interfaces

design
without
boundaries

Ken Banks
on Design for Change

Andy Smith
on HCI and International Development

Brigitte Kaltenbacher
gets creative

HCI 2010 and Create10

BCS

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What she really needs to borrow is more time …

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BCS membership

To receive your own copy of Interfaces, join the BCS and gain access to BCS Interaction and four other Specialist Groups (see page 27).

PDFs of Interfaces issues 35–80 can be found on the Interaction web site
www.bcs-hci.org.uk/about/interfaces/ archive/

About Interfaces

Interfaces welcomes submissions on any HCI-related topic, including articles, opinion pieces, book reviews and conference reports.

Forthcoming themes

Interfaces 82, Spring 2010: Competency and employability. Deadline 14 February 2010

Submission guidelines

Articles should be MS Word or plain text. Send images as separate files: these must be high resolution digital originals suitable for commercial printing, cropped if desired but not resized, and if edited, saved as tiff or highest quality jpeg. Please supply photographers' credits as appropriate.

Authors should please provide a 70–80-word biography and a high resolution head and shoulders original digital photo. Photographers' credits will be printed if provided.

Send to John Knight, John.Knight@intiuo.com; 34a Hackford Road, London, SW9 0RF.

interfaces

It seems a long time since the conference at Cambridge and since I was in the country long enough to attend our annual get-together. There was some inspiring stuff. The Service Design Workshop got me thinking about the scope of HCI as did Bill Buxton's Keynote, which I think was a wake-up call to many of us: stop reinventing poor copies of past innovations – learn from the past!

The Panel discussion with Ann Light and Gilbert Cockton showed how far we have come in overcoming definitional boundaries, going beyond the interface and embracing value. A breadth of experiences were on offer at the conference, from what we might call the high-end stuff of theory to actionable practical nuggets, with an audience from pre-graduates to professors to practitioners; that is very valuable and perhaps unique.

I think the conference can be summarised firstly as showing we have got to grips with a new technological context (Web 2.0, mobile, games, SNS, etc.), and secondly that our humanistic values are not only credible but increasingly resonate with wider society. It's worth remembering that whether we are helping elders socialise on the Internet, or figuring out what value means in design, in some way or another we are making the world a better place.

John Knight

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View from the Chair

Tom McEwan

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This is my first time, viewing from the chair, and I must start by paying tribute to the illustrious posteriors that preceded mine!

Russell Beale's is the most recent, having been parked here for five years. That length of time surprised me, but looking over old Interfaces, back to issue 61, it's easy to detect and to appreciate the immense amount of work that Russell has done for all of you and for HCI in general. On behalf of the Executive and all of the membership, thank you, Russell.

With their valued support, I will try to continue the many accomplishments of Russell, Gilbert Cockton, Andrew Monk and previous chairs. When Russell took over in 2004, the group ran its own bank accounts and BCS HQ pressurised us to spend our accumulated conference surpluses – which we duly did setting up and developing usabilitynews.com. Since then, the interpretation of charity law has changed and "our money" has been redefined as "charitable funds", to be spent on achieving the charitable objectives of the BCS. Luckily, usabilitynews.com was precisely the type of outreach work that fitted these charitable objectives. But for the last two years we have had to request exceptional funding for UN. This is risky and allows no forward planning, so now we need to integrate the production and distribution of UN, and also Interfaces, into mainstream BCS web and publishing activities. This brings us all challenges – to fit into BCS processes, while still preserving the editorial independence, the voluntary contributions and, most importantly, still funding the professional expertise that makes our publications so valuable to members and the outside world.

Despite the challenges, this change will safeguard the future of UN and Interfaces

and ultimately will also promote HCI and Interaction Design and increase the impact BCS Interaction SG has on the other 70,000 BCS members and the rest of the IT profession. You will be aware that BCS has undergone a transformation, adding "The Chartered Institute for IT" to its masthead, and with new branding and formal understandings in place with other bodies like ACM, IEEE, IET, BPS and CILIP, BCS is poised to professionalise the IT industry in the UK and, increasingly, abroad. Our group, its events and publications, will change to take advantage of this new professionalism.

Our discretionary budget is very much smaller, so we have to change how we operate. We can still get approval and "risk funding" for one-off specialist BCS Interaction workshops and small conferences, to complement our annual conference and HCI Educators. The recent EISE09, which we ran on behalf of UKInit, brought together HCI experts from India, the UK and elsewhere. We're putting the proceedings on BCS's EWIC website – a free open access academic publishing portal. Also on EWIC are the papers from HCI Educators and HCI2009. Alan Blackwell and his team did a tremendous job turning the conference inside out and challenging past practice, creating both a lively and a successful conference in Cambridge and gathering large amounts of market research and reflection that I and others are still considering. You will see elsewhere how Lachlan and Jackie build on Alan's ideas for 2010 in Abertay.

BCS requires that all Executive (indeed BCS Interaction SG) members are BCS members. Additionally, Chair & Officer Group (COG) meetings have become unsustainably expensive (for both travel costs and carbon

footprint), hard to timetable, and increasingly unproductive for tired participants travelling four to six hours each way to attend. COG has now slimmed to six with the intention of ending face-to-face meetings. We've agreed to work in regions, each of which will have a portfolio of national and local activities. The larger Executive will still meet at each of our major events.

You'll see on the back page the beginnings of the new committee structure. We know some of you who were previously listed have decided to withdraw. On behalf of the membership and the Executive, thank you for your service. We may have inadvertently deleted still-active members of the Executive – if so, sorry, we still value your help, so please let us know and we'll correct for the next issue.

Forthcoming events

Linda Little, Lynne Coventry et al will host HCI 2011 at Northumbria. Due to a clash of dates with INTERACT2011 (they moved!!), but also the fact that more universities start classes by the second week of September, we will experiment with moving the conference to early July from 2011 onwards.

Professionalism in User Experience is one area in which BCS Interaction has a vested interest. UX (or UE) still defies precise definition even though many jobs are now advertised in it. For over ten years, working with other stakeholders such as the Usability Professionals Association and the Ergonomics Society, we have been trying to define competency in usability. More recently Jonathan Earthy and others ensured that competences in human-centred design appeared in the Skills Framework for the Information Age (SFIA). Other frameworks by Skillset (Interactive Media) and CCSkills (Design) are also of interest to us.

So John Knight and I are organising a BCS Interaction SG workshop on 25th February 2010 to tie together some of the issues I raised at HCI Educators and to define, in detail, competency in the roles associated with User Experience.

See www.usabilitynews.com/news/article6092.asp

Create10

The conference for innovative interactions

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After three very successful years at the BCS offices in London's Covent Garden, the annual CREATE conference is moving north to Edinburgh Napier University, inspiring this year's broad theme of 'transitions'. The move to the university's city centre venue will allow the conference to expand and also provides an opportunity to launch a new student design competition. The conference organisers are particularly pleased that the winning students' entries will be on public show at Inspace, a fantastic new-media exhibition space.

The CREATE conference is all about creating innovative interactions, whether digital consumer products, interactive services or interaction paradigms. The event is a chance to share and discuss the design opportunities and dilemmas that are currently being addressed by practitioners and researchers from the commercial, public and academic sectors. The

blend of thought and practice that CREATE wants to encourage was nicely summed up recently by interaction designer, Jack Schulze: "No one cares about what you think, unless you do what you think. No one cares what you do, unless you think about what you do."

As well as presenting academic research and student work, the event will provide real learning opportunities through hands-on workshops, case studies and demonstrations. There will also be theoretical and research perspectives on the process of design innovation and approaches to creativity in HCI: how human factors can be integrated within a creative design process, methods that encourage creativity in interaction design, and the challenges of working in multi-disciplinary teams.

Provisional dates are 30th June to 2nd July 2010. The call for participation will be out soon for papers, videos, exhibitions, demos and practical workshops.

The conference is jointly organised by the Human–Computer Interaction Specialist Group of the Ergonomics Society, the British Computing Society's Interaction Specialist Group, and Edinburgh Napier University's Centre for Interaction Design.

Student design competition

Today's art, design and technology students are the people who will be defining what the interdisciplinary field of interaction design will become in the near future. Create10 is a conference that celebrates innovative interaction design, whether digital products, services, environments or new interaction paradigms. This competition is aimed at students from a range of disciplines, both undergraduate and postgraduate, in interaction design, product design, industrial design, communications design, architecture, fashion, multimedia, HCI, and related fields.

The conference theme of 'transitions' is the inspiration for this competition. We want to receive entries that scope, explore, define and prototype interactions that make transitions visible. These could be transitions that investigate the relationship between the analogue and digital realms, or systems that make visible transitions across time, place or information spaces. For this competition, students are asked to design an interactive artefact, interface, installation or experience. If selected, they will be invited to display their working designs, or tangible prototypes, in the conference public exhibition space.

Entries will be assessed by a jury of leading creative design practitioners and academics, and all selected submissions will be exhibited at the Create10 conference exhibition in June/July 2010 in Edinburgh, at New Media Scotland's Inspace. Full details of prizes will be announced at a later date.

www.create-conference.org

Left: Graham Hancock, Enlighten. Right: Kate Saunderson, Common Threads. Students from Dundee University's Digital Interaction Design course who exhibited in 2009.

Ecomodo – the marketplace of good returns

Meriel Lenfestey & Tracy Currer

In today's society we are all focused upon purchasing and possessing. Manufacturers and retailers perpetuate this way of thinking through the design of their goods and marketing campaigns. As a consequence, the lofts, sheds, cupboards and garages across the country are filled with many of the same things, often barely used, collecting dust.

The environmental cost of embodied carbon and energy used to build, package and distribute to satisfy this demand is great. The more an item is shared the greater the carbon savings.

If products are seldom used, by sharing the product with a number of people (changing use patterns), the resource productivity of the product will be increased and the consumption of natural resources in the production stage reduced. *WRAP, Meeting the UK climate change challenge: The contribution of resource efficiency, 2009*

Companies are increasingly looking at offering hire services alongside traditional sales, but the costs of commercial hiring are often perceived as being high. Poor experiences of lost or broken items discourage the sharing of personal belongings.

