interfaces

25 YEARS OF HCI
Reflections on the past,
the present and the future

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

Forthcoming themes
Interfaces 86, Spring 2011: deadline: **31 January 2011**. Theme: A socio-technical approach to privacy, security and trust.

Submission guidelines
Articles should be MS Word or plain text. Send images as separate files: these must be high resolution digital originals suitable for commercial printing, cropped if desired but not resized, and if edited, saved as tiff or highest quality jpeg. Please supply photographers' credits as appropriate. Authors should please provide a 70-word biography and a high resolution head and shoulders original digital photo. Photographers' credits will be printed if provided.

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As we move towards a world of increasing technology dependency, this issue reflects on some of the issues addressed by the HCI conferences over the years. We revisit the question of accessibility and the possibility of digital exclusion resulting from inadequate design, particularly with regard to older adults. Ben Schneiderman reflects on the potential for social networking sites to facilitate civic participation, yet the paper by Lehtinen, Näsanen and Sarvas highlights self imposed exclusion by some older adults from these sites.

Reflections on the last 25 years highlight a period of constant technology development and a shift from a technological focus to a focus on people – both as individuals and as a society. The next 25 years may be a time when we learn to make best use of the technology which is now firmly embedded in our lives and strive to stop the misuse of this new world of interconnectivity.

From WikiLeaks to extremists' publication of inflammatory material, to the exposure of intimate private communications – the problems of privacy, security and trust in this interconnected world are being exposed. Our next issue will explore the socio-technical aspects of this problem.

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VIEW FROM THE CHAIR

DEFINING AND REDEFINING

Tom McEwan reflects, from several thousand feet, on HCI's patchwork of tools, methods, theories, disciplines and application domains and suggests socially responsible stitches for the festive season.

As the plane slips beneath the clouds on the run-in to Paris-CDG, beneath me are constellations of villages, innumerable settlements of hundreds, interconnected by road and rail and river. Some are only a few hundred metres apart, each surrounded by patchworks of well-worked fields in their Napoleonic subdivisions. It never quite looks like this in the UK, but France has far more usable land to spare, no need for green belts to hem in their populations.

25 years of HCI
Has 25 years of HCI led us to a similar state? Our strength appears to lie less in our body of knowledge than in our network – the novel and the longstanding connections, the multiplicity of routes to productive and enjoyable experiences, and, of course, our Interfaces.

HCI2010 summed up our places in the world. We are no subdivision of a subdivision of an ACM classification, and the Dewey decimal system only looks full of territories to conquer. As well as longstanding sessions on InfoVis, UX,

Interaction Methods, Multimodality (now with all-new haptics and gesture!), new combinations appear: HCI and Security, ... and Health, ... and Gaming, and Physical & Urban HCI. Alongside sessions on this year's Research Tools and Methods, there's now HCI in the Market lending a new mindset.

Striding the foothills
Our keynotes ranged, as giants do, across the foothills and beyond: redefining the links between business innovation and education in the world of games design; unleashing government information for visualisation, interpretation and especially contribution; interactive improvisation and drama with professional actors awakening the moral conscience of the new generation of HCI. Yet for all their stellar contributions, all three were able to spin on a sixpence and send themselves up in a maniacally unrehearsed post-dinner cabaret.

I had a great week. I hope you did – the story continues at Northumbria in July.

Titanic conceit
We waste a lot of time deciding what is HCI (or ID or UX) and what isn't. Meanwhile commercial innovators change the landscape before we get our tuppence worth in. Too often their innovations are socially irresponsible, solving the easy 20% instead of the jagged 80% that lurks beneath.

Recent statistics about average income, indeed where the top 15% starts, surprised me. We have a responsibility to bring the knowledge of 25 years to action and to knock the worst edges off careless innovation. It's not just the conceit of Titanic proportions we need to address, it's the insidious propaganda that makes the top three most desirable children's gifts this Xmas technology luxuries well beyond the pockets of almost every family.

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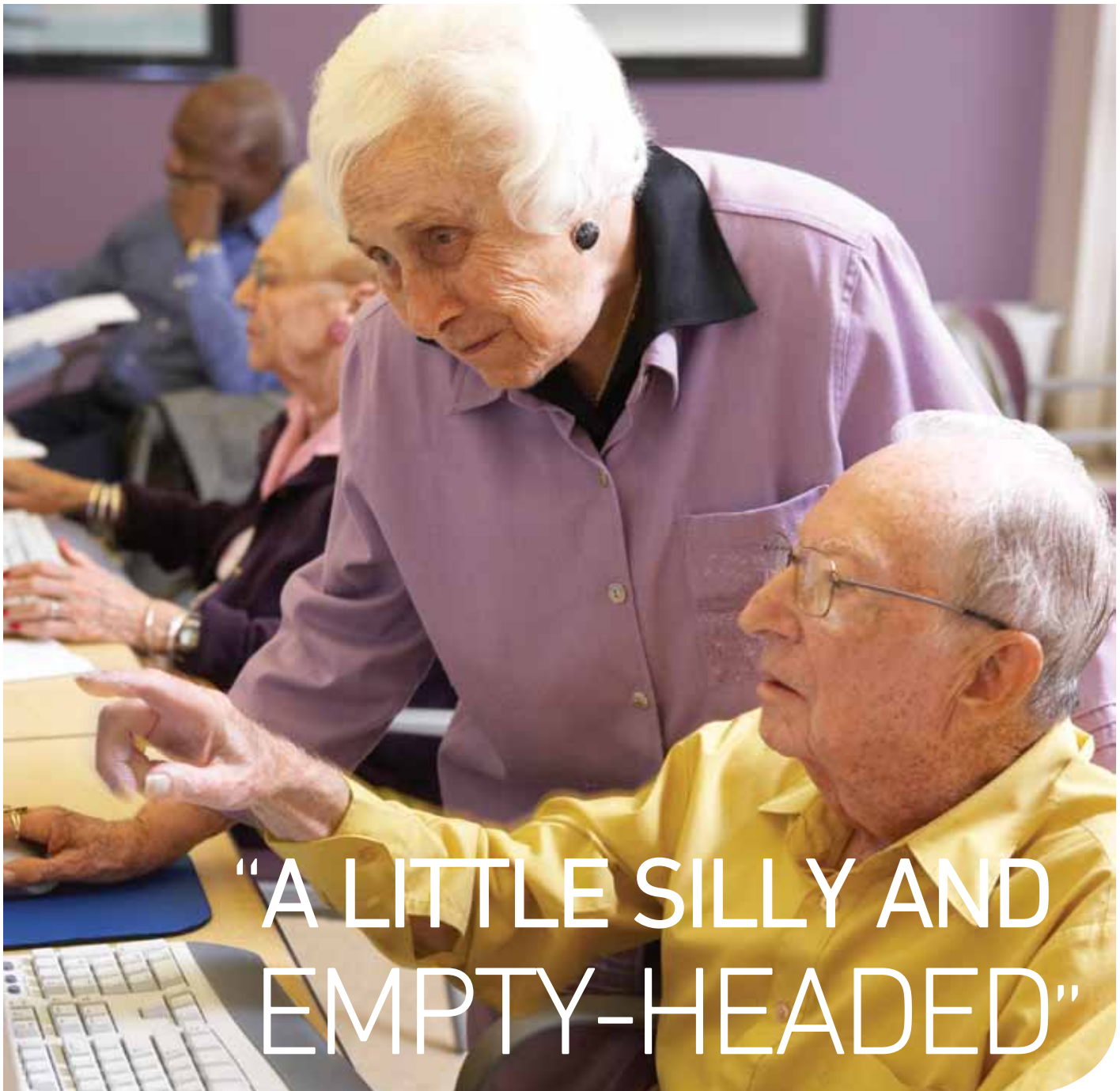
"A LITTLE SILLY AND EMPTY-HEADED"

Vilma Lehtinen, **Jaana Näsanen** and **Risto Sarvas** from Helsinki University of Technology, Finland, investigate older adults' understandings of social networking sites. This paper won the Best Paper Award at the British HCI conference 2009, University of Cambridge, UK.

The proportion of adults over 55 years old online has increased steadily (Fox 2001, 2004) and the retiring baby boomers are becoming a prominent group online. Looking more closely at users of various online services, we find a new kind of digital divide: baby boomers are still a clear minority on social networking sites (SNSs) (Jones & Fox, 2009; Lipsman, 2006). In industrialised countries, in the past year, only 10% of baby boomers have used SNSs (DeRosa et al., 2007). Research on the reasons for use or non-use of SNSs has focused mainly on young adults and teenagers, an exception being Arjan et al. (2008), who studied active users of SNSs aged 60+. In this article, we discuss possible reasons why older adults have not been adopting SNSs as much as younger generations.

Although we do not draw a causal relationship here between not using SNSs and being excluded from the information society, we argue that the absence of older adults from these services should be considered when planning the inclusion of all ages in the information society. ICT use has been found to benefit personal well-being, for example through reducing social isolation (Selwyn, 2004). Older adults do not have similar needs as teenagers and young adults for constructing their identity or their own public sphere (Boyd, 2007). However, SNSs could be beneficial in supporting the transition from work life to retirement (Lowenthal & Robinson, 1976), in the same way that Ellison et al. (2006) hypothesised that students amid the transition from high school to college take advantage of SNSs to preserve their dispersed social relationships and to build new ones when entering new social circles.

Similarly, Lindley et al. (2008) argue that older adults benefit from technologies that support the maintenance of existing relationships, which are found to be more valued in older adult life compared to new ties. SNSs are used prominently with existing ties (Boyd & Ellison, 2007), so the question remains why older adults do not

take full advantage of SNSs. To explore this issue, we addressed the following research questions:

1 What is older adults' understanding of SNSs?
2 How do these understandings fit certain aspects of their life?
3 How should these conceptions be taken into account in the design of SNSs?

To address these questions, we conducted a qualitative interview study, which included an intervention period. We interviewed our participants before and after the period in which they used an SNS, and we held group discussions before introducing the site. The site used was Netlog (**www.netlog.com**), a site in their native language, Finnish. The group and personal interviews covered the participants' social networks, use of communication media, and perceptions of SNSs, including experiences with the SNS used in the study. Our participants were eight older adults, aged 58 to 66, a group of four women and a group of four men. Our participants knew each other, since we wanted to study how social networking technology is adopted in an existing social network rather than how new relationships are created. None of the participants had used any SNS before the study, so the objective of the intervention was to provide a common experience to be discussed in the interviews.

Designing social networking sites to fit older adult life
Our analysis identified quite negative attitudes. The main issues identified were computer skills, transferring or constructing a common frame for interaction, and paying special attention to management of privacy and publicity of personal and social information. However, we point to design solutions to address this negativity.

Critical mass is not the only problem
The current computer-mediated communication habits of the participants did not seem to support the use of the Netlog site. Even though our participants had used computers regularly both at work and leisure, we noticed that the participants found computers difficult and awkward to use and they did not trust their own computer skills. They found computers to be more a tool for working than for fun or communication. Although the participants made an effort to invent good uses for the Netlog service, they did not manage to identify any real motivation for using an SNS; instead, they cited many reasons for deeming it useless and unnecessary and adding no value:

"I already have a phone and e-mail. I'm wondering where I'd need this."

