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British HCI Group
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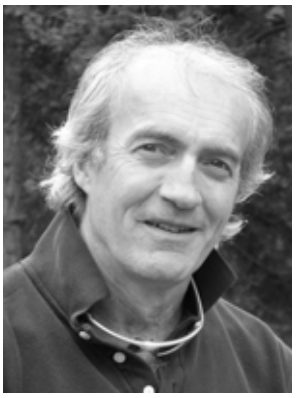
debating the nature of HCI with

Gilbert Cockton

and

David Siegel

Susan Dray



Bill Buxton

John Waterworth

Yvonne Rogers

plus

get involved with open source software through the OpenUsability project
Rod McCall provides a European perspective on HCI research
Gerred Blyth describes Amberlight's usability research
a Noddy's Guide to mode problems

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Human–Computer Interaction

View from the Events Chair

I am a Spaniard who spent the second half of his life in Italy. A repentant background in engineering together with a series of introspections in the world of design and the arts in Milan led me to explore the reality of interaction design. After my PhD I joined HiuGO, a major Italian services provider for the emerging Mobile Interactive Community, as Head of HCI, in conjunction with academic duties at the Politecnico di Milano and consultancy for Vodafone and Nokia.

During a visiting period at the National Institute of Design (NID) in India, I bumped into a sort of shaman who miraculously predicted that soon I'd move from my beloved Milan to a thrilling (sort of tropical location I assumed) location in the seaside; some months later I found myself living in the UK, as an academic at the University of Brighton.

Since then I've been devoted to exploring the user experience in future scenarios of pervasive communication and, in particular, to unfold the future of mobile and pervasive iTV. Among the new stimulating activities I have engaged with was joining the Events Sub-group of the British HCI Group. Thanks to the work of Chris Roast and, subsequently, Peter Wild (from whom I took over the role of Chair) the Sub-group was happily well structured already and with clear responsibilities. The main mission of the Sub-group is to support the events that the British HCI Group either runs itself (such as the HCI annual conference) or co-runs with other organisations, or just to promote activities (mainly one-day events) organised by other institutions.

The HCI annual conference, which this year will celebrate its 20th anniversary with the theme 'engagability', is one of the main activities of the BCS HCI Group. Fintan Culwin is doing an admirable job in liaising with this matter. In order to provide process support for the annual HCI conference, we are in the process of creating a permanent Conference Steering Group, represented by a selected number of prominent HCI conference veterans.

These years have witnessed an increase in the number of BHCIG run or associated workshops as a result of active teamwork with Colin Venters. We also promote regional events such as the South West Usability Group (SWUG), UPA in Cardiff, UPA in Scotland and the UXnet meetings in London.

Usually the collaboration with externally organised events consists of promotion using the different groups' channels: UsabilityNews (www.usabilitynews.com, our web site (www.bcs-hci.org.uk/news.html), and the BCS weekly Events Calendar (www.bcs.org/BCS/Awards/Events/BCSEventsCalendar). Reciprocally, organisers are asked to include our logo on the event's web site, and distribute our promotional material in delegate packs at the event. Likewise we are keen on offering an events discount registration (when applicable) for our members, improving, in this way, the attendance. Our future events agenda aspires to increase the quality and involvement nature of our collaborations. In this sense we have started a significant cooperation with the Ergonomics Society which entails, for example, our endorsement of ESHCI 2007. We have been lucky to have a usability industry-based volunteer on the Events Sub-group. Furthermore, with the crucial support of Bhiru Shelat we aim to

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Editorial

Laura Cowen

Hello and welcome to *Interfaces* 66.

This issue, *Interfaces* gets interactive and we begin with an extended edition of Gilbert Cockton's Deflections column; a collection of pieces that reflect Gilbert's discussions about HCI with David Siegel and Susan Dray, Bill Buxton, Yvonne Rogers, and John Waterworth.

Meanwhile, Jan Meuhlig and Celeste Lyn Paul describe how user-centred design can actually benefit from the open source software development process, where early and much testing is a major feature of development. They encourage you to provide usability and user-centred design expertise to open source software projects through their site OpenUsability.org. With the launch of the Open Source Academy by the Department of the Deputy Prime Minister last Spring (www.opensourceacademy.gov.uk) and the increasing popularity of open source software like the Firefox web browser, open source software is gaining mainstream acceptance and a good working relationship with the usability community can only help that.

With the new year, comes a new column, *Introducing…*, which will look at the HCI research done by a different research group or company in each issue; this issue, Gerred Blyth introduces the usability research at Amberlight Ltd, an HCI consultancy in London. And, just to show that we're not all about throwing out the old for the new, Hokyoung Ryu of New Zealand brings about the welcome return of the Noddy's Guide, this time looking at how to avoid the problems caused by badly designed modes in interfaces.

Finally, I encourage you to respond to the call for participation in HCI2006. The full paper deadline is now past but there's still time to submit short papers before the 5th May. For full details, see www.hci2006.org. The excellent HCI2005 last summer in Edinburgh made a few changes to the usual format, including, for instance, the introduction of the Conference Fringe. HCI2006 promises more updates to reflect changes in the HCI field – though what the slightly surreal conference website says about the field, I'm not sure…

Laura Cowen is a Technical Writer at IBM Software Development Laboratories near Winchester, Hampshire. She previously worked as a Usability Researcher for an information design company in Milton Keynes, which included a very brief semi-academic career in eye movement and usability research.

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strengthen our promotion and management of events that are more relevant to usability professionals.

Student representatives have undertaken valuable work in the Events Sub-group, and as we are always willing to find motivated student representatives I take this opportunity to announce an open call for new volunteers.

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Right to Reply

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

To receive your own copy of *Interfaces*, join the British HCI Group by filling in the form on page 27 and sending it to the address given.

Next Issue

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

With thanks to commissioning editors:
Interfaces reviews: John Knight, John.Knight@uce.ac.uk
My PhD: Martha Hause, m.l.hause@dsl.pipex.com
Profile: Alan Dix, alan@hcibook.com

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Deadline for issue 67 is **15 April 2006**. Deadline for issue 68 is **15 July 2006**. Electronic versions are preferred: RTF, plain text or MS Word, via email or FTP (mail fiona.dix@hiraeth.com for FTP address) or on Mac, PC disks; but copy will be accepted on paper or fax.

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

PDFs of *Interfaces* issues 35–65 can be found on the B-HCI-G web site, www.bcs-hci.org.uk/interfaces.html

Deflections and rebounds

How fat can we get, where will we fit in?

Gilbert Cockton

Well, ACM <*interactions*> did publish a reply to the letter about the column that provided one focus for my previous Deflections column. However, *Interfaces* stays one step ahead of our colorful [sic] co-organ as usual, putting all the responses in the same issue, rather than stringing them out for almost a year (<*interactions*> Vol. 12 issues 2, 5 and 6). What's more, we also have a letter from John Waterworth about my other focus, Yvonne Rogers' 'Is HCI in danger of spiralling out of control?' piece in *Interfaces* 64, and Yvonne's reply to both John and I!

Smugly, I write, where there's a will there's a way. And long may it continue. HCI needs open and vigorous debates. It's a field that is largely constructed by outsiders: the user-friendly technopolitics of the 1980s (Alvey, MCC, 5th Generation, ESPRIT), the "I'm a usability professional now" autodidacts of the 1990s, as well as more timeless personas such as the "can't you just make it usable?" software engineer who believes that usability can be poured in (or worse, painted on), the "it's just applied psychology" moonlighting academic consultant, or the "we followed all the guidelines" e-government managers who have never yet failed to tick any set of boxes surrogate for real work.

Their enviable certainty can even make it feel that there is no need for a debate within HCI about what it is, its relation to design, and its scope as an academic discipline. Actually, we need a very visible massive debate on the nature of HCI and its relation to real design, since for every one of 'us' there are scores of outsiders with very clear views on what usability, user-centred interaction design, and user friendliness are all about. We have to be loud, clear, well informed, persuasive, and authoritative. User hugging is about as effective as tree hugging. Stop 'fighting for the user' and don't make a fool of yourself by 'getting angry'. Just deliver, and where you can't, explain why and state what we need before we can.

This issue's expanded 'Deflections and rebounds' begins with David Siegel and Susan Dray's response to my piece (as well as to Bill Buxton's letter); this extends their letter in <*interactions*> 12(6). It all began with their <*interactions*> piece back in February. Next, sticking with the chronology, comes Bill's expansion on his letter <*interactions*> 12(5), which is also a micro version of his lively Interact plenary. Then, as if by magic, John Waterworth's letter arrived after *Interfaces* 65 had gone to press, so we include this here as well. Last comes Yvonne's response to my previous Deflections piece.

So, what's the answer, or indeed, what's the question? There are many of both, but having promised to give away my column for this issue, I can hardly start taking it back. Read, decide for yourself, and *please* share your responses. Our editor, Laura Cowen (laurajcowen@yahoo.co.uk), looks forward to your contributions.

What HCI adds to the product development stew

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Our thanks to Gilbert for inviting us to this debate. However, we have been scratching our heads trying to figure out what is being debated. It looks like each party is simply emphasising different themes that are part of a larger truth. When we review the comments of Yvonne, Bill, and Gilbert, it seems they are all talking about how our field and its role should be defined, what its appropriate role is *vis-à-vis* design, and what makes HCI relevant and useful. While we think that many apparent 'disagreements' are really matters of nuance, here's our perspective on a few of them.

Let's start by talking about one thing the dispute is not, for us. Some of you may not have known what Gilbert was referring to in his last Deflections column when he alluded to a 'debate' between us and Bill Buxton. We published a piece in the March/April issue of our Business Column in <*interactions*> (which sadly for us is no more) in which we discussed the dangers of a turf war between ethnography and usability over their roles as contributors to design. Four months later, a letter from Bill appeared expressing his confusion that we did not describe any design process he recognised. We were confused that he was confused, because we never pretended to be explaining the design process. We vehemently agree with Bill's statement that design is the glue that makes ethnography and usability relevant at all. However, we are referring to design as an overall endeavour uniting many participants, and not talking about the pre-eminence of one professional group over another.

Now, let's turn to what may be a more substantive disagreement. Bill also objected to our mention of 'designer guesses about people' as an influence in the product development process that ethnography and usability balance with behavioural data. Bill asked 'on what planet' this was true, and went on to say that all designers he knew cared deeply about their users, etc. We acknowledge that we probably singled designers out unfairly, because many in the process make these guesses, not just designers. However, we certainly have seen designers on this very planet doing it as well. When this happens, it is not because they do not care, but rather because this may not be how their roles are set up and because of how product development is structured in their environments. Often, others dictate requirements to them based on guesses, and it is neither their role to challenge this, nor do they typically have a systematic means to do so. To deny that this happens is to suggest there is no need for the skills of usability or ethnography. It is certainly proper to question whether ethnography and usability as practised are as useful as they should be – and many besides Bill have done so – but we object to portraying them as inherently incapable of making core contributions to design. More on this later.

We have no problem with Gilbert's statement that we should reframe 'our whole enterprise as providing effective support for design'. The question is what exactly do we contribute? One thing that does not define our contribution in the applied world is theory. No one in business environments is interested in theory for its own sake, and few even care about its potential value in producing knowledge that could generalise across instances of a problem to reduce reinventing the wheel.

Companies are interested in turning out products that succeed in the market place and that don't create too many headaches later. Decision makers in companies want to do this in the quickest, cheapest way they can, while managing perceived risk, both for their companies and for themselves politically. The sociology and politics of product development make it an enormous dialectical stew of influences, perspectives, and pressures. Diverse stakeholders with complementary or conflicting priorities advocate for attention to the factors that are their particular concerns. Trade-offs among these competing pressures are very hard to analyse rationally, so decisions are the outcome of complex political and social processes. Arguments are often evaluated solely on their face validity, which is most compelling when they are very specific to the particular product under consideration. In this environment, design recommendations based on abstract HCI theory will not carry much weight.

Even if we could get companies to stop being so darn political and just listen to us, we'd be unable to guide them to success based on our theories. HCI theory is a very long way from being powerful enough to guide specific design decisions for specific products in specific domains with specific business models under specific market conditions, and from considering the trade-offs among so many other decisions that all influence each other and which together determine the form of the final product.