Ecomodo is a social enterprise which aims to collectively reduce our consumption by building a trusted lending and borrowing marketplace to open up our personal treasure troves. Alongside the environmental goals are social and economic ones. Ecomodo will maximize the utility of goods, enable responsible consumerism, drive participation in society and distribute wealth. Ecomodo are attempting mass behaviour change for the common good.

Meriel Lenfestey presented this new vision at WUD2009 to demonstrate the power of UX design to make a difference. Both the founders are eminently qualified to take on this challenge because interaction and experience design are fields well used to delivering solutions to contradictory and complex briefs. Their approach has been one of utilising carrots rather than sticks... by making lending and borrowing a more appealing option. The design elicits behavioural change through satisfying existing motivations, inspiring confidence and ease of use.

Motivations

The first step in encouraging behaviour change is in providing compelling reasons to change.

To reach the mass market required to make a substantial difference, the team realised that the motivation could not be just environmental conscience. The research also highlighted that encouraging lenders would be the greatest challenge, as people quickly identified reasons to borrow. The following lending motivations have informed the functional specification, the UI and the marketing strategy.

Sustainable living

Being a green consumer is at the heart of the concept and brand.

Raising money

Lenders can choose to keep the money they make for themselves or donate to a good cause in a tax-efficient manner.
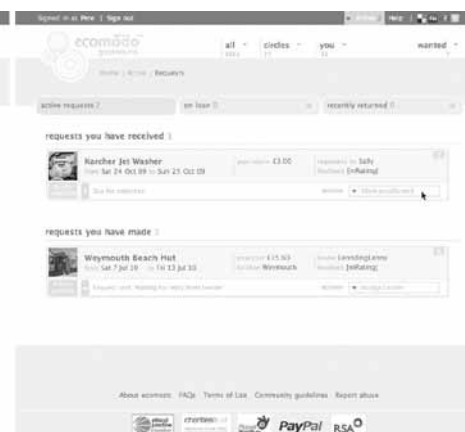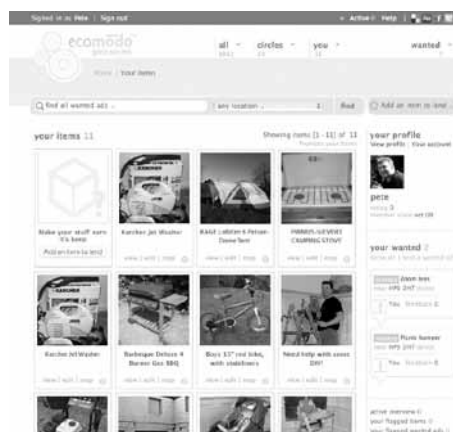
Saving money

Borrowers can achieve their goals and reduce the need for wasteful purchases.

A sense of belonging

Ecomodo empowers members of a community to help each other and connect in new ways.

Being inspired

Items to borrow, wanted ads and lending circles are presented spatially to focus users' minds on opportunities around them.

Imagine if you could see into the lofts, sheds, cupboards, garages of the houses in your area – imagine how useful all that stuff could be and how much money it could save you...

Inspiring confidence

A potential lender must be assured that the benefits outweigh the risks. Creating an interface which inspires confidence involves a mixture of specific confidence features in the UI, as well as a broad attention to delivering an intuitive interface and appropriate brand promise.

The specific features employed in Ecomodo are as follows:

Circles of trust

Real-world communities are engaged to form lending circles. Circles provide community engagement that feels comfortable to the user by enabling people to restrict their lending (and borrowing) to people they know. Resulting feedback given then has real implications as it may relate to people they know.

Facilitated transaction

It is easy for lenders and borrowers to act with confidence and ensure mutual satisfaction by supporting the complete lending transaction process including:

- introduction and negotiation
- holding of monies during a lend
- paying out funds upon completion
- reputation building through feedback
- simple dispute resolution if things do go wrong.

Optional extras

The lender has the ability to have a deposit taken or include insurance to cover the accidental loss or damage of an item.

Tracking

All lends are logged allowing lenders to easily track their possessions.

Privacy

The location specification interface empowers members to strike their own balance between privacy and security, and useful locating of their items for potential borrowers.

Ease of use

Designing an interface to support people in achieving unfamiliar tasks requires attention to the following:

Intuitive experience

The interface works hard to hide the underlying legal, technical and functional complexity, delivering the appropriate depth of experience when needed. A simple architecture helps users find what they want, and a conversational UI guides users through complex processes including if things go wrong.

Contextual help

An exhaustive contextual help system assists users whenever questions arise. This is particularly necessary when people are being asked to behave in new ways.

Looking forward

There can be no certainties in undertaking such an ambitious project. When the site launches at the end of the year the team will be watching closely to fine tune the experience.

The site is at www.ecomodo.com. Go there now to register your interest.
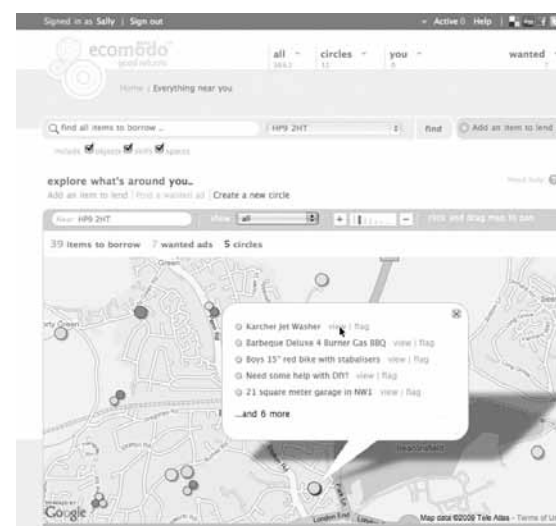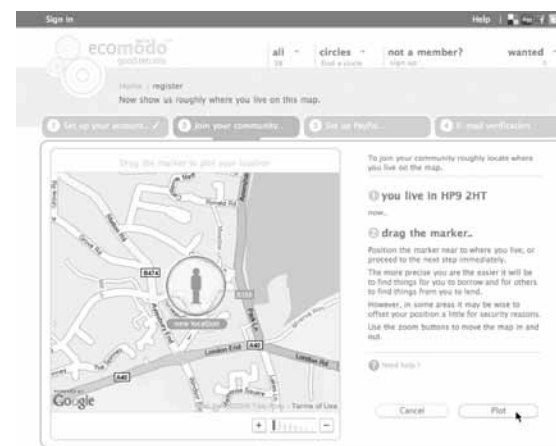
Ten things you might want to know before building for mobile

Ken Banks & Joel Selanikio

Progress in the social mobile field will come only when we think more about best design practices rather than obsessing over details on the ground. Social mobile tools are those built specifically for use by organisations working for positive social and environmental change, often in the developing world. Over years of creating some of the most widely used mobile applications in the public space, we've made a lot of mistakes, and we've learned a lot. We think that successful mobile projects – those aimed at developing countries in particular – have a better chance of succeeding if these points are considered from the outset:

1 You will never know what the end-user knows

All the best technologies – from fire to phones to cars to writing to email – all of them are general purpose solutions that solve one problem – transport, cooking, communications, etc. – in general but not in particular. That is because there are too many particular, on-the-ground situations – too many things to write about, too many things to talk about, too many places to drive to – for the technologies to ever anticipate them all.

So don't try: make it your goal to design the spreadsheet, the email, the general tools so that users – who know their own needs better than you ever could – can repurpose them to suit those needs. That approach lets users create their own solutions, using your tools, and creates a sense of local ownership, which is crucial for success and sustainability. It's always going to be easier to equip local NGOs,

or users, with tools to do the job than it will ever be for you to learn everything they know.

2 Aim for the technologies most widely available to your users

Ensure that your applications can work on the most readily available hardware and network infrastructure available to the user group you're aiming at. Text messaging solutions aren't big in the social mobile space for nothing: they're simple, and they're available to anyone with a phone. If your target audience is the rural public in Africa, a Web 2.0 application wouldn't make a lot of sense.

On the other hand, it also wouldn't make sense to restrict political workers in Eastern Europe from using a web-based application. So consider your users and if in doubt go for the simplest platform first.

3 Don't reinvent the wheel

Check to see if any similar tools to the one you want to build already exist and, if they do, consider adding to them rather than starting from scratch. People and institutions are incentivised to reinvent the wheel each time, but don't do it unless you really believe there's nothing out there you can use.

4 Simple and free scales better than complicated and expensive

Anything that needs a programmer or technologist to use is inherently less scalable

than something (like the car, like the phone, like email) that can be used by the average non-technical user. So from the outset try to build something that's easy enough to use without the need for user training or a complex manual (or any manual at all!) – so new users can easily and effortlessly replicate once news of your application begins to spread.

Be realistic about what your application can achieve, and wherever possible look for low-hanging fruit. Remember – big is not better, small is beautiful, and focus is king. A solid application that solves one element of a wider problem well is better than an average application that tries to solve everything (especially given point 1, above).

Another factor in keeping it simple is remembering that every third party the user needs to speak to in order to implement your solution increases the chances of failure by a considerable margin, particularly if one of those parties is a local mobile operator or a high-priced foreign consultant.

5 Focus first on the users, not the developers

Anyone who builds software inevitably spends more time with developers than with users – especially if your users are in some of the more hard to reach spots on earth. Don't let yourself get sidetracked by technical details that the user doesn't care about but that developers love to discuss; that's as silly and time-wasting as arguing about Windows vs. Mac. The user cares about cost, and the user cares about simplicity, and the user cares about whether the software gets the job done. That's what you should care about, too.

The best example of this developer-focus is the constant discussion about open-source. Open-source is great for some things and not great for other things, but that's an issue you can deal with after you have working software: the start of a project is not the time for "design by committee" anyway. Controlling your development process to start with also helps you understand better who is using the app – something that donors routinely want to know. Besides, if you can give your users something as elegant, simple, and free as Gmail (free but closed source, like most widely-scaled and popular web applications) they will be very happy users.

And encourage those users to share experiences, and to support each other. Don't be afraid to reach out for additional information, and work hard to keep it active, engaging and growing. Solicit feedback, and criticism. Communities are notoriously hard to build, but when they work they're worth it.