If the site had included more of their friends, relatives, or other acquaintances, perhaps then it would have had enough "critical mass" to become a meaningful communication technology. This problem is common to all social networking technologies but perhaps especially challenging in building social networking for older adults. However, a system such as Facebook would overcome the problem of critical mass (at least of a critical mass of younger people), as it would have users from the older adults' wider offline social network (children, grandchildren, and other relatives, as well as friends, colleagues, and ex-colleagues of a younger age).

Nevertheless, whether the service concerned is new or existing, if it is targeted at older adults, it must address the challenge that, according to our study, the internet was not felt to be a place for social interaction. We now discuss each of the issues discovered, and suggest designs that could address the concerns raised and make SNSs better suit older adults.

Elements valued in friendship and social interaction
By understanding the elements older adults value in their friendships and social interaction, we can develop SNSs that better match the conceptions and patterns of older adult social relationships and hence make the services more attractive in this stage of life. Clearly, many features of SNSs already afford possibilities to express dimensions older adults value in social relationships, such as reciprocity and the presentation of similar interests. However, fears of not controlling these possibilities in a socially acceptable way may hinder the use of SNSs. Moreover, the common frames for interaction that friends maintain, built in decades-long relationships, are perceived as difficult to manage in a new environment.

Constructing a common frame for interaction: through social events to social networking sites
We borrow the concept of a common frame for interaction from Goffman (1974) to refer to how, in a long friendship, the ways of behaving toward each other as friends are negotiated and learned. This is especially salient in the case of older adults, because a friendship of long duration includes experiences of different situations with the friend. Through these experiences, common definitions for how to act together are formed:

"... the biggest part is that you've learned to know the person better and better in different situations."

It may be difficult to construct this kind of a common frame in mediated communication for older adults who are not aware of, or do not want to comply with, the norms of communication set by younger generations. When one cannot rely on a common frame when communicating with others, stable confidence in others is not formed. Without stable confidence, one does not want to interact when worried about breaking the norms for interaction. To design SNSs that are attractive for older adults would necessitate a possibility of building a common frame in which to interpret the actions of other people on the site.

To alleviate this concern, the technology could be introduced in a more welcoming environment, namely, a physical real-life social context familiar to the age group such as a computer course or an informal computer clubhouse. A club setting can also be an educative environment in which learning and socialising are inherent. Also, an educative atmosphere would directly address the computer skill issues brought up in our study.

In arranging the social events or spaces for older adults, it could be suggested that the participants "bring a friend" with whom the common frame of interaction is already constructed. The event itself and the SNS used would become a social object binding the friends and other attendees together. In other words, the course, the technology, and the site would be part of the common frame among all attendees. Also, using the SNS with a friend would facilitate extending that friendship's common frame into mediated communication. In other words, sitting side by side with a friend and learning to use a SNS could lower the threshold for transferring part of the "old" social interaction into the "new" mediated interaction.

The attendees' tasks should involve the sharing of objects related to the common interests of the pair of friends and among all participants in the event (or members of the club). The shared objects might be photos, choir notes, flowers grown, recipes for favorite foods, or jokes. The end result would be that the SNS would have a meaning as a new social object building on existing ones.

Clear and simple privacy management
To implement the activities discussed above, special attention should be paid to management of privacy. Our participants did not appreciate publicity, as younger generations might, but instead regarded

telling details of one's life to others as boasting. SNSs were perceived as places for people who seek publicity and superficial relationships. Blogs, for example, were associated with politicians or celebrities, not ordinary people. Self-presentation arose as a critical issue also in discussion of attributes of users of an SNS in general. It seems that intentional self-presentation is not socially acceptable among older adults:

"If someone of my age put her photo on the net, I would think she is a little silly and empty-headed."

This implies that active use of services where self-presentation appears to be a focal activity might stigmatise.

According to our findings, if personal details about a friendship were shared with everyone it would erode the friendship. Therefore, privacy concerns kept our participants from discussing online the topics they most liked to discuss with their social networks. They wanted to discuss these favorite topics through non-internet media, since they did not regard the internet as safe to use. Other media are preferred, because with close friends, the participants felt no need to discuss superficial topics such as "Hi. It's a nice day today, isn't it?" or could not see any sense in informing others of what they will do in their private lives. One said,

"Why would I write there something like 'well, I'm planning to go to have lunch at the shopping centre'?"

The participants spoke about two general ways in which privacy concerns might be realised. First, the male participants were worried about hackers having access to almost any content on the internet, whereas those in the female group thought that their own level of skills might be harmful for them. They were worried about the fact that they might unintentionally publish private content by hitting the wrong key. Therefore, the functions for controlling the recipients of the content published should be clear and simple, perhaps even at the cost of sophisticated and flexible configuration options and mechanisms.

In addition, promotion of disclosure of information should perhaps be rethought. Often SNSs promote publicity and openness and therefore, privacy settings are by default set for disclosure rather than privacy. Our findings suggest that the other way around could make an older adult user feel more in control. For example, when sharing "blog posts" or photos, an older adult could feel more comfortable if required to choose the

recipients from a list of actual names before disclosure rather than having general pre-defined privacy settings that automatically affect all communications.

Clear and rigorous privacy management would allow control in sharing of content and maintaining relationships without the feeling of breaking self-disclosure-related norms and hopefully enhance the sense of security from malicious third parties.

Implications for social networking sites for all ages

Our suggestions for an SNS for older adults have potential implications for SNSs for all ages. Older adults may be the ones who still dare to question the usefulness of technology, and we can interpret our findings from that perspective.

Popular SNSs have addressed the issue of how to build understandable privacy management mainly by providing flexibility and high granularity of configuration. Perhaps simplifying the models for privacy and disabling automatic disclosures of information would create better user experiences. On the other hand, unsophisticated and "conservative" privacy settings would not suit some users who are familiar with more complex mechanisms for managing one's private information. Nevertheless, our suggestion is that building an unsophisticated and simple privacy model could prove to be popular regardless of age.

Conclusions

The factors we found most hindering older adults in their use of SNSs were

- their lack of confidence in their personal computer skills in combination with concerns about malicious third parties using their personal information,
- fear of accidental social blunders in mediated social interaction through not understanding privacy settings and privacy management,
- incompatibility of their perceptions of social relationships with their preconceptions and assumptions about social networking sites, and
- the extension of interaction habits formed through very-long-term relationships to a new interaction environment was difficult.

To alleviate the barriers of extending interaction to SNSs in older adult life, we have suggested real-life social events for negotiating how to use the services initially in face-to-face settings. However, a key challenge remains in implementation of clear and simple privacy management options – potentially even at the cost of flexibility and configurability.

These actions are suggested as means of giving older adults the option to participate in mediated social interaction online through technology that better takes their life situations and attitudes into account. We hope this study will provide a step toward building successful services for older adults.

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PLAYING VIDEOGAMES
DOES TIME FLY?

This paper is a summary of "Time perception, immersion and music in videogames" by **Tim Sanders** and **Paul Cairns**. This paper won the Best Paper Award at the British HCI conference 2010.

Stop playing? I've only just started
When playing computer games, a commonly reported experience is that of immersion. This is understood to be the extent to which a player gets into the game but not in the sense of presence. That is, some games, most notoriously Grand Theft Auto, allow players to enter a fictional, virtual world. It is possible for players to feel "in the game" in the sense of actually located in that world. This is presence, or more precisely spatial presence. By contrast, it is still possible to get immersed even when games don't offer a virtual world for the player to enter: just think about Tetris or Bejeweled which are both considered to be highly immersive but are clearly 2D games in which there is no avatar or virtual representation of the player.

What then is immersion? Early on, our work on immersion tried to devise a measure that would help us to study immersion in more depth (Jennett et al., 2008). This resulted in the Immersive Experience Questionnaire (IEQ), which has 31 questions answered on Likert scales. Further analysis of this questionnaire suggested that there are five factors underlying immersion, which together constitute the immersive experience. These are: cognitive involvement, emotional involvement, real world dissociation, challenge and control. Real world dissociation (RWD) perhaps gives the most distinctive sense of immersion

being the loss of awareness of the world around you and increased focus upon the experience being offered by the game. This is not just obliviousness to the external world but in extreme cases also applies to players' internal physiological needs for food and going for a wee. The latter may appear to be laughable but in fact, has resulted in death due to kidney failure, though fortunately this is quite rare amongst gamers.

A much less extreme component of RWD is the loss of a sense of time. Not only have we had loss of time reported in our studies, e.g. Brown and Cairns (2004) but it has been reported in other studies of the gaming experience. Psychology has for a long time understood that time perception is a complex phenomenon and has developed a variety of methods for understanding how people perceive time. The goal of this work was therefore to link up the reported loss of time with actual changes in the perception of time whilst playing videogames. To do this we asked participants who played games in a laboratory setting to estimate their playing time. The results were not quite so simple as we expected. To understand the results, we first need to discuss how psychologists measure time perception.

What happens if watching a kettle boil is fun?
From the earliest days of psychology, time perception has been a topic of

interest. One thing that is immediately apparent is that what you are thinking about alters your perception of time. Old sayings such as "A watched kettle never boils" and "Time flies when you're having fun" show the colloquial understanding of this. Early work in psychology set out to understand these phenomena better. James (1957) set out two paradigms for studying time perception – the prospective and retrospective paradigms. In both paradigms, participants undertake an activity at the end of which they are required to produce an estimate of the duration of the activity. The difference between the paradigms is that in the prospective condition the participant is told beforehand that they will need to produce the time estimate, whereas in the retrospective paradigm they are not.

What becomes immediately clear is that the two paradigms produce different effects. However, unlike other areas of psychology, such as attention or decision making, there is not a clear theory of how time perception works under these paradigms, nor is there much in the way of strong, unequivocal evidence for what influences time perception. Block and Zakay (1997) have reviewed much of the existing literature on time perception. A conclusion from this work is that it appears to only be complexity that consistently affects time perception in both paradigms. Interestingly, though, complexity influences time perception

differently between the paradigms. In very simple terms, under the prospective paradigm, the more complex a task a person is doing, the more they underestimate the time. Conversely, under the retrospective paradigm, the more complex the task the more time is overestimated.

The prevalent theory based on this is that there are separate mechanisms underlying time perception in the different paradigms. In the prospective paradigm, people deliberately attend to the passage of time, potentially using an internal clock that a person attends to during the task. However, if the task is complex then people do not have the attentional resources to attend to their internal clock and hence underestimate the passage of time. In the retrospective paradigm, people are not deliberately attending to time. Instead, when asked to provide a time estimate, people look back across their memories of the task and use them to produce an estimate. The more memories there are, due to the richness and complexity of the task, the more time is perceived to have passed.

What then happens when a person is playing a videogame? Our hypothesis would be that in the prospective paradigm, a more immersive game may require a greater use of attentional resources and hence lead to people underestimating time as immersion increases. An alternative hypothesis would be that many games make use of repetitive elements that could provide an external mechanism for noticing time passing, such as leveling up, key pressing, and so on. Thus, as immersion increases and a person is more into the game, they may be more aware of these mechanisms and hence produce more accurate time estimates. There is a similar ambiguity for the retrospective paradigm with complex, immersive games providing rich memories leading to overestimation of time. Whereas repetitive game elements might make one memory much like another and lead to the underestimation of time. But given the common report of time loss, we would expect time to be underestimated somewhere along the line.