Actually, it may not be fair to expect this of any theory. Even powerful theories like Newtonian or quantum physics, the germ theory of disease, or continental drift, all of which have generated enormous bodies of much more coherent research than HCI, don't directly dictate the details of what practitioners must do in individual cases, and design requires getting the details right. Theory-based research can give a head start but, in many ways, applied research picks up where theory leaves off. It draws on layers of accumulated empirical experience, leading to general guidelines, increasingly specified over time to narrow down the approaches for sub-categories of cases, and then tweaked through empirical attempts to adjust the approach to the particularities of the present case.

So what *do* HCI people offer, or what should they be contributing to the design process? We think it is more useful to talk in terms of the skills and perspectives we contribute, rather than theoretical knowledge. Ideally, we bring things like:

- Both knowledge about how to study behaviour, and a deep understanding of the pitfalls of behavioural research
- The ability to bring analytical rigour to highly complex information filled with 'noise'
- An understanding of the strengths and limitations of different methods for gathering user and customer data that play a role in developing design requirements
- An ability to make explicit the implicit assumptions about people that are inevitably embedded in product feature and design ideas, and to turn these into hypotheses to be evaluated
- Experience and skill in 'breaking mental set', a skill we draw on in developing alternative hypotheses, and one that is very similar to the ability to discard limiting central design assumptions and envision other sometimes radically different design approaches
- The ability to recognise limitations to the applicability of general guidelines to the present case, to see the possible existence of intervening variables, such as contextual factors or distinctions among usage scenarios or categories of users that may require alternative design modifications to address them.

The list could go on but our point is that these important skills are much needed and often lacking in product development. The ones that address the pitfalls of studying human behaviour, and going about it in a way most likely to yield useful implications for products, are fairly specialised contributions of those in HCI who are focused on behaviour. Others overlap with skills needed for the design endeavour, and provide the basis for collaboration with designers, both in inventing and refining solutions.

However, HCI professionals cannot make their proper contribution if they are content to simply provide rich description (ethnography) or testing (usability). Those who limit themselves in this way will remain peripheral, and some certainly deserve criticisms such as Bill's, just as some people in design roles who are limited in their core skills do. But let's not turn the discussion into attempts to define rigid boundaries that self-fulfillingly relegate HCI people to these peripheral roles, and exclude their being collaborators in generating new solutions, much less turn it into a contest about who is more important.

Susan Dray and David Siegel are user-centred design consultants who have worked with designers, engineers, marketing professionals, product development managers, and fellow HCI professionals in more than 60 companies since 1993 to help them create products, systems, and services that are useful, desirable, and usable.

Who cares if you are dressed if you are alone?

Bill Buxton
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Let me dredge up an old observation. I made it during a CHI plenary talk. I was trying to explain why I wasn't coming to the conference any more. It was that the Gaithersburg Conference, which led to the formation of SIGCHI, took place after the commercial release of the graphical user interface and the Xerox Star. That is, the CHI literature played no role in the development of what was perhaps the greatest contribution to improving people's experience using computers. There was no CHI literature!

Now let's flash forward. Imagine stacking up all of the CHI literature that has accumulated since then. It would make a pile that was a couple of storeys high. Yet, despite all of the work that pile represents, we as a discipline have not come up with anything that even begins to compare with those innovations that preceded the establishment of our field as a distinct discipline.

So here is the thought that drove me to speak then: We could have done so, we should have done so, and even now, I feel like a failure for not having done so.

Yet, we were not wasting our time. No. We were doing hard and useful things. But they had far more to do with

analysis, evaluation and engineering than with the design of new things. It was distinctly not about doing to the GUI what the GUI did to the command-line style interface that preceded it.

One way that I would characterise this is to say that as a community we have been obsessed with learning how to *get the design right* rather than how to *get the right design*. Obviously both are critical, but without the latter, you fail, regardless of how well you do the former.

'Getting the design right' is largely what usability is about. And while ethnography helps inform 'getting the right design', it does not do it. Both ethnography and usability are important and worthy of respect, but they are not sufficient to do what needs to be done. Without either divine intervention or a competent designer, they will fail in doing so.

Am I being too harsh or too dramatic? For once, I think not.

In the past three years I have been making a study of software companies. Here is what I learned. After their first product, in terms of designing new (as opposed to n+1) products, they suck. Is that blunt enough?

Look at Adobe. A great company with great products. But, besides their first application, *Illustrator*®, they have produced precisely one other application in-house: *Acrobat*®. All others came about through mergers and acquisitions. And Adobe demonstrates the rule, not the exception.

So if you are some CHI attendee who aspires to change the world through great innovation and your skills at shaping wonderful user experience, you had better go and work for a start-up, since without some serious changes, working for an established company will mean that you either (a) work on great innovative products that fail or never ship, or (b) work on version 7 of some established application that is so encumbered by the restrictions of the legacy code that you will live a life of frustration trying to make the proverbial silk purse out of a sow's ear.

Not the future that our prototypical young, bright enthusiast deserves. But in my view of the world, this is more or less where we are.

While the CHI community is fiddling around with our ethnography–usability dilemmas, Rome is burning, and has been doing so for years! If we believe the rhetoric about total user experience and value-based design, then perhaps we should spend a bit more time thinking about what makes products succeed, and how we can contribute to that, rather than how to get 10% better performance out of some menu.

And lest I be accused of being an old fart arguing about yesterday's news (the GUI), may I point out that having not learned our lesson with the GUI, mobile computing (as manifest in the smart phone, for example), is following exactly the same track as the GUI towards self-destruction due to feature bloat. The platforms have changed, but the song remains the same.

So let me put it to you this way. Let's take a successful and iconic design: the iPod. My feelings are this. I think that the design is seriously flawed. Working from the existing design, I think that any undergraduate design student that couldn't do significantly better may not be worthy of graduating. Let me soften that a bit. They can graduate. I just wouldn't hire them. (By the way, before the hate mail starts, I mean no disrespect for Jonathan Ive and his team. Hell, he himself revised the user interface three times during the three years that it took the iPod to become an 'instant success'.)

But here is the kicker: I also believe that the design of the iPod could have been a lot worse and it *still* would have been a phenomenal success. The reason is that 'The Design' with a capital 'D' is only minimally about that white and silver object with the rounded corners, the circular controller and the hard disk inside. Rather, my analysis says that there was not a single part of the Apple organisation that was not involved in the iPod success, and that each excelled in its own sphere of 'design' and that is what made 'The Design' so outstanding.

But you won't learn about that at SIGCHI.

Too bad.

Time for change?

Bill Buxton is a designer, researcher and old man about town who recently joined Microsoft Research as Senior Scientist, thereby demonstrating that he is still an optimist, and has a strong faith that some companies are as hungry for these types of change as he is. He is in the final stages of finishing a book on sketching in experience design.

Is HCI spiralling out of control (and does it matter)?

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In *Interfaces* 64, Yvonne Rogers frets that HCI (or Interaction Design, as she prefers to call it) may be spiralling out of control. My view is that it has never been under control, and that this is the way things are bound to be. We became human through the development of technology, and the technology is evolving rapidly. We can only try to make sense of it, and thus of ourselves, as we go along. This is not a new situation.

I've worked in the field for over 25 years, and as far as I know there never was a time when HCI was a nicely constrained and tightly defined area, with well agreed methods and established results (or even a generally accepted name). You can't do that kind of science if your object of study is a complex set of rapidly evolving forms, which is what information and communication technologies are. We have never got past the pre-taxonomic stage; perhaps we never will. I attended my first CHI conference in 1985, in San Francisco, and the worries were the same: what is HCI (or CHI)? Does the 'I' stand for interaction or interfaces? What should be included, and what not? How do research and practice relate? Ethnographic methods, Wizard of Oz, video prototyping, scenario-based approaches, and so on, were all around in the 1980s, and it was already clear that HCI was chasing a moving target. It probably always will be, and that's why it's such fun.

One of the more confusing things that happened to HCI was its marriage to 'design' in the early 1990s. HCI became HCID – Human–Computer Interaction Design. This may have been a reaction to the uncomfortable feeling that HCI is not really a science. Even if you were not a designer, what was studied was design (or designs?), because HCI is always designed. HCID studied how the way HCI was designed (the result of designing, not the process, at least not usually) affected people, and vice versa (how the characteristics of people impact, or should, on HCI designs, or – less commonly – designing). During the last few years HCI Design has become Interaction Design, as a response to the fact that many things we are interacting with are no longer primarily computers. But a 'more encompassing term' cannot be

expected to help constrain the field (not that I think it should be constrained). And I really don't see how the term helps us in 'focusing more on what is being done', since what is being done in HCI is often not design! The word 'design' seems to add nothing except confusion between product and process, but it has certainly caught on.

Every artifact can be said to be designed, but this misses a crucial point: how artifacts (especially information artifacts) are actually used is often, even usually, not designed. And whether a designed artifact is successfully adopted for some purpose (whether or not it was designed for that purpose) is not predictable. This is again rather like evolution, from which we should know that the emergence of new species cannot be predicted by looking at an existing environment. Designing contributes to the process of technological evolution underlying how we interact, but it does not determine it. What HCI studies is interaction and its evolution. We shouldn't try to constrain it, because we don't know how it could or should develop. Let's enjoy that, not worry about it.

John Waterworth is Professor of Informatics at Umeå University in northern Sweden, and Research Manager of the Q-life studio there. He has a PhD in Experimental Psychology, and has carried out research on various evolving forms of human–computer interaction since 1980.

What a ludic suggestion: taking the fretting out of HCI

Yvonne Rogers
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My piece in *Interfaces* 64 on whether HCI is in danger of spiralling out of control has caused quite a stir. John Waterworth and Gilbert Cockton have risen to the bait and responded to a number of points I made about where HCI has gone in the last 20 years. It appears I am fretting too much about the state of HCI today and have a nostalgia for the 1980s, when the mission, goals, and methods of the field were clear and 'fixed'. I admit to being concerned about the current lack of direction in the field and the uncertainty as to where it is heading, but I did not mean to give the impression that I saw the 1980s as the glory days. My intention was to contrast then and now, pointing out how markedly different the field has become. In the 1980s, there was a core set of challenges and goals that researchers tried to address. Now, it seems anything goes and there is little consensus as to what are the important questions or how they should be addressed.

Nor did I mean to suggest that we needed somehow to manage or constrain the rapidly expanding field or take the fun out of research and design. Rather, I am advocating more reflection in, and meta-level analyses of, the field. Specifically, I would like to see a core set of fundamental challenges and questions being proposed – similar to the approach adopted in Computer Science and e-Science in the UK that covers a range of big issues and burning questions. Don Norman laid out a similar quest for Cognitive Science in the 1980s, when he specified 12 big issues for the field, to which he subsequently added four more a decade later (Norman, 1980). These had a significant impact on the Cognitive Science community, leading to new research agendas and significant conceptual developments.

One reason for tabling such challenges and issues is to spark debate, identify a common set of concerns, make explicit poorly articulated assumptions about humans, technology and design and focus the collective mind on what are the important ideas – all of which is healthy and necessary to raise the intellectual level of the field. Of course, such debate does not have to stifle creativity nor inhibit those wishing to pursue alternative avenues of research and design, but it can provide a common sense of purpose for the field – something that is lacking at the moment.

I agree with both Gilbert and John that HCI is no longer pretending to be a science and that there has been a significant shift towards both understanding and supporting the design process. However, the transition has had its tensions and problems. For one thing, there is a need to come to terms with the fact that design has developed its own set of methods, traditions, goals, and aspirations and that HCI researchers need to be respectful of these. The mistake psychologists made in the 1980s of adopting the rhetoric of compassion (Cooper, 1991) – imposing their own views of what needed to be done by another community, i.e, software developers – should not be made again by the current generation of non-designers (e.g., anthropologists, sociologists and dramaturgists) who are now participating in the field. Conversely, if these interlopers stay on the fringes they will have limited impact. Instead, it will be more productive if they can join in, contributing to the big challenges confronting the field.