6 "Shipping is an important feature"

This dictum of the best programming shops reminds us that good software in the hands of the user is always better than perfect software that no one ever sees. Think about rapid prototyping. Don't spend too much time waiting to build the perfect solution, but instead get something out there quickly and let reality shape it. Get user feedback. Then get more user feedback.

7 Promote your solution like crazy

Reach out to people working in the same technology circles as you, post messages on relevant blogs, blog about it yourself, speak at user and developer conferences, build a project website, brand your solution, and make use of social networking tools such as Twitter and Facebook. Make your users aware, make your funders aware, make the developers aware, make the media aware.

8 9 &10 Don't let anything stop you

Not a lack of funding: if considerable amounts of funding are required to even get a prototype together, then that's telling you something – your solution is probably overly complex.

Not a lack of specialists: nowadays it is easier than ever to learn programming, or to communicate to a worldwide audience. Learn to do what you can't afford to pay other people to do. The more design, coding, building, testing and outreach you can do yourself, the better. Stay lean. These tasks can be outsourced later if your solution gains traction and attracts funding. The more you achieve with few resources the more commitment and initiative is shown, increasing the chances a donor will be attracted to what you're doing.

Not the naysayers: many people will stand on the sidelines and tell you all the reasons why it just won't work. Ignore them. Those people don't build, they prevent building. Ignore them. Remember these words from the writer Arthur C. Clarke, and forge ahead:

New ideas pass through three periods:
1   It can't be done.
2   It probably can be done, but it's not worth doing.
3   I knew it was a good idea all along!

Ken Banks is the founder of kiwanja.net and the creator of FrontlineSMS, a piece of free and open source software which turns a laptop and mobile phone into a two-way group messaging hub. Ken combines over 25 years in IT with 16 years' experience living and working in Africa, and has a degree in Social Anthropology with Development Studies. He has been working exclusively in mobile for the past seven years. Ken recently became a Tech Award Laureate for his work with FrontlineSMS.
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www.DataDyne.org

HCI and international development with African farmers

Perspectives on 'HCI anywhere' from TVU

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The Centre for Internationalisation and Usability within the School of Computing at Thames Valley University aims to enhance understanding of cultural differences in international software development. A particular focus is the development and usability of ICT products in a global market, both in terms of international software development (including offshoring) and economic, community and social development (Global South). We have managed, and been involved in, many international projects. We managed two EU projects in India and China (Smith et al, 2007) helping to develop an understanding of how to localise and build HCI and usability in these countries. In this article we focus on our contribution to the VeSeL project – *Village eScience for Life* **– which is addressing the problems associated with the digital divide in Africa.**

VeSeL: background and approach

The EPSRC-funded VeSeL project, part of the Bridging the Global Digital network, aims to enable rural communities in Kenya, Africa to use digital technology to improve their agricultural practices and literacy levels. VeSeL is a multi-disciplinary project involving five UK universities plus the University of Nairobi in Kenya, with specialists in education, HCI, power engineering, computing, communication technologies and agriculture.

Two rural agricultural communities (Kiangwaci and Kambu) were identified with vastly different economic and climatic conditions. Farming communities in Kenya tend to organise themselves into small self-help groups based on mutual interests (growing the same crops or herding similar livestock). A self-help group and a local primary school were identified in each community as direct target users for the research.

The VeSeL approach to the context and culture of the rural communities had to be participative and inclusive of the social and technological context of its stakeholders (users, designers, government, institutions and third parties). Two complementary approaches were adopted: Localised Usability Evaluation (LUE) and Socio-Technical Evaluation (STE). LUE is an important strand because the yet-to-be-developed technology needs to be evaluated before being deployed to the farming communities. STE offers an approach to explicating the different assumptions of all stakeholders in the process of design. Taken together, both of these approaches are aimed at an ethnographic understanding and effective design rationale.

Localised Usability Evaluation (LUE)

One of the farming community groups requested a blog site to promote their projects, such as the eradication of the Tsetse fly, in the hopes of attracting funding from globally distributed users. The usability of the blog site needed to be evaluated both with a sample of local (Kenyan) and global (British) audiences before it was launched. In one study within VeSeL we examined approaches to usability testing/ evaluation, comparing different usability methods with both UK and Kenyan users.

Initially we compared the relative success of implementing the Developer User Contextual Evaluation (DUCE) method (Smith and Dunckley, 2002) and found that elicitation of information was more challenging for Kenyan users who were not comfortable with the probing questioning style. They felt that the responses they were giving to the evaluator might be 'incorrect' and therefore felt their 'failure' to be exposed. We have attempted to relate these findings to Face Negotiation Theory (Ting-Toomey, 1985). 'Face' is the public image of an individual or group, what their society sees and evaluates based on cultural norms and values. Conflict occurs when that group or individual feels threatened and fears a loss of face. We also placed our findings in the context of models of culture such as those proposed by Hall (1976) and Hofstede (1991).

Within VeSeL we needed a usability method that suits the Kenyan collectivistic culture and avoids face loss, hence the selection of the Co-discovery Usability Method. Findings to date indicate that the data collected from the Kenyan users using the Co-discovery Method is much richer compared to that collected using the DUCE Method, which is a more probing style of evaluation.

Socio-Technical Evaluation for ICT Design

Cultural understanding in HCI in contexts such as these needs to expand further as LUE can only take place after technological solutions have been identified. Furthermore, stakeholders' decisions and participation are fluctuating and conflicting variables at times, leading to a dynamic environment for HCI input. An approach is needed not only to augment the understanding of the users, but

also to explicate the cultural and technological gaps across stakeholders and the resulting impacts on design processes.

We proposed a Socio-Technical Evaluation (STE) approach to address these gaps through the development of an online artefact for collaboration called Socio-Technical Evaluation Matrices (STEM) to complement knowledge obtained through localised usability evaluation. The tool is an online form-based system where all stakeholders evaluate social and technical requirements or decisions against pre-defined criteria (dimensions and attributes) to highlight dependability issues for both the technology and the users within their own cultural sensibilities. The tool allows stakeholders/partners to enter comments/views and other data, such as results of the LUE, against the dimensions and attributes so that each partner can measure impacts against their culture, practice and ability. These comments become available to other partners for comments. The tool then organises comments according to their interdependency to one another. A moderator is also assigned to each matrix to invite, regulate and report on contributions/participations.

Interactive systems are subject to interpretations grounded in the cultural spaces of both producers and users. In VeSeL, STEM exposes these intercultural gaps by allowing the different stakeholders to explicate their own interpretive frames and reflect on their own cultural positions (e.g., while Western partners believe that a minimal trial set of resources should be sent to the communities, local partners see this as an expression of how limited the project will be, thus painting a negative image of VeSeL).

Research on the dichotomy between tacit and explicit knowledge, group psychodynamics, and the cognitive shows that while explicit knowledge

can be shared or represented using information technology, tacit knowledge is more difficult to represent. In STEM design decisions both users and technology are negotiated against pre-defined criteria. A decision that is expressed for one is therefore evaluated in its context and cultural implication for the other (e.g., in VeSeL, the cost of a technology is often understood as the responsibility of a specified partner or third party – conversely in rural Kenya, this is culturally a collective effort).

Conclusion

The impact of context and culture poses many challenges that cannot be exposed as a one-off evaluation in technology design. As the design progresses through the different stages, decisions and actions often result in the emergence of cultural and socio-technical implications. Through LUE and STEM we have proposed a combination of two evaluation approaches in the early identification of these inherent issues resulting in enhanced stakeholder participation and better product usability.

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Professor Lynne Dunckley

We would like to dedicate this article to the memory of Professor Lynne Dunckley, a colleague of ours – some of us for over 15 years. It was because of Lynne that we all got involved in VeSeL. Over many years we have all been inspired by her ideas, creativity and inspiration throughout our research in HCI. For much of the VeSel project Lynne was undertaking her own personal battle with cancer and passed away before the project could be completed. She is very sadly missed by us, and by so many other colleagues and collaborators at TVU, nationally and, by the nature of her work, internationally.

www.lkl.ac.uk/projects/vesel/
veselproject.blogspot.com

Access all areas

Do we really mean it?

Andy Dearden

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Last month I changed my electricity and gas supplier. Working through a web-based sign up form, automated credit reference checking, electronic billing via email, direct-debit banking, and the fact that the gas & electricity will continue to arrive through the same 'pipes', I suspect that I was the only human being involved in actually executing the necessary changes. This reduction in the amount of labour involved, and the availability of the on-line comparison sites that enable what economists might regard as (an approximation of) a 'perfect market', mean that I pay less for my household energy than I would otherwise. Indeed, I pay less for my household energy than my father and most of the people in his generation.

And there's the rub. I am lucky that I am well educated, my income is relatively high, I have good computer skills, I have computers and broadband connections at home, and I regularly interact with the electronic financial system of bank accounts and credit cards and loans and mortgages and supermarket checkouts and all the rest. This network of tools and connections makes many things available to me that are not accessible for my father, or for many other people in the UK, because they do not have the full set of knowledge, skills, equipment, network services, credit history and all the rest that makes these interactions possible, and ensures that someone writes the software services so that I can sort it out for myself. Thus, whilst the technology certainly brings benefits, the benefits are unevenly distributed, often with the greatest gains being provided to those who are already well off. And even for those of us who have access to these services, there are places and times where we have better access to facilities than others (I prefer to do these things at a desk with a large screen, good broadband connectivity, and access to my paper records of past bills).

Further afield, many people working with ICT in international development have argued that ICTs could be used to provide better information about market prices to farmers in developing countries, thus strengthening their hand in negotiating a 'fair' price for their produce, as well as supporting information and knowledge sharing to assist farmers' productivity and sustainability. But access to the telecoms connectivity, the equipment, the digital skills, all represent barriers to obtaining these benefits, and additional barriers arise from the lack of content in local languages and the dependence of so many services on text literacy.

The narrative of ubiquitous interaction – the always on, always connected, information everywhere, internet of things – will share these same properties. For one group of people (those who have access to the necessary equipment, possess relevant skills, and engage within a particular network of related systems) there will be some major benefits. But these will be unevenly distributed in time, in space and between people. Can our designs respond to this reality. What principles underpin appropriate designs?

One common arrangement involves human intermediaries supporting people's access to the capabilities offered by the technology. This could be an informal arrangement such as me sorting out my father's energy supplies for him; volunteer-based, such as Age Concern York's NetNeighbours scheme that extends the benefits of on-line grocery shopping to elderly people (www.ageconcernyork.org.uk/net.html); or a more formal arrangement, such as being able to assess and change your electricity supplier by calling a premium rate telephone service. Of course, the more usable we can make services, the less need there will be for such intermediaries.

Another principle might be called the heterogeneous network principle. Inclusive services integrate interaction across diverse platforms. A common pattern connects many users accessing information via multimedia mobile phones, with a small number of locations, people or systems that support enhanced network access and/or larger displays. The University of Cape Town's BigBoard system offers multimedia sharing using 'snap & grab' Bluetooth connections. Storybank adds stories captured using mobile phones to a library of stories presented on large touchscreen displays (http://www.cs.swan.ac.uk/storybank/index.php). In each case, some functionality is on a mobile phone that is (potentially) available everywhere, but this is enhanced by other functionality using more costly technologies available only at selected locations.

The Rural e-Services project (http://www.menarik.co.uk/eservblog/) combines these two arrangements to provide information and advice services to members of a farmers' co-operative in Madhya Pradesh. Service providers who are paid by the co-operative carry mobile phones to the farmer's field and use a simple interface to create a multimedia message composed of up to six photographs and an audio track. This is then uploaded via GPRS to a website. The co-operative's agricultural advisor views these messages using a web-browser (usually in the evening of the day they are created), and the next day the service provider goes back to the farmer with the phone, and the advisor can call the farmer and provide advice for their problem. In preparing for this conversation, the advisor might also be researching the farmer's problem, utilising his (or her) broader connectivity and digital skills. Of course, further development of such a system could offer many

additional capabilities to the farmer, and the individual farmer could develop their own skills so as to access those services more directly, without the need to work through the service provider as an intermediary.

Thus, the set of services available to the farmer is delivered through a diverse network of people and devices, each with different skills and capabilities working together to deliver the benefits. The arrangements for my energy supply (where software engineers set up a complete system that I control from my laptop) is only one possible division of labour. Interaction 'anywhere, anytime, anyplace' will need a much richer design space than just 'the user' and 'the cloud'.

Engaging developing markets
Dialogue with local users

Anxo Cereijo-Roibás, Mark Vanderbeeken, Neil Clavin & Jan-Christoph Zoels

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Developing markets are one of the fastest growing areas of mobile phone use in the world. Pictures abound online of the intriguing juxtaposition between traditional social practices and latest communications technology – a hennaed Indian hand holding a mobile phone, an Egyptian man engaged in a lively cellular conversation standing near his camel. But in reality, these iconic scenes that say so much about the ubiquity of useful technology provide little information about the people behind the handset – who are they? What does having a phone mean for them? How does it change their daily life and how could we make it even more useful for them?

Long-term communication channels

Vodafone's User Experience team decided to answer these sorts of questions by exploring the characteristics, behaviours and needs of mobile phone users in developing markets. We wanted to start a conversation with local people that would be open, personal and ongoing. Instead of a short research project, we wanted regular and long-lasting channels of communication with real users, where we could gather in-depth insights over a longer period of time. Together with Experientia, the user experience design company based in Turin, Italy, we developed an experimental remote-user research technique. Fittingly, the tool facilitating this method was the object of research itself: the mobile phone.

The "Socially Emerging" project focused on three countries in the African and Asian markets. The objectives were to explore mobile convergence practices in different contexts ('immersions') and when moving from one context to another ('transitions'); to access

and connect to consumer conversations around communication needs; to engage customers in ongoing conversations with the UE Team; and to prototype new formats for research using mobile and internet environments. Through qualitative analysis of the contextual factors that influence people's behaviour, we searched for insights to help us envision services, tools and strategies to suit the unique characteristics of these markets. The challenge in this ongoing project was twofold: not just to create a tool to enable remote communication, but also to keep people involved and engaged over a long time, continuously exchanging content.

Panels of participants were recruited locally, through local Vodafone Companies in each country. A kick-off interview by phone helped researchers get to know each participant a little better. Then, the remote user research method required participants to complete a series of questions and tasks over a two-week observation period. All the rich data (text, voice, photos and videos) were sent by participants directly through their mobile phones and, sometimes, computers. The benefits of using the phone as a material recorder are many:

- The device is with the person at all times.
- Content can be sent directly from users' phones to the researchers.
- During the observation period, variables can be put in place to see if the person adopts certain services and applications.
- Participants could start off just using SMS for text-based questions and be introduced to MMS and email later.
- Using just a phone, the influencer aspect can be monitored: a person

is more likely to show off relevant elements on the phone than in a diary.

- It is easier to access images from the phone than to set up a system of collecting disposable cameras.
- It gives the research team flexibility to adjust content/direction while the project progresses.

The flexibility of using the phone as a research tool allowed for different modalities of task setting. We combined regular "on-appointment" tasks with a series of "on-the-fly" tasks. The former were activities that required more time and reflection, such as: "On a piece of paper, draw a map of your friends: write their names, create different groups and give a name to each group." "On-the-fly" tasks, however, arrived with no warning, and required participants to react immediately: "Take a picture of your work position and describe how you feel sitting there." One or two questions, in common to all participants in all three countries, were sent to people's phones every day. People could respond via SMS, MMS or email, and their responses were published automatically on an *ad hoc* blog. Facebook was also a useful tool to create a more personal connection between researchers and participants.

Engaging with strangers

Results were encouraging and the methodology strongly validated. Participants provided feedback on the majority of tasks, and in general took part in the research with enthusiasm and curiosity. However, cultural differences soon emerged, with strong impact on the data collected. In some regions, participants tended to be open towards the researchers, and happy to provide answers and carry out

tasks. In other countries, however, respondents were more reserved and less prone to disclose personal information without having established a face-to-face relationship. This seems to be a culturally influenced behaviour.

A key learning from the project was that in the absence of face-to-face contact with participants, it is important to find ways to keep them motivated to contribute over a distance. We also understood that the initial and final phone calls are important to establish a warmer relationship. We learnt that it is better to assign a smaller number of tasks, so people don't feel burdened by the amount of work to do. The ability to provide feedback through different channels (e.g. email exchanges) was a bonus, as it gave people flexibility in the length and type of reply.

Recognising limitations

Like any method, the remote-user research method has some limitations. Perhaps most importantly, the contexts, lifestyles, and practices of developing countries need to be well understood in order to find the best ways to connect with people, interpret their answers and get better insights. Although we carried out secondary research to gain these kinds of insights, we realised that, ideally, field research would be needed too. This seemed particularly true for more reticent cultures, where people were less willing to share personal information with effective strangers.

Secondly, the method assumes that users have access to, and are competent with, technologies such as mobile phones with camera and MMS capabilities, and PCs with internet access. While this was true for our current panel of participants, we knew that this platform was not accessible in this way to people from lower socio-economic classes who don't use communication technologies, or to first-time users, unfamiliar with these technologies. We started to look at a very specific challenge – how could we evolve the same research methodology, and use it with the lower groups of the socioeconomic pyramid (BoP)?

Evolving the methodology: broadening the users' reach

We decided to conduct a second panel, extending the recruitment of people across all socio-economic segments, including people who earn less than US$2 a day. The first panel created a picture of user segments in developing markets, and compared them with European segments. Instead, the second panel also focused on understanding the relationship with technology of the lowest socio-economic segments, and their daily life needs and activities, in order to gain a picture of how the mobile phone could be used to support their lives. The questions and tasks for this group included social networks, or more personal stories, such as "a story about a healthcare issue you experienced." This allowed us to explore areas where technology could have a meaningful impact on difficulties in people's day-to-day lives.

One of the major hurdles in researching the above segments was that of literacy, both functional, and technological. Many people in the target group could not read, and many more spoke languages that were not commonly used in mobile phones. What behaviours had they developed to enable them to use mobile phones? Beyond this, we were also interested in first-time users, and people with little familiarity with technology: what would a person who had never used a mobile phone do when confronted with all the richness of internet-enabled com-

munications technology? It was clear that local facilitators would be necessary to provide assistance and support to the participants, and to aid them in passing on information and insights to us. In addition, we decided to support the remote-collection method with field research. In Asia, where we had noticed the most reluctance to share personal information, we decided on a more immersive approach, of observation, contextual enquiries and participatory workshops, giving us the opportunity to meet and work with participants face-to-face.

The local facilitator played a vital role in this field work. They carried out the initial and concluding interviews in person, and visited the participants two to three times over the course of the research project to assist them in carrying out tasks, collect the data, assign new tasks, and carry out limited on-site observations of the participants' environments, tools and communication practices. They translated the collected information and relayed it back to the research team. Participants were also given a project journal, for collecting visual tasks as well as their spontaneous thoughts and comments. At the start of the project, participants who felt uncomfortable with the tools being used were encouraged to complete tasks in this booklet, as a medium that relied less on literacy and technological skills. Learning from the first panel, we also assigned fewer tasks (one or two a week, over eight weeks, instead of several a day over two weeks) and gave participants more time to complete them. The facilitators and researchers acted as mentors, following up with participants who hadn't completed a task and encouraging a response.

This use of a mediator also overcame another problem, which had been rather accentuated in the Asian panel. In the first panel, we

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found a good gender balance quite difficult to achieve, especially in Asian regions; the questions were seen as overly private for women to provide to strangers. However, with the reassuring face-to-face contact with local facilitators, we were able to involve a number of women in the panel including the lower groups of the socioeconomic pyramid, greatly enriching the data collected.

Overcoming limitations

The refining of the methodology allowed us to overcome the limitations we had identified. Fewer tasks and stronger mentoring encouraged more frequent responses. Occasional face-to-face contact made people more comfortable about revealing personal information, and allowed both genders to participate more freely. Finally, to gain deeper insight into cultural contexts and what kinds of services and products would be truly useful in these regions, we decided we needed the chance to engage in person with the participants we had been communicating with for so many weeks. We arranged a series of field observations and participatory design workshops in Asia.

With the benefit of weeks of prior communication, the co-design workshop was rich with insights. The information we had been sharing with the participants gave us a greater level of understanding as they expressed their needs and ideas – when they suggested a service or application that they would like to see, we quickly understood why, fitting the new information in against a background of detail and history. The co-design workshops enriched the remote user methodology, but the reverse was also true.

In the two panels, very different objectives were achieved using the remote-user research methodology. In the first panel the methodology

helped us to validate existing market segments and to identify ones that were unique to the countries being explored. In the second panel, we were able to gain an understanding of the kind of tailored and simple services that could be strongly beneficial for people who in many cases have very limited social networks and communication practices. In our attempts to overcome the issues of literacy, privacy and intimacy with the lowest groups of the SEC Pyramid, the process was refined into a holistic, integrated and participatory method. Complementing the remote-user research methodology with field research, face-to-face meetings, and participatory design workshops led to active user engagement, and results that were relevant and innovative. Co-design seems to be the natural follow-up to the research, as it adds a vital element of face-to-face contact with the research participants, and strengthens the relationships that have been developed over the course of the remote communication.

Conclusions

The approach described above allowed us to engage in a permanent and long-lasting dialogue with users across all groups of the SEC Pyramid in selected developing countries in Africa and Asia. From this experience we gained vital insight into best practice, which will be highly useful to other teams that work in these areas.

One of the main learnings to emerge was that online panels should be complemented with more immersive field work in order to gain in-depth knowledge, and fill any gaps that the distance dialogue might not satisfy. Our experience found that field work was a good complement to the online panels, especially for users in rural contexts (mainly due to the poor

infrastructures in these areas compared to urban contexts). We also found the field work was most successful when research and design were appropriately integrated as part of the same process. This implied allowing at least two weeks' planning by the project leaders and one week of preparation for the local group of designers and researchers. It also proved effective to allow some reflection time per day for each group (both with and without the users).

Secondly, it is crucial to ensure that the most representative locations (e.g. urban, sub-urban, remote rural villages) are identified, and the right people are involved in terms of researchers, designers and users. For the former, this means an appropriate combination of skills, subject-matter knowledge and design expertise, while for the latter, an accurate recruitment of the target users with a good balance of gender, SEC profile, occupation and attitude towards technology is necessary (for example, we found that some users played a strong support role in their community regarding technology matters). The involvement of the Vodafone local companies and the use of local designers and ethnographers who were familiar with those contexts was very useful in correctly interpreting cultural issues and overcoming linguistic barriers. This was particularly valid for the face-to-face meetings during the field work.

When doing immersive research with urban users, it is important to consider their social and physical contexts and integrate them as much as possible into co-design activities. This occurred easily when doing field research in the close-knit rural communities. In this sense, group sessions complemented with guerilla street video interviews using 'informal' tools such as mobile phone cameras, provided effective audiovisual insights.

First International Workshop on Expressive Interactions for Sustainability and Empowerment

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The First International Workshop on Expressive Interactions for Sustainability and Empowerment (EISE09) was held at Vodafone's offices on 29–30 October 2009. Arising from the activities of the UK-India network on IT for the End-User[1], the workshop provided a valuable opportunity to discuss how HCI can contribute to sustainability and the empowerment of people who are currently excluded from the digital economy.

The workshop began with the observation that the next generation of interactive technologies will be dominated by touch, gesture and other forms of movement; expressive interactions. Tracking technologies are increasingly able to locate and follow people as they move through or gesture in 3D space. Multi-touch surfaces and proximity sensing are set to be commonplace in business and leisure environments. New forms of 2D gestural interactions are emerging in different cultural settings. The next generation pico projectors promise to turn any surface into a re-configurable interactive device. Mobile devices enable expressive interactions with public displays changing the language and nature of interaction, particularly outside Europe and the USA.

The opportunities presented by these developments go far beyond iPhone apps, games and photo applications on multi-touch tables. Large numbers of people who have previously been excluded from the digital economy have the potential to be empowered. The tyranny of the western keyboard and rectangular screen can be replaced by new forms of interaction that are much more intuitive and expressive. This in turn will democratise access to a wide range of new services,

cutting across language, literacy and other barriers.

The workshop opened with an invited talk from Chris Burgess, Director of Corporate Responsibility for Vodafone Group. He sees sustainability as development that does not compromise future progress. Vodafone's image is improved and its profits increased if the sustainability agenda is an integral part of its business operation.

In the first paper session on Inclusive Sustainability, Lucia Terrenghi (Vodafone) and Sriram Subramanian from the University of Bristol argued for cultural sustainability and saw HCI as a natural home for this in interactive systems development. Anirhuda Joshi from IIT Bombay looked at economic sustainability and the use of mobile phones in India. He provided a rich and fascinating variety of case studies to illustrate key themes of design for economic sustainability. In the third paper Rama Vennelakanti and Sriganesh Madhvanath (HP Labs, India) looked at the context of a rapidly changing India and the impact this is having on new technologies and how they are developed.

The afternoon session was concerned with gestures and mobility. Stephen Brewster presented a review of new interaction techniques that are becoming increasingly common thanks to miniaturisation of sensors and effectors. Gestures such as shaking, turning and waving are now available for interaction designers to make use of. Santanu Chaudhury and Aditya Khandelia (IIT Delhi) looked at handwriting as an interface; something that remains one of the most basic and effective tools for communication. Kaustubh Srikrishna Patwardhan (IIT Bombay) and Sumantra Dutta Roy (IIT Delhi) focused on the technology of gestures

recognition and the first day concluded with a panel on the key issues of the day.

Day two started with case studies of expressive and empowering interactions. Anupam Basu (IIT Kharagpur) described a communication tool for disabled Indian children and Dirk de Jeger (University of Southampton) described a system for measuring water quality via a mobile. The system keeps a 'human in the loop', resisting the deskilling over-dependence on technology. In the third paper Sunyoung Kim (MIT) described work on building systems to detect and display air quality.

The final paper session concerned near-end development. Alan Dix (Lancaster University) with colleagues from HP Labs Bangalore and the National Institute of Design (Bangalore) explored opportunities for delivering novel content to mobile phones. Finally Martin Ludvigsen (University of Aarhus) presented insights into sustainability and interaction design offering seven 'articles' for sustainable design.

Eric Schaffer provided the closing keynote in his inimitable controversial and entertaining style. His message was clear – we really do need to change the way we live to beat climate change, and IT can help us do just that.

The final session, chaired by Tom McEwan, was a barn-storming, brain-storming session on where EISE should go following this inaugural meeting. Many ideas were mooted and it seems certain that further meetings will be held through the Interaction group and elsewhere, such as the India HCI conference in Mumbai next March.

1. http://www.ukinit.org/

The creative moment in internet interaction

The value of implicit (or unstructured) interaction

Brigitte Kaltenbacher

Discussions of interaction design usually focus on structured and deliberate interaction modes and scenarios. Ambiguity in the context of technical interaction design is viewed as challenging (Gaver, Beaver & Benford, 2003), which could cause affective symptoms such as frustration and anxiety in users (Kuhlthau, 1993). With regards to internet interaction "there is still a lingering tendency in information science to see browsing in contrast to directed searching" (Bates, 1989).

This short article expands on these positions by considering the importance of context. Firstly, it argues that browsing in the form of exploratory interaction is *intertwined* with goal-orientated interaction, and can even dominate in certain (low choice) content areas such as entertainment or news. Secondly, ambiguous interaction scenarios can also support users' creativity in informational internet interaction[1]. The probability of positive or negative affects occurring is context sensitive. Context here is considered to be a complex matrix of task type, timeframe, and content type.

Several early writers on interaction with technology can be usefully revisited and employed to discuss these matters. With regards to internet interaction I am thinking in particular of Marcia Bates' article on Berrypicking techniques in human information retrieval (Bates, 1989). The value of her work, initially positioned in information science and widely cited in academic research, has recently been recognised as having significance for information architecture on the web (e.g. Morville, 2005, pp.59/60; Kalbach, 2007, p.30). Both sources acknowledge her achievements in revising the classic linear information retrieval model towards the notion of an

Document > Document representation >	Match	< Query < Information need

Figure 1 "The Classic information Retrieval Model" recreated from Bates, 1989.

evolving search (i.e. Berrypicking) as well as laying the foundations for an evolutionary approach to information seeking behaviour. The approach she proposed was developed further by Pirolli and Card (1995) to become the concept of 'information foraging'. These developments have an undeniable benefit for studies about (internet) search behaviour, but I would argue that Bates' work also acts as a link to and an extension of what John McCarthy and Peter Wright (2005) call 'situated creative action' in the user experience.

Before explaining how I see this link, I will briefly introduce Bates' concept of Berrypicking as a technique in information seeking behaviour. Firstly, based on her observations of the information retrieval techniques of professional academic researchers, Bates challenges the classic information model (Figure 1).

She argues that not only do information seeking individuals perform a variety of actions in their pathways through research material, they also constantly change direction based on their previous encounters with information (Figure 2).

She stresses that these changes in direction are very different from iteratively optimising an initial search query, and that her concept of 'Berrypicking' stands for an evolving and therefore unpredictable search behaviour. Essentially her model makes a case for the complementary and mutually beneficial combination of browsing and searching. Since Bates recognises that "there is still a lingering tendency in information science to see browsing *in contrast* to directed searching" (1989, emphasis in original), a large part of

her paper makes suggestions about how to support browsing behaviour and offers potential online solutions in information retrieval (IR) environments. Some of the key advantages of browsing which she lists challenge conventional IA practices about informational interaction: users are able to "jump the rails" of classification, avoid an early focus on specific aspects of any subject matter, and gain high-level overviews of a topic, similar to snapshots. Likewise "flipping through pages" (in reference to analogue reading) provides a gestalt sense and "feel" about the character of the author and/or a subject matter. All of these unstructured activities can lead to new connections or even serendipitous discoveries. Personally I believe one could also refer to these activities of de- and recontexualisation as defamiliarisation, a technique used to break habitual thought or practice in order to inspire innovation in designers (see Leong, Howard & Vetere, 2008).

In summary, Berrypicking is the concept of an evolving search, which unites the directed goal-oriented search with an unfocused and more relaxed mode of browsing. The latter is the space that allows users to explore, experiment or change direction, and is of central interest in this article: browsing as the space for discovery, and even serendipity, and as we see later, for implicit learning that supports users' situated creativity.