Oddly though, the few existing studies into time perception whilst playing games do not find this time loss. In fact, if anything, players seem to consistently overestimate the duration of play. For example, Tobin et al. (2010) found that players overestimated time of playing on durations up to 58 minutes long. It may be that the study was undermining the time perception with environmental features providing cues to time having elapsed. Or it may be that players have developed strategies for correcting their perception

of time knowing that they tend to underestimate the passage of time.

So if players are consistently reporting the loss of time, where are they losing it? We set out to produce two experiments that would rummage down the back of the sofa of videogames to find out where the time went.

"To stop the flow of music would be like the stopping of time itself"
The trick with the experimental design for our studies was to develop a manipulation of a videogame that would affect immersion but not affect complexity. This way, any changes in time perception would not be due to the complexity of the game, which we already know would affect time perception, but rather due to the immersive experience. Based on our previous studies, we knew that we could manipulate the immersiveness of a game by adding music to the game. Thus we set out to use music to manipulate immersion and hence time perception.

The game was a straightforward maze game. The objective for a player was simply to run around the maze and find the exit. We chose large enough mazes that players would not be able to find the exit within the time limit. Players then played the game for 3 minutes 23 seconds. In one condition, they listened to a piece of music taken from the game, The Legend of Zelda: Ocarina of Time, and in the other there was silence. Participants were further split into the retrospective and prospective paradigm conditions.

So did they lose time? Well, yes and no. In the retrospective condition, players underestimated time a little, but this is common in retrospective time estimation. Additionally, the estimates were unaffected by music. In the prospective condition, players, on average, provided accurate estimates without music but then underestimated slightly with music. Thus music was causing players to lose track of time. So we thought "Hurray!" But only briefly. On measuring immersion, it seems that the music was making players less immersed. A bit of digging and we realised that this was because players didn't like the music.

Undaunted, we tried again but this time found a piece of music that people liked and then repeated the experiment with a fresh set of participants. This time immersion did go up. Better yet, the results were in the same direction but stronger. The time estimate in the prospective condition was even lower! Music was causing players to fail to

track time when asked to and even more so when the music was likable.

So does reported immersion, which includes time loss, actually correspond to a loss of a sense of time? The answer is still unclear. What appears to be going on is that music is affecting both time perception and immersion. When the immersion is higher this seems to have a greater effect on time perception. But it's not the definitive answer we were looking for. Everything we have seen could be entirely due to music and not immersion. What we need is more studies to look at manipulating immersion in different ways and so get at the direct effect of immersion on time perception.

Is that the time? I'd better stop
There is no doubt that this is a complex area. This summer, I have been working with another MSc student, Mark Friend, just to see how different games affect time perception and if we can see any link between immersion and time loss. We can, but it still isn't simple. Generally, players of the two games BioShock and Hexic were overestimating the duration of play despite different durations and experiencing differing levels of immersion. In certain situations, players could produce more accurate estimations of time. But they never underestimated. This fits with other studies in the literature but it does not fit with the reported experience of players. So where do we lose time when we're playing videogames? I just don't know but do let me know if you find it.

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GETTING SERIOUS ABOUT
SOCIAL MEDIA

Ben Shneiderman of the University of Maryland offers strategies for increasing civic participation through social networking in a keynote address to the British HCI Conference at the University of Abertay, Dundee, September 2010.

Technology-mediated social participation is generated when social networking tools (such as Facebook), blogs and microblogs (Twitter), user-generated content sites (YouTube), discussion groups, problem reporting, recommendation systems, and other social media are applied to national priorities such as health, energy, education, disaster response, environmental protection, business innovation, cultural heritage, or community safety.

Fire, earthquake, storm, fraud, or crime reporting sites provide information to civic authorities, AmberAlert has more than seven million users who help with information on child abductions, Peer-to-Patent provides valuable information for patent examiners, and the SERVE.GOV enables citizens to volunteer for national parks, museums and other institutions. These early attempts hint at the vast potential for technology-mediated social participation, but substantial research is needed to scale up, raise motivation, control malicious attacks, limit misguided rumours, and protect privacy (**iparticipate. wikispaces.com**).

As national initiatives are launched in several countries, a coordinated approach towards increasing research and education on social media is essential. Clearly stated research challenges should have three key elements: (1) close linkage to compelling national priorities, (2) scientific foundation based on established theories and well-defined research questions (privacy, reciprocity, trust, motivation, recognition, etc.), and (3) computer science research challenges (security, privacy protection, scalability, visualisation, end-user development, distributed data handling for massive user-generated content, network analysis of community evolution, cross network comparison, etc.).

Potential short-term interventions include:

- universities changing course content, adding courses, and offering new degree programmes
- industry helping researchers by providing access to data and platforms for testing
- government agencies applying these strategies in pilot studies related to national priorities
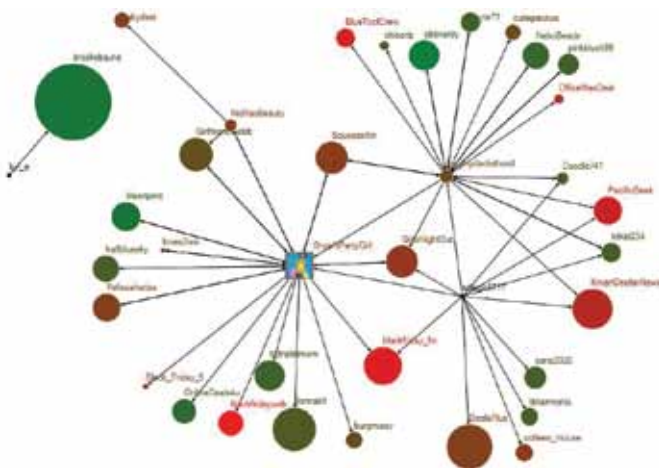
National Science Foundation workshops

Under support from the U.S. National Science Foundation (Jennifer Preece (Principal Investigator), Peter Pirolli (Co-PI), Ben Shneiderman (Co-PI)) workshops were organised in Palo Alto, CA (December 10–11, 2009) and Arlington, VA (April 22–23, 2010). The focus was on Technology-Mediated Social Participation (**www.tmsp.umd.edu**) which was intended to encompass civic efforts that would benefit local, regional, national, and international communities. The 60+ participants included a range of faculty and graduate students from a variety of disciplines, plus representatives of key corporations, government agencies, and non-government organisations. The groups developed six chapters that covered scientific foundations, infrastructure building, design strategies, health and wellness, e-government applications, and educational curriculum recommendations.

Theories and frameworks

A central challenge for researchers in technology-mediated social participation is to develop theories. These theories could be basic descriptive theories that report on the distinctions among communities and their activities.

A second form of theory is explanatory, which deals with cause and effect relationship that might help community managers understand how external or internal events impact activity. The third form of theory is prescriptive, providing guidelines for practice based on experience. The fourth form of theory is predictive, which allows quantitative measures that can be used to predict future activity.

The *Reader-to-Leader Framework* (see right) is an attempt to describe common paths for social media participation. Many users move from being a reader

I like the orderly displays in these figures from the book *Analyzing Social Media Networks with NodeXL.* They are packed with useful information, nice colours, strong graphic icons. They avoid the clutter of many network drawings and convey the sense of orderliness and insight that I believe is NodeXL's strength.

Above Figure 10.5.11: Twitter mentions network for "Black Friday." @ShopNPartyGirl and her friend/follow relationships are highlighted in red. Greener vertices have more tweets, larger vertices have more followers. @ShopNPartyGirl is represented in the canvas by her Twitter profile image.
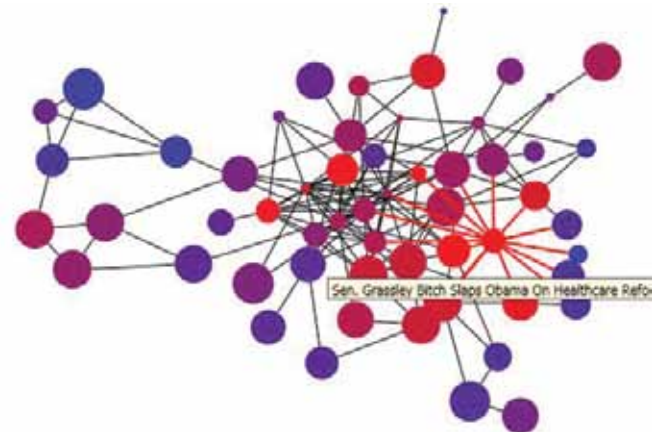
Right, top Figure 14.19: NodeXL map of YouTube Healthcare reform video network with colour and size responding to the number of comments and ratings for each video, respectively. The blue vertices, which are not frequently commented-on, received (in general) higher ratings than the more commented-on videos. This may be the outcome of contentious content that generated heated discussion but dissent that was reflected in lower ratings. The highlighted video has the highest betweenness centrality, making it a pivotal video in the online discussion.

Right, bottom Figure 14.20: NodeXL map of clusters of YouTube videos discussing healthcare reform linked by shared comments. With two exceptions (the yellow cluster reflecting opponents to the Administration health care plan, and the red cluster reflecting videos supporting the plan), most clusters do not portray contextual ties between the videos.

of online content to a contributor of user-generated content. They may start with contributing single edits, ratings, photos, videos, or posts, and moving on to contributing more substantive bodies of material. Collaborators work together over periods of weeks or months to make more substantial contributions, and leaders act to set policies, deal with problems, and mentor new users [1].

Tracking the process of contributing and collaborating is becoming a central task to understanding and influencing the development of social participation. Our efforts, supported by Microsoft External Research, have led to development of a free and open-source tool: Network Overview for Discovery and Exploration in Excel (NodeXL) [2]. It enables users to download networks from email, discussion groups, Twitter, Flickr, YouTube, and other sources, into Excel 2007/2010, and invoke analytic tools such as metrics, clustering, and filtering. Then users can display the results as a node-link diagram with rich control of visual attributes supported by strong filtering tools.
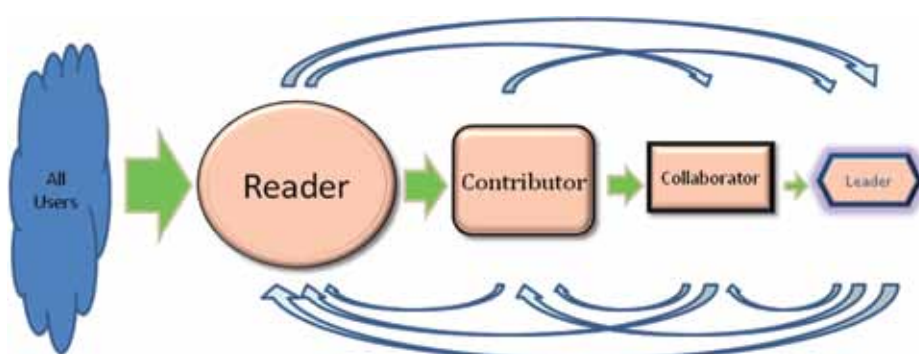
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2   Hansen, M., Shneiderman, B., and Smith, M.A., (2010). *Analyzing Social Media Networks with NodeXL: Insights from a Connected World.* Morgan Kaufmann Publishers.

25 YEARS OF BRITISH HCI CONFERENCES

This issue of *Interfaces* reflects on 25 years of HCI. It focuses on the 'now' by featuring the papers which received the Best Paper Award for the last two years. **Lynne Coventry** presents her own personal reflection on 25 years of British HCI conferences. It is by no means a systematic analysis and serves only to illustrate the changing nature of HCI over the years.

Some context for HCI

A lightning overview of the last 30 years shows exponential changes in the nature of the "computer" as it moved from its clean room, to the desktop, to the hand, to being embedded in a variety of other devices. In terms of storage, the IBM 3380 Direct Access Storage Device was introduced in June 1980. It had a capacity of 2.52 gigabytes with a data transfer rate of 3 megabytes per second. The purchase price at this time ranged from approximately £50,000 to £100,000. This required a trolley to move it around. Now you can carry more memory round your neck as a piece of jewellery or in your pocket, and it costs anywhere from £5 (depending on the level of ornamentation designed around the storage device). Phones have transitioned from a fixed line, one per household, to being an indispensable, individual belonging which no longer only facilitates phone conversation but also the internet,

GPS positioning and applications too numerous to mention. Satellite navigation has moved from military personnel to the civilian. Computer games have developed from Pong, Donkey Kong and Space Invaders. Firstly the memory, graphics and processing power vastly improved, enabling new interactions with the computer game, and more recently communications are facilitating global online game playing between individuals anywhere in the world. Games have moved from finger input to full body interaction.

Human–computer interaction continues to be shaped by the forces shaping the nature of computing. These forces include:

- Decreasing hardware costs
- Improved technology (larger memories, faster systems, and increased functionality)
- Miniaturisation of hardware
- Reduction in power requirements
- New technologies – packaging of computational devices in new forms
- Assimilation of computation into the environment (e.g., cars, kitchens, living rooms)
- Specialised hardware leading to new functions
- Improved network communication and distributed computing
- Widespread adoption of computers, from the initial non-professionals to across the lifespan and into developing countries (issues of accessibility, usability and appropriateness)
- Increasing innovation in input techniques (e.g., voice, gesture, pen)
- Wider social concerns ranging from improving access to computers and worrying about the digitally excluded to worrying about the social implications with the current use of technology by vulnerable individuals (e.g., cybercrime, privacy security, trust, information overload and lack of productivity)

One consequence of these changes is that computing systems have partially disappeared into the environment and become much more intimately associated with a person's activities, leading to increasing questions about managing privacy.

The changing nature of HCI?
Human–computer interaction (HCI) as a discipline emerged in the early 1980s. Initially established as a specialist group in computer science, HCI rapidly expanded to incorporate perspectives from many other disciplines.

Until the late 1970s, the only humans who interacted with computers were

Computer games have developed from Pong, Donkey Kong and Space Invaders.

computing professionals, scientists and to some extent engineers. In the 1980s the personal computer became the disruptive technology of its time. First the Xerox Star, an innovative, graphical interface but a commercial flop, followed closely by Apple's Lisa and then Microsoft's Windows. Personal computing enabled everyone in the developed world to be a potential computer user. However, as functionality increased and demographics of computer users expanded, the problems of understanding user requirements and usability, for those without the formal training in computing, became an issue.

A number of rapidly developing fields came together at the beginning of the 1980s. They recognised that computing needed to better understand and empower its users to continue to develop, and created a highly interdisciplinary approach to HCI. Firstly, HCI was of interest to people working in the developing field of cognitive science. Cognitive science is the interdisciplinary study of mind and intelligence, incorporating philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology. It developed theories of the mind based on complex representations and computational procedures.

Software engineering emerged as a discipline, presenting an approach to managing the growing software complexity. This introduced a focus on non-functional requirements, including

usability and maintainability. Later on it was to incorporate non-linear software development processes that relied heavily on testing, including user testing (i.e. user centred design). Computer graphics, communications and information retrieval were also rapidly expanding areas of research.

Ergonomics, which had developed many techniques for empirical analysis of human–system interactions in control domains such as aviation and manufacturing, came to see HCI as a valuable and challenging domain in which humans were regularly faced with problems to solve and use errors could be catastrophic.

In 1985 the first British HCI conference was held, bringing together researchers from throughout Europe. The origins of the area are reflected in the titles from this conference. For example:

- A Path Algebra Support Facility for Interactive Dialogue Designers
- The Use of Rule Induction: A Knowledge Acquisition Technique for Expert Systems to Interpret HCI Experiments
- User Modelling Techniques for Interactive Systems
- Modelling User Behaviour with Formal Grammar
- A Model of How Program Designers Behave

and trust as well as cross-cultural design issues and the diversity of users and uses.

- A Visuo-Biometric Authentication Mechanism for Older Users
- Rich Media, Poor Judgement? A Study of Media Effects on Users' Trust in Expertise
- Engagement with an Interactive Museum Exhibit
- Fit for Purpose Evaluation: The Case of a Public Information Kiosk for the Socially Disadvantaged
- Building Usability in India: Reflections from the Indo-European Systems Usability Partnership
- Researching Culture and Usability – A Conceptual Model of Usability

2010 saw an increase in the diversity of papers, and its focus is on novel interaction and gaming

- Community Generated Location Based Gaming
- Foot Tapping for Mobile Interaction
- Being Safety Smart: Social Issue Game for Child Protective Behaviour Training
- Harnessing Player Creativity to Broaden the Appeal of Location Based Games
- Time Perception, Immersion and Music in Videogames
- Designing Social Networking Sites for Older Adults

So where is HCI now?

Although the original academic home for HCI was computer science, and its original focus was on work-based productivity applications, it is difficult to still regard HCI as a specialist interest group for computer scientists. HCI has broadened and diversified, making it difficult to define its boundaries. It expanded from individual and generic user behaviour to include social computing, creativity, accessibility for the elderly, understanding the role of HCI for the developing world and domains such as health. It expanded to encompass visualisation, information systems, collaborative systems, mobile systems, ubiquitous computing and many areas of design.

The original technical focus of HCI was on the concept of understanding what the user wants and needs. This concept was originally articulated naively as ease of use and ease of learning. However, this simplicity hides the complexity of approaches that have been utilised to achieve this understanding, and the diversity of domains, problems and people that this interdisciplinary field addresses. The studies have progressed from simple ease of use to understanding

By 1991 the HCI community were exploring the role of multimedia in the computing experience and trying to understand how to best design this new technology. This was reflected in the proceedings:

- Wet and Sticky: Supporting Interaction with Wet Paint

There was also increasing interest in evaluation methods:

- Signature Tasks and Paradigm Tasks: New Wrinkles on the Scenario Methodology
- The Use of Focus Groups as an Evaluation Technique in HCI

There was still an interest in its cognitive science routes with papers such as:

- User Modelling the Task Oriented Modelling (TOM) Approach to the Designer's Model

And software engineering:

- Human Factors and Structured Software Development: The Importance of Software Structure

By 1995 there was still some interest in formal specification:

- Formal Specification and Verification of CSCW using the Interactive Cooperative Object Formalism

However, interest was increasingly diverted to new topics such as user requirements and usability, design and understanding cyberspace:

- "I'll know what I want when I see it." – Towards a Creative Assistant
- Applying a Structured Method for Usability Engineering to Domestic Energy Management User Requirements
- Red Faces over User Interfaces: What should Colour be used For?
- Cyberspace: The HCI Frontier? A New Model in Human–Computer Interaction.
- What's the Flaming Problem? or Computer Mediated Communication – Deindividuating or Disinhibiting?

2000 saw increasing interest in usability and evaluation methods:

- Do Users Always Know what is Good for Them?
- How Effective are User Studies?
- User Involvement in the Design of HCIs
- Low Cost Remote Evaluation

2005 saw increasing interest in security

user requirements such as fun, well-being, inclusion and self-actualisation. Applications no longer just support work and productivity but playing, gambling, creating, and managing our everyday communications, our personal memories and potentially very private interaction. The focus moved from work applications to commerce, health, communication, gaming and learning. It moved from very basic WIMP interfaces to a patchwork of interaction techniques – ubiquitous, multi-modal and mobile. Now with context-aware systems we appear to be full circle back to its roots in artificial intelligence and understanding what the user is trying to achieve.

The HCI community, and by association the conference, can be considered a victim of its own success. For the first few years papers predominantly represented its core in computer science with influences from cognitive science, but as it became less focused with respect to core concepts and methods, more people found a common interest and joined the HCI community. For instance, in the 1990s we saw more designers join the community. However, after a few years the different communities of interest splintered off and started their own conferences. User experience design and interaction design are examples of exports from the HCI community. Conferences with initial roots in HCI include CSCW, Ubicomp, mobileHCI, DIS, ACCESS, Creativity and Cognition, and Cyberpsychology. The actual HCI conference has grown very little over the 25 years, in terms of participants; however, the range of the topics addressed and the subgroups incubated by the HCI community continues to grow.

Now you can carry more memory round your neck as a piece of jewellery or in your pocket

The future

The question to answer for the future is – if everyone and everything is connected to the internet what are the potential uses and misuses of this interconnectivity, and what information, tools, policies and procedures will we need to understand and manage this world? My own thoughts are that context-aware systems will increase and take us back to our roots in AI and user modelling. That privacy, security and trust will become bigger issues. That we will revisit speech interfaces as a result of increasing use of mobile devices in new domains. That we must start to manage the mountain of "information" that we have made. We need to consider the implications of information expiration, question the need for censorship and moderation, and build the required tools for managing these issues.

The "any place, any time, any where, any one" level of connectivity has led to a myriad of communications, interruptions and information we must all deal with on what seems like a constant basis. The increasing use of social networking sites has vast potential for increasing social participation in the community but it also has the potential for negative consequences. Free speech and access to people can be misused.

The HCI community should not be frightened of its interdisciplinary nature. It should be proud to be the incubation ground for new research that comes from the assimilation of ideas from many different disciplines. It should take pride in seeing its "babies" develop, mature and go off on their own. It should continue to progress as it has done for the last 25 years, reflecting the nature of the technology, its applications and its users through the years. We are starting to lose sight of the theories and science that grounded this discipline in the early days and perhaps it is time to reflect on this and ensure that HCI still has strong foundations to continue to grow over the next 25 years.

HCI 2011

HCI IN THE TOON
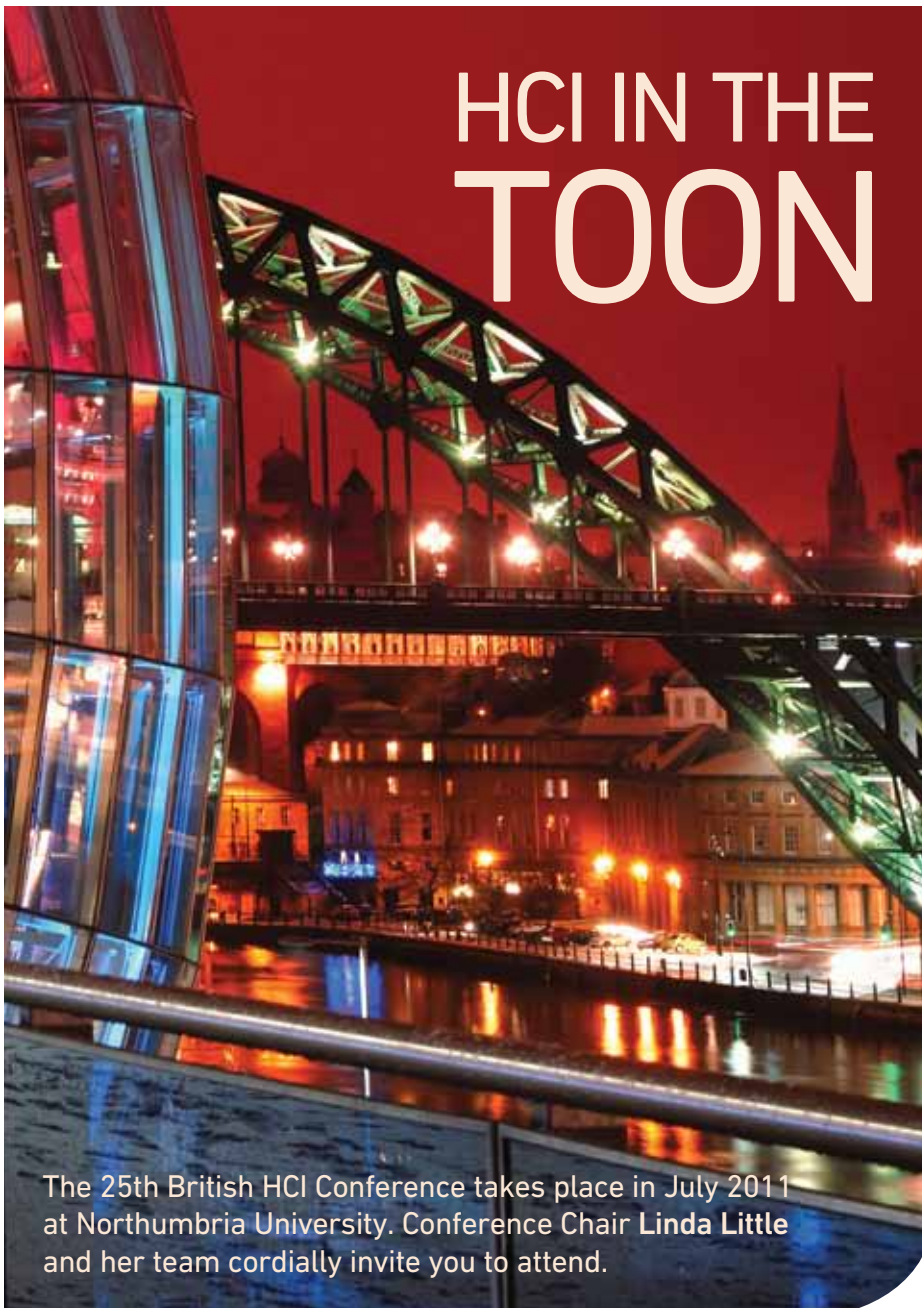
The 25th British HCI Conference takes place in July 2011 at Northumbria University. Conference Chair **Linda Little** and her team cordially invite you to attend.

If you want an exciting date for your diary, read on! 2011 is BCS Interaction's 25th conference and an inspirational event needs a setting to match. Northumbria University will host and help celebrate the 25th conference. This annual conference has brought together people from a wide variety of countries, disciplines and backgrounds but who all share common goals – understanding, designing and developing theories and systems for Human–Computer Interaction.

Health, Wealth and Happiness
The conference takes place at Northumbria University, Newcastle upon Tyne, UK, from 4th to 8th July. The Psychology & Communications Technologies (PaCT) Lab, Department of Psychology, School of Life Sciences, is proud to host this conference with the support of the Culture Lab at Newcastle University. In addition to the usual wide range of topics, we have the special theme "Health, Wealth and Happiness". This theme reflects the celebration of the 25th anniversary of the conference and a key research theme at Northumbria University. We would like to celebrate how the design and use of technologies continue to enhance overall well-being.

Friendly interaction
This conference will be one of 'Interaction'. We envisage a place where not only the papers describe research, methods and approaches in HCI but delegates will continue the discussions around these topics. The location is well known for its friendliness and so the perfect place and opportunity to meet new and old friends and collaborators, discuss and generate new ideas and take British HCI onwards and upwards.

Delegates will receive a warm welcome at Northumbria which is situated in the heart of the City and renowned for excellence in teaching and research. Over lunch on Thursday the Culture Lab, Newcastle University, will open their doors to allow delegates to view and interact with current and future systems in the demo and design extravaganza. The conference dinner will be held at the Discovery Museum where you can find out about life in Newcastle past and present. The events and activities on offer at this conference make it one not to be missed.

Vibrant culture
Newcastle is fast building a reputation for being one of the most culturally vibrant destinations in Europe, and now seamlessly boasts a world-class transport infrastructure, extraordinary Georgian architecture, restaurants, bars, shopping, theatres, live music, world-class festivals and stunning modern icons such as The Angel of the North, The Sage Gateshead and Gateshead Millennium Bridge. Sport also plays a major role in Newcastle life with its famous football club, Great North Run, and the Eagles basketball team to name but a few. Delegates will have the opportunity to visit all these iconic places and view Team Northumbria's fantastic new home, Sport Central, which is attached to the main conference facilities.

As Chair and along with colleagues in the PaCT Lab, Northumbria University, Newcastle University, The Toon (Newcastle City), the programme committee and the BCs Interaction Executive Committee, we hope you will attend next year's conference and help celebrate 25 years of British HCI. We'll even have interpreters on hand if anyone has trouble with the lingo and finally 'wuh lyeuk forward tuh seein yee next yeor in the toon'!

DATES FOR YOUR DIARY

Conference **4–8 July 2011**

Submissions for full papers and workshops are due on **21st January 2011**. All other submissions are due on **18th February 2011**.

For more information don't forget to visit **www.hci2011.co.uk**

CALL FOR PAPERS

INCLUSIVE DESIGN

Dianne Murray calls for papers for a Special Issue of *Interacting with Computers* on Inclusive Design in the Context of Social Media and Emerging Technologies.

Recently we have witnessed an increasing proliferation of new digital technologies such as online social networking sites, micro-blogging and virtual worlds, which has changed the way we communicate and interact with each other. Studies are being conducted in order to investigate these interesting socio-technological phenomena.

To date, little research has been published on inclusive design in the context of social networking and emerging technologies. These technologies have the potential to impact positively on the lives of a wide range of people including older people, disabled people, and people from different social and cultural backgrounds. For example, it is claimed that the fastest growing demographic of the social networking sites is women over 55 years old (Facebook Global Monitor, 2009).

With this special issue, we aim to analyse existing and novel ways in which these audiences use social networks and emerging technologies. We ask questions such as: How can these technologies be designed to be more inclusive? What motivates people to engage with these new technologies? What are the effects on people's behaviour, attitudes and social interactions? What methods can be used to analyse these interactions?

This special issue of *Interacting with Computers* invites contributions from the academic community, industry and design practitioners. We welcome research papers that trigger discussions based on investigations, case studies and overviews in this area.

Possible topics may include (but are not limited to):

- Inclusive design issues related to social media and emerging technologies
- Concepts, methods and frameworks aimed at motivating people to participate
- Case studies of various social and cultural contexts
- The impact of participation on society and culture
- Different user groups' engagement with social media
- New technologies such as virtual worlds and augmented humans
- The application of these technologies in a variety of settings (e-democracy, communities, sustainability and environment, etc.).

Submission details
Please submit a 300–500 word abstract to Dr Jim Ang (**c.s.ang@kent.ac.uk**) no later than 28th January 2011. Please include full contact information and a biographical note (up to 75 words) on each of the authors.

Important dates

28th January 2011 Deadline for abstract submission
25th February 2011 Announcement of results and full paper invitations
29th April 2011 Submission of full papers
24th June 2011 Response to authors
2nd September 2011 Final submission

Editors
Jim Ang, **Ania Bobrowicz,** School of Engineering and Digital Arts, University of Kent
Panayotis Zaphiris, Department of Multimedia and Graphic Arts, Cyprus University of Technology
Ben Shneiderman, Human Computer Interaction Laboratory, University of Maryland

ICT ACCESSIBILITY
PAST, PRESENT AND FUTURE

As the world moves towards digital exclusivity, **Peter Abrahams** questions awareness of the importance and accessibility, legislation and acquisition of the skills required to achieve accessible ICT.

ICT Accessibility is important today. But will it be important in five years' time and what will it look like? What should organisations that are involved, interested or dependent on ICT Accessibility be planning for over the next five years?

Firstly, a short definition of ICT Accessibility to ensure that we are all on the same page. The international standard ISO 9241-171:2008 (*Ergonomics of human–system interaction – Part 171: Guidance on software accessibility*) defines accessibility as:

Usability of a product, service, environment or facility by people with the widest range of capabilities.

The term "widest range of capabilities" is really a politically correct way of saying "including people with disabilities".

This article will use a slightly more limited definition:

ICT for people with disabilities including : vision, hearing, speech, muscular-skeletal, learning and ageing.

Ageing is included not because it is a disability in its own right but because as we age we will tend to become less able through diseases such as Parkinson's or Alzheimer's or failing eyesight or hearing.

To try and answer the questions this article will look back five years, look at the present and then extrapolate five years into the future.

ICT Accessibility is a complex intertwined area so the discussion will be based around the following questions:

- How important is it for an individual to access digital information?
- What is the impact of laws, legislation and standards?
- Are decision makers aware of the requirements and benefits?
- Do the various professionals have the implementation skills?
- How does technology help or hinder?

How important is it for an individual to access digital information?
This is the key question that influences changing views on accessibility.

2005
Primary sources of information and services were offline: paper, telephone or face-to-face. In some cases alternative formats were offered, for example Braille or large print. Some basic information (brochureware) and some bleeding edge services were available online.

The majority of the population were not regular users of the Internet. People with disabilities had access to the information and services they needed offline and access to digital information was not that important. However, there was an awakening to the potential benefits of access to digital information, especially amongst those with vision impairments who could access such information through screen readers rather than being dependent on the information being transformed into another format.

2010
Digital is the preferred channel for most providers: how often do you hear or see "for more information go to our website"? This implies that the information is on the web but not available in any offline format. Better service (or price) is now provided via online shopping, banking and travel than is available face-to-face or via the telephone.

In particular there is a strong push in the public sector towards e-government as a way of providing better services more efficiently; hardcopy documents and

forms will continue to be provided but only grudgingly.

Some providers have gone the next step, with information and services only available online: Amazon, iTunes, EasyJet, comparison websites, etc. Where possible the product has also gone digital: music and electronic books. We are seeing the slow death of printed books; for example Amazon now sell more electronic than paper versions of some titles and the Oxford University Press has announced that it is not going to produce another printed version of the Oxford English Dictionary, which will now only be available online.

The other major area of push towards the need to access online is the meteoric rise of social networks of all sorts.

Lack of access to digital information, services and products is now serious enough to have a name, 'the Digital Divide'. Those on the wrong side of the divide are now disadvantaged but can still survive.

According to the Office for National Statistics about 1 in 5 UK adults are not online. This group includes people who are old, poor, or lack the necessary skills, and also a small group who wish to remain offline.

The British Computer Society (BCS) has just published a report that shows that access to IT makes people happier. Not only does it enable people to do things better but it also improves their view of their quality of life.

Unfortunately some people with disabilities find themselves on the wrong side of the divide, even though they are keen to be on the right side, because the information, services and products are not provided in an accessible form.

2015

By 2015 the trend from offline to digital information, services and products will be complete. Anything that can be provided digitally will be digital by default and will only be available in other formats by request, if at all, and probably at a premium.

By this date anyone on the wrong side of the divide will find it very difficult to carry on as a member of society. They will lack access to basic government-supplied services, most commercial services such as insurance, banking, many retail outlets, and all electronic social networks.

There will be pressure from a new group, "the recently old". This group will have been using digital channels for some years and will be furious if they cannot continue to do so because of illnesses of old age.

As the digital divide closes down it is essential that people with disabilities are not left on the wrong side through no fault

of their own and therefore everything digital needs to be accessible.

It would not be overstating it to say that by 2015 access to digital information will be considered a basic human right.

What is the impact of laws, legislation and standards?

2005

Legislation existed in many countries relating to disability, including the UK Disability Discrimination Act 1995 and the US Rehabilitation Act 1973 (and in particular Section 508 1998). These laws were either limited in relation to ICT or only relevant to government; they also seemed to lack teeth. They did not have a major impact on the accessibility of most ICT systems.

Guidelines also existed: the W3C developed guidelines for web accessibility, the *Web Content Accessibility Guidelines* (WCAG 1.0) 1999, and the British Standards Institution (BSI) published *PAS 78: Guide to good practice in commissioning accessible websites* in 2006.

At this time it was not clear if the legislation applied to ICT and if it did whether it only applied to specific parts of ICT: did it apply to all websites, or did it just apply to public sector organisations?

Because of this confusion the guidelines and guides were not enforced by legislation. This meant that most webmasters and their organisations were either unaware of them or ignored them.

2010

In the last year or two, case law has made it clear that all areas of ICT are covered. Probably the most publicised example is the case against Target (a large US retail chain). An individual sued Target because its website was not accessible and therefore he was getting a poorer service than members of the able-bodied community. It took at least two years to go through the courts. In the end it was agreed that the website had to be accessible, Target had to pay out compensation to the individual and also to a group who took out a class action, and Target had to fix the site within a given timescale. The total cost to the business came to more than $10M. Despite this, there is still a lack of awareness amongst many business decision makers and plaintiffs are still put off pursuing claims because of the effort involved and potentially small returns.

In 2010 eBay announced changes to their systems to support users of screen readers. There were good moral and financial reasons for implementing the changes, but it can be assumed that the possibility of legal action also encouraged

their implementation.

There are still cases going through courts for example Donna Jodhan v the Canadian Government. The number of cases going to court is likely to decrease as organisations cry *mea culpa* rather than spend money on legal support for a case they are likely to lose.

2015

In 2010 several acts are going through the US Senate, Mandate 376 Phase 2 is progressing through the EU, the United Nations Convention on the Rights of Persons with Disabilities has been ratified by most member states, rules and regulations are being passed through many other governments. All of these will have had a major impact by 2015.

By 2015 legislation across the world should be clear and have sufficient teeth so that it cannot be ignored. As it cannot be ignored any relevant person (manager, procurer, technician, user) will be aware of the legislation and the importance of accessibility.

Are decision makers aware of the requirements and benefits?

ICT systems will only be fully accessible if accessibility is built in during all phases of implementation. This will happen if the decision makers dictate that it should. Ideally the edict should come from top management but it could be at the level of procurement or a highly motivated development manager.

2005

By 2005 most decision makers were aware of the need to provide physical access to people with disabilities, most obviously users of wheelchairs. This was certainly true in the UK and North America but may not have been so common in some other parts of Europe and the world. The decision makers were aware because the laws were clear and because the problem was easy to understand; a client in a wheelchair at the bottom of a flight of stairs leading to their building was not a photo-call that a CEO wanted to deal with.

The same could not be said about ICT accessibility. Firstly the law was not clear and had not been tested. But also the issue was not so easy to understand or even be aware of. If the issue was raised the initial reaction was "how can blind people use computers", not "what has to be done to our systems to make them easy to use by people who are blind?".

The users were only beginning to push for ICT accessibility, because access to ICT was less important and because alternative formats such as Braille and large print were the main requirement.

2010

Today the situation is not very different from 2005, with most decision makers still not being aware of the need for accessible ICT. The biggest improvement has been in the public sector where legislation has made the requirement clear. In the US, Section 508 makes it mandatory for government organisations, and in the UK the push to e-government and the Disability Equality Duty have raised the awareness significantly.

The commercial sector is only just beginning to understand and be aware through court cases such as Target and by major organisations, most recently eBay, realising the importance of accessibility and going public with the changes they have made and the benefits to their clients and to their organisations.

The decision makers are also becoming more aware because of the noise being generated by disabled users. People are complaining when systems are not accessible and these complaints are beginning to percolate up to those who can instigate the changes.

2015

By 2015 most decision makers will be aware of the need for accessible ICT; this greater awareness will be driven by several factors:

- Legislation will have been extended; given more power and written to explicitly include ICT.
- Disabled users will become more vocal.
- The ageing population will include users who expect to be able to access digital information and who will not accept that age related illnesses have removed that ability.
- The economic imperative to move towards digital information will highlight the need to make that information available to all.

The only question is, will this increased awareness always ensure that the systems are made accessible? There will still be a conflict between using the latest whizzy technology and the need to ensure accessibility.

Do the various professionals have the implementation skills?

Even if the decision makers decided that all ICT systems should be accessible it would not be possible if the professionals who were implementing it lacked the necessary skills. The professionals include the designers, coders, content creators, and testers.

2005

A small cohort of dedicated professionals was available to implement accessible systems, but they were the exception. Most professionals knew nothing about accessibility and were not interested in finding out. Professional education ignored accessibility, with tutors not understanding why it should be included.

2010

In 2010 the number of skilled professionals has grown significantly but is still a small minority of those involved in implementing and developing ICT. If there was a sudden drive to improve the accessibility of ICT then skills would become a real issue.

The only way to know if a system is accessible is to test it. Testing needs to be done throughout the project and should use automated checking tools alongside user testing. There are a growing number of professional testers who have the necessary skills to run the automated and user tests.

There are some good signs in the education field:

- Accessibility and user-centred design are now included as modules in many ICT courses, but they still tend to be add-ons delivered quite late in the schedule. Accessibility is still not built in as an inherent part of implementation.
- The BCS is reviewing accessibility across the whole of the organisation. One aspect is to look at the inclusion of accessibility in SFIAPlus, the IT skills, training and development standard. Inclusion of accessibility in the right places in SFIAPlus will have a significant long term impact on the development of accessibility skills.
- Middlesex University now offers a MSc in Digital Inclusion.

This trend in education should ensure that accessibility becomes business as usual in the next few years.

2015

By 2015 skilled implementers should be available and should be willing to keep their skills honed because of demands for such skills from aware decision-makers.

Technology – will Assistive Technology keep up?

There are two areas of technology that need to be considered:

- Assistive Technology: covers hardware and software that helps people who cannot see the screen well, or find it difficult to use a standard keyboard or mouse.
- The interface between the system and the user: drives screens, keyboards and pointing devices directly and needs to be accessible to the widest possible population, but it also needs to communicate with Assistive Technologies so that users of these technologies can access all the functions of the system.

2005

Speech recognition and text to speech were both available but, without being too disparaging, they were both fairly clunky and were only used by those who had no option. If you were blind text-to-speech was the main way you could get access to digital information. If you could not use a keyboard, voice recognition software did enable you to input text and control the computer.

Predictive text was originally developed as an Assistive Technology; users who could only type very slowly just had to type a few letters rather than a whole word or phrase.

There were a variety of alternatives to the standard mouse, ranging from bigger mice, to roller balls, through to controlling the mouse by winking an eye.

2010

The increase in processing power and significant advances in the software now mean that solutions that were clunky in 2005 are now so good that they are being used by people without any disability as they become a natural and efficient way to interact with ICT. This has led to some assistive technologies being built in to standard products. Examples include Voiceover text-to-speech on Apple products, and voice control in new cars: saying 'call home' whilst driving is much easier and safer than fiddling with any buttons.

Built-in touch technology has provided solutions for many people, for example those suffering from rheumatism or RSI, who cannot use a standard mouse.

Other alternatives to standard keyboards and mice are available but due to limited demand they are expensive.

2015

There will be new forms of AT: direct brain connections, wearable devices that will enable certain people to more easily control and access their ICT environment.

There will be a continuing improvement in the power available to AT, for example text-to-speech today tends to be fairly flat, and with more power it will be possible to include emotions and clearer pronunciation and intonation.

As the digital divide closes down it is essential that people with disabilities are not left on the wrong side through no fault of their own and therefore everything digital needs to be accessible.
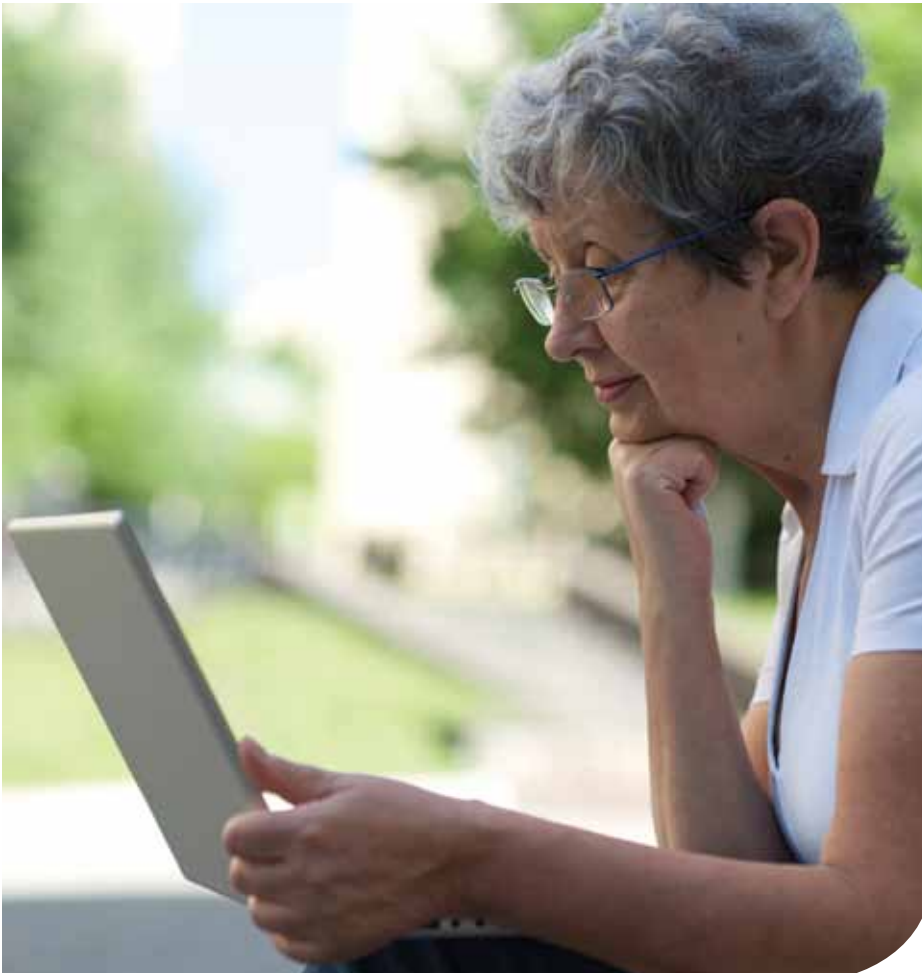
Technology – will the user interface be accessible?

2005
In 2005 most of the input and output was text and that meant that it was fairly easy for the Assistive Technologies to interact. Some ancillary technologies were causing problems; probably the biggest examples were Flash and PDF which did not always interface well to the Assistive Technologies.

There were also some web development tools that produced HTML that did not follow the W3C guidelines and was by definition not fully accessible. In fact it was difficult to find a tool that made it easy to produce accessible HTML.

2010
Significant strides have been made since 2005. Most development tools can now produce websites that are accessible, the issue now is that it is still up to the creator to use the tools in the right way, as the tools give very little assistance or guidance on how to create accessible sites. Adobe now provides PDF and Flash products that can be made accessible and has worked with the Assistive Technology vendors to ensure that the interface works.

Unfortunately there are other new technologies that have been developed that are not accessible, for example the standard YouTube screens are not accessible; so if YouTube clips are included in a website the site is not fully accessible to users of screen readers or users who cannot use a mouse. However, YouTube now supports closed captioning to support people who are deaf or hard of hearing. Developers of other widgets have not been aware of the accessibility issues and have created solutions that are not accessible.

Vendors are recognising the need for solutions in specific niches, for example Xenos Axxess is a tool to create accessible transaction reports (e.g. bank statements) from non-accessible print streams.

2015
It is impossible to predict all the new user interfaces that will be used in five years' time but 3D, interactive gestures and emotions are three areas that will be commonplace. Emotions will be supported with the Emotion Markup Language (EML) that is currently being developed by the W3C. The EML will be added to text and then a text-to-speech engine will be able to vocalise the text with the right intonation, or an avatar could make a suitable gesture or facial expression. The question with all of these interfaces is, will the system be able to interface to the user, directly or via a suitable Assistive Technology, so that it is accessible?

New and exciting interfaces will always be attractive to the marketing departments, as a way of being ahead of the competition. It will be an uphill struggle to stop them being used if they are not accessible.

The likelihood is that new interfaces will be developed to include accessibility features built in. However, there will be a need for continuous vigilance by the accessibility community to ensure that this is the case. The community will have to recognise the new interfaces early and put pressure on the developers, standards bodies and users of the technology to ensure that it is accessible from first delivery.

Summary
By 2015:

- Accessibility will not be optional; everyone who provides digital content, services or products will need to make sure that they are accessible.
- There will be moral, legal and financial imperatives for this to happen. In particular there will be pressure from users to be on the right side of the digital divide as a human right.
- Awareness will be much higher both at the user and the supplier end.
- Skill levels will have increased and should be sufficient for the demand.
- New user interface technologies will need to be accessible. Ensuring this happens will be the major challenge to the accessibility community.

STEPHAN SCHLÖGL: SKETCHING EXPERIENCES WITH LANGUAGE TECHNOLOGY

The use of Language Technology Components (LTCs), e.g. Automatic Speech Recognition (ASR), Machine Translation (MT) and Speech Synthesis (SS), has significantly increased in recent years as their performance has improved. Examples include speech-based interaction in cars that keep a driver's attention on the road, and the use of web-based translation tools such as *Google translate*[1] and *Yahoo! Babel Fish,*[2] which facilitate the understanding of text written in a foreign language.

As with applications based on a Graphical User Interface (GUI), software that uses LTCs also needs to be tested early in the design process. Whereas low-fidelity prototyping for GUI applications can be done relatively quickly and inexpensively, through sketches and wireframes, the development of prototypes evaluating applications that use LTCs can be both cost and time intensive.

One technique that has been used in the past to test software involving speech and language is Wizard of Oz (WOZ). Based on Baum's famous novel [1], a WOZ experiment uses a 'human wizard' to mimic some of the functions of a future system that currently do not exist or are too faulty. Since the technical requirements for such a prototype can be reduced to a minimum, the WOZ technique is particularly useful for early stage evaluations, and thus a good candidate for addressing this lack of low-fidelity prototyping methods evaluating the use of LTCs.

Yet, there are more things required than just pen and paper in order to somewhat realistically 'sketch' speech-based interaction. In the case of WOZ, for example, one needs to create a WOZ tool consisting of a wizard as well as a client component, design a certain dialogue to be tested, and define the machine-like behaviour that would represent the possibilities of a future system. In order to convey the same user experience there is also some sort of synthesised speech output or at least a distortion mechanism needed. In summary it might take a couple of days of programming, recording, and testing until a prototype is built that can be used to run experiments and therefore get feedback on the interaction. Compared to some quick sketches on a sheet of paper, this seems too much of an effort for low-fidelity prototyping.

My work aims to address this problem by coming up with a WOZ prototyping framework that is as easy and efficient to use as pen and paper. The designer should

only be concerned with the dialogue that needs to be tested. No programming work should be needed and technology components like ASR, MT and SS in various quality levels should be integrated through the click of a button. The goal is to make running WOZ experiments as easy as sketching screen layouts and therefore pointing to its qualities as a low-fidelity prototyping technique.

Why something new?

The question arises: Why do we need yet another prototyping tool to cope with the lack of WOZ support? Why can't we just use one of the standard prototyping tools that are out there and adapt it to test speech-based interactions? The main reason here is the imperfect nature of the technology to be tested. Traditional prototyping techniques have the goal of coming up with a rather flawless final product – iterative testing aiming for the identification of all the problems and uncertainties a user would eventually struggle with. Due to the fallibility of speech-based applications, however, a different prototyping methodology is required and needs to be supported by the tool. Of course, as designers and researchers we are always searching for an optimal solution. Yet, with speech this perfect solution in which the recogniser would understand every word, the MT would not make any translation errors and the speech output would be as natural as a real person, is rarely possible or might just require a disproportionate amount of resources. Therefore designers need to find solutions that might not be perfect but will be accepted by the users of the system.

What is my goal?

Knowing the restrictions of the domain, the goal of my work is to support designers and researchers by providing them with a tool that helps them to explore the acceptability and possibilities of using LTCs for different application scenarios. More concretely, I am aiming for a WOZ prototyping framework that allows for the generic creation of WOZ prototypes, which support the testing and evaluation of software applications using LTCs. In addition to creating this tool I want to understand and optimally support the task of the wizard. It was highlighted that playing the wizard is cognitively highly demanding [3] and that supporting this task helps to create a more realistic experiment setup. My goal therefore is to design a generic wizard interface that takes away some of the cognitive load and helps the wizard to be consistent and as machine-like as possible.

What has been done and what is next?

In order to create a WOZ tool that would meet the stated requirements, I use a User-Centred Design [4] development process. A first iteration has already been performed. The goal here was to get insight into the process of running WOZ experiments and to obtain a basic understanding of the task of the wizard. Furthermore it was sought to generally discover the domain of prototyping software applications using LTCs. Based on the literature and inspired by situations that were explored in previous WOZ studies I was able to define four experimental scenarios in which WOZ could be used as a prototyping technique. Elaborating on one of them I built a first WOZ tool and evaluated it. The evaluation took place in two steps.

First a formal usability study [2] was conducted in which four users were confronted with the task of the wizard and asked to interact with the provided wizard interface. A third person was observing them while I was sitting in a different room mimicking the test subject. In a second study I was acting as the wizard myself, using the wizard interface to interact with 12 real test subjects while being observed by a third person. The aim of this second study was to foster my own understanding of what it means to be a wizard and supplement this with the data collected during the usability tests.

Reflecting on the results of this first study I am currently working on an improved version of the WOZ tool, which will hopefully allow me to identify further aspects of the task of the wizard as well as the challenges of designing speech-based interaction.

1   **translate.google.com**
2   **babelfish.yahoo.com**

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1   Baum, L.F. (1900). *The Wonderful Wizard of Oz*. Hill.

2   Dumas, J.S., & Redish, J.C. (1999). *A Practical Guide to Usability Testing*. Intellect.

3   Salber, D., & Coutaz, J. (1993). A wizard of oz platform for the study of multimodal systems. In *Proceedings of INTERACT and CHI*, 95–96.

4   Travis, D. (2009). *The Fable of the User-Centred Designer*. Userfocus.

MY PHD

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

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

Dr Shaun Lawson, Reader in School of Computer Science, Director, Lincoln Social Computing (LiSC) Research Centre, University of Lincoln, UK

http://lisc.lincoln.ac.uk/shaun

INTERFACES REVIEWS

Pandora's Box: Social and Professional Issues of the Information Age

Pandora's Box is not for the faint hearted. It is a long and sometimes very intense journey through the social and professional issues that the information age has brought with it. It is aimed at students on computing degrees and anyone taking IT related modules. It would be suitable for any social scientists interested in the social impact of IT systems.

Context of technology

The book kicks off with a quick but interesting examination of the effect IT has had on the law and society. It raises the question of the digital divide and how starkly the haves and the have-nots are contrasted.

Having laid the arena for the book, chapter 2 then looks at how technologies have emerged and converged. It examines printing and the rise of the telegraph and the telephone, following this with an examination of broadcasting and the input of computing and the internet. IT is put into a context and its relationship to other forms of communication is made clear.

Entertainment and censorship

Chapter 3 moves on to digital entertainment raising the issues of stereotyping and health. The impact of the TV and computers on family life is considered and both the possible negative and positive facts discussed in a thought provoking way. Questions over regulating or censoring games are posed.

This leads naturally on to chapter 4 and an examination of censorship and freedom of speech on a wider scale and then again naturally enough into chapter 5 and sex and technology with a look at cyberspace, pornography and again discussion topics on censorship.

Chapter 6 looks at governance of the Internet and the interesting and sometimes perplexing question of who really owns the Internet. Again, this develops into questions over privacy and surveillance, which are examined in chapter 7.

Chapter 8 looks at warfare and how computers have changed the nature of the battlefield. It also examines the question of cyber terrorism and asks the question whether this is a real threat or not.

Chapter 9 looks at the effect of technology on health including an examination of self-diagnosis, robots in hospitals and prosthetics. The chapter concludes asking what it means to be human.

Downside of the internet

Chapter 10 looks at professionalism and chapters 11 and 12 return to the law and IT. Malware and computer crime are examined and the book carefully walks the tightrope that has to be walked between freedom of the individual and ensuring that the vulnerable are protected. The issues of copyright and intellectual property are discussed in some detail.

Chapter 13 looks at the downside of the Internet and mass communication – the communication none of us want – spam, cold calling, etc. Chapter 14 looks at education and online learning and chapter 15 examines what it means to live in the new digital society. There is an ethical analysis in the appendix.

This is a very large book covering a very large topic in considerable depth and doing it in some considerable detail. It is lively and interesting and has lots of stories and examples along the way to sweeten what could otherwise be quite difficult medicine to swallow.

It certainly isn't a book you can recommend for one of your one-semester units. There is no way that the majority of modern students with their 15-week units could ever put aside the time it would take to read this book. The Internet has brought us wonderful gifts but it has also made us want our facts quickly and in bite-sized pieces so it certainly couldn't be recommended to students to read on the bus unless they offset the cost of the book by dispensing with weight lifting at the gym – it is a big heavy tome.

However, it is the sort of book you could recommend to students in the first year, explaining that the ideas will be useful throughout their study and beyond when faced with dilemmas in their professional life.

Sound grounding

I enjoyed the style and the anecdotes along the way, the use of cartoons and interjections. It is an extremely impressive book and I can't help feeling admiration for the authors for putting so much together so thoroughly, and although I have made light of its size actually I'm impressed that they have managed to cram so much into the allotted space.

If students are interested in the implications of IT in their world then this book will give them a very sound grounding indeed. And as for me, I'm really delighted to have given this valuable shelf space – it is certainly a very worthy addition to my books.

Reviewed by Xristine Faulkner
London South Bank University, UK
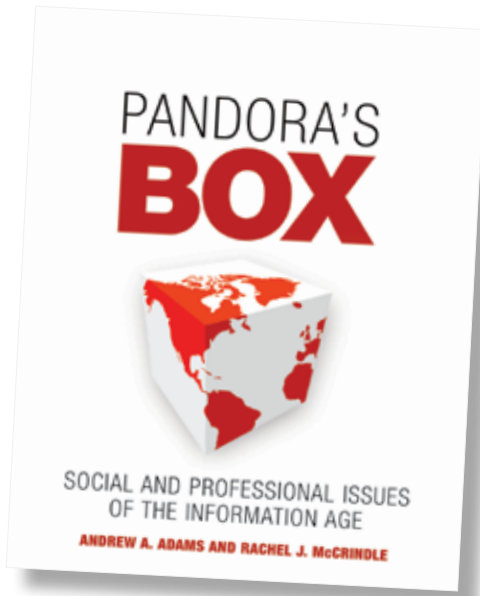
We have two book reviews for you in this edition of *Interfaces*. I hope you enjoy the reviews and find them useful.

Please contact me if you want to review a book, or have come across a book that you think should be reviewed, or if you have published a book. I very much look forward to your comments, ideas and contributions. If you would like *Interfaces* to include reviews on a particular theme or domain, then please also let me know. Many thanks.

Shailey Minocha, The Open University, UK
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ABOUT OUR REVIEWERS

Xristine Faulkner is a Reader (Assistant Professor) in HCI education at the Department of Informatics, London South Bank University, where she has lectured since 1990. She currently teaches HCI, usability engineering and social technology. She is the author of a book on HCI and one on usability engineering. Her research interests are in usability and social technology and she has authored several papers and articles over the years. Her current interest is in the area of social technology and especially interaction on forums. Xristine was a former reviews editor for *Interfaces* and remains an avid book reviewer. In her spare time Xristine is a keen photographer and likes gardening.

Dr Shailey Minocha is a Reader (Assistant Professor) in Computing in the Department of Computing at The Open University, UK. The focus of her research is understanding users' interactions with technology and investigating the factors that affect usability, user experience and user adoption of technology-enabled systems. Her recent research projects have involved investigating the role of social software and 3D virtual worlds in virtual team working, socialisation, collaborative learning and community building. She has also been investigating the role of 3D virtual worlds for non-teaching, research purposes, either where the behaviour of the participants becomes the object of study, or where the 3D environment is used to investigate or simulate other behaviours, such as wayfinding and navigation. Shailey's website has details of her activities and publications, **http://mcs.open. ac.uk/sm577**.

THE BOOKS

Pandora's Box: Social and Professional issues of the Information Age
Andrew A Adams and Rachel McCrindle
John Wiley & Sons
978-0470065532
2007

Mobile Technology for Children: Designing for Interaction and Learning
Allison Druin (editor)
Morgan Kaufmann
978-0123749000
2009

Mobile Technology for Children: Designing for Interaction and Learning

The foreword to the book states: "this book enlists its readers in a call for action to promote mobile technology development for child development". The book's editor, Allison Druin, further reinforces in the Preface and in the introduction this ethos of the book. The book is about how to make better mobile technologies for children. The book is organised in three sections involving 43 authors from 9 countries: The Landscape, Designing Mobile Technologies and Learning and Use. The first two sections have five chapters each while the third section has six chapters.
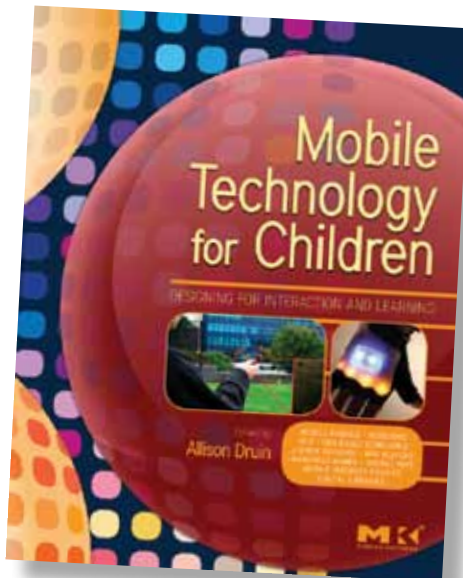
Landscape

The chapters in the Landscape section look at how mobile technologies are changing the way children learn, how the potential of mobile technologies for children can be harnessed, the various kinds of portable technology devices for children, the social impacts of mobile technologies for children, and the challenges for HCI researchers to cater for mobile disruption.

The second section of the book discusses a variety of design methods and case studies. The third section of the book presents case studies on the use of mobile technologies for various applications: to support literacy development, to enhance parent/child relationships, and to support well-being of children. The final chapter looks at the future: the technological advances in the mobile domain, possibilities for children and their learning, and the challenges for designers and researchers. This final chapter also highlights the role of children as co-designers and evaluators in the design process.

'Connecting to You'

Each chapter in the book concludes with a helpful section titled 'Connecting to You' which presents a bulleted list of the key points of that chapter. Each chapter has a comprehensive list of references (books, journal/conferences papers and also links to web resources).

The book inspires the reader to investigate the opportunities and challenges of applying mobile technologies to advance children's learning. The book is international in its outlook and raises the issues of supporting children's education in the developed and developing countries. It highlights that mobile technologies should be designed to suit the contexts, culture and requirements of children in their contexts. Although each of the chapters on its own is interesting and raises research issues and challenges, the book on the whole, and in fact, each of the three sections of the book, don't give a cohesive feeling, or a sense of being an integrated whole. Underlying themes from each of the sections don't emerge, and there is little or no connectivity between the individual chapters. However, the book is novel, engaging, and the only resource that brings together research and researchers in the area of mobile technologies for children. It will be a useful resource for HCI academics and researchers, and will also help to inform policy makers involved in education for children.

Reviewed by Shailey Minocha
The Open University, UK

INTERACTING WITH COMPUTERS

Inclusion and Interaction

The last issue of *Interacting with Computers* for 2010 is Volume 22(6), a Special Issue on the topic of 'Inclusion and Interaction: Designing Interaction for Inclusive Populations with Products Containing Computer Technology', edited by Dr Patrick Langdon and Professor Harold Thimbleby. An overview article by the two editors presenting a case for a synthesis of inclusive design approaches with computer science and ICT precedes seven selected papers which address a broad variety of issues relating to Inclusive Interaction. Topics include: developing models of cognitive interaction for analytical inclusive design evaluation; inclusive design applied to gesture recognition; analytical evaluation of interfaces in the context of smart homes; investigating multimodal interaction as a strategy for including older users; the use of design processes for encouraging older adults' social and physical activities using play; the use of diversity and personas in an approach to promoting uptake of inclusive design in industry, and ways of assessing current trends and considerations in influencing technology adoption by older adults.

- Belkacem Chikhaoui, Hélène Pigot
  Towards analytical evaluation of human machine interfaces developed in the context of smart homes
- Anja B. Naumann, Ina Wechsung, Jörn Hurtienne
  Multimodal interaction: A suitable strategy for including older users?
- Jörn Hurtienne, Christian Stößel, Christine Sturm, Alexander Maus, Matthias Rötting, Patrick Langdon, John Clarkson
  Physical gestures for abstract

concepts: Inclusive design with primary metaphors
- Natalia Romero, Janienke Sturm, Tilde Bekker, Linda de Valk, Sander Kruitwagen
  Playful persuasion to support older adults' social and physical activities
- Ian Hosking, Sam Waller, P. John Clarkson
  It is normal to be different: Applying inclusive design in industry
- Vicki L. Hanson
  Influencing technology adoption by older adults
- Patrick Langdon, Umesh Persad, P. John Clarkson
  Developing a model of cognitive interaction for analytical inclusive design evaluation

There are also six regular papers in this issue.

2011

The first issue of 2011, Volume 23(1) will contain the following papers, in addition to the annual thanks to all the referees who have worked so hard for the journal during 2010.

- Ramón Hervás, José Bravo
  Towards the Ubiquitous Visualization. Adaptive User-Interfaces based on the Semantic Web
- Javier A. Bargas-Avila, Sébastien Orsini, Hannah Piosczyk, Dominic Urwyler, Klaus Opwis
  Enhancing online forms: Use format specifications for fields with format restrictions to help respondents
- Gordon Baxter, Ian Sommerville
  Socio-technical systems: From design methods to systems engineering
- Paul van Schaik, Jonathan Ling
  An integrated model of interaction experience for information retrieval in a Web-based encyclopaedia
- Catrina Denvir, Nigel J. Balmer, Pascoe Pleasence
  Surfing the web – recreation or resource? Exploring how young people in the UK use the Internet as an advice portal for problems with a legal dimension
- Dingyun Zhu, Tom Gedeon, Ken Taylor
  "Moving to the Centre": A Gaze-Driven Remote Camera Control for Teleoperation
- R.J.W. Sluis-Thiescheffer, M.M. Bekker, J.H. Eggen, A.P.O.S. Vermeeren, H. De Ridder
  Development and Application of a Framework for Comparing Early-Design Methods for Young Children
- Nancie Gunson, Diarmid Marshall, Fergus McInnes, Mervyn Jack

Usability Evaluation of Voiceprint Authentication in Automated Telephone Banking: Sentences versus Digits

Papers are available on ScienceDirect at **www.sciencedirect.com/science/journal/09535438**.

Recent papers

The Science Direct page for IwC also provides access to papers still awaiting printed publication, although they are available to cite with a doi, and can be downloaded in full. Recently accepted regular papers are:

- Stella Mills
  Caring through technology
- Benjamin Cowan & Mervyn Jack
  Exploring the wiki user experience: the effects of training spaces on novice user usability and anxiety towards wiki editing
- Kine Dørum & Kate Garlan
  Efficient electronic navigation: A metaphorical question?

Special Issues for 2011

Three Special Issues are in preparation and will be published throughout the next year:

- Feminist HCI, edited by Shaowen Bardzell & Elizabeth Churchill
- Selected expanded papers from ECCE10, edited by Willem-Paul Brinkman, Mark Neerincx & Herre van Oostendorp
- Inclusive Design in the Context of Social Media and Emerging Technologies, edited by Jim Ang, Ania Bobrowicz, Panayotis Zaphiris & Ben Shneiderman

The CfP for the Special Issue on Inclusive Design is still live. See page 17, or contact Dr. Jim Ang (**c.s.ang@kent.ac.uk**) for further information.

Latest news

Access *Interacting with Computers* via the Science Direct link and see, on the IwC homepage, the latest papers, most downloaded articles, up-to-the-minute citation statistics and calls for submissions.

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CALLS AND COMMUNICATIONS