Unlike Gilbert, I don't think we should be focusing exclusively on design. We need also to develop new theories of human–technology interaction. Cognitivists – who are no longer fashionable – still have an important role to play in helping us understand the psychology of human–technology interactions. Mental models and affordances (both derived from psychological theory) may be tired buzzwords from the 1980s, but at least they provided researchers, designers, and even the layperson with an effective way of talking about the phenomena surrounding human–computer interactions. Perhaps, a new set of concepts, metaphors and terms is needed that can enable users, designers and researchers to understand and talk about user experiences and technological developments; for example, the problem of how to manage, navigate, and conceptualise the masses of files individuals are accumulating on their computers, mobile phones, cameras, memory sticks, and the Internet. Personal Information Management (PIM) calls for new ontologies, tools, and representations (CACM, 2006). If this and other topics could be better understood at a psychological level, a new body of relevant knowledge might result in design principles that all could find useful and feel comfortable using. That, to me, is progress.

And finally, I challenge all of you to follow in Don Norman's footsteps and generate 12 issues for Interaction Design.

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Yvonne Rogers is a professor of HCI and an academic at heart. She has worked most of her life in universities, from Sussex to Stanford, but has also spent time working in research labs including a stint at Apple Computer Inc. She has just completed the 2nd Edition of her textbook *Interaction Design: Beyond HCI* along with co-authors Helen Sharp and Jenny Preece, due out later this year.

New technologies, old habits

Russell Beale

"Look, cool new phone" said Peter, waving some Nokia under my nose. "I succumbed to the marketing speak finally" he went on "cos they give me a free photo printer with it, and there's a decent camera on the phone, so I can take and print okay pictures with it". I didn't like to point out that the photoprinter manufacturers make all their money on the cartridges and refills for the printer – though the point had not completely escaped Peter either. "But I worked out it costs me 33p a photo to use it – more than I was paying the old way," he said.

So there you are: he'd heard the marketing scam, and seen through it. More expensive than before. But he'd also fallen for it – despite the increased costs, it seemed like there was a bargain there, and so he'd got the new phone. It's strange how marketing sells things – we watch more adverts than ever before, and they often hardly mention the product or its features. Instead, they sell a lifestyle, an ethos, an image, which we are all keen to buy into (quite literally).

Some of us are more detailed (some say anal) about technologies: when scoping out new phones, I wanted to know which ran Symbian operating systems, what the screen resolutions were, and so on. But I couldn't find out many of those things, not even from the well-trained shop assistants or the technical pages on the company websites. Some technical information is there, but often it's used for marketing purposes and not for informative ones. For example, all people can tell you the megapixel resolution of their digital camera inbuilt into the phone. It's a pseudo-technical figure that is there to impress, not inform. Who cares if you have a 2Mpixel resolution, if the sensor chip has a dire signal–noise ratio, or the white balance is unreliable, as the pictures will be awful. But do they tell you these things – I think not… My photo-mad colleague, Tim, has a photoprinter that is 300dpi – terrible, you may think. But it's a dye-sublimation printer – ah, go the knowledgeable ones – and basically, it's as good as you'll get. The basic technofacts tell us nothing.

Technical systems aren't the worst. 'Contains digistivum bacteria', 'Hyper-super-anti-aging ribosomic nucleiac pure natural hydrophilic embalming oils', and any advert with a person in a white coat and a pipette all get on my nerves.

But who cares? Well, I think we should, on a number of levels. Firstly, it idolises science and suggests that scientists are omnipotent beings who can create almost anything useful. Secondly, it trivialises science as well: the public aren't daft, and know that one toothpaste is pretty much like another, and so the pronouncements of the scientists used in adverts are ignored or not considered critically. Thirdly, it creates a cult of the new, a thirsting for technologies and products that we must have because they are new. And fourthly, related to this, it encourages featureitis, in which a perfectly good system is subsequently ruined by adding another 15 things you never knew you wanted it to do. For example, a mobile phone that's also a torch…

It's these last two things that concern me from an HCI perspective. 'Usable' gets lost in 'marketable', and worse, even our users are taken in, so that they focus on the new and the greater number of gadgets (or pixels, or oxy-hyphenated-do-something-essential oils) instead of what they need, want, and use.

So perhaps the answer is to fight fire with fire. Market usability as a lifestyle: Ikea do it with Scandinavian minimalism, Habitat have done it, Liberty used to do it in a country cottage sort of way. We need the new trend to be usable – 'look, no manual' should be a rallying cry. The fewest button presses, not the most buttons.

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CFP

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My PhD

Computers, games and cultures

Chee Siang Ang

Edited by Martha Hause

The computer has always fascinated me, beyond its ability to perform lightning-fast calculations. Although, essentially, computers are hardware for processing and storing binary data, for me what makes computers so exciting an invention is their potential as a new form of educational media.

Interestingly, albeit not unexpectedly, the advent of every new medium is always associated with the research of its educational uses. With the computer technologies currently available, it is not hard to imagine that educators are jumping on the bandwagon of using the so-called educational technologies, hoping that the mere use of technologies will resolve some of the educational problems. Yet, many computer-based learning systems are unable to do the 'magic' anticipated by educators.

Perhaps what Shneiderman says in his book, *Leonardo's Laptop*, would help shed some light on this issue:

> Paper has an even more potent role than as a storehouse of knowledge. It achieves remarkable power when it is a blank sheet, inviting student creativity. (Shneiderman 2002)

It is crucial to realise the fact that the advent of new media changes how people perceive new forms of multimedia messages. Using computers to present information to the students in a sexier way is probably not how they should be used. What is more important is that students should harness this medium for expressing their creativities.

They talk about saving the princess from the haunted castle as if it really happened

My research has been revolving around what computers can do to aid the learning and teaching process. I have investigated narrative metaphors in designing a more engaging user interface for computer-aided learning systems and moved on to study computer games, a newborn art form which exploits the interactive advantage of computer technologies.

It was not until I started my PhD early last year that I was introduced to the work of Seymour Papert, which changed my view on computer-based learning considerably. Papert's visionary learning philosophy deals with the concept of artefact construction and opens a new door for using computers in education. Instead of designing technologies for instruction, his approach calls for design for construction. In other words, we are not designing better instructional methods that help convey knowledge in the most efficient way; we are crafting an environment that facilitates the construction of knowledge in a collaborative context.

This philosophy reveals a new direction in my research. Oriented towards computer games-based learning, my research no longer treats game playing as a solitary experience. The players are in fact living within a game culture in which the members share a great many common practices. The virtual game culture in which the player immerses during the game playing does not constrain itself within the game screen. This link remains active even when the computer game is turned off.

Players start to incorporate this virtual culture in their real life. Outside the game, they begin telling stories which are based on their virtual experiences. They talk about saving the princess from the haunted castle as if it really happened. This process goes even further and soaks into the player's life through the Internet. A large number of online forums are spawned to allow the players to discuss their gaming experiences. Game-related weblogs are also growing for them to record their second self from the virtual world.

My PhD research is, therefore, centred on the study of online game communities in supporting language and literacy education. Being a new medium and a popular culture, computer games are intended for active construction, instead of passive reception. Game players are active audiences as the creators of text rather than as solely recipients of pre-designed media messages. The potential of game-based learning is not limited by what is happening within the game; it also comprises the social activity and the entire gaming culture.

In order to appreciate the game community, a deeper understanding of what computer games are is crucial. Unfortunately, the study of computer games is still young and the literature is scattered across a number of disciplines. Thus, my initial attempt is to scrutinise computer games both as an artefact as well as a human activity. Using well-established HCI methodologies, a play theoretical framework of computer games will be developed. This study will then be expanded to include the consumption and production culture around such artefacts/activities. Ultimately it is my interest to see how these kind of play activities can be applied into non-play domains such as learning.

The emergence of a new learning philosophy, as well as innovative technologies, has shifted the focus of instructional design to constructional design. The job of the educational technologist is no longer to develop technologies that match how the learner's brain works. Rather, computers are seen as cyber spaces or virtual playgrounds for nurturing creativity and innovation.

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Noddy's Guide to mode problems

Most people feel that modes in an interface should be used as little as possible, believing that a moded interface is difficult to learn; on the other hand, they also tend to be less fascinated by non-moded interfaces, mainly because the non-moded interfaces often seem to be more clumsy than useful.

For instance, text-entry with a QWERTY keypad on a mobile phone has been less popular than that with a moded multi-tap interface. This article takes the position that modedness is inevitable and so identifies several types of mode errors that users may face and how they can cause human errors. This article also describes how interface designers can make their moded designs less error-prone.

Arguably, you have always lived in a moded environment. If you are in the kitchen at home, you may want to cook something or to look for some food; by contrast, if you are in the lounge area, you may be very keen on being in a relaxed mode after your hard day at work. Modes ensure that you can concentrate your desired interactions with the environment. However, the negative aspects of modedness often engulf its usefulness. Effective mode design, then, must reduce the potential of modedness being a bad thing.

HCI researchers have identified several mode issues in interface design; for example, hidden modes should be avoided under all circumstances [1]. Software design guidelines [e.g., 2, 3] have produced many cases of effective mode design for specific contexts. However, the focus is generally on the potential negative effects of modes in interfaces.

To address this, Monk [4] recently accounted for the mode problem as action–effect consistency, in the sense that the mode produced different system effects in response to the same action. This is a decent theoretical concept; however, I doubt that all the mode problems around us can be explained by this concept, so I have identified other types of mode problems. This article summarises mode problems in interfaces with examples of them as found in everyday life.

The three mode problems

Many studies [1, 5, 6] on moded interfaces maintain that unnecessary modes should be avoided; however, we know that sometimes they are inevitable. For instance, small devices like mobile phones employ the same action to perform various tasks. The action of pressing a particular button leads to different effects depending on what mode the phone is in. For example, in normal calling mode, pressing the button '2ABC' enters the number '2' on the display; on the other hand, when the user edits their address book, pressing the same button enters the letter 'A' first.

Modes, in this case, are not necessarily a problem because the mobile phone provides a clear mode signal using the prompt in the display; for example, the Nokia™ 3320 displays 'Tel number:' for number-entry, and 'Name:' for letter-entry. Of course, if the mobile phone users are not looking at the display on the phone, they might not notice the current mode. However, inattentiveness is not one of the mode problems that is covered in this article (see [7] for more details of this attentive issue of human perception). The purpose of this article is to see the mode problems caused by interface designers.

In my PhD thesis [8], I classified the mode problems caused by interface designers into three areas:

(i) The user has forgotten the mode change or has not identified the relevant mode signal.

(ii) The user has not recognised the mode signal presented by the system or has accidentally changed mode without meaning to [9].

(iii) The user has perceived a misleading mode signal.

The first case is the traditional mode problem: the hidden mode problem. That is, the identification of the current mode depends on the recall of an earlier event rather than the recognition of external cues or, even worse, the user has no idea whether the mode change has been made or not.

The second mode problem can be thought of as a partially hidden mode problem because of the relatively low salience of the mode signal given at the time of interaction so users are very unlikely to notice the mode change.

One can attribute the third possibility to an incorrect user model that misleads the user into believing that they are performing the correct action: the misleading mode signal.

The last two cases, in particular, are discussed less in the early HCI studies. Each of the mode problems is explored in the following sections.

Hidden modes

A typical hidden mode problem can be found in a Unix *vi* text editor. Mode errors in the Unix *vi* editor arise from the fact that it has a command mode, in which characters that are typed as input are interpreted as commands, and an input mode, in which characters that are typed are inserted into the document being edited. Because there is no indication of which mode the editor is currently in, users often type in text thinking they are in input mode but *vi* interprets their characters as commands because it is actually in command mode. It means that *vi* users have to recall what mode the editor was last changed to.

This recognised mode problem can be easily found in many aircraft disasters, e.g. L-0111 (see [10] for more details of this disaster). The main cause of the disaster is that the autoflight system became disengaged as soon as a pilot inadvertently grabbed the control yoke. None of the three pilots, however, noticed that the aircraft was being manually controlled because there were no clear mode signals to show whether the aircraft was in the manual or the automatic control mode.

For an everyday hidden mode example, consider your TV environment. Here in New Zealand, there are few terrestrial TV channels, so many households, including my own, have set up a Sky TV tuner. Whilst it satisfies me in terms of the number of TV channels I can tune in, it confuses me about whether I am watching a terrestrial channel or a satellite one because my satellite TV tuner does not have any indicator apart from the power light (please blame the cheapest TV tuner I could find).

It is almost impossible for me to know whether I am in satellite TV or terrestrial TV mode. In the absence of such a clear mode signal, I have to recall what mode the TV set was last changed to. This is a typical hidden mode example

because I cannot employ any external cue to reason about the current mode or the mode reachable by the action. Although this can obviously be seen as bad mode design, I don't think that the designers are unaware of the problem because some more expensive set-top boxes explicitly signal the current mode with text or coloured icons on their display or on the TV screen. It is a kind of trade-off between the cost and the benefit.

Partially hidden modes (poorly signalled modes)

The hidden mode problem has been well researched in early work on mode problems [1], concluding that whenever the mode change is likely to happen in any interaction situation, a designer should ensure that recognisable indicators of the current mode have been presented. In contrast, the second mode ambiguity, in which mode signals are not saliently designed, has been less clearly identified in the early HCI studies.

This second mode problem is different from the hidden mode problem because mode signals do exist in the system; however, the user has difficulty recognising them as mode signals. It appears as if this problem is not from designers but from the user but the following example reveals the opposite:

> My newest camera, a Nikon COOLPIX 900, is a … digital camera and the smartest yet. … its on/off switch has four settings: off/Arec/Mrec/Play. ARec means automatic record and Mrec means manual record. As far as I can tell, there is no difference. There is no 'On' setting, and none of my friends can figure out how to turn it on without a lengthy explanation [11: p5].

This situation seems to be very frustrating for the novice users, but once they learnt what the two modes (Arec and Mrec) mean, it is very unlikely to be a significant mode problem in future. However, the following quote from Cooper [11] shows his worst experience with the camera:

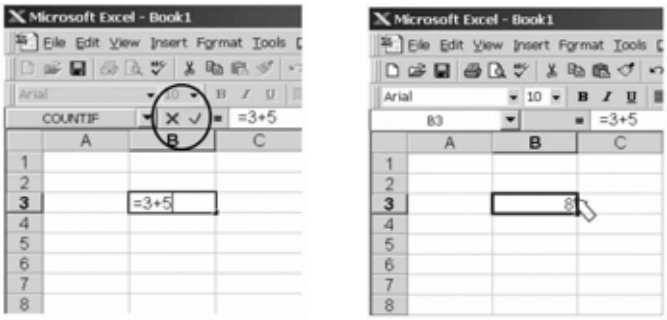
> I turn the evil Off/etc. switch to Mrec wait about seven long seconds for the camera to boot up, then point it at my subject. (and then look through the viewfinder) … Just as I'm about to press the shutter button, the camera suddenly realised that simultaneously running the zoom, charging the flash, and energizing the display has caused it to run out of power. In self-defence, it suspends its capability to actually take pictures. But I don't know that because I'm looking through the viewfinder, waving my arms, saying 'smile', and pressing the shutter button (p5).

The self-defence mode signal was actually presented on the LCD display of the camera but he was looking through the viewfinder at that point so he didn't notice that the camera had changed mode. Many interface designs have this type of mode problem and they demand huge efforts from users to recognise the current mode of the interface.

Designers claim that they have considered their mode design from the user's perspective but the following quote, also from Cooper [11], undermines this claim:

> My new alarm clock (JVC FS-2000)… it has a sophisticated alphanumeric LCD that displays all of its many functions. The presence of a small clock symbol in the upper-left corner of the LCD indicates the alarm is armed, but in a dimly lit bedroom the clock symbol cannot be seen. The LCD has a built-in backlight that makes the clock symbol visible, but the backlight only comes on when the CD or radio is explicitly turned on. … By contrast, my old $11 non-computerised alarm clock woke me up with a sudden, unholy buzzing. When it was armed, a single red light glowed. When it was not armed, the red light was dark. I didn't like this old alarm clock for many reasons, but at least I could tell when it was going to wake me up. (p6)

Dix [12] also identifies a poorly signalled mode in Microsoft Excel™ 97. Excel has two editing modes: one is a cell-editing mode that enables the user to edit the contents of a single cell by, for example, adding a formula; the other is a sheet-editing mode that allows the user to edit or move sheets around (Figure 1).



(a) Sheet-editing mode (b) Cell-editing mode

Figure 1 Two editing modes in Microsoft Excel 97

A mode ambiguity in Excel occurs because the system automatically changes from sheet-editing mode to the cell-editing mode when users type anything while they are in the sheet-editing mode. Also, pressing the Enter key returns the cell-editing mode promptly into the sheet-editing mode [12]. Consider the following situation from Dix:

> If a user has selected a cell and can see the formula '=3+5' (see Figure 1(a)), the user may simply type '+2' thinking wrongly that they are in the cell-editing mode. However, this results in deleting the original cell contents rather than getting '=3+5+2' as probably expected.

This mode error can be detected easily when the user is looking at the screen but if the user is looking back and forth to a paper list of numbers, it is quite difficult to notice this error [12]. The nature of this problem is that the application signals the current mode using only small icons, a cross (✖) and a tick (✓) in the formula box, as shown in Figure 1(b).

In effect, these three examples show that whenever recognition of mode is necessary, designers should ask themselves whether the mode signals provided are strong enough for users to recognise the mode change – even if it seems straightforward from the designer's perspective. They also indicate that the typical definition of a mode problem, 'the same action leads to different system effects', should extend to embody this partially hidden mode issue.

Misleading mode signal

The last category of mode problems is even trickier, so it is

not so straightforward to define the mode problem in the traditional terms. The problem generally arises when the system hinders the correct interpretation of the current mode or the future mode. This commonly happens when mode signals are in conflict and the status of the system at the time of interaction is ambiguous. This third problem can account for the failure of highly moded interfaces.

For instance, in the context of aircraft flights, many accidents have been reported that have been caused by conflicting mode signals. Consider the A320 Strasbourg disaster (see NASA Contractor Report 177528). Due to the confusing design of the display, it reads 33 in the one mode and 3.3 in another. The aircraft descended at 3,300 ft per minute instead of a 3.3 degree glide slope. That is, pilots selected the wrong mode to display their descent.

Cooper also gives his experience of this mode error: the system actually gives the wrong signal to enter into the different mode. To quote from Cooper [11]:

> Whenever I withdraw cash from an automatic teller machine (ATM), I encounter the same sullen and difficult behaviour… It always asks me whether I want to withdraw money from my checking, savings or money-market account, even though I have only a checking account. Subsequently, I always forget which type it is, and the question confuses me. About once a month I inadvertently select savings, and the infernal machine summarily boots me out of the entire transaction to start over from the beginning. To reject savings, the machine has to know that I don't have a savings account, yet it still offers it to me as a choice (p9).

Quite often, many software design guidelines [2, 3] guarantee to avoid this type of mode problem with some menu items deactivated; for example, greying out the menu items that are unavailable. This technique is frequently employed to prevent users getting into the wrong mode. The ATM example above should develop this technique for the user who only has the 'Check account' not to inadvertently enter into a following interaction under the 'Savings account' mode or the 'Money-market account' mode.

Traditionally, this ATM problem has been considered as a goal–action matching problem: the two plausible actions (Select 'Check account' and Select 'Savings account') are in conflict to achieve the overall goal (Withdraw money), which emphasises one-to-one matching between a particular goal and the correct action. It implies that the designer has to review all the plausible actions of each goal to avoid this type of problem. However, sometimes, this is not a feasible approach, especially for an interface that has many action sets for a particular goal.

If, instead, we consider the ATM problem as a competing mode problem in a highly moded interface, we can easily see if the user could be misled into changing to the incorrect mode by the information presented on the interface. A designer should ask himself or herself whether there are competing modes that must be clearly signalled (see [13] for a different example of this category).

Conclusion and future work: a way of detecting mode problems

Most systems have modes of one kind or another. This is a problem if the user is not aware of the contingency; that is, whether the mode is hidden (there is no signal to the user), poorly signalled (the mode signal is insufficiently salient to guide the user's behaviour), or inappropriate (the mode signal misleads the user). The classification of the mode problems accounts for why the user's perception of the current mode needs to be considered whenever there are modes. The different characteristics of the mode issues should be considered to ensure that a highly moded interface is less error-prone.

These case-by-case analyses, however, do not offer a ready-made practical technique or procedure to follow when designing moded interfaces. I have created three questions for interface designers to answer when reviewing the modes in their proposed interface design:

Q1. *Hidden mode*
Does the user recognise (rather than recall) the current mode from system effects?

Q2. *Partially-hidden mode (poorly signalled mode)*
Are system effects sufficiently salient for the user to discriminate the mode change from the previous interaction?

Q3. *Mode signals in conflict (misleading mode signal)*
Is it possible that mode signals (or information presented on the interface) imply an incorrect mode?

These three questions, of course, cannot exhaustively review all the possible mode problems in the interface. Yet I hope that designers can use them to pay more attention to understanding the mode issues hidden behind the interface so that they can provide a credible argument for their proposed design.

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I have attempted to write this as an accessible introduction to the topic of mode problems. To obtain a deeper understanding of the topic the following reading is recommended.

The concept of mode problems [1, 4, 6, 12, 13], the examples of mode problems [5, 9, 12, 13], and the theoretical view of the mode problem in HCI [4, 13, 14]. Also, many insightful accounts of mode-related problems can be found in [10, 11, 15]. Most GUI guidelines [2, 3] provide many practical examples of successful mode design in software design.

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Eyetracking workshops

Reflecting on where we're at

Laura Cowen

When I gatecrashed the Commercial Uses of Eye Tracking workshop at HCI2005, I wasn't sure what to expect. It's four years since I've done any eyetracking work and I'm aware, second hand, of continuing improvements in the technology since then. At each of the recent HCI conferences, there have been papers on using eye movement data to evaluate interface usability. So I was expecting things to have moved on by leaps and bounds.

As far as the technology is concerned, things really have moved on, mainly in that the newer eyetrackers and bundled software are now more usable for your average researcher or usability practitioner. This improvement in usability is probably a partial influence in the increase in companies that have taken up eyetracking as a usability evaluation method. For example, attendees at the workshop claimed that eyetrackers are getting easier to calibrate to their participants' eyes; gone are many of the difficulties with which I struggled, including problems calibrating when the participant has dark eyelashes or is wearing spectacles.

Beyond the technology

With the technology now doing what the researcher wants (rather than the researcher fighting with the technology), discussion turned to how to use eye movement data and to investigate the assumptions that we make when we do eyetracking work, including:

- Being able to justify the cost of having or buying eyetracking equipment. It's still pricey and takes a disproportionate amount of time to analyse the data. The general conclusion at the workshop was that eyetracking data is beneficial for providing visual evidence of an interface's usability but is not suitable for all usability studies – it just depends on what you're trying to find out. Even then, it's a complementary, rather than replacement, usability evaluation method. Visualisations of eye movement data are useful for illustrating the usability of an interface to clients, though, so the cost-justification really depends on what you want to get out of it.
- Can we validly use pupil size as a metric when measuring the usability of an interface? Workshop conclusion: Pupil size is influenced by a number of different factors and to use it as a metric on its own is not advisable.
- The lack of benchmarking in eyetracking research is still a problem. Each different study uses different definitions of fixations and uses different terminology to describe eye movement patterns. We need a standardised terminology and researchers to publish the exact algorithms that they use to process raw eye movement data.
- We still need improvements in analysis software. One of the participants had years of experience of eyetracking and had found that most research groups tend to write their own software to suit their purposes. Another of the participants was interested in applying eyetracking to analysing and designing 3D computer games but there needs to be some way of defining areas of interest in a 3D dynamic scene.
- Having all done eyetracking research, the workshop attendees have implicitly or explicitly accepted, to some degree, the validity of the eye–mind hypothesis. which says that eye movements reflect what is currently being processed by the brain. There are still questions about this assumption but should we just accept it and move on? Or should we continue investigating its validity?

None of these issues is very new, and I think I had expected more progress in resolving them to match the progress in eyetracker development. With the technological improvements, we need to resolve some of these fundamental issues while eyetracking becomes more and more widespread as a usability evaluation tool.

The HCI2005 workshop was prepared and run by Tony Renshaw (Usability Services consultancy, Leeds Metropolitan University) and Natalie Webb (Amberlight Partners Ltd). Following its success, they are currently preparing another eyetracking workshop, with Janet Finlay (Leeds Metropolitan University), for CHI2006 in April, and a third workshop, Adding Value with Eyetracking, for UPA2006 in Colorado in June.

Thanks to Tony and Natalie for letting me participate in the workshop.

Get involved at UPA2006

If you're interested in getting involved in these discussions and more, there is still time to submit a position paper to the UPA2006 workshop. Contact Tony Renshaw at t.renshaw@leedsmet.ac.uk. The deadline for position papers (max. 2 pages) is 9th May 2006.

The facilitators aim to select participants (academics and practitioners) who have experience in using eyetracking or, if little experience, have developed a position or view on the use of eyetracking for commercial reasons. The workshop is not a tutorial and attendees should be able to actively participate in the discussions.

For more information about the UPA2006 conference, see its website at http://www.upassoc.org/conferences_and_events/upa_conference/2006/

Introducing…

amberlight

In a nutshell

Amberlight was founded in 2000, at the 'peak' of the dotcom trough. Originally focusing purely on website usability, we built our profile by offering robust, researched proof of concepts, as opposed to the glitzy 'experiential' website ideas that users baulked at and that contributed to the dotcom crash in the first place.

Since 2000, there have been a number of key changes for us. Websites now only represent 50% of our revenue – the remainder coming from mobile, touchscreen, gaming, and other cross-device work.

We have also consistently expanded in terms of size and profile. Now 15 people strong, we work with some of the biggest clients in the UK and internationally such as AOL, O2, Orange, Sony and the BBC.

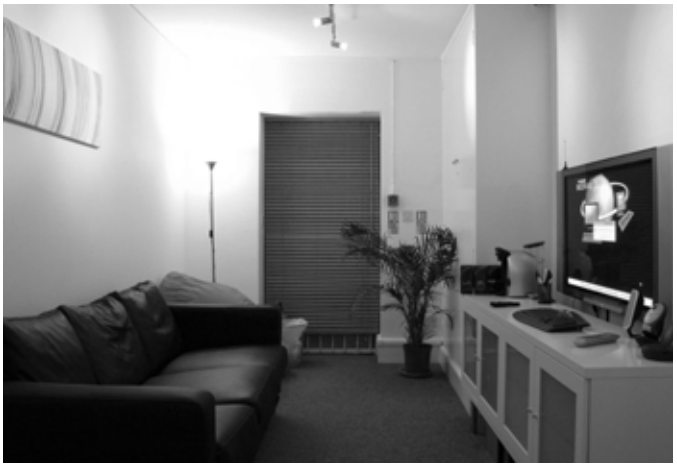
About half of our work is pure research: usability testing, or user requirements research such as ethnography. The remainder involves design work as well, from developing wireframes to visualise our recommendations, to full user-centred design, with iterative prototyping and multiple rounds of research.

Our perspective

In our approach, we try to find the middle ground between the hubris of the commercial design world and the considered reflection of academia. We like to think our clients return to us because we have staked out this ground as our own.

In this vein, we try to bring the world of academic research to life for our clients by attending and speaking at conferences and communicating new developments back to them. We reach the other way too, by hosting Masters projects in conjunction with UCLIC and guest lecturing on HCI courses.

We work in terms of a hierarchy of system requirements: Products must be useful, accessible, usable, and persuasive – in that order. There's no point worrying about one quality until you have nailed its predecessors. Within this framework, we employ a range of proven techniques that will be familiar to academia, from structured interface engineering to ethnography.



Typical projects

Our shift to cross-device work has been driven forward as the industry realises that classic design mistakes are re-emerging and are having a major impact as new platforms become more ubiquitous.

Recent work with O2 on the new i-mode platform has seen us put pre-launch prototype phones into the hands of potential customers and work with them for a number of months to perfect the interaction model.

We have been Sony's research partner for a number of years on their key games. This relationship was defined as Sony began to broaden its target audience to include non-players as opposed to dedicated game heads.

One particular product, the Eye-Toy, embraces a new audience by doing away with the hand-held controller altogether. Games are controlled using whole body movements, both precision and gestural, and are played by anyone from 2 years to 100. It has become a modern-day parlour game. We have been working with Sony for a number of

years to develop frameworks for how to make the most of this new interaction concept. It has required fairly robust thinking to ensure that immediate novelty doesn't triumph over true playability.

Our work with Microsoft over the last few years has typically required international ethnography. For example, our consultants once spent weeks following round members of families from Sweden, Japan, UK and France in order to build a model of how web search from a mobile device might fit into people's habits. In Japan, our consultant followed his family to a dinner party and had a little ethnographers table all of his own specially made up, just next to the childrens' table!

Like most other usability companies, we've got a great heritage in transactional and ecommerce websites too, for the likes of AOL, News International, and the BBC.

Amberlight HQ

We are based on Bloomsbury Street, in London's West End. All our consultants work out of this base, though occasionally disappear to client sites or international partners. We conduct all our lab-based research at Bloomsbury Street (approximately 20% of our research is in-situ with users). There are two testing rooms – a study for PC based testing and a lounge for TV, mobile and games. We also have facilities for up to 10 viewers.

For recording test sessions, we use picture-in-picture capture software called TechSmith Morae for PC-based testing. We have hardware solutions for other platforms, including a lightweight goose-neck camera for capturing picture-in-picture handheld interactions.

In 2003 we brought our eyetracking services in house and now use this technology to deliver specific insights to our clients. It's a fantastically powerful piece of kit to be able to use and completely non invasive (participants rarely remember we're using it). We're leading international workshops (HCI 05, CHI and UPA) to push our eyetracking methodologies even further.

The future

In the immediate future, we are looking to continue to grow our UK and international client base, and to evolve the techniques that we are using to deliver insight about end-users. As new platforms and devices enter into popular usage, we will be there ensuring that age-old interaction issues are ironed out before they take hold. We're also looking forward to developing more primary design insights for new interaction platforms as they are created.

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European perspective

Data visualisation, ERCIM, food and drink?

Europe is home to a wide variety of research organisations and programmes, as well as fine beers, foods and wines. However the focus of this and future columns is not the gastronomic experience, but rather the research currently being undertaken across the continent; although there are some tips for travelling academics provided at the end of the article.

Researchers in Europe

The European Union offers a range of programmes for post-doctoral researchers, including Marie Curie (*www.mariecurie.org*) and ERCIM (European Research Consortium for Informatics and Mathematics) fellowships (*www.ercim.org*). Both of these programmes enable people from participating countries to spend time at one or two host institutions in some far flung and exotic land. In my case I have been fortunate enough to be awarded an ERCIM Fellowship which enables me to spend a total of eighteen months at two research laboratories: The Centre de Recherche Public – Gabriel Lippmann (CRP-GL), Luxembourg (*www.lippmann.lu*) and FIT Fraunhofer, Germany (*fit.fraunhofer.de*). CRP-GL is also hosting AIM 2006 in June, a conference that covers, among other things, a range of topics relevant to the HCI community (*aim2006.Lippmann.lu*).

CRP-GL is home to a range of research departments including Informatics, Systems and Collaboration (ISC), environmental and materials science (including nanotechnologies); many of which collaborate on projects with partners from across Europe. As collaboration is an essential part of many projects within CRP-GL, the ISC department is exploring among other things how to improve collaboration by combining visualisations with everyday software such as MS-Word and instant messaging (IM).

The SUGAR project

Work within the Fonds National de La Recherche (FNR) funded SUGAR[1] project (2005–2007) focuses on supporting collaboration through ambient visualisations of work flow, people and interactions. It is also concerned with the measurement of the level of interaction that results from different types of collaboration and tools. Part of the project explores how to build upon and link everyday software such as Microsoft Word, an IM client, and the Windows wallpaper, to provide visualisations that encourage collaboration.

The objective is not to provide new collaborative tools to replace systems such as BSCW, Wikis or Netmeeting, but rather to explore whether ambient visualisations of synchronous and asynchronous interactions increase the level of collaboration. A synchronous visualisation represents current or live information; for example, a group of people chatting. In contrast an asynchronous visualisation relates to aspects such as histories of interactions; for example, listing who has edited a document or who has posted on a forum.

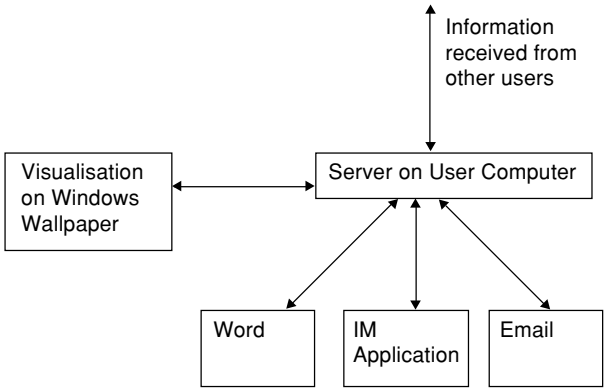

Figure 1 The proposed architecture for the visualisation system, data from the client applications and other users is displayed within the windows Wallpaper.

In the proposed system (see Figure 1), the main visualisation appears in the Windows wallpaper, with smaller relevant visualisations appearing in the client applications. The main visualisation is based on information received from various client applications on the user's PC, such as Word or IM.

Data is also received from applications on other users' computers. The system is designed so that people can click on parts of the main visualisation and, in turn, interact with the relevant client application, user, or data. The small visualisations are embedded within each of the client applications and provide a means of making people aware of the activities when the Windows wallpaper is out of view. Among the issues that require exploration are how to make the visualisations ubiquitous and ambient, that is, so that they are nearly always present but do not interrupt the user.

The proposed system plans to draw upon previous work from the fields of ambient visualisations and informative art. One example being a project by the Viktoria Institute in Sweden[2] that developed live visualisations of, among other things, bus arrivals and departures (see Figure 2), weather forecasts and email. The visualisations were placed in public areas and were designed to be simple and non-intrusive.

Figure 2 is a visualisation that is used to depict the arrival and departure of buses using basic cues such as size, position,

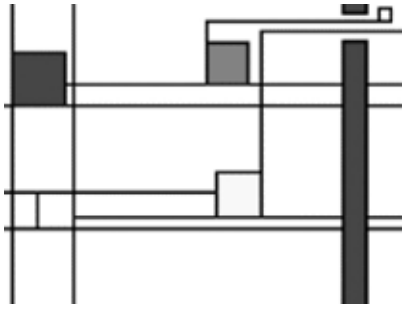

Figure 2 A Visualisation of arrivals and departures of buses by Viktoria Institute, Sweden

and colour. Size is used to indicate the amount of time left until the bus leaves the bus stop. Colour is used to indicate how long is left for a person to catch the bus; for example, red indicating that you must leave now to catch it. Position is used to indicate the direction of the bus movement (e.g. right for the city centre and left to another locale) and the large thick line on the right illustrates the river running through the city of Göteborg.

A study is currently being carried out with a view to identifying what types of interactions and collaborations to model in the visualisation; the study is focusing on a group of students from across Europe that are working within a Network of Excellence. At present it is only possible to speculate on the type of scenarios.

An example could be that of a group of students discussing and sharing a document with a professor. In this example the system could visualise the 'lively' discussion, and that there are a range of documents, or other files circulating. In this particular example it would be useful to know who is editing the document, and what other materials relevant to the document need to be shared, edited, or discussed. The objectives in such a visualisation are to alert people to the existence of the discussion, improve collaboration, and ease the editing process.

The SUGAR project is also developing set of metrics to measure the level of collaboration that takes place in a range of systems. The metrics explore aspects such as whether an interaction (or collaboration) is mandatory, optional, active, or passive.

In summary the SUGAR project encompasses the development of metrics for measuring collaboration and the development of ambient visualisations which it is hoped will encourage collaboration. The project commenced in October 2005 and is currently in its very early stages. More information is available from the project manager, Benoît Otjacques (otjacque@lippmann.lu).

Tips for travelling academics

In Luxembourg, the word 'prost' is used in place of 'cheers'; always say it and look into the eyes of each person you are with prior to drinking, otherwise folklore has it that seven years bad sex will follow.

The local beers are: Diekirch, Bofferding, and Mousel, there is also a variety of fine wines from Luxembourg (Pinot Blanc) and surrounding countries. For a truly musical, arty, and Luxembourgish drinking experience, try Café Des Artists in Grund. Speciality local foods are Kniddlen (dumpling), Träipen (blood sausage), Päerdsbüffteck (horse), and Judd mat Gaardebounen (pork with beans), although French and Italian foods are much more common.

Luxembourg has the highest number of Michelin star restaurants per capita (***www.resto.lu***). Be prepared to speak French, German, and Luxembourgish on a daily basis.

Some Luxembourgish: Moien (hello), merci (thank you), addi (good bye). The old parts of Luxembourg City such as the UNESCO world heritage site Grund are definitely worth visiting.

1 **Su**ivi de l'efficacité des nouvelles formes de coopération électronique via des outils **g**raphiques permettant d'**a**nalyse**r** leur fonctionnement.

2 http://www.viktoria.se/fal/projects/infoart/index.html

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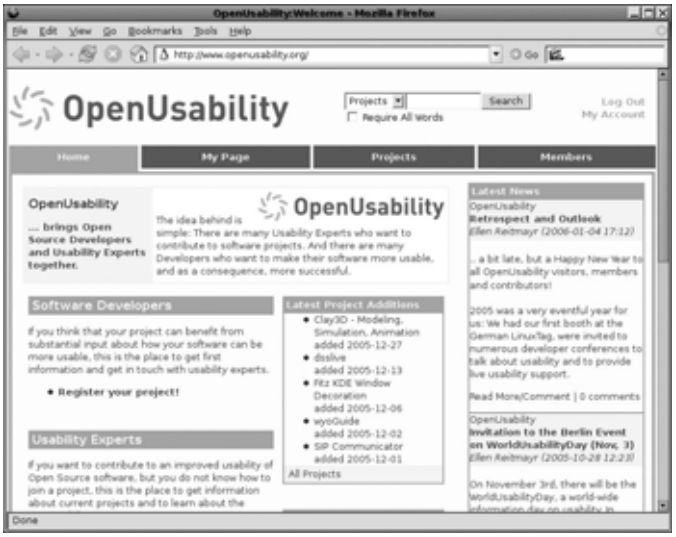
OpenUsability.org
Usability and Open Source Software

OpenUsability

Open Source Software (OSS) is not notable for being usable for the average user. Some (partially self-acclaimed) 'experts' see this as being due to a lack of interest by the non-commercial developers in ergonomics and usability. Our experiences with several open source projects prove a less stereotypical picture.[1]

In this article, we show some structural settings, or general conditions, of OSS projects and outline their effects on usability in comparison to commercial software development. We describe the challenges of realising and establishing usability in the open source realm for the future. The focus is on two factors: the integration of usability into the daily practice of OSS development, and the availability of usability resources (experts, knowledge, time, availability). If this can be achieved, OSS has an excellent chance of making usability a key market advantage.



Introduction

The success and spread of OSS in recent years is based mainly on server and backend applications. Its success is still limited on the desktop. Beacons, like the decision of the cities of Munich and Vienna to migrate to Linux, might lead to the conclusion that it is only a matter of time for the OSS success story to be continued on the desktop.

For the OSS desktop to compete with commercial software, OSS must be usable, not only for the 'geeks', but also for the 'average user'. But how usable and user-friendly is OSS? There are currently few studies.

Berlin-based user experience consultancy Relevantive undertook a study in Spring 2003 about Linux in a technically administered environment (Muehlig et al. 2003); this was one of the first studies to provide data about this issue. Since then, hardly any further studies have been done. Also, little is known about the role of usability in OSS projects. Nichols and Twidale (2002) were pioneers in this field, yet their conclusions are drawn mainly from structural factors of Open Source development, not from concrete empirical data.

In this article, we discuss some of the factors that sustain or hinder the development of usable Open Source Software and relate our experiences of several projects, including the KDE desktop. In addition, we want to show that Open Source is a wonderful realm for applying and enhancing usability methods and to promote the use of usability to both developers and a broader audience.

Developing for the community

One of the most frequent arguments about why OSS performs poorly with respect to usability (a charge made, in many cases, without concrete evidence) is the traditional orientation of developers towards the community, that is, other hackers (Nielsen 2004). The community judges the quality of a piece of software so it is, to some degree, written to their requirements. Other projects are developed to meet an individual programmer's requirements. So can you demand that this software is usable for non-geek users? And that users who cannot intuitively use such software should simply choose another?

This argument is quite plausible, but it is no longer valid if you want 'your' software to be considered seriously in businesses, public administrations, or converting end-users to OSS.

While, traditionally, the success of OSS was determined more by performance and functionality than ease-of-use and aesthetic appeal, it is also true that hackers are normally proud if their software gets widely used. And, as the acceptance and the demand for OSS from a larger audience increases, we are finding that developers and projects more and more acknowledge, and even welcome, the need to make their software more usable for a wider range of users.

In principle, usability relates to certain users in certain contexts. In general, a clear description of the target user groups is lacking from OSS development – commonly the users are seen vaguely to be 'everyone'. Even if information about the users were available, the desire to make software usable for users other than hackers consequently leads to a significant conflict.

Making software usable for one user group is a feasible challenge, but for 'everyone' tends to be difficult if not impossible. This leads necessarily to prioritisation, which again is problematical for political reasons. For example, most OSS has a huge range of functionality, which matches the needs and expectations of the developers (who can cope with the complexity) but, for 'average users', the amount of functionality renders the software unusable.

Take a real-world example: the email client Kmail. It has a setting that defines a mail folder as containing a mailing list. One developer designed this function, programmed it, and integrated it, but the number of users who deal with mailing lists outside the hacker community is rather limited. Nevertheless, this function is displayed on the same level as folder names and icons.

For the non-geek user, the amount of functionality makes the usage difficult because he cannot immediately distinguish between essential and optional functions (for his purpose).

Does this lead to the conclusion that the program should only offer those functions that are relevant for average users? Which functions will be removed? What will be the response of those developers who wrote these functions? What will be the response of the users who chose the software exactly because it had those functions?

These conflicts became prominent when we worked on a redesign of the folder menu dialogs of KMail, to make them more usable for a wider audience. Removing or hiding exotic functions would reduce the cognitive load and visual clutter, and would likely support a quick perception of essential functions. On the other hand, some developers did not like these 'improvements' and questioned the competence of the usability experts.

Whether a project decides to prioritise the average user and increase compatibility beyond the hacker community will surely become more prominent in the near future. There may be space for compromise, but this conflict is not easy to bridge.

Usability is trivial?

In a highly disputed article, the renowned OSS evangelist Eric S Raymond curses the poor usability of the CUPS configuration system (a Unix printing interface). Raymond attacks the developers for their design negligence and concludes that they only needed Aunt Tilly in mind to design the software so that it was usable for her (and thus for everyone else too): Usability is trivial.

This assumption is well established in OSS, as well as in commercial software development. In fact, a fundamental misconception about usability is obvious: How do I know what Aunt Tilly needs? Have I observed her using the software? Do I know why she does what she does? Do I know which terms and concepts she understands? Probably not.

Instead, an image of a fictitious aunt and her usage environment is made up to represent the lower end of all users. Gruber (2004) is absolutely right when he points to the disdain of 'dumb users' that is implicit in this attitude. OSS seems to be more predisposed for such a stance, since its success is not necessarily dependent on a market, unlike commercial software.

If usability were so trivial that you only have to think about the right user, we would live in a world in which software disappears because it matches our needs so well that we wouldn't notice it anymore. Instead, usability in most cases is quite a laborious process. The software is tailored to the user so that it is intuitively, successfully, and efficiently usable in an enjoyable way.

In classic software development, this aim is ideally achieved by collecting and analysing data about the target users (the requirements) and then by developing the software, step by step, while checking it against the reality, the user, using prototypes. This procedure is complex and expensive, requires usability specialists and, of course, must be backed by the project management. If not, it is merely a lip service. OSS projects can decide for themselves if their software should be suitable for average users. If the developers make this decision, they must equally set up workflows and resources to achieve this goal.

Usability as a bazaar?

Collaboration in OSS projects was compared, by Raymond in his famous article 'The Cathedral and the Bazaar', with the mechanisms of a bazaar. OSS development is characterised by open communication structures: it is easy to get in contact with the developers and to provide feedback. Consequently, OSS should have the ideal conditions to achieve usable software through interaction with users. Can usability contributions work similarly? Or are there significant differences between usability contributions and bug fixes?

Maintainers of OSS projects can judge very well what is good code and what is not, even if they don't know the contributor. Bugs are usually objectively reproducible and are identifiable as either really a bug or not.

This is different for usability contributions. Let's say someone sends in a description of a usage problem and a solution to the project maintainers. How do the maintainers know that it is a real problem? How do they know that the suggestions really do solve the problem and for which users? From this, it is obvious that usability contributions cannot be be handled in the same way as code.

Aside from this, consistency or conformity to guidelines can easily be verified. Still, guidelines cannot sufficiently describe how to design a usable interface.

Without this basic foundation, usability becomes mere speculation and the aim of getting a more usable application for non-geek users cannot be achieved. These forums more often present personal opinions of users rather than applied usability knowledge. As Nielsen has repeatedly stated, 'users are not designers' and 'designers are not users' (1994).

It seems unlikely that the 'wonder of the bazaar', where everybody speaks at the same time and, by way of magic, the right result comes out, does work for the field of usability. On the contrary, in the midst of many voices (and many opinions), the maintainers have difficulty trusting such opinions, and filtering noise to make a decision. Often a decision is never made and the software is left untouched and unimproved. This will only change if discussions are based on facts and mere opinions are better filtered.

Important parts of the bazaar are the communication channels on which the projects mostly rely: mailing lists, IRC (a kind of chat room), and bug tracking. These channels are well suited for technically savvy users, but are very difficult for non-geek users. In fact, they work as a filter distorting the representativeness of user feedback. But assuming that they were easy to access and to use, they still would be of little help for OSS projects. Imagine if thousands or millions of users report their problems, wishes, and solutions to the programmers, there would be no time left for coding. The problem of 'who is right' and 'whom shall I believe/trust' is still the same.

Missing resources

From what we have described so far, it becomes clear that OSS projects have a fundamental problem: they lack usability resources that help achieve better usable software for non-geek users. The community has traditionally consisted of programmers, while usability experts are practically absent. Even in large desktop projects, like KDE, there is only a handful of members with strong usability skills.

There are exceptions where companies try to support OSS projects with their own experts (for example, OpenOffice.org and Sun Microsystems), but they are commercially motivated and do not always get the wide acceptance by the community. Also, the conflict of 'developing for the community' versus 'developing for the average (or marketable) user' gets even more emphasised.

Speed is the key

So far, we have mainly described the difficulties and handicaps that OSS faces with respect to becoming usable software. OSS has, however, a huge advantage over commercial software: the principle of 'release early and often'.

Professional usability engineering is effective when the software is presented to the user early in its development. The earlier such tests can be done, the easier and cheaper are changes and adaptations. This is where prototyping comes into play. Unfortunately, in commercial reality, it is neither done as often as expected, nor as early as needed.

For OSS, however, a constant publication of incremental 'prototypes' is simply part of the open source process: a fantastic situation for every usability engineer! With frequent releases, it is possible to integrate improvements step by step. Classic software development has a much more rigid framework which focuses on major releases and does not allow for many iterative usability changes. Here, OSS has a huge advantage – a killer feature – that can lead to better and more usable software but it requires usability resources.

Open Usability

In OSS development, usability experts are very rare, and procedures to integrate them are missing. On the part of potential usability contributors, knowledge about the peculiarities of OSS development is missing – it is unclear what is expected and how to interact with the developers. On the part of the developers, it is unclear what they can expect from the usability experts, what is needed by them, and whether the contributions from the so-called usability experts can be trusted.

Changing this situation is one of the main motivations of the OpenUsability project. The idea was born at the KDE developers conference 2003 in Nove Hrady (Czech Republic) to which OpenUsability founders Jan Muehlig and Jutta Horstmann were invited. They discovered that interest in usability was very high but knowledge about usability and how to achieve it were lacking.

The result is a portal that aims to facilitate the interaction between usability contributors and developers. Projects can present themselves and communicate their wish to incorporate usability and improve their software – this is crucial to avoid misunderstandings and frustration because not all developers and projects are sold on usability. Likewise usability experts can get in direct contact with project maintainers or representatives and get a clear picture of what is needed.

Currently, the portal is being redesigned as a result of our experiences with many of the participating projects. We are looking forward to providing effective means and workflows for collaboration, as well as documentation, HowTos, and a general interface between OSS projects and usability resources.

Trust

One thing we have definitively learned during the last few years is the importance of trust. Typical open source projects rely on remote communication tools like mailing lists, IRC, bug tracking systems and code repositories.

Collaboration does not depend on seeing or sitting next to each other because code can largely speak for itself. Physical meetings are mostly not crucial for day-to-day development. But, as we said, usability input is different to bug reports and, in a world where many feel inclined to provide their 'usability expertise', it is difficult for developers to know who to believe and follow – or not. Therefore, personal relationships between usability engineers and developers are very important.

The developers are ultimately those who decide which changes do and do not get committed. If the developers do not trust the usability input, the changes will never get made. There is no executive power to force usability changes on an OSS project – rightfully so because many of these projects are very personal to those who maintain them.

While this may sound counterproductive at first, it is ultimately very fruitful. Established usability engineer–developer relationships have a high success rate of committed usability improvements due to the willingness and trust that the developer has for the usability engineer. The 'review' period of the usability feedback is greatly shortened if not eliminated because they have proved to be a trusted source.

Invitation

Open Source Software has specific disadvantages with respect to usability. This includes the traditional focus on code, the strong preference of functionality over accessibility, and a lack of good usability amplifies this. The current poor attraction and integration of usability contributors and the non-availability of usability resources are fuelling this even more.

But many projects are willing to become usable to non-geeks and to become the first choice of end-users. The interest in usability by the KDE and Gnome projects, and the many projects that participate in OpenUsability and in other efforts like the FLOSS-Usability group, is really promising. If OSS incorporates usability as a significant part of its development process, it can make full use of its advantages, including its 'rapid prototyping' framework. In which case, OSS may one day be notable for its usability.

In addition, Open Source usability can be an extremely rewarding field for any usability professional who wants to improve software for the sake of applying and sharing skills and knowledge. We invite everyone to contribute to a project and to take advantage of the open environment to provide free, usable software to the world (as well as sharpening your skills in the process). And it is a unique opportunity to help improve the free and open software you can use everyday.

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1 See *Interfaces* 60 for a brief introduction to Open Source Software.

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Workshop Report

Peter J Wild and Claudia Eckert

International Workshop on Understanding Designers'05 Aix-En-Provence 17–18 October 2005

About 40 researchers from around the world gathered in Aix-en-Provence to report on efforts to study designers in a variety of domains using a variety of empirical methods. The researchers came from a range of academic backgrounds and domains of interest, but an important feature of the workshop was in bringing researchers and educators together; the workshop format allowed for long and lively discussions.

The major emphasis of the research studies was on the conceptual phase of design, and studied this using experiments on design students. A smaller number of papers, mainly from an engineering design background, reported on empirical studies of large-scale engineering projects or interviews with experienced designers spanning the entire design process. These papers had a wider scope then the three main themes that John Gero identified in his summary:

1. Creativity and Design (both explicit and implicit),
2. Externalisation through sketching, drawing, etc, and
3. The connections between teaching and learning.

To us this workshop was once again a reminder that truly understanding designers, if not design, embraces understanding the differences as well as what is common between different design domains. Some of the observable differences include the tension between a novel or creative solution and a well-engineered product; validation of findings; accounting for the strengths and shortcomings of your chosen research method. This sort of event makes it possible to discuss these issues. However, we concur with John that the study of design processes has just begun.

Information about the programme can be found at: *http://www.arch.usyd.edu.au/kcdc/conferences/sd05/*

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Experiencing design
Fearful symmetry

Robert St Amant

With his wonderful book, *The Design of Everyday Things*, Don Norman ensured that a generation of interaction designers would be acutely aware of the layout of… stove tops. The concept of a natural mapping is now a familiar one: if the spatial arrangement of the knobs on a stove matches that of the burners, it is easy to see which knob corresponds to which burner. The correspondence between a square of burners and a line of knobs, on the other hand, is ambiguous and can lead to potentially disastrous usage errors.

My students offer comparable everyday examples of mapping problems:

> The clothes dryers in the laundry rooms here on campus are poorly designed. They are arranged in pairs, with a single coin slot and controls between each pair. More than once, I have put in money and pressed the button to start the wrong dryer. If the other dryer is already being used by someone else, it is impossible to move your own clothes into it. I have ended up paying for other people's clothes to dry by mistake at least twice this semester!

> One of the elevators I use has a 'walk through' design, with two sets of doors opposite each other. The elevator buttons are in two columns on a panel beside one set of doors. On the bottom row of the panel is a pair of buttons, side by side, for opening and closing one set of doors; the row just above controls the other set of doors. The problem is that there's no easy way to tell which row of buttons is for which doors, so when someone is running to catch the elevator as the doors close, and I reach out to push a button, I can't tell which is the right one.

Most discussions of mappings in the HCI literature focus on such examples and their analogies in user interface design. If we dig a bit deeper, though, we find a strong (but to my knowledge unrecognised) connection to another general concept in HCI, that of affordance.

Affordances can be thought of as opportunities for action in the environment, opportunities that can be perceived immediately or via exploration. The knobs on a stove are a good illustration. Knobs are contoured to fit the hand, such that they can be easily activated by a twisting motion. Even if I had no knowledge of the behaviour or purpose of a knob, I could still see that it is grippable; trying out different motions while gripping the knob would eventually teach me that twisting it is the correct action to take. (Perhaps surprisingly, knowing which direction to twist a stove top knob seems to be a matter of convention, based on a metaphor with 'increasing' time on a clock face.)

Harold Thimbleby has suggested that central aspects of affordance are captured by the concept of symmetry. For example, a knob has an affordance for grippability because of the symmetry between its shape and the configuration of my fingers as they close on it. In 'Reflections on Symmetry' (www.uclic.ucl.ac.uk/usr/harold/srf/avi2002.pdf),Thimbleby writes:

> Hence Gibson [who coined the term "affordance"] assumed the human (i) recognises a set of symmetries (ii) particular sets of symmetries stimulate particular responses. Together these ideas constitute affordance.

One of Thimbleby's key insights is that symmetry in the user interface generalises beyond visual arrangements to states and actions: if a system has translational symmetry, for example, then an action taken in *this* interactive context has the same effect as in *that* context.

Mappings and affordances come together in the process of learning how to act in an environment. If I have some set of objects that can be acted upon to cause changes in the environment, as in the examples above, then natural mappings are spatial symmetries that tell me *where* to expect a change when I interact with a specific object. Affordances of the kind described above are procedural symmetries that tell me *how* I can interact with an object and sometimes, by translation, what I can expect will happen as a result.

In user interfaces, many common conventions for layout and function can be traced to the appropriate use of symmetry. For example, buttons for scrolling upward are always above, not below, buttons for scrolling downward – a natural mapping. A horizontal slider that controls vertical scrolling would break a symmetry based on orientation.

Natural mappings are not always unique, however. In visualisation applications such as Google Earth, for example, it's possible to zoom in on points of interest. Zooming in can be interpreted as 'moving closer', which in this application is handled by moving a vertical control upward. But zooming can also be thought of as 'increasing the level of detail', which could be handled by the same vertical control or by moving a horizontal control to the right (a convention based on an analogy to a number line).

Affordances, in the form of the symmetrical translation of actions, can also be seen in the user interface. Moving about locally in a visualisation is sometimes supported by a dragging action on the scene displayed – an action that corresponds to sliding a paper map across a desk. Sometimes an interface does not entirely meet expectations; in trying to change the angle of view of a map in Google Earth, for example, I tried 'pressing down' on the lower part of the map to tilt the surface, but to no effect. What's important here is that analysis of the actions possible in one context can help designers understand what is expected in similar contexts.

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Robert St Amant is an associate professor in the computer science department at North Carolina State University. The work in his lab is a blend of human–computer interaction and artificial intelligence, with an emphasis on planning concepts. He's interested in building intelligent tools to help users with complex tasks.

Welcome to the Spring edition of *Interfaces* Reviews. Stuart Smith, Robert Ward and myself review three books on games. Interestingly, we reach similar conclusions on the topic. Firstly, games are tricky things to research and design as they bridge a number of disciplines and interests including the commercial imperative to sell stuff. Secondly, the research, player and developer communities could work together more closely for their mutual benefit. Indeed, many of the design issues faced by the gaming industry (e.g. emotion and motivation) are the same ones being explored by the HCI community.

Creating Emotion in Games: the craft and art of emotioneering™
David Freeman
New Riders Publishing (2004)
Paperback, 538 pp
Illustrated: colour and monochrome
List price: £38.99
ISBN 1-59273-007-8

The idea behind this book is that emotion is a major key to success in the games market, therefore games that are emotionally deep will 'reach players' hearts and really make them care about the game's story and characters'. The book is therefore more creative and inspirational than academic and analytical, aimed at games designers rather than academics – in fact at one point it says it is for magicians.

The book's author is an experienced screenwriter who teaches screenwriting classes in New York and Los Angeles, and now provides design and writing consultancy to well-known games corporations. He follows an approach he developed as a screenwriter, describing techniques that can be used 'to create characters, dialogue, scenes and plots … refreshingly unique and layered with emotional depth'.

Most of the techniques are accompanied by examples from novels, films, segments of dialogue, imaginary game scenarios and imaginary non-player characters (NPCs) to illustrate the creation of motivation, mystery, allure, anticipation, bonding, plot deepening, and so on. Things would seem to have come a long way since Malone's thesis that just challenge, fantasy and curiosity make computer games fun.

The main part of the book presents '32 categories of emotioneering™ techniques' (pp 45–417). This is preceded by a short introduction proposing why 'emotioneering' is important, and setting out some differences between screenwriting and computer games (e.g. NPCs have to use minimal dialogue both to convey information and to enhance emotion). The last section of the book consists of an exploration of how the techniques might be applied in three hypothetical games (e.g. you are a Roman soldier who has just escaped fatal injury because a friend confronted death and died in your place), afterthoughts about types of fun (e.g. combat, travel, bartering), sources of inspiration (e.g. childhood, our fantasies) and miscellaneous collected thoughts and ideas. But the core of the book consists of the 32 'emotioneering' techniques. My own main point of interest was to wonder what this might offer us as HCI researchers and practitioners.

From a theory perspective I was drawn to an interesting looking diagram on page 40 that plots techniques for making things interesting against techniques for making them emotionally deep, suggesting that interesting and deep are different things, and that when these two concepts are applied to the five areas of dialogue, characters, relationships, scenes and plots then there are ten categories of techniques. But the diagram is only indicative and unpopulated, and is said to apply only to films and TV. 'When it comes to games … there are not ten but rather 32 categories of techniques that you can use to emotionally engage a player' (p 40). There is little further explanation of how these 32 categories are derived or organised. This book is not the place to look for explanations of the emotional relationship between people and technology or theoretical contributions to design practice.

So does it offer methods or techniques that might be repeatable, measurable, predictable, and so on (even though one suspects these very words would be anathema to the author)? One proposal is that NPCs can be made interesting by giving them a 'character diamond' of four different traits. For example you might have an NPC that is sly, heroic, absent-minded and aesthetic, all manifest in the action or dialogue of that character. The character might then be made deep as well as interesting by giving it a hidden secret or emotional pain. However, it would seem that, for this to be effective, the person writing the dialogue for the character needs to be 'a wordsmith with a hotline to the muses' with a gifted actor for the voiceover (p 65). Many of the techniques rely on quality of dialogue. Instead of a cook saying "Here's your food" it might be more interesting to hear instead "It's probably chicken" or emotionally deeper to hear "You know, our kids won't even care about this war." In this way, Freeman works through his 32 categories, creating relationships and chemistry between NPCs, creating deep and interesting plots, associating symbols with emotions, binding story to gameplay, and so on. Plenty of ideas, but little by way of instant recipes or principled design guidelines.

I feel I now have better understanding of why I feel more positive towards my cyberbuddy than 'Clippy', the dreadful paperclip assistant, and designers of embodied agents and computer-assisted learning scenarios might find the book an enriching source of ideas. The book might also provide testable hypotheses for affective computing researchers, although I struggled to find them. But basically this book is written to inspire games designers, and it probably does that reasonably well.

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Gameplay and Design
Kevin Oxland
Addison Wesley (2004)
Paperback, 368 pp
Illustrated: monochrome
List Price: £32.99
ISBN 0-32120-467-0

Kevin Oxland's book leaves me with a problem. I want to recommend it strongly because here is a book that is passionately written, with lots of interesting real world examples and useful tips. The style is friendly and readable and should appeal to a wide range of people. However I have to hold back on my praises because it lacks authority.

Gameplay and Design is an ambitious introductory textbook. It is aimed at a wide audience and therefore has to try to please different kinds of readers. Oxland claims to offer his audience 'a solid foundation on which to build from'. The book is split into two parts: Part 1 looks at what makes up a game and how to design for it, while Part 2 considers the documentation of that design. The author believes the work has something to offer everyone interested in the games industry, irrespective of their background. The book is interesting to read but much has to be taken on trust. Indeed it is impossible, realistically, to test the claim that a solid foundation is on offer here.

One of the biggest barriers to recommendation is that there are very few places where the author cites the work of others. On the rare occasion where he does do this, it is incomplete. For example, research cited in Chapter 5 does not appear listed in full in the reference section nor the bibliography. This means that a novice to game design could be left wondering if Oxland is the only expert in this field.

This is a shame because Oxland is an experienced games designer. His writing demonstrates an almost innate knowledge of this industry and this can only be a testimony to his ability. Indeed, Oxland has a string of successful games to reinforce his experience in the competitive world of commercial game development. Naturally, there is a trade off between offering conceptual rigour and maintaining the book's accessible first-hand insights into the industry.

On a more positive note, there is much that is useful about this book. Oxland delivers a vivid sense of design for the real world, one where deadlines, budgets and things going wrong exist and impact on our work. Indeed, I am sure that many people involved in designing any computer system, will probably relate to the feeling he conveys that the process of design is still misunderstood and underrated by the industry at large.

In the first part of the book the author analyses the construction of a game. He then looks at the constituent parts and how to design them. He considers the players' motivation and the interaction of the game with the end user. He also looks at the different types of game and how to adapt the design process for them. Oxland shows that the genres of games available are growing; ranging from role-play, such as Dungeon Siege® and action adventure such as Burnout™ through to puzzle games such as the classic Tetris®. He considers the demands these genres place on the designer. Throughout, his opinion is reinforced by examples of real commercial games and of his own example constructed for the book. This is a design for a game called 'Norbot'.

This first section is an interesting overview of the current games development process. It seems widely acknowledged (and is in the book) that the days of the successful solo bedroom-based games programmer are long gone. The industry has grown up and the development of games for multi-platforms and multi-players requires teams of co-operating specialists. In addition, Oxland infers that the development of a game cannot be owned by an individual nor, would it seem, can the design process. He writes about the need to co-operate with the artists and programmers but makes a clear distinction between games design, artistry and the technology. That revelation will still come as a shock to some in the development field!

The second part is much shorter and is meant to consider the documentation required to achieve part 1 successfully. Templates are provided and appear to be quite useful and detailed. The final chapter also considers career pathways into the games industry, which sits awkwardly in a section about documentation. There is a strand running through the book that tackles career options and perhaps this could have been made into a concluding section in its own right.

Despite the many positive features of this book and the author's compelling enthusiasm for his field, I am still left wondering about the strength of the work. Without substantial referencing, it remains the opinion of just one professional. And there is a inherent contradiction to the book. Oxland himself notes that the design process is not a solo activity but his book about it is. In places it feels like he is trying to cover every area himself. Oxland has much to say that is probably valuable to the reader but it needs to be proven. A reworking with references would produce a more authoritative work. Alternatively, the inclusion of other experts would make it more representative of the gaming world.

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Handbook of Computer Game Studies
Joost Raessens and Jeffrey Goldstein (eds)
MIT Press (2005)
Hardback, 496 pages
Illustrated: monochrome
List Price: £32.95
ISBN 0-262-18240-8

The book has six parts that deal with history, design, reception, audience, aesthetics and the social and cultural aspects of gaming. It brings together fourteen contributors who tackle these issues from a practitioner and research perspective. Authors include some well-known researchers such as Sherry Turkle, and many of the authors are involved in New Media Studies (p 424). The book is particularly welcome given the the dearth of scholarly books on the subject. The length and large format reinforce the handbook's reference credentials.

The book has some difficult problems to tackle. Research findings on such important issues as violence are often contradictory. In addition, potentially useful contributions from other disciplines (e.g. cinema) are hampered by the unique character of games. This leads to disputes, including whether games are narrative or non-narrative (p 219). Britta Neitzel notes 'Research work on computer games cannot avail itself of a long

tradition – popular games are just thirty-five years old' (p 227).

Difficulties are further exacerbated by the skewed demographics of the gaming world. Sandra L. Calvert notes that 'boys are … typically spending twice as much time gaming as girls' (p 125). The influence of this audience naturally affects which games are produced and what research is conducted. In some ways, the book is about broadening the audience for games.

The best chapters draw on relationships with the gaming audience through design and participation. Unfortunately, these links are concentrated on the fringes of the gaming industry and non-gaming community. Exceptions include Anne-Marie Schleiner's look at the 'Gamer Culture' and end user modifications and Douglas Rushkoff's 'Renaissance Now! The Gamers Perspective'.

The book starts at the prehistory of gaming. Erkki Hutamo goes back to before the industrial revolution 'as manifestation of the human–machine relationship' (p 4). Steven Mailiet and Gust de Meyer bring things up to date. The authors note that 'it is remarkable that almost all genres known today already existed in a prototypical form in the early 1980s' (p 31). The history ends with a chapter on mobile gaming.

A more sociological history would have been useful here, particularly an analysis of the impact of industry on content and consumption. This is partly redressed by chapters (e.g. Isabelle Raynauld) linking the gaming world to cinema. Henry Jenkins' great chapter is based on Gilbert Seldes and offers a cinematic approach to criticism. Corollaries of cinema include genre, narrative and interactivity. And, these three issues underpin much of the analysis including chapters by Juul, Wolf, Salen and Zimmerman.

The importance of play is evident in many chapters. This is often referenced with 'Homo Ludens' by Johan Huizinga. This leads Katie Salen and Eric Zimmerman to propose that 'the goal of successful design is the creation of meaningful play' (p 60). They suggest that meaningful play consists of 'the way game actions result in game outcomes to create meaning … [and] occurs when the relationships between actions and outcomes in a game are both discernable and integrated in the larger context of the game' (p 60–61).

The centrality of play lends games to more utilitarian ends. The most obvious of these ends are educational although Jos de Mul offers a compelling investigation (drawing on the work of Paul Ricoeur) of 'the way computer games construct our identity…' (p 251). Mark Griffiths' chapter breaks the stereotype of games as 'shoot em ups'. His chapter (The Therapeutic Value of Video Games) includes examples of gaming in pain relief, rehabilitation, development of social and communication skills, tacking attention deficit syndrome and care for the elderly.

Play can also be harmful and much of the research is based on empirical studies of audience reception. Given the demographics, this focuses on developmental issues such as the effect of violent games. The concluding chapters introduce a sociological dimension to the analysis. These see games in terms of gender (e.g. Birgit Richard and Jutta Zaremba) and political intervention (e.g. The 'Ethnic Cleansing' Game, p 319) including race (e.g. Anna Everett).

Authors tackle these issues with authority and balance. Jo Bryce and Jason Rutter conclude that 'it is important to see … beyond the game text', and that an overly deterministic approach to the construction and influence of gender is restrictive. (p 307). 'Games as Social Phenomenon' ends this solid work. Like other sections, it offers a prescient and multidisciplinary perspective on computer games. Well written and authoritative, this book is one to recommend for your library.

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Other books to try…

Clarisse Sieckenius de Souza's *The Semiotic Engineering of Human Computer Interaction*. This book has the plaudits of Terry Winograd and Donald Norman and promises a practical application of semiotics to design. Well, let's see.

Bolter and Gromala's *Windows and Mirrors… Interaction Design and the Myth of Transparency* is also vying for my attention. It sees the authors 'argue that contrary to Donald Norman's famous dictum, we do not always want our computers to be invisible "information appliances"'. On first reading it tackles HCI, but misses out on the seamful/seamless interaction debate. However, it may well predate this debate as it came out in 2003!

Talking of Donald Norman, tantalising news comes of his next publication, provisionally entitled *Cautious Cars and Cantankerous Kitchens*. More news from the Nielsen/Norman Group in the next issue.

The *Encyclopaedia of HCI* has been published by the Idea Group and promises to be 'the most thorough and definitive source providing coverage of everything related to the field of human computer interaction'. Lastly, the second edition of Steve Krug's *Don't Make Me Think: A Common Sense Approach to Web Usability* hit the shops in the winter. I quote the publishers (my italics):

> Steve adds three new chapters – in the same *wry and entertaining* style as the original – that explain why people really leave Web sites (Usability as Common Courtesy), how to make sites usable and accessible (Web Accessibility, CSS, and You), and the art of surviving executive design whims… plus a new preface and updated recommended reading.

Publications due in Spring 2006

Change of State: Information, Policy, and Power by Sandra Braman (MIT)
Group Cognition: Computer Support for Building Collaborative Knowledge by Gerry Stahl (MIT)
Thinking about Android Epistemology edited by Kenneth M. Ford, Clark Glymour, and Patrick J. Hayes (MIT)

Looking forward to the next issue

In the next issue, *Interfaces* Reviews will tackle Information Architecture. Expect reviews of the key books in this area including:

Information Architecture for the World Wide Web by Louis Rosenfeld and Peter Morville
Information Architecture: Designing Information Environments for Purpose edited by Alan Gilchrist and Barry Mahon
Information Architecture Handbook: A Hands-on Approach to Structuring Successful Websites by Eric Reiss
Information Architecture: Blueprints for the Web by Christina Wodtke

If you have any comments on *Interfaces* Reviews email John.knight@uce.ac.uk.

Profile Nick Bryan-Kinns talks to Alan Dix

I'm a lecturer in HCI and research into mutual engagement in creative collaborations at Queen Mary, University of London. Several years ago I left the champagne soaked sofas of bankrupt.com to work for a large consultancy which soon made me realise that what I really wanted to do was research into collaborative music making. Some years later I now have a couple of research projects investigating the nature of mutual engagement in group music improvisation, and am even trying to commercialise the results. For some bizarre reason I also thought it would be a good idea to chair HCI 2006. And, oh yes, before I forget, I did do a PhD many years ago, but it was on something quite unrelated to what I'm doing now.

What is your idea of happiness?
Being on the edge of madness

What is your greatest fear?
Sleeping

With which historical figure do you most identify?
Figure 8

Which living person do you most admire?
To save their embarrassment I shan't mention them by name, but they are definitely alive

What is the trait you most deplore in yourself?
That I've never learned yoga

What is the trait you most deplore in others?
People who make excuses

What vehicles do you own?
A car, a bike, and a mechanical dog

What is your greatest extravagance?
Lockets

What makes you feel most depressed?
Television

What objects do you always carry with you?
A mechanical dog

What do you most dislike about your appearance?
That I don't have enough new clothes

What is your most unappealing habit?
Driving in Wales

What is your favourite smell?
London streets in the Summer after a brief rain shower

What is your favourite word?
Confabulate

What is your favourite building?
Anything with a top floor

What is your favourite journey?
Leaving the house in the morning and knowing where I'm going

What or who is the greatest love of your life?
It's a secret

Which living person do you most despise?
Despise is rather a harsh word

On what occasions do you lie?
I don't

Which words or phrases do you over-use?
In text: "In order to…". In speech: "So, …".

What is your greatest regret?
Regrets can eat you up, you know

When and where were you happiest?
Yesterday was pretty good, today is panning out quite well so far

How do you relax?
With music

What single thing would improve the quality of your life?
Being able to play the piano

Which talent would you most like to have?
Being able to play the piano

What would your motto be?
The most beautiful thing in life is simply to love and be loved

What keeps you awake at night?
Monosyllabic utterances

How would you like to die?
Quickly

How would you like to be remembered?
Fondly

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