Here I need to answer an obvious question. Bates wrote about Berrypicking before the internet had become a mass communication medium. Can we assume that current internet users behave in a similar way to professional

researchers in the late 1980s? According to the responses to the questionnaires in my own research with students and young professionals (ages 18–32), they do (Kaltenbacher, 2008). In addition, different contexts seem to produce different ratios of browsing and searching in interaction behaviour, and consequently call for different navigation mechanisms.

Bates' claim that there is creative potential in unstructured interaction is supported by recent theories of learning; in particular of implicit learning processes. Implicit learning relates to unstructured interaction as structured interaction does to explicit learning: the former stands for a playful explorative mode of interaction; the latter for a reasoned and planned approach. Children take to the implicit mode quite naturally, yet this child's play is anything but childish.

Guy Claxton (1998) made a strong argument for the value of implicit cognitive

processes in his article 'Knowing without knowing why' as well as in his subsequent writings. He argues that an experimental unstructured approach supports early and vague forms of learning. Although "[g]iven a complex task to perform, expertise develops well in advance of the ability to articulate, explain or even consciously detect the pattern of information"(Reber, in Claxton, 1998), implicit knowledge is not inferior to explicit knowledge. Indeed, it seems to represent a superior form of learning when it comes to managing situations that involve complex patterns of contingency (Lewicki, Hill & Czyzewska, in Claxton, 1998). Claxton's article lists an impressive array of studies about how implicit knowledge develops over time. An informal study with children, for example, included the use of the Rubik's cube; others like Diane Berry and Donald Broadbent studied problems like managing traffic control, school

budgets, and factory production problems by simulating them in computer games with adults. The connection between implicit knowledge and creativity – for example in the thought processes of contemporary Nobel prize winners in medicine and science – has been studied by Marton et al. (1994) as well as Sternberg and Davidson (1995). Claxton (1998) summarises all these studies as "an increasingly powerful assault on the Cartesian assumption that 'mind' is all and only that which is conscious (as well as … rational, systematic and articulate)" and that "cognitive science is well on the way to resuscitating the idea of an 'intelligent unconscious'".

This excursion into theories of learning reveals how Bates' concept of Berrypicking offers the potential of serendipitous discoveries or creative moves for (internet) users by making space for implicit processes, e.g. browsing. In addition, it reveals that playfulness as a consideration of the user experience relates as much to the usability principle learnibility (or ease of learning) as it does to user satisfaction, i.e. enjoyable and pleasurable user experiences (though one does not exclude the other of course).

So how can Berrypicking be applied to internet interaction? The first step might be increased awareness of the potential of browsing activities. Follett (2007) states that playfulness is an often "under-appreciated, and rarely measured component of user experience" in UX design, and that it plays an important role in users' engagement and creative enjoyment of the interaction experience. McCarthy and Wright (2004) dedicated a whole book to the creative potential of the user's experience with technology, supported by many examples. To counteract the fact that some HCI-related practices are
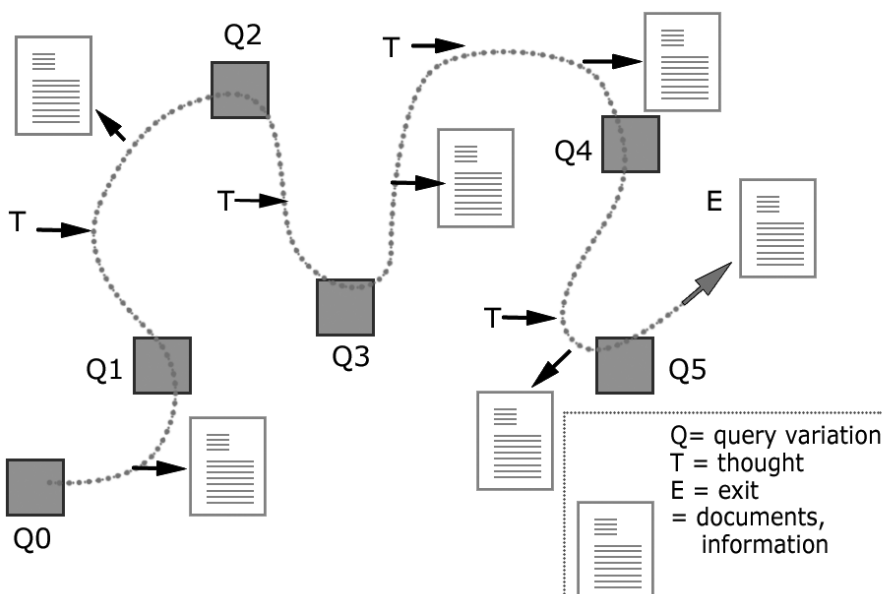

Q2

T

Q4

E

T

T

Q1

T

Q3

T

Q5

Q0

Q= query variation
T = thought
E = exit
= documents,
   information

Figure 2 Bates' model of Berrypicking (recreated from Bates, 1989)

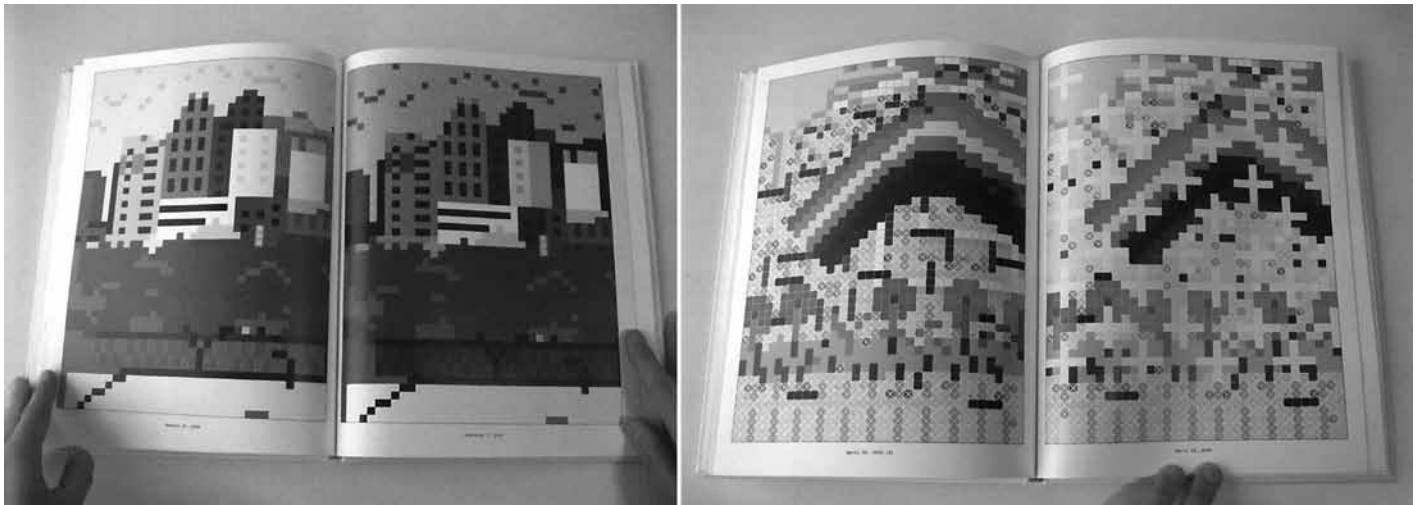# The creative moment in internet interaction
Brigitte Kaltenbacher

Figure 3 Danielle Aubert, from *16 Months Worth of Drawing Exercises in Microsoft Excel* (images used by kind permission of Ms Aubert)

still strongly influenced by rationalist thought, they aim to "make lived experience with technology the primary reality in [HCI] practice and comment on relations between people and technology" (p.183). Inspired by Dewey's *Art as Experience* they consider that every experience has the potential to be enriched, meaningful, and whole, i.e. to constitute an aesthetic experience. It is important to understand that the aesthetic experience in this context does not refer to art, art objects or institutional conceptions of art. Every experience can oscillate between our ordinary everyday experiences and the potential it has to be fulfilling, surprising and creative.

One example they discuss is interaction with spreadsheets. While some users simply use them to process numerical data, "for others it is a very enjoyable way of making sense of situations and events through creating and viewing patterns" (p.69). To illustrate their point, I will take a detour through art, by now a seemingly accepted catalyst for innovation in HCI[2]. In particular Danielle Aubert's work can act as a beautiful illustration of this statement. The

use of a spreadsheet application in her artwork 'Extrapolations in Excel' goes well beyond the potential of human adaptation or reflexivity that HCI traditionally assigns to human nature. Instead it demonstrates the creative potential latent in any user in interaction with technology. A potential, I would argue, that can usefully be tapped into for future innovative interaction solutions, for example by a combination of participatory and ethnographic methods, both of which are also discussed by McCarthy and Wright (2004). At the same time McCarthy and Wright expand on Follett's point that "awareness about the importance of the deeper implications of playfulness might lead to a view of interaction "as an open, unfinalized, and unfinalizable place where every person and thing is always a dynamic process [and] always open to the future".

Assuming that the potential of playfulness, its connection to users' creativity, and the repercussions it has on interaction design are interconnected, the next step is to look at informational navigation mechanisms on the internet. The point of internet navigation such as menus,

categories, and label systems is of course to support users' goals. Hypertext on the other hand "allows for useful and creative relationships between items and areas" in information hierarchies (Morville & Rosenfeld, 2007, p.77). This positions non-hierarchical navigational means such as hypertext as well as 'embedded' and 'related' links, as the current space for users' creative turns and moves in informational internet interaction.

So, if mechanisms for creative internet interaction already exist, why should this issue require further discussion? One reason is that non-hierarchical navigational means, such as hyperlinks, are still considered as being confusing, as users "simply can't create a mental model of the site organisation" (Morville & Rosenfeld, 2007). Bates directly answers this criticism in one of her later papers: not having a mental model does not mean that offering browsing features is a simple matter. Indeed, "making effective provision for browsing capabilities involves its own complexities" (Bates, 2002). These complexities need to be explored and conceptualised within the HCI framework

in order to support the development of innova- tive future interaction solutions.

The ambiguities these spaces create "are not a virtue for its own sake, nor should they be used as an excuse for poor design" (Gaver, 2002). Contextual and relational quality needs to be a key consideration in the design of explora- tory spaces in internet interaction. Supportive conditions for exploration are constituted by a complex matrix of task types, timeframes, and types of content. In other words, open tasks (i.e. tasks without a pre-determined solution), a pressure-free timeframe which allows for the processes and developments of sense-making in interaction, or a content type that gravitates towards a low choice scenario (e.g. news or entertainment), produce a greater likelihood that those emotions which support creativity will come to the forefront. This is why creativ- ity techniques like brainstorming require a safe, non-judgmental and relaxing environment.

In terms of designing for implicit internet interaction, a great deal of inspiration can be found in the work of early writers on infor- mational interaction. Bates' ideas, which have already been mentioned, have yet to be evaluated in the context of contemporary multi- faceted internet interaction, let alone produced. Similarly, Ted Nelson's original concept of hyper- text could be usefully revisited. When Nelson coined the term in 1963, he had a fundamentally more complex idea in mind, compared to its current implementation in browser software. He envisioned hypertext to be part of a "file structure for the complex, the changing and the indeterminate" (p.134ff, in Wardrip-Fruin & Montfort, 2003). Users were supposed to enter, edit, annotate and connect links freely to suit the multifaceted needs of writers and scientist alike. Such a participatory anticipation of hyper-

link or contextual navigation design could take the idea of 'user-generated' content to the next level, e.g. user generated navigation design (see Kaltenbacher, 2009).

In summary, this article challenges a tradi- tional understanding of browsing as unfocused and indecisive internet interaction on several levels. Firstly, as an area for exploration browsing supports early and vague forms of learning, and thus has repercussions on the ease of learning of informational products. Secondly, designing for the complexities of browsing shifts the design focus from the interface to the context of – and relations between – infor- mational components (e.g. multi-dimensional background structures such as relational and dynamic taxonomies). Thirdly, provision for browsing can support users in finding their own unpredictable, possibly serendipitous or even creative connections in informational interac- tion. Finally, the discussion of implicit interaction is intrinsically intertwined with contextual and relational considerations.

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1. Informational interaction here is distinguished from transactional interaction, such as online shopping, or holiday booking 'configurations' combining on-line flight, hotel, car and event booking and purchases.

2. For example, Ben Shneiderman proposes a 'Renaissance 2.0' that should bridge the two cultures of art and science "to overcome the troubling split between them [and] unify thinking about technology by promoting multidisciplinary education and sympathy for diversity" (Shneiderman, 2002, p.2).

My PhD

The reality of interacting with Powerwalls

Chris Rooney

I must admit, it does put a smile on my face when people compare my research to the gesture interactions performed by Tom Cruise in the sci-fi film Minority Report, and when I started my PhD, that film was the inspiration for my research. What I have learnt during my studies, however, is that lots of fancy gesture interactions won't get you very far in the real world. My research has helped me to understand interaction, and design an interface that is easily adoptable and minimises learning.

Powerwalls

My research focuses on how people interact with high-resolution wall-size (Powerwall) displays. First, however, it is important to understand what a Powerwall display actually is. These displays are generally made up of a number of TFT monitors tiled together, driven by a cluster of PCs. The Powerwall in Figure 1 offers a combined resolution of approximately 53 million pixels. The largest Powerwall display in the world is currently the Stallion display at the University of Texas, with a total resolution of 306 million pixels. This vast amount of screen real estate allows very large and complex data sets to be visualised, without the need to pan and zoom. Alternatively, the screen space can be used to show multiple visualisations, or provide additional context to aid understanding.

The pixel density of Powerwall displays is generally the same as a desktop display, so you can expect targets to remain the same size on the Powerwall as they would on the desktop. Since Powerwalls are much larger, targets are much further away from each other. Fitts' Law [1] lets us predict how long it will take to select a target of a certain size at a certain distance

away. Since targets on the Powerwall are further away, simply moving interaction from the desktop to a Powerwall will increase the time taken to perform simple selection tasks.

Understanding desktop interaction

To understand how best to improve Powerwall interaction, it was important to first understand how users currently interact on the desktop. I studied user interaction with three desktop visualisation applications [2]. The study presented two major findings: desktop interaction relies heavily on multi-window interaction, and the majority of targets are small (< 20 pixels).

These small targets present a problem for Powerwall interaction because, over large distances, they become more difficult to select. This leads to the conclusion that the key to improving interaction is to reduce the level of precision by increasing target sizes. Based on this, I developed two techniques that improve interaction with single windows.

Single window interaction

It has been established that users tend to perform more window management when they interact with large desktop spaces, including moving and resizing [3]. On standard desktop windows, the move bar has a narrowest edge of 20 pixels and the resize border has a narrowest edge of 5 pixels. Interacting with these targets can be difficult on the desktop, never mind on a Powerwall. Based on this, I designed the manipulation layer, an invisible layer that overlays windows and provides large target areas for moving and resizing. This

makes it much easier for users to move and resize windows.

The second technique I developed was the Power-Lens, which magnifies targets and is designed specifically for Powerwall displays. Based on the assumption that users move the cursor at a high velocity when navigating to a target, and reduce the velocity as they near the target, the Power-Lens automatically appears when the cursor velocity slows. Because it appears automatically, users are able to select both near and distant targets.

I performed two formal experiments to evaluate the performance of the manipulation layer and Power-Lens. Experiment 1 showed the window manipulation layer to speed up the tasks of moving and resizing a window by 24% and 27% respectively. Experiment 2 showed the Power-Lens to speed up the selection of 5x5 pixel targets by 18%.

Multi-window interaction

My next goal was to improve window management. Previous research had suggested that with such large displays, users only tend to work in a small area of the display [3]. This is known as the focal region and contains windows of interest. Any other windows are left in a peripheral region. Based on this assumption, I developed a set of tools for managing multiple windows. When a new window is opened, users are able to place the window anywhere on the display. Assuming this location is the focal region, any windows that are currently residing at this location are automatically pushing outward towards the periphery. Users can also group windows; these can then be moved together using a single action, or, if they were spread out, the group can be brought together into the focal region.

Chris Rooney is a PhD student in the School of Computing at the University of Leeds. He is in his 4th year and currently writing up. His supervisor is Dr. Roy Ruddle who is in the Visualisation and Virtual Reality Group. Chris also completed his BSc in Computing at the University of Leeds in 2006 and decided to stay and continue in academia.

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To evaluate these techniques, I developed a multi-window visualisation application. The main application window visualised a set of geographical data objects on a map. From this window, users could view the data associated with each data object using one of five visualisations. Users had the option to use the display space to view one visualisation in great detail, or view many visualisations simultaneously for easy comparison.

Air quality and traffic data was used as a case study, and the application was used as a training tool to allow six PhD students, studying energy and environment, to understand and analyse the data (Figure 2). As a group, they used the Powerwall for one week. At the end of the week, the students found the Powerwall application easy to use, and found that it was very useful for group work. Interestingly, the users' window management was not as predicted. Users never felt the need to group windows, and rarely used any of the multi-window features. The users tended to open a new window wherever there was space on the display, and naturally placed visualisations next to each other for comparison. When starting a new task, rather than group and move the windows, they simply changed their focal region to some new empty space on the display.

What I have learnt from this is that users are difficult to predict. You can try and rely on previous research, and make educated guesses, but the best way to develop solutions for them is to observe them in their environment. I did not get the results I wanted in terms of the multi-window techniques, but I gained a lot more understanding about how users interact with Powerwalls.

What I did not predict when I started my PhD was that my novel contributions to Powerwall interaction would be software based, and work with a range of devices. While users can use hand tracking and gesture interaction to interact, surprisingly a mouse and keyboard on a podium proved to be more accurate and successful.

Future work

I believe that these displays have a strong future ahead, but only if applications and interactions are developed correctly. These displays offer fantastic support for group work, and have also shown their benefit as a teaching tool. I would like to understand more about the social interaction that occurs during group work and develop ways to support and improve group work with Powerwall displays.

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Figure 1 Me interacting with the Leeds Powerwall. The wall is made up of 28 20-inch TFT monitors and has a resolution of 11200x4800 pixels.

Figure 2 Six PhD students interacting with the multi-window visualisation application on the Leeds Powerwall.

My PhD

If you are a PhD student just itching to tell the world about your research or if you've enjoyed reading about some of the emerging areas of research that the My Phd column has recently discussed then we would like to hear from you. We are currently accepting one to two page summaries from PhD students in the UK and across Europe with a focus on being open and accessible to everyone in the HCI community.

If you would like to submit or would just like more information please contact Stephen Hassard using the contact information below.

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Interfaces reviews

Shailey Minocha

For this special issue of Interfaces on the ubiquitous character of HCI in terms of time and place, we have reviewed a book that discusses how the internet and other technologies are supporting novel kinds of science and engineering collaboration in geographically dispersed project teams. The book highlights the trade-offs between the benefits of dispersed collaboration and the issues associated with co-ordination and communication in virtual project teams – whether in research or in the industry. I hope you will find the review interesting.

Please contact me if you want to review a book, or have come across a book that you think should be reviewed, or if you have published a book yourself recently. I very much look forward to your comments, ideas and contributions. If you would like Interfaces to include reviews on a particular theme or domain, then please also let me know. Many thanks. Shailey Minocha, The Open University, UK
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Scientific Collaboration on the Internet

Research is increasingly distributed, as indicated by a rising number of co-authored papers with international colleagues, and multi-investigator grants. Collaborative research makes it possible to address research problems that are beyond the realm of one scientist or discipline to solve. Funding agencies and policy makers encourage collaborative research or *e-research*: the European Union's framework programme, or EPSRC's Digital Economy Hubs, involve experts from academia and practice in various institutions and disciplines in order to build the capacity, skills and expertise. In software engineering, software development activities are being conducted collaboratively across multiple time zones and multiple teams due to off-shoring and outsourcing. In fact, work in almost every domain these days requires crossing organisational boundaries for complementary resources and skills.

Scientific Collaboration on the Internet focuses on collaborative research across disciplinary and organisational boundaries. The book has several case studies of collaborative research projects, past and ongoing. The projects described range from astronomical research to medical research; from the deployment of computational infrastructure for connecting experts in earthquake engineering, to partnerships between developed and developing countries in AIDS research. Through these case studies, the book provides an in-depth review of how technologies are enabling e-research or novel kinds of science and engineering collaboration. Although the book is a collection of chapters from a variety of disciplines and projects from around the world, several common themes emerge across the chapters: success stories, failures and challenges in e-research or 'collaboratories', the role of the internet and other technologies, and whether new management practices are needed to enable long-distance collaborative science.

HCI researchers and practitioners who are interested in collaboration projects, or have had the experience of participating in virtual project teams, particularly those over long distances and using information and communication technologies, will find this book a useful and valuable source of inspiration and a resource for thinking and reflecting about their own collaboration activities, and for planning future collaborations. The table of contents may seem daunting as many authors and scientists from diverse disciplines have contributed to this book, but the first 11 pages of 'introduction' by the editors set the scene and help the reader to settle down and enjoy the book.

The 'introduction' to the book describes its rationale, terminology used, unifying questions for the various case studies in the book, and the outline descriptions for each of the six parts. The introductory chapter provides an excellent motivation for e-research, the role of technologies in e-research, and the social, organisational and technological challenges in collaborations that involve geographically dispersed participants. The editors then discuss the concept of a 'collaboratory':

> an organisational entity that spans distance, supports rich and recurring human interaction oriented to a common research area, and provides access to data sources, artifacts, and tools required to accomplish research tasks.

Over the last few years, the terms e-science (in Europe) and cyber-infrastructure (in the US) or cyber-science have been used, but, as the editors argue, the concepts embodied in these newer terms have been influenced by the 'collaboratory' vision which has been proposed and analysed in this book.

Scientific Collaboration on the Internet begins with a section on the 'Contemporary Collaboratory Vision'. The second part of the book relates to building a theory in the area of distributed collaborative science. The third section is focused on e-research projects in the physical sciences domain and, specifically, on the technological innovations that are enabling collaborations in high-energy physics and space physics. The fourth part covers topics in the biomedical domain and how complex and data-intensive research problems in areas such as genetics, proteomics, and neurobiology require large-scale collaboratories. As in the other chapters this section also focuses on the challenges of technological infrastructure and organisational arrangements to manage large-scale distributed projects in the bio-medical domain. The fifth section covers projects in the earth and environmental sciences. The sixth and final
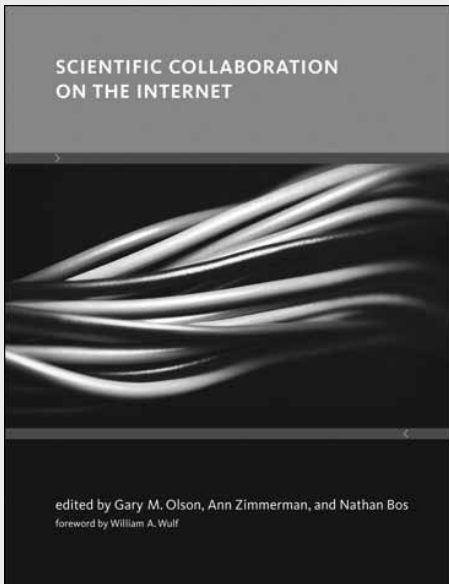
Scientific Collaboration on the Internet
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part discusses collaborations with researchers in the developing world. The chapters in this part examine the technical, institutional, and cultural barriers in collaborations between developed and developing worlds.

Through the case studies or real stories encompassing a variety of disciplines, the book provides an in-depth and 'rich' review of how scientific collaborations are being carried out at a distance and raises a number of interesting issues and challenges for the HCI community. A thread that runs through all the chapters of the book and which is of particular interest to HCI/CSCW research-ers and practitioners is how communication and collaboration technologies can facilitate co-ordination in virtual teams. Co-ordination is the integration or linking together of differ-ent pieces of a project to accomplish a col-lective task. A major challenge for dispersed scientific collaboration is coordinating work so that scientists can effectively use one another's ideas and expertise without frequent face-to-face interaction. The book highlights a tension between the benefits to innovation by working across disciplinary and organisational boundaries, versus the risks that arise from the costs of co-ordination and relationship development in these collaborations. When multiple institutions are involved in a project, the co-ordination costs are much higher than single-institution projects. Whether in research or projects in the industry, distance can slow group communication and consensus making. In studies of research projects with dispersed members discussed in this book, research-ers have found project delays, institutional

rivalries, and failure to share information and communicate effectively. Hence, the research agenda for HCI researchers, implicit in this book, is to investigate the different ways that virtual teams make choices about collaboration technologies and, most importantly, what is meant by collaboration in a particular context.

The challenge for HCI researchers, there-fore, is to investigate how collaborative envi-ronments can be designed so as to facilitate and support work in virtual teams. There are some well-catalogued issues in the HCI lit-erature, which are also discussed in this book: building shared trust, organisation of synchro-nous meetings with partners who are in differ-ent time zones, and so on, but one of the main obstacles to effective co-ordination, as high-lighted in Part 2 of this book, is determining fit-for-purpose technologies for co-ordination at different stages of the research project life cycle. Further, what strategies should be devel-oped for communication and co-ordination to overcome the barriers of languages, cultures, and disciplines?

Although this book does not explic-itly mention them, there are two other HCI aspects that came up in my mind while reading this book: first, that bandwidth and technological infrastructure in different loca-tions can constrain the technologies that can be adopted to support virtual team working; and secondly, the need to learn about tech-nologies for co-ordination and virtual project management being used in the industry (e.g., Basecamp, DeskAway) as such tools may help to streamline task dependencies and project reviews in e-research.

This book's focus is different from the HCI books that we normally review in this column, but I hope that this review encourages you to think about the challenges and research problems for the HCI community: how we need to integrate our research efforts and experiences to design and develop technologi-cal environments to support geographically distributed teams – particularly when the team members are spread over different time zones, have different cultural backgrounds, and when the technological infrastructures may not be compatible.

Come and play with us in Dundee, but seriously though …

Lachlan MacKinnon

Next year's HCI conference will be hosted by the University of Abertay Dundee from 6th to 10th September 2010, with the special theme being "Play is a Serious Business".

It will build on this year's successful HCI Educators conference, themed "Playing with our Education", which was also hosted by Abertay. You may detect a bit of a hint of play, and I hope playfulness, in the themes for these conferences, and that reflects Abertay's expertise in teaching and researching in Computer Games, and indeed some of the sessions of the conference will take place in the UK's first Centre for Excellence in Computer Games Education.

The conference will also seek to build on the successes of HCI 2009, held a few months ago in Cambridge, and will take forward some of the innovations piloted by Alan Blackwell and previously reported in Interfaces.

Hopefully, by the time you read this, several calls for activities associated with HCI 2010 will have arrived in a mailbox near you. If these haven't made it to you, or there's one you haven't seen and are interested by, then please visit the conference website at http://www.hci2010.org, where you will find all the calls and further information on the conference. Please bookmark the site, as it will develop over the year as the conference programme evolves, the keynote speakers are identified, the papers are selected, the conference date arrives, and finally as the organisers lie down in a darkened room to celebrate a successful event.

The conference calls begin with traditional research papers, covering any of the HCI themes, of which a non-exhaustive list is provided in the call, not just Play and Games.

Perhaps the most significant change brought about by the experience of HCI 2009 in Cambridge is the move away from short papers and posters to encounter papers. These will be presented in sessions of six papers, which offers the opportunity for a short (five-minute) presentation by each of the authors to whet the appetite of the audience, followed by a period of interaction (30 minutes) between the audience and the authors, in which the main themes of the work presented can be fleshed out and discussed, new perspectives offered, and arguments made. This interaction takes place in a face-to-face promenade model, which allows dialogue to ebb and flow as the audience moves around the authors.

At Cambridge the authors then had an opportunity to report back for a further five minutes each at the end, but this didn't always work too well, so we're planning to have the authors come together as a panel for the last 30 minutes of the session, to feedback on the discussions but continue to allow dialogue and further questions from the audience. In order to make this work, each session will have to be closely themed, and the call for these papers asks for four-page papers and presentation outlines for the themes of student work, research ideas, research in progress, and commercial and industrial applications. These papers will all appear in the main conference proceedings, which will be provided electronically to delegates and will appear on-line in the BCS eWiCS series and the ACM Digital Library; again thanks to Alan for initiating this.

As in previous years, the conference will be preceded by workshops, tutorials and a PhD Forum (doctoral consortium) on Monday 6th and Tuesday 7th September. Details of these will emerge over the next few months, as the

responses to the calls come in and are processed and agreed.

I would encourage any of you with an interesting area of research or development that doesn't cut down to a research paper, or has already been published but needs further dissemination, to consider putting forward a tutorial proposal; these are usually well-attended and for many HCIers are more important than the conference proper.

Likewise, for those of you seeking to establish critical mass or networks of colleagues in a new, or perhaps under-represented, area of HCI activity, perhaps a co-located workshop would offer the opportunity to move your area of interest forward, and many of these have since moved on to become full-blown conferences in their own right.

For PhD students and supervisors the HCI PhD Forum is an annual opportunity to obtain reflective feedback on the work being done by the student, at whichever stage they have reached, from a panel of experienced HCI researchers, in a safe and friendly environment. The students also receive advice and guidance on the process of research and the PhD, and have a chance to voice their fears and concerns with the academics and fellow students engaged in the Forum, helping the students and helping to build the HCI community.

There'll be more later, but I look forward to seeing you all in Dundee next September!!

CfP

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CfP: Special Issue of Behaviour and Information Technology

**Services and Human–Computer Interaction:
New Opportunities**

Guest editors

Peter Wild, Institute for Manufacturing, University of Cambridge

Geke van Dijk, STBY London/Amsterdam

Neil Maiden, Centre for HCI Design, City University London

Services and Service Design are an ever more important part of local and global economies and are emerging, crossing, and redefining disciplinary boundaries. Service has emerged as a frequent metaphor for a range of computing applications, both web based, pervasive and ubiquitous. Here researchers and practitioners often talk of Services instead of applications. This special issue will bring together papers that explore the intersection between Services and HCI.

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