Centred Process Improvement Group.

BACKGROUND

The Ambridge Building Society (ABS) has become a bank. In order to raise the revenue needed to pay for the windfall handouts, the board has decided to sell personal pensions. Following the board meeting there are the following centres of activity:

The business development group is defining a set of products, deciding suitable launch dates and marketing. Projections of market share, numbers of sales and customer profiles are being made. They have decided to sell them over the counter at branches rather than direct sales or over the Internet. The group has brought in MAMMON management consultants to help with the business planning and product development. MAMMON were involved in the flotation and know that ABS need to lose 20% of their counter staff to meet financial predictions.

The compliance group is devising a strategy to avoid mis-selling in the light of the damage to Prudential and others from mis-selling personal pensions. They were concerned at the complexity of personal pensions compared to building society products and that counter staff would be unable to cope with this. However, they have been assured that the new computer system will supply the necessary support, backed up with the open learning resources coming on stream. (One of the compliance group used to work for CIS and has a fair idea of how long it takes to complete a personal pension sale in the client's home).

The human resources department is considering a range of new terms and conditions of employment with a big move to performance-related pay. If pensions sales meet the business development department projections, then 25% of counter staff take-home pay will be a function of successful pensions selling. They realise that both technical and personal development training will be required and have contracted Row and Holdall (R&H) to conduct a corporate training analysis and plan.

The IT department was considering a new infrastructure as part of the move to a bank; the choice was between Java and thin clients or NT LANs and a separate WAN structure. They would like to make the pensions applications the lead

Test scenario

Brian Sherwood Jones

item on the new computer system while they solve the problems of transferring legacy software. Either way, the user interface will be windowing and therefore easy to use. The IT department knows it is under some threat of outsourcing. Partly to counter this it is talking to John Wayne Facilities (JWF) with the intent of placing and managing a subcontract on them for the supply of the new infrastructure, and possibly the pensions software.

The union, BIFFO, has its mind firmly fixed on avoiding redundancies and negotiating satisfactory conditions of employment. It had an unfortunate run-in with ABS some years back on working conditions and is disinclined to consider IT-related stress. Further, it is aware that the CEO of the HSE has said that they will not be policing the Display Screen Equipment Regulations.

The CEO of ABS has sent her husband (Mr Archer – he changed his name) to evening classes in user-centred design in the hope that he can get a good job at the end of it. He came back very enthusiastic about <insert your tool, method or metric here>. In return for him taking the children to Woolley's Burger Bar (he is a vegetarian) she agreed to send copies of the report of <insert your tool, method or metric here> to all heads of department.

There are a number of ways that this scenario could evolve. Please describe how specific stakeholders would use <your tool, method, metric> for one or more of the following options (add your own options as you see fit). Make sure that its use has commercial benefits to those who are to use it.

SPECIFICATION

Option A - in-house IT
Mrs Archer asks the IT department to write specifications for the infrastructure and for the pensions application software, emphasising that while she would be pleased to have the work done in-house, it will have to go to competitive tender.

Option B - in-house multi-disciplinary
Mrs A asks each of the centres of activity to second someone to a working party to write the specification, led by the business development group. She has asked a member of the Borchester counter staff – Shula – to act as a user representative (Thursday afternoons). It is expected that while the business group are in charge of the requirements specification, it will go the IT dept to be turned into a full procurement specification.

Option C - sub-contract
Mrs A asks for quotes from JWF, MAMMON and Gabriel Consultants to write the specification. Gabriel Consultants win by £10.

IMPLEMENTATION

Option A - business-led IT change
The board has considered a number of papers by the ABS centres of activity and has opted to place a performance-related Business Process Re-engineering (BPR) programme with MAMMON who will supply the necessary IT applica-

tions to support this. The leading application will be pensions. The IT department has decided to go with Java, and JWF will be installing the infrastructure (only). The legacy ABS software will be treated as 'middleware'. Database development and updating will be done by the IT department; MAMMON will do the user interface and any front-end development. Quotes from R&H and MAMMON (Training) both proved too expensive for the implementation of the training plan, and so training requirements will be specified in-house, as will the development of classroom courseware. Video training material will be sub-contracted to Fawlty Towers Video (FTV). CBT and on-line help will be done as part of the MAMMON IT contract.

Option B - Learning organisation
Mrs Archer has decided that IT is too central to the future of financial services to be handed out to greedy contractors and consultants. She has given the go-ahead for NT-based LANs to be set up in each major branch, and appointed IT gurus to each branch for applications development. The IT department will develop the WAN, and be responsible for software engineering aspects such as version control. Training requirements will be defined by the human resources department working with the local branches. Training material development will be done by R&H. Branches have been given tight personnel budgets which will be difficult to meet with early retirement, but natural wastage might just do it. The Borchester branch will lead the development of pensions software. The legacy software will be rewritten from new at a number of branches because it was getting out of date anyway.

Option C - Major subcontracting
JWF have been given the contract to put in a Java-based intranet and develop pensions software as the lead application. They are basing the application on a US savings and loan software product. MAMMON will be providing the bulk of the resources for pension product development and planning the marketing material. R&H will be subcontracted to implement the training plan.

Please submit entries for the Test Scenario to the author, not to Inter*faces*

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Alternative Realities

Our current conception of what HCI is and should be cannot possibly last. We are at a transition point in the relationship between people, information technology, and society, and need to break up a few of our cosy preconceptions about the field. **Alternative Realities** is a new regular section which is intended to serve as a forum for expressing much-needed alternative, and preferably controversial, views of what is, should, or will be going on. Contributions are sought which might be brief and jokey, or more serious in tone and deeper in argumentation. Articles should not be merely amusing though – we are looking for meaty issues behind the views expressed, however lightly. So, get it off your chest and write to **Alternative Realities**!

The series starts with a short piece from me on a neglected issue in HCI – the frequent human need to avoid most of the activities on which we currently focus in HCI design.

The IDLE Project

Supporting Human–Computer Inaction

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There is a strong bias to be found in current research and teaching on HCI, a bias that is distorting our understanding and limiting the applicability of our findings. This bias is so central, so pervasive, that we fail to notice its presence, even in the very name of our discipline: Human–Computer InterACTION. Increasingly, we talk of purposes and the need to design artifacts that successfully help us fulfil those purposes. Yet we fail to acknowledge that our purposes do not always involve activity; quite the contrary. Has human progress been primarily motivated by the desire to do things, or by the desire to avoid doing things? Clearly, a bit of both, yet our discipline is blind to the importance of idleness in the human psyche.

A few examples should make my point clearer. We speak of the need, even the desire, for Life Long Learning. Yet we also know, but suppress the idea, that the main ongoing project for many people is that of Life Long Laziness. The suppression comes from guilt, and probably reflects the dominance of the Anglo-Saxon Protestant Work Ethic as the unquestioned ideology of many of those involved in our field. We seek theoretical approaches that will make sense of the role of artifacts in human activities. But what of human inactivity? How can we hope to account for phenomena such as TV-watching or Web-surfing for hours on end, without a Theory of Human Inactivity linking artifacts and human inaction?

Although we are beginning to see the need to consider leisure as well as work in our approaches to the design of computer-based artifacts, we speak only of "leisure activities". What of recreational inactivity? Is this not at least equally significant? Similarly, we are beginning to hear many calls to design for human creativity in HCI. We assume that creativity is about solving problems, thinking in new ways (especially laterally), and finding novel solutions. But, for all we know, the essence of creativity may be the avoidance of problems to be solved, of seeing situations in new ways so that less work is needed, of purposively choosing to do nothing.

As a discipline, we have been blind to the importance of inactivity. It is generally accepted that learning and development are a function of acting in the world. This is a good motivation for the design of systems to support both physical and mental "doing", and has been the focus of almost all our efforts in HCI. But there is more to life than work, and more to mental life than thought. Dreaming, sleeping, resting, drifting, doodling, playing, dozing and daydreaming may well be equally important. This is obvious in relation to the intangible realms of creativity and psychological wellbeing, but it may be that effective mental action also depends on inaction, as effective physical action depends on rest.

In an effort to correct this pervasive bias in our discipline, and explore the potential of inactivity in computer-mediated human existence, I have initiated the IDLE project: Inaction Design for a Lazy Existence. If you would like to participate in this new sub-branch of HCI, however passively, you are very welcome to contact me with your musings.

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