Summer issue: Play of ideas and ideas of play

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With a theme that includes play, children leap once more to the forefront of i3mag — without apology, because children make up an especially vibrant and part of the i3 community. But this issue is about a lot more as well, because play is not just the realm of children, and playing with ideas is what keeps the i3 community alive.

Take cyberturtles. Edith Ackermann (whom many i3mag readers will remember from this year's Spring Days) opens this issue by looking more closely at play objects of a particular kind: things that think, objects that behave — toys that become fictional characters not just through the power of someone's imagination, but through having a mind or behaviour of their own. Exploring children's "dance" with such creatures (artificial toys, avatars...) helps us understand how children relate to things they engage with and how they conceptualise things. But Edith also reminds us early on in the article that adults, too, interact with imaginary characters in all aspects of their lives; and she concludes by pointing out that social virtual environments can help people (of all ages) work out mental events, foster projective imagination and construct inner and outer worlds.

Another aspect of play is story-telling, one of the things Justine Cassell of the MIT Media Laboratory talks about in a lively interview with Rossella Magli. Justine draws attention to the importance of giving children the chance to become *self-efficacious*, which means believing that you can have an effect on the world around you. It's a concept that has stuck with me and that, again, strikes me as relevant for adults as well. Justine argues that story-telling about the self, through collaboration with other children and through the development of real projects, helps children see their own power and possibility. And this idea was put into practice at the Junior Summit in 1998, a hugely successful event which gathered no less than 3062 children from 139 countries on-line.

3062 children, "boys and girls". Is gender a factor in the way children interact with technology (and with each other in the context of technology)? We consulted some ESE researchers on this, and they sketch informally what they have observed so far, pointing to some intriguing observations without drawing hard conclusions.

We also look back on the i3 Spring Days 2000, with an insider's and an outsider's perspective. Nik Baerten, not really an outsider anymore, reflects on "how much we are all children, but how much we seem to have 'unlearnt' while growing up, and how much we can therefore learn from children's learning." Which seems an appropriate quote for summing up what this issue is about.

If you have ideas you'd like to play with and explore further, remember i3 may fund your proposal for Future probes (see i3mag 08, p28 for more information). And new i3 members have now joined the community — more on p 30 of this issue. If you know of any suitable candidates for i3 membership (including your own institute or organisation), let us know! Happy summer.

Links to the Web sites of all the i3 Projects: AMUSEMENT, CAMPIELLO, COMRIS, CO-NEXUS, eRENA, eSCAPE, HIPS, LIME, MAYPOLE, MLOUNGE, PERSONA, POPULATE and PRESENCE, can be found on: http://www.i3net.org/i3projects/links.html Information about the ESE projects can be found on: http://www.i3net.org/schools/

Feature

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From music boxes to wind-up toys, from Tamagotchi to Virtual Petz, animated toys occupy a special place in children's lives. They are intriguing because they *do* things. Sometimes they even seem to have a mind of their own, and many are responsive to a child's solicitations. In all cases, *objects that behave* are treated differently from inert toys.

Relating to things that think

Animated toys, artificial creatures, avatars

Obviously, toys need not be animated to behave in our imagination. In their pretence play, children endow things with life all the time, blurring the boundaries between animate and inanimate. Puppets, dolls, stuffed animals, and even sticks and brooms are transformed into living beings. Children treat them as companions that they talk and play with. Adults too, interact with imaginary characters in all aspects of their lives. Fictional characters entertain us in books, films, plays, and television shows.

Yet toys that actually behave elicit novel ways of exploring relational issues, like agency and identity. They engage our minds because of their ambiguous nature (between animate and inanimate). They intrigue us because of their relative autonomy (responsive but with a "mind" of their own), and because of their singular form of intelligence (a "mind" that can surprise us). Their hybrid nature makes it possible to play out the fine line between objectifying minds and animating things, and come to grips with the hardships that identity formation involves.

We know from studies by Turkle (1995), Steward (1982), and Inagaki and Hatano (1987) that people tend to attribute agency to objects that behave. They treat them "as if" they were animated, even if they know that these things are not really alive. Piaget in particular long ago established that young children animate things that move, like clouds and water (Piaget, 1979). Humans also relate differently to objects that they animate in their imagination (personify) than to objects that they treat as merely reactive (objectify). What is less clear is the role attributed to personification as a lever for human cognitive and emotional growth.

Our own research on children, with machines, robotics, and virtual avatars, provides evidence for the idea that both *objectifying the subjective* and *subjectifying the objective* have a place in helping youngsters achieve a balance between empathy and autonomy:

"To understand anything at all, we must envision it as having an independent subjective interior existence, capable of experience, obliged to a history, motivated by purposes and intentions (...) Personifying helps place subjective experiences 'out there'; thereby we can devise protection against them and relations with them. Where imagination reigns, personification happens." (Hillman, 1976, p.16).

People's ability to treat fictional characters as if they were real and to personify things is important because its puts empathy and creative imagination at the service of intelligence.

Kids and machines

In a pilot study on elementary-school children's conceptions of simple machines, Brandes and I asked groups of children *what*, in their eyes, *makes something a machine*, and *how machines work*. (Brandes, 1992, Ackermann, 1999). We then presented individual children with a collection of images or toy models showing instances of machine-like objects. We formed clusters of objects that had similar functionality but differed in terms of their source of power, level of complexity, and control mechanisms. Examples of collections included a skateboard, a bicycle and a car (all used for transportation); and scissors, a power lawnmower and a push lawnmower (all used for cutting). Other examples included a clock, a washer dryer, and a toy-robot (Fig 1).



and machines

Although the children were far from unanimous about which objects were machines, several regularities emerged. All the groups produced *definitions by use:* "A machine is something that helps you 'do your homework' or 'go places' or 'defend you against enemies'", and so on. Almost everyone drew a line between machines and nonmachines in terms of the object's level of autonomy, that is, its ability to transform an input in significant ways. Thus, an object is a machine if it can modify what you do in ways that make a difference. For one child, scissors are not a machine because "it's you who cuts". A *push lawnmower* is a machine because "you push and it cuts". For another child a *bike* is not a machine because "it's you who pedals", while an *aircraft with a bicycle mechanism* (as exhibited at the Boston Science Museum) is a machine because "if you pedal and it flies...then it's gotta be a machine". With the bicycle, the transformation of a rotation into a translation (moving on the ground) is not perceived as significant, whereas for the aeroplane, the transformation from rotation to taking off the ground is indeed significant. To conclude, elementary-school children's criteria for 'machineness' remains to a large extent psychological/functional. The focus is not on *how the mechanism works* but on *what it achieves* and how it can be used to *add value* to an action.

Fig 1: Kids





Fig 2 b: Cybertutles equipped with sensors. Lego Logo Lab (MIT)

Fig 2 a: Kids and robotics: Logo Turtle (Turtle Geometry). Lego Logo Lab (MIT)

Kids and robotics

The Epistemology and Learning Group at the MIT Media Laboratory have long been engaged in the design and evaluation of computer-based environments to explore a variety of scientific concepts in children. Turtle geometry, for example, allows learners to draw geometric shapes by driving around artificial robots, or 'turtles' (Fig 2a). Children teach the turtle how to move by programming it, using Logo commands (Papert, 1980). In recent years, the group became more interested in exploring children's cybernetic intuitions, and their ideas about control and communication in humans, animals and machines. This has lead to the design of a new generation of turtles that are more autonomous. Unlike their ancestors, these cyberturtles are equipped with sensors, which grant them greater self-regulating capabilities (Fig 2b).

In what became known as the Lego Logo lab, we started exploring children's ways of relating to and describing these new self-regulating cybernetic turtles. We noted that, as with simple machines, the question of significance was not how does an artificial creature work? but, what can it do on its own? and, how should it be treated so that it responds in interesting ways? It would not occur to many children to take apart a creature to see what is inside. Instead, they take their creature as is and explore its ways of evolving in its surrounds. Optimising their 'dance' with the creature allows children to learn about its ways of being and relating to the child's solicitations. The children's purpose, in other words, is to converse rather than construct, to mutually attune rather than break down, to empathise rather than analyse. What is true of children is also true, to a lesser extent, of adults (Grannott, 1991). Relating to artificial creatures *as if* they were partners enables people to explore the dynamic of exchanges, the patterns of give and take and the degrees of mutual influence so characteristic of human transactions.

Dialogues with virtual others

In all aspects of our lives, we engage in *imaginary dialogues* with a host of interlocutors, fictional or real, and through whose eyes we learn to see ourselves. Social virtual environments (or MUDs) provide, even more than the previous robotics games, a unique opportunity for exploring children's ways of relating to virtual others. This time, the 'others' in question are not things that think but people behind masks. They are real persons in disguise with whom the children talk and play via their own extended selves, or avatars (Fig.3). Transactions among avatars occur in real time, an electronic bal-masqué of sorts.



What is particular about MUDs is the intricate connection between users and their avatars, and the immediacy and unpredictability of other player's responses to one's virtual appearance. Players are attached to their avatars like puppeteers to their string puppets, and act and feel through them; they both build the avatars and bring them to life. Projected outwards, the avatars act on their puppeteer's behalf. And it is the players' strong identification with their avatars that allows them to vicariously experience what the double "goes through".

In MUDs, players often endorse multiple personae and launch them into different habitats simultaneously. Putting on multiple personae is not new. But what is different is the ubiquity of selfappearances. It's like being at two 'bal-masqués' at once or maintaining parallel streams of conversation. Along with Turkle, I suggest that social virtual environments can be used to help people work out intriguing mental events, foster projective imagination, and construct inner and outer worlds.

References

Ackermann, E. (1999). "Enactive Representations in Learning: Pretence, Models, and Machines". In *Learning Sites: Social and Technological Resources for Learning*. (Bliss, Saljö, and Light, Eds.). Oxford, UK: Pergamon. Elsevier Science. pp. 144-155.

Ackermann, E. (1991) "The Agency Model of Transactions: Toward an Understanding of Children's Theory of Control". In I. Harel & S. Papert (Eds.) *Constructionism*. Norwood, N.J.: Ablex Publishing Co, pp. 367-379.

Brandes (1992). Children's ideas about Machines. Paper presented at the Annual Meeting of American Educational Research Association.

Hillman, J. (1976). *Revisioning Psychology*, New York, N.Y.: Harper and Row, Publishers.

Inagaki, K, and Hatano, G (1987). Young children's spontaneous personification as analogy. Child Development, 58, pp 13-26.

Papert, S. (1980). Mindstorms: Children, Computers, and Powerful ideas. New York, NY: Basic Books.

Piaget, J. (1979). The Child's Conception of the World. Totowa, N.J.: Rowman & Littlefield Publishers (Reprint).

Steward, J. (1982). *Perception of Animacy*. Unpublished Doctoral Thesis. University of Pennsylvania.

Turkle, S (1995). Life on the Screen. New York: Simon and Schuster.



Fig 3: Kids and avatars

Edith Ackermann is Professor of Developmental Psychology, University of Aix-Marseille I, France (1994-present). On a leave of absence since 1996, she teaches design and creative learning at the Massachusetts Institute of Technology, School of Architecture (Design Technologies Group, and Center for Advanced Visual Studies), where she was appointed Visiting Professor in the Fall of 1996. She also consults for various research institutions interested in the intersections between learning, teaching, kids, and media (TERC, Lego, The Learning Company).

Summit vista

The i3 interview

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I met Justine for the first time in the breakfast room of the Holiday Inn, the morning after my late night arrival in Helsinki for the IST '99 conference last November. We were both jet-lagged in some way: she for good reasons, since she had just flown in from Boston; I was just completely confused by the late-morning darkness at the Helsinki latitude. We casually sat at the same table and despite the fact that we didn't know each other we embarked on a passionate conversation about the incredible variety of breakfast items on offer. She was more into raw fish, I was more into cheese (the extent of my compromise with northern cultures). And our conversation wasn't limited to comments about our food choices: we actually engaged in an attempt to construct a framework that would allow us to communicate to each other the meaning of that taste experience.

I did not know at that point who Justine was, but I enjoyed her enthusiasm for terrestrial things, her obvious pleasure in experimenting and her tongue-in-cheek sense of humour. For once I did not regret sitting talking to someone at breakfast time, the grumpiest time of the day for low-blood-pressured people like me. The breakfast lasted more than an hour, during which we didn't exchange a single word on our professional identity. It was only in the afternoon that I realised Justine was one of the invited speakers to the workshop on 'Children shaping the future' (see the report in issue 07 of i3magazine].

It was after that workshop and an exotic and hilarious dinner in a Helsinki restaurant that I decided to do a formal interview with Justine. But had it not been for the valuable culinary experiences we shared, the current interview would probably not exist: my tape recorder did not work (I only realised this an hour and a half into the interview), and I would never have never dared to tell Justine so, had we not shared such an intimate taste experience before. Justine patiently accepted to do it again, and here is the result.

Interview by Rossella Magli Starlab rossella@starlab.net

magazine

What was your motivation in developing such a 'total experience' as the Junior Summit? (See sidebar on p7)

Because of my familiarity with developmental research and anthropological research, and my interest in how the cultural, the linguistic and the cognitive come together when we build technologies, I was very eager to develop an on-line community for kids that really allowed them to become the people that they wanted to be, and to explore their identity — their cultural identity and their social identity. I wanted to give them a chance to become *self-efficacious*, which means to believe that you can have an effect on the world around you. This is a very important thing for children. And some children grow up in poverty and in other kinds of circumstances that don't allow this.

In my research group at the MIT Media Laboratory, we believe that through story-telling about the self, through collaboration with other children around the world, and through the development of real projects in the world that have a real effect, children can see their own power and their own possibility. So we developed the Junior Summit in order to allow children to collaborate and for us adults to be marginal, for the future to be "in the hands of children". Sometimes we get criticised for this. People, like the man who asked a question during the panel yesterday (see the report on the "Children shaping the future" session in i3magazine 07): "There is a role for adults and we can't give up that role". I do share this view. But isn't it better to teach children to ask adults for help, rather than to shout at children what they should do? (in which case they probably won't even listen). We were very happy to



The Junior Summit

The goal of Junior Summit '98 was to change the nature and possibilities of childhood in the world through contact with information technology, and to change the nature and possibilities of information technology through contact with children. 3062 children from 139 countries, boys and girls, aged 10 to 16 years, technologically literate and technologically innocent, were gathered online. Computers and internet connections were provided to those in need, multilingual online community software was built for the occasion, and the children were asked to spend their time thinking and talking about how to use IT to make the world a better place for children. The children themselves chose 100 delegates to attend an international summit in Cambridge, Mass. The outcome of the Summit has been a number of extraordinary projects, including an online country whose geography is cyberspace and whose citizenship requirements are age; a hard-hitting international online newspaper exclusively written and edited by children; and a plan to broaden the meaning of the Olympics to include social action.

see that the kids at the Junior Summit spontaneously wanted the help of the adults around them.

You mention the role and the extent of the presence of adults at the Junior Summit. How would you describe it in the design process of story-telling technologies, which is your main field of interest?

In my research group we find it is very important, when working with children, to think about the role of the observer. In all sciences it is a cliché to say that the observer changes the event. The psychological literature is very clear about it: children tell less advanced stories to adults than they do to other children. Perhaps because they expect the adult to 'fill in the blanks', perhaps they don't feel motivated to assume that 'responsibility' themselves. This is the reason why, in all of our research, when we ask children to tell stories we leave the room and let them do it alone with other children. There is some really interesting literature on this: when children tell stories to adults, they don't 'fill things in'. They tend to assume that the adult is omniscient. But to other children they can tell very complex stories, and they can tell them in a very collaborative way: one child starts, and then the other child continues, and then the first child takes over... — and that is a very valuable skill for children to acquire.

What are your design methods and principles when you design story-telling tools for and with children?

In our design work, my students and I have a very particular philosophy: rather than looking for technology that makes the world a totally different place, we like to say that we look for new technologies that encourage old forms of culture. So in order to develop our technologies, the first thing we do is gather a group of children in a room, with the oldest kinds of toys we can find: crayons and paper and cardboard boxes and stuffed animals... and we watch what children do, quite



naturally. Then we sit and ask ourselves: what role can technology play in children's own natural forms of play? And that's when we begin to design. We want to embed technology in what children already know how to do. There's virtually no learning curve and with anything we build, children play easily because it's a kind of play they already know.

It's the same play, only technologically augmented...

Exactly, it's technologically augmented or enhanced, but not radically changed.

Do you think these technologically-enhanced toys will change the way children play and tell stories about their play, in the long run?

I do think that these technologies have an effect on how children play, in a delicate way — perhaps making them aware of technology itself. And this is another aspect of our design philosophy: we like to make the technology apparent in some way, so that children can become comfortable with it and realize they can master it, that they can implement it. In that sense, it is very important to us to have children as implementation partners. This is part of another design principle that we call 'undetermined' design, where we build a skeleton or a framework and we invite children to work with us, to implement the full technology itself. How would you describe the state of the art of story-telling technologies so far? What's been done? What do you think should be done?

I think there is some very good work being done in story-telling technologies for children, but I think even more attention could be paid to the issue of why we do research on story-telling for young children. That is, what is the goal of getting children to tell stories? Is it to improve literacy? Is it to improve self-expression? Is it to enhance imagination? Why do we do it? And once we've decided what the goal is for children, then I think more attention could be paid to the large body of research that actually exists on the development of story-telling. For example, in our own work we found a large body of literature on how storytelling plays a role in the acquisition of language, in the acquisition of identity, in the acquisition of collaborative skills, in how to interact with other children. We use this literature to build systems that encourage children to collaborate and to use language in a linguistically-advanced way.

And we were in fact able to show, using very careful evaluation, that children's language was more advanced when they used one of our story-telling technology-based tools than when they told a story using exactly the same kind of toys without the technology built in. I think that's very important. We have to make sure we don't just build storytelling toys without an understanding of what they are for, what they do, how they function for the children.

How would you evaluate the i3 experience on the basis of what you have been able to see here in Helsinki?

When I look at the story-telling technologies that have been developed for i3, I can certainly say that some really wonderful work has been done. And it is wonderful to see that the European Commission is willing to fund such an important kind of work: in the United States it is really hard to find funding for work on story-telling and technology.

But what I would really like to see at a later stage is an evaluation of this work. I'd like to know more about the effects that these technologies have on





children's development, their social development, their linguistic development, their school-based development. Does it support literacy? Does it support pro-social behaviour? Does it support the development of the self? It's wonderful to create tools, but being able to say: "I created a tool that really has a positive effect on children's lives" is a much stronger claim.

What do you think are the main differences in research approaches to technology and story-telling, if you compare the European and the US experience?

I think that Europe may actually be more advanced in the domain of interaction and story-telling technology. Perhaps this is partly due to the fact that Europeans have a better understanding of the role of the social, given the very different social milieux that exist side-by-side. In Europe, one becomes very aware of the differences between cultures of countries that are very close together and have many exchanges. That forces people to think about the role of culture and the role of the self and identity in their everyday life. And perhaps this reflection encompasses technology as well. In any case, in Europe there seems to be a very good understanding of how to embed technology in the social world. So, I see better work in Europe in that arena than I see in the States, that is, more advanced work in the use of technology to support the social. And story-telling is a very social domain, indeed.

Justine Cassell is an Associate Professor at the MIT Media Laboratory and directs the Articulate Media Research Group (formerly "Gesture and Narrative Language Group"). Her research focuses on technology to support the verbal and gestural aspects of storytelling and conversation in children and adults, with special attention paid to underserved populations (such as girls, and the developing world). She is particularly interested in how digital artifacts (such as computer interfaces and technological toys) can be designed with social competencies, based on a deep understanding of human linguistic, cognitive, and social ability. She has published widely in journals as diverse as Poetics Today and Computer Graphics, and is co-editor of From Barbie to Mortal Kombat: Gender and Computer Games (MIT Press, 1998), and of

Conference report

Spring fever The i3 Spring Days, Glyfada, Athens, 1 — 3 March 2000



We learned about counting (aeroplanes, in our sleep). We learned about navigating (cars, on the pavement). And we learned about the work that's taking place in the i3 community, which was presented, debated, questioned, defended, taken further, redefined, coloured in, connected, dissembled and put together again. The i3 Spring Days, somewhat smaller in scale than last year and somewhat louder in terms of traffic noise, but once again an event that demonstrated, amply, that this formula works.

Two participants look back: an 'insider' (or i3 member), CARESS researcher Lisa Percy who needs no introduction in the i3 community; and an 'outsider', Nik Baerten of the Marshall McLuhan Institute in Maastricht. Both took part in the Spring Days for the second time.



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The outsider

By the time you read this, Michael Mann's magnificent "The Insider" will have played in most European theatres. In his story, quite a few insiders become outsiders. When I look at myself and the i3 community I feel happy to see me walking in the exact opposite direction, from being an outsider to becoming a bit more of an insider. After attending two wonderful Spring Days editions, I like to think of myself in a hybrid way: *'an outside member of the i3 community'*.

Oh yes ... there is a community. But unlike most communities, this one does not seem to build walls around itself, but doors, windows, patios and archways. This one does not seem to petrify and die from the inside out, as many others unfortunately do due to lack of oxygen. The i3-community breathes fresh air through its dynamic members as well as its ever-evolving environment.

This nurturing effect could be felt at this year's Spring Days event, which was once again in many ways as refreshing as any spring should be. Spurred by the magic number 3 I shall restrict myself and shed light on only 3 of the many refreshing and inspiring events that I attended at this year's get-together. First, there was the Microworlds workshop. One presentation that somehow remains fresh in my memory was that of another 'i3 outsider', Edith Ackermann from the MIT School of Architecture [Edith Ackerman also contributed to this issue: see her article on page 2 - editor] who talked about 'Microworlds as theatre'. Both from a personal and a more general perspective I found her presentation and ideas inspiring, sometimes surprising, many times confirming my own ideas and expectations, and always well thought-through and well expressed. Once again I noticed how much we are all children, but also how much we seem to have 'un-learnt' while growing up, and how much we can therefore learn from children's learning. The whole idea of children learning through being world- and toolbuilders, explorers, playwrights and actors is so appealing that I felt like 'microworlding' right away. But then we continuously do so anyway, don't we?

Second, the real i3 life force flows through hallways, stairways, patios etc. Probably even more so than in the workshop-rooms, this is where I feel the real cross-fertilisation of ideas takes place, where congenial minds meet — no matter their age,

generation or background — and where revitalising discussions lead to progress. It is especially this informal, cross-everything spirit and open flow of communication, I think, that makes the i3 community truly unique. Also, this year's local organisers made sure that there was plenty of room and opportunity for i3 community life, and many people, (including myself) gladly and gratefully took the opportunity to feed upon these moments.

Last but certainly not least, there was the Patterns of Disappearance workshop: an experiment away from the typical, sometimes worn-out paperpresentation-questions workshop form. Speakers were asked to break free from the confinements of scientific paper writing and start straight from the most pure form of innovation: their ideas. These were put forward by means of scenarios which sketched not only their views on the disappearing computer, but also the different future settings in which they saw their ideas fit. Although the sudden creative liberation asked for some acclimatisation on both sides of the microphone, the sparkle in many speakers' and participants' eyes showed that this way of presenting ideas comes very naturally, and that engages and above all inspires most of us. This was also apparent in the long discussions after the workshop. After this year's success, I am sure Massimo Zancanaro and Odd-Wiking Rahlff will continue to offer a stage that will facilitate this healthy injection of pure Vitamin I(dea). After all, it's the creative ideas of many that turn the i3 Spring Days into the big brainstorm - or should I say tornado? - it is (and hopefully will continue to be in the future).

Although project meetings and EC funding are what one might consider to be the primary factor that pulls and keeps the i3 community together, I like to think that as a community i3 transcends these organisational aspects. I like to think that the community thrives upon the people, the ideas they bring, the fruitful co-operation between them and their common hunger for a deeper understanding, ever more intelligent and natural information interfaces, and continuous innovation. I cannot wait to see some entrepreneurial offspring of i3 initiatives. I realise some projects are coming to an end, but there is no reason to let that be the end of i3, or the i3 community. That would be a shame. For me personally - and I am sure that I can speak for many young





researchers — the i3 community stands for an inspiring, stimulating and motivating resource and platform. Its unique features include a healthy cross-generation approach, true multi-disciplinarity of a kind where quality ingredients from any kitchen are welcomed, and an openness and healthy flow of new ideas and people that should render many other networks and meetings very jealous. Hopefully i3 will live long and happily ever after. I guess it is up to all of us to ensure that and to make it happen.

Finally, I ask myself: why is i3 only cubed? Anyone experiencing i3 will endorse its strong multidisciplinarity and the fact that counting its disciplines certainly does not stop at three. I ask myself: why do the three i-words suddenly sound boring to anyone who has experienced i3? Maybe it is time to be a little bit more creative, a little bit more 'i3', and come up with some creative variations on the theme, such as: immersive impact of imagination, inspiring individuals initiative, intriguing ideas incubator, impassioned illuminati inc., innovative impulse initiator ...

The insider

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'Spring Days 2000' was different. Like previous i3 gatherings it provided the opportunity to attend workshops, explore the work of other projects, make new contacts and renew friendships. But this time there was one element notable by its absence. This year no project reviews were conducted during the event and I, for one, felt that this made for a significant change in atmosphere.

Reviews have been an important element in all the other i3 gatherings which I have attended so far, and their absence this time not only left project teams with their nerves intact, but also made the event more conducive to collaboration and more open discussion. Indeed, those who attended this year's Spring Days did so because they wished to participate in the workshops, not because they were required to represent their respective projects. While this had the immediate effect of lessening the overall number of attendees, it also ensured that participants were free to engage more readily with the topics open for discussion, and that projects could present their work informally to colleagues in a relatively stress-free environment.

While the review process is necessary and valuable, there is a strong argument to be made for allowing project members to gather purely to share ideas, explore themes and socialise, in an atmosphere unsullied by the pressure of project reviews. This case was reinforced by my experience in Athens.

Like last year, the Spring Days were structured around a series of workshops representative of the range of activities within i3. The workshops were well-attended and, in my experience, wellorganised, and proved to be melting pots of ideas.



The time tomorrow: through a glass darkly

An atmosphere of genuine interest and enthusiasm prevailed. True to the i3 spirit of inter-disciplinary collaboration, researchers from a wide variety of backgrounds were able to engage in discussion of ongoing projects and possible future approaches.

The CHAT workshop on 'Learning, Collaboration and the Analysis of Video Data' proved valuable. It enabled researchers to see how other projects are managing the use of video as a data source and to explore different methods of analysis. It was both reassuring and encouraging to hear that others share some of the same concerns, and it was refreshing to share thoughts and ideas, and to be able to discuss possible solutions to problems. The launch of the CHAT webside as a conclusion to the workshop reinforced CHAT's role in supporting the work of projects and in providing a platform for ongoing work. Again, it reflected the supportive atmosphere throughout the event as a whole.

Because of the informal nature of the workshops, participants were able to take from them what they needed — be it a flavour of the kinds of projects that are ongoing in the field, or a deeper exploration of particular research issues. As a member of a research team looking ahead to develop future projects I came away with many ideas for possible investigation. I found the workshops on 'Translating Children's Answers into Design Requirements' and 'Physicality and Tangibility in Interaction' particularly useful in their interdisciplinary approach.

Having the opportunity to come together as a research community is refreshing, and my own enthusiasm was certainly renewed by the Spring Days, as I am once again able to see the broader i3 picture. Being part of a larger research organisation helps me put my own research into context, and regain a sense of perspective.

Equally important is the opportunity to take time to socialise and to enjoy being part of a European initiative. For those of us who stayed on in Athens until Sunday, it was not too difficult to escape the traffic, both air and road, and find a few moments to enjoy some sunshine and seafood. Here's to 'Spring Days 2001'!''





The time tomorrow: spot the watches

CG member Alan Munro (of the Persona project) adds:

What an event like this one is about is talking to people and finding that they face the same problems — like funding, or simply persuading their bosses to let them to go to conferences. Finding that we all face the day-to-day reality, the grind of doing research, sometimes with little time or in quite challenging circumstances. Comparing notes, comparing the different aspects of project work. All that fosters a sense of community.

And there's a specific community here that's quite different from other conferences. The Spring Days provide a great place for meeting people excelling in different areas— designers, architects, coders, system designers, ethnographers, people who don't normally come together...

What I particularly value is the role that is given to design. Usually in the software design process there's this bit called 'requirements' — and that's it. There is no awareness that designing software is like designing other artefacts. There's a huge tradition and a huge amount of skill involved in design, and we need to respect and use that. The same for ethnography. And the same for the arts disciplines. That's one of the things that's interesting and unusual about i3: you've got this multiplicity of approaches, including the "softer" side of things, you've got this amazing, almost anarchistic array of methodologies that all feed into the same process.

So there's a huge pool of skills at an event like the Spring Days. But you've also got a context, you know the people, you know how good they are and whether they can deliver in time. And that's important: it means that when you are forming a consortium for a project at some point and you need a good designer (or whatever), chances are you can think of someone whose work you know (and whose work you know is good) — perhaps someone you got atrociously drunk with! And this is actually a more natural way of constructing a consortium. Many other European events are like a Blind Date cattle market, where you'll meet people but you don't have enough time to know what they've done, and if they've done it well. The Spring Days are different." £

Acknowledged (but perhaps not often enough) and easily forgotten: the i3 Spring Days take shape and take place only because of the unperturbable commitment and the generous investment of time and energy of Thomas Rist. And they would never have taken off without the tireless efforts of the local organisers, Manolis Koutlis and his friendly, hospitable crew of people supporting the event. On behalf of the i3 community, thanks!

Spring Days close-up













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Tales of the road

i3 takes a stand at Dutch roadshows

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Marc Blasband, the coordinator of i3's new industrial Partnership Programme, has launched an ESE i3 'visibility campaign' in the Netherlands. i3 hired stands at three out of six venues of a road-show tour called "School en Computer", which was organised by the Dutch Ministry of Education. The shows took place in Eindhoven (15 March), Rotterdam (29 March) and Utrecht (26 April). Marc manned the stalls alone in Rotterdam and Eindhoven; Lieselotte Van Leeuwen joined him in Utrecht.

The immediate pay-off of having an i3 stand at the recent Dutch roadshows was that I made contacts with several organisations interested in the i3 Partnership Programme, and that some promising meetings were set. But the interest of roadshow goers in i3 extended beyond the possibility of partnership: the i3 stand attracted the attention of a wide range of people, and the motivations of those who expressed interest varied widely.

The affiliations of those interested in partnership ranged from the mainstream school system, through multi-media distributors, to companies developing systems for children with problems. Many of our potential partners were particularly interested in various aspects of NIMIS, such as the writing concept and the NIMIS T3 product. Playground and Co-Nexus were also mentioned.

Like many visitors to any exhibition, some of the teachers at the roadshows were looking only for gadgets or for products that they could try out immediately, and were therefore not interested in the i3 vision or research. But several heads of schools were fascinated by the changes the i3 research could make to the attitudes of their staff. And those involved in teaching children with special needs showed an interest in i3 generally, and especially in Caress. Several parents, too, were interested in the potential of i3, and Caress in particular, for their disabled children. The POGO video (which shows teachers telling stories) attracted the interest of some teachers' teachers, and adult education proved to be a hot topic for a number of visitors. KibsLab was also popular (unfortunately in part because an English product with the same

name provides a virtual laboratory for physics or chemistry!), and one politically-minded teaching supervisor liked the idea of empowering the children against the establishment.

Some teachers expressed a wish for help with some particular ongoing projects of theirs (such as methods of targeting language teaching to specific individuals with speech or language shortcomings); others were interested in possible new applications of current ESE technology. Information about i3 was given to the magazine Vives which targets schoolteachers, so we may be hearing more from interested parties...

Various other useful contacts were made, especially in Eindhoven and Utrecht. These included a large Dutch computer club, researchers involved in work similar to that of i3, teachers interested in schools abroad, and assorted researchers at several software companies. Thinking ahead, it would perhaps be worthwhile to have a stand at the next large computer club show.

Several lessons and issues might be relevant to all of us:

In retrospect, events like the Dutch roadshows could be used to start a different dialogue between teachers and the i3 community. This was not considered and should be discussed if we repeat this sort of activity.

In the first show I used only the i3 banner and the large posters as poster material; but visitors kept coming up to me to ask what i3



is, and this made me realise that other posters representing key information are needed that are more geared toward people outside i3 (rather than to i3 members). We are currently working on this. I also felt a strong need for brochures which describe in a few pages what i3 and ESE are about, in a way that is comprehensible to people outside the i3 community. These brochures now exist.

We only managed to raise interest in projects for which pamphlets were available. So ideally we need pamphlets for all the projects, and if we want these pamphlets snapped up we need to pay attention to their immediate visual effect. In the first half-second of people's attention to these things it is the logo, colour, images and format that have most impact.

Video was found to be a very effective medium for getting i3's message across: many visitors were drawn in by what happened to be shown on video as they passed by. However, shots of "real things" work best; shots of researchers explaining what they do doesn't work well and should be kept to a minimum for the road-shows. Caress's video in particular was a success, as it is very impressive visually.

Another lesson lies in the difference made by the presence of Lieselotte Van Leeuwen at the Utrecht stand. Having company not only makes the day more enjoyable for those manning the stand, but the number of contacts increases. This suggests we should always try and go to road-shows with at least two people.

All in all, these three days of road-shows were a great success. Several potential partnerships contacts were made --- more than hoped for --and there was a lot of interest in the projects themselves. Since visitors expressing an interest in the projects were told to contact projects directly, we will have to wait to see what comes out of this. But there are some concrete outcomes already: some of the roadshow contacts have resulted in two new projects that should start this Autumn or early next year. And we are looking into the possibility of extending the experience of these three shows to other industrial exhibitions in other countries after the summer.

Rule I: Hire a van to get you and your props to the show.



Rule 2: Buy a trolley and some strong boxes to carry your props to the stand.



Rule 3: Keep it neat and tidy, and let the show begin.

We'll keep you informed.



Fresh perspectives on an old conundrum

Gender and technology

Girls, boys, gender differences? It's an old debate. I grew up at a time when it was fashionable to minimise the differences and hold "nurture" and cultural conditioning largely responsible for gender stereotyping. Many fellow mothers of my generation approached parenthood determined not to encourage or discourage stereotypic behaviour. But many have also confessed (reluctantly) or declared (defiantly) that there are obvious (and in their mind gender-linked) differences in behaviour and temperament between their sons and daughters; and that these differences are there from an early age.

The debate is complex and continues. And while it continues it is valuable to continue to observe. We know about girls and boys and dolls and trainsets, but what about boys and girls and technology? ESE researchers are well-placed to note if any meaningful gender-related differences arise in the responses





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Who gets to hold the mouse? KidStory

Reviews of both psychological and educational investigations of peer collaboration have demonstrated time and again that working in pairs and small groups can have beneficial effects on learning and development, particularly in early years and primary education (Wood & O'Malley, 1996; Rogoff, 1990; Topping, 1992). One of the main aims of the KidStory project is to develop technologies that support and encourage children's collaboration. Computer-based work has been identified as a useful vehicle for exploring collaboration between children.

While working in schools, KidStory members have taken guidance from the teachers when grouping the children. The target group of children that we will follow for three years consists of an even mix of girls and boys. When pairing the children we always take into account the importance of friendship. During informal observation of groups of pupils working with the first iterations of KidStory technologies we have noted a number of differences in the ways in which the technology is used dependent on the setting. We have observed patterns of dominance amongst mixed gender pairs, with incidences of male pupils taking control of the mouse and leading the activity.

This is not surprising, as previous research into pair collaboration around a computer has found an interesting pattern of gender effects. Traditional computer software and hardware has been designed with only one user in mind, and if there are two users they must share a mouse and share control over one cursor on the screen. This may result in an unequal balance between two children collaborating, Light and Glachan's (1985) study found that boys were more likely to take control of the mouse when access was limited. Studies have also shown that mixed-gender pairs perform worse than either boy-boy pairs or girl-girl pairs (Underwood, 1994). Underwood, Underwood, Pheasey and Wood (1997) found that although there was no difference between the performance of mixed pairs and single gender pairs, the quality of collaboration and interaction between the children was much lower for the mixed pairs. However there is an interaction between these effects and the nature of the task: when the task appeals to boys the mixed pairs can outperform the girl pairs (Barbieri and Light, 1992).

Cole (1995) found that when one mouse was shared in a group activity there was an unequal balance between the participants who contributed ideas towards what was happening on the computer screen. But surprisingly, the equity balance favoured the children who were not holding the mouse. These children contributed more ideas, while the child holding the mouse, trying to keep up with the ideas being shouted at them, did not contribute as much. Nevertheless the pupils involved in this study still saw the mouse as a measure of control and felt a sense of disempowerment when they were not holding it. The KidStory project's use of multiple input devices and software specifically designed to support collaboration may be a means of improving collaboration between mixed gender pairs, because they allow a more equal sharing of the task between pairs and enable more effective communication. A more focused collaboration study has just been completed, which examines the performance of single-gender and mixed-gender pairs when using a computer with one or two mice. A large proportion of earlier research has used problem-solving tasks; but the nature of the task can affect how well the children collaborate. In this study the task was more creative: it involved writing a story in KidPad, a software tool which has been designed in the KidStory project to support collaborative storytelling (see i3mag 07, p16). KidPad explicitly supports collaboration by allowing children with two mice to perform actions that are not possible without the children collaborating. We hope that the use of this software with two mice will allow pairs of children to collaborate more effectively. The results are presently being analysed.

References

Barbieri, M.S. and Light, P. (1992) Interaction, gender and performance on a computer-based problem solving task. *Learning and Instruction*, 2, 199-124.

Benford, S., Bederson , B., B., Åkesson, K., Bayon, V., Druin, A., Hansson, P., Hourcade, J-P., Ingram, R., Neale, H., O'Malley, C., Simsarian, K.T., Stanton, D. (2000) Designing Storytelling Technologies to Encourage Collaboration Between Young Children. *CHI 2000* The Hague, The Netherlands, I-6th April 2000.

Cole, K.A. (1995) Equity issues in computer based collaboration: Looking beyond surface indicators, In Proceedings of *CSCL* 95, http://www-cscl95.indiana.edu/cscl95/cole.html



Light, P. and Glachan, M. (1985) Facilitation of individual problem solving through peer interaction. *Educational Psychology*, 5, 3-4, 217-225.

Rogoff (1990) Apprenticeship in Thinking: Cognitive development in social context. Oxford University Press, Oxford.

Topping, K. (1992) Cooperative learning and peer tutoring: An overview. *The Psychologist*, 5(4), 151-157.

Wood, D. & O'Malley, C. (1996) Collaborative learning between peers: An overview. Educational Psychology in Practice, 11 (4), 4-9.

Underwood, G. (1994) Collaboration and problem solving: Gender differences and the quality of discussion. In J. Underwood (Ed) *Computer Based Learning*. London: David Fulton.

Underwood, G., Underwood, J., Pheasey, K. and Wood, D. (1997) When does Gender Matter? Interactions during computer-based problem solving. *Learning and Instruction*.

The CHAT working group recommends the following background reading:

Butler, J. (1990) Gender Trouble: Feminism and the Subversion of Identity. London: Routledge

Clarricoates, K. (1978) 'Dinosaurs in the Classroom: a re-examination of some aspects of the hidden curriculum in primary schools'. Women's Studies International Quarterly. 1, 4: 353-64 (reprinted in Arnot and Weiner 1987)

Davies, B. (1989) Frogs and Snails and Feminist Tales. St Leonards, NSW: Allen and Unwin

Davies, B. (1993) Shards of Glass: Reading and Writing Beyond Gendered Identities. St. Leonards, NSW: Allen and Unwin

Epstein, D. (19)'Girls Don't Do Bricks: Gendered Discourses in Primary Classrooms

Walkerdine, V. (1981) 'Sex, power and pedagogy', Screen Education. 38: 14-24



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Marked gender differences in collaboration and playing with rules

Playground

For many children, their early experience of computer use occurs within the home and involves playing computer games. Evidence suggests that boys have considerably more experience of computer games than girls and tend to be more enthusiastic game players. Female gamers are few and far between, partly because of the male-oriented nature of many computer games, which frequently depict violence or portray women as sex objects.

The plea for 'girl friendly' computer gaming software has been made and the computer game industry has now recognised a potential market for girls. There has been a new wave of hugely successful games – some still sex-stereotyped while others more gender-neutral involving narrative and strategic approaches (Cassell and Jenkins (1998) present an excellent summary of the evolution of these games).

Computer games are an important part of children's culture. Is it possible to exploit this for learning without disadvantaging girls? Current computer games typically cast children in the role of game-players, playing according to rules programmed by someone else — a situation which, however motivating, sets strong boundaries around what might be learned. One way to make computer game-playing a scenario for *constructionist learning*, that is the kind of learning that arises when children build things for themselves and others, is to place children in the role of producers as well as consumers of games. This is the aim of the Playground project.

We have noted in our twice-weekly visits to the computer club in our local school how the children (aged 6-8 years) display marked gender differences in their approach to Playground work, in terms of how they collaborate (or don't!), how they play and what they choose to change in their games. We illustrated this in two case studies (for details of one study, see Hoyles, Noss and Adamson, in press).

The first case study analysed how two girls changed a simple Pong game so that it fitted more closely with what they wanted to play (namely a beautiful underwater game with sharks and fish). The girls' work was notable for the constant generation of ideas



collaborative way they played and built their game, sharing ideas and ways of putting them in practice.

Many aspects of their work contrasted with that of two boys, who found it hard to collaborate and share ideas. The boys came up with few ideas about how to change the rules of Pong — they simply wanted to change its appearance and the noises it made, rather than the rules and feel of the game. Eventually the boys did try to simulate a football game, but they resisted suspending reality: they wanted it to be a 'real' football game with real football teams!

The two case studies serve to illustrate different and possibly gendered approaches to game evolution. Our contention is that any trajectory can be harnessed for learning about rules. Playground's approach of designing tools and play objects so that children can build as well as play their own games means that the children can shape the prevailing computer culture to suit their own goals. This, we hope, will mean that girls playing differently doesn't mean girls learning less.

References

Cassell J and Jenkins H. (eds) (1998) From *Barbie to Mortal Kombat*, Gender and Computer Games. MIT Press.

Hoyles, C. Noss, R. & Adamson R., Rethinking the Microworld Idea. ubmitted to the *Journal of Educational Computing Research*, for a special issue on Microworlds in Mathematics Education.

Different approaches to Lego construction kits

CAB

Do boys and girls make different use of the Lego Mindstorms kits used by the CAB project? This was one of the research questions formulated at the beginning of the project.

The results of the Swedish field study of CAB, which was led by Jörgen Lindh, show that boys and girls generally differ in their approach to the Lego construction kits. Boys tend to rush into their construction activities, while the girls seem to reflect more and take longer before they start working with the Lego bricks. This is probably due to the fact that boys are generally more used to working with Lego construction kits than girls.

Boys and girls also choose to make different use of the Lego kits. The boys are very focused on building robots that have some kind of destructive power (such as war machines) or fantasy robots, and the actual process of construction is central to their play. The girls, on the other hand, tend to construct robots which can be useful and which they can play with (for example animals such as dogs and horses). The girls are often heard talking to the robots and giving them instructions during their play.

Another gender-related aspect of the programming activities of the children observed in the field study is that girls seem to be more patient during the learning process, take their time to consider and determine the performance of the robots, and are better able to concentrate while working with the computer than the boys.

The 'girls vs. boys' perspective will be subject to further studies in the context of the Swedish field tests that are part of the CAB project. The results may have practical relevance or repercussions: in Sweden there are currently many initiatives, both within the educational and the business sector, which aim to create more interest in science and technology in school children, especially girls.



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Sound and movement appeal to both sexes



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The data of the CARESS project falls into two categories, Special Needs Education and Mainstream Education. Perhaps inevitably, issues surrounding technology and gender are more prominent in the mainstream sector, since this is where activities are focused on mixed-gender and mixed-ability groups rather than on objectives for individual children.

The sensor technology (see i3magazine 06 for more information) employed by CARESS researchers in schools is used chiefly in the realm of 'aesthetic expression', but it also has applications in the development of physical skills such as motor control and reaction times.

We have found that in classroom activities where the objective is to explore the relationships between sound, movement and gesture, both girls and boys appear to be equally keen to try out new sounds and explore ways of playing and wearing the sensors. But it has chiefly (although not exclusively) been the girls who maintain a significant interest in continuing this kind of activity once a particular topic or session has come to an end. Activities in 'game format' which focus on the development of physical skills also seem to appeal to both sexes. Boys and girls often work together in mixed teams to develop co-ordination and speed. Both sexes appear to enjoy the competitive element of the activity and respond equally well to the use of technology as a tool to improve their technique. Perhaps — but this is conjecture at this stage — the nature of the interfaces used by CARESS (i.e. novel, wearable, shareable sensors, removed from the standard keyboard and screen computer set-up) lends itself to greater flexibility of use.

We have also tested the CARESS technology as a collaborative tool in a Special Needs research context, with a boy (age 6) and a girl (age 10) working together to 'create music' through the manipulation of sensors. We have observed that the boy often chooses to direct the sessions in an artistic sense, but this may be due to the fact that, unlike the girl, he has been working with the technology for several months. On the other hand the girl, who is relatively new to Sound Therapy, frequently points out better ways of playing the sensors to the boy.





Children at the Tusenskonan (mainstream) school in Landskrona, Sweden. Involved in a "throw and catch" game.



Melody(and me) working in the soundbeam at the Emaljskolan (special needs) school, Landskrona, Sweden.

Conference report

i3 in India

In collaboration with India's National Institute of Design, Doors of Perception and i3 organised a series of events in Ahmedabad, India in February of this year. Lasting a week in total, the events included a three-day professional workshop for graduate design students and some invited professionals, a two-day seminar on design strategies for the internet, and a two-day series of visits to companies. The purpose was to accelerate the exchange of people, knowledge and experiences among Indian and European design innovators active in interaction design, new media and the internet. Key topics were: what can European interaction designers learn from Indian culture? And what are the prospects for future joint work between the two communities? The answers are, respectively; a lot, and fantastic! We returned exhilirated, and determined to to build on these first steps.

More than 200 people attended the sell-out twoday seminar. The event, which was part-funded by i3net as a Future Probe, included presentations by John Thackara and Marco Susani. Participants came from all parts of India — many travelling up to two days to get there. Among the delegates present were groups from the Indian Institute of Technology (Delhi and Bombay campuses), the Indian Institute of Management, and the National Institute of Fashion Technology. India's emerging interaction design and 'dot.com' sector was also well represented.

Eighty students and faculty members took part in the three-day design workshop on the theme of 'lightness', which was also the first step in preparation of this year's Doors of Perception conference (which will take place in Amsterdam on 10-12 November; see www.doorsofperception. com for more information). The European team also visited several companies and organisations in the area in search of possible projects that might be undertaken in the future. The organisations visited included the SEWA (the nationwide self-employed women's association, which is using the internet to connect makers and consumers); Amul (the national milk distribution cooperative, which is a world leader in physical distribution of short-life produce and now wants to use the internet to enhance this system); and the Indian Institute of Management (which is developing advanced knowledge management to distribute the tacit expertise of farmers, artisans and other pastoral workers).

The Indian press and media turned up in force to cover the event, and focused much of their coverage on the i3 projects Presence, LiMe and Campiello. Feature stories appeared in major national daily newspapers such as the EconomicTimes, India's largest circulation English language paper which is printed daily from six cities. Said ET, "it's time to replace the personal computer with new interaction paradigms". The Indian Express, printed daily in more than 20 locations in India, called the event "an amazing display". The Asian Age, printed daily from seven cities including London, commented that "this could be a beginning which will make the internet a part of our everyday lives". Other media present included Business World, one of India's largest business magazines, Zee Network television, Rupert Murdoch's Asia-wide Star TV, UNI (the biggest wire agency in India) and PTI.

A fuller account of the event can be found at www.doorsofperception.com/bubble.





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"And maybe computers"

School of the future, take 4

Take I (i3mag 05) Ulrich Hoppe and Bridget Cooper, NIMIS project:



"In tomorrow's schools, integration (connectivity and inter-operability) will foster the communal aspect of the classroom and support collaborative learning, by giving both teachers and pupils flexible access to classroom resources and by facilitating a high degree of group awareness."

Take 2 (i3mag 06) Michele Zini, architect and designer:



"The school of the future will be like a large incubator, where children and adults work, learn, play, sleep, cultivate, experiment, make mistakes... It will be a changeable environment, with generic spaces that can be used for and adapted to different activities. Architecture, furniture, systems and interfaces will permit different activities at different times of the day, depending on the decisions that children and teachers make as they go along."

Take 3 (i3mag 07) Leon Cych, teacher:





"I should imagine the school of the future will be less textbased, or to be more specific, less reliant on outmoded and inefficient ways of representing "language". Text will still be there, but there will be more and different flavours of "communication" and control — if children are given the opportunity to empower themselves. And that is, always has and will be the teacher's role."

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What will the school of the future be like? Or what would we want it to be like? We've already consulted the people above, all experts in their respective areas. This time, a dream vision of the school of the future by a non-expert (or a different kind of expert).

The school I would like in the future would be quite big and very fun. You would have lots of German and French and Spanish classes ; the German ones would be on Wednesday and the Spanish ones on Thursday and the French ones on Friday. And reading and writing and sums and stuff, but if you got any wrong you wouldn't be badly told off, you would just be helped. And all the teachers would be nice and you would only get told off if you did something really bad like smashed something or done something you really shouldn't do or if you'd hurt somebody. And you'd get taught to be bright and easy-going and help people and all be friends... that's one of the importantest things you'd get taught. The classrooms would be big and light with lots of pictures on the wall, and cosy as well. And there would be things to build with and blankets and bricks that you can stick together and Lego and bouncy balls and telly, but you could only watch telly on Monday and Tuesday. And maybe computers. There would be different parts where you could do lots of different things and there would be toys to play with outside like space hoppers and skipping ropes and stuff.

And afterwards you would have a snack, you would have two snacks a day, and then you'd go to play outside. And outside it would be a really really really really big garden! With lots of trees and climbing frames and swings, apple trees so you can pick apples and plum trees and trees that you can climb and see-saws, a big big garden and then at the end you would go into a circle and sing a song about friendship and then you would go and meet your mommies.

But you could go into that school whenever you like, go in there any time, it's on all day and there will be lots of music playing inside the rooms and you can do whatever you like in it, whatever you like. It's very fun in that school and everybody's so happy in there that every day the sun shines.

Maaike Klein is six-and-three-quarters and lives in Edinburgh.



"School of the future" by Maaike Klein

Opinion column

No joy in the brave new world

Bill Joy on the danger of GNR

The April 2000 issue of Wired contains a long text by Bill loy, titled "Why the future doesn't need us." (pp. 238-262). Bill Joy is co-founder and Chief Scientist of Sun Microsystems and has, over the last twenty-five years, contributed to the development of the Unix operating system, the design of the SPARC microprocessors and, most recently, to the specification of Java and Jini, Joy is surely not a Luddite driven by ideological considerations against technology: his life up to now has been dedicated to research and development of new technology. It is therefore surprising to read in his text a radical criticism of some of the most successful and promising research trends in computer science and technology: nanotechnology and robotics (in particular when coupled together and with genetic engineering).

His position is that while his reasearch (and we could add, our research) is dealing with technology and applications that evolve from existing technology and applications, Genetics, Robotics and Nanotechnology (GNR) are creating something new that has nothing to do with the technology we already know:

"By 2030, we are likely to be able to build machines, in quantity, a million times as powerful as the personal computer of today. ... As this enormous computing power is combined with the manipulative advances of the physical sciences and the new, deep understandings in genetics, enormous transformative power is being unleashed. These combinations open up the opportunity to completely redesign the world, for beeter or worse: The replicating and evolving processes that have been confined to the natural world are about to become realms of human endeavour." (p. 243).

GNR, therefore, "can spawn whole new classes of accidents and abuses. Most dangerously, for the first time, these accidents and abuses are widely

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within the reach of individuals and small groups" (p. 242).

His psychological stance is one of surprise ("Nothing about the way I got involved with computers suggested to me that I was going to be facing these kind of issues." (p. 242)) and of fear ("accustomed to living with almost routine scientific breakthroughs, we have yet to come to terms with the fact that [GNR] pose a different threat than the technologies that have come before" (p. 240)). Joy's article in *Wired* appears as an attempt to go beyond surprise and adopt an active stance.

Reading "Why the future doesn't need us", I felt myself sympathetic to Joy's psychological stance (which is also mine), and that's probably why I gave it careful consideration: if a person from a culture similar to mine sees this type of problem, involving the very nature of the research going on in our field, I thought, I must also worry. Moreover, my experience as a researcher in areas like CSCW, communityware and i3 tells me that Bill Joy is right when he says: "My personal experience suggests we tend to overestimate our design abilities." (p. 244): we can tell hundreds of stories about failures of Information Systems and tools due to recognisable design errors.

From this point of view, our concern as designers of applications that support communities should be greater than that of Bill Joy, who is a designer of microprocessors, operating systems and programming languages. We know in fact that systems designed to support people in their work or social relations are frequently ineffective and sometimes obtrusive; that such systems tend to prevail on their users by imposing on them rules of behaviour that are inadequate in the situation the users are in; and that they are based on the rational instead of what is reasonable. We know also that systems are effective only to the extent that they offer their users new possibilities of behaviour and learning.

Our current knowledge probably can't tell the designers of GNR and their applications how to design systems that are not threatening human life; but it can help public opinion to recognise the perils inherent in these types of technology and applications. We should therefore react positively to the Bill Joy's call and play our role in the debate.

And it is my opinion, in fact, that our role in the debate on GNR is not only to express an ethical worry about how research outcomes will impact on human life, but also, and mainly, to develop a design approach that is capable of guiding the development of the aplications of powerful technology while avoiding the risks of "overestimating our design capabilities". We should discuss if there are other ways, apart from calling things to a halt when faced with risky projects, to create the conditions for safe research in fields like GNR.



Worldwide webcast

How do you change the world from a small farmhouse in a rural location, when you have plenty of passion and ambition but no money?

I have a passion for using advanced Information Communications Technology (ICT) to help local communities discover and harness their skills and talents in ways which build social and economic wealth. My small new-media technology company, Mass Mitec, initiated the ComKnet (Community Commerce and Knowledge Network) project, based in Market Harborough (England). Here is the story behind the world's first interactive webcast on using ICT to build the communities of the future.

In November 1999 I attended a Picturetel prelaunch demonstration of a new visual collaboration technology called eVideo which effectively delivers interactive virtual seminars with full audio and video streaming over both internet and intranet. Recognising its potential to engage a global audience in sharing knowledge and awareness of ICT for social change, I floated the idea of a virtual seminar to the European Product Marketing Manager. To his credit he hid his scepticism about this grand ambition and agreed in principle for us to hold such an event which Picturetel would host free of charge.

The next challenge was to create content worthy of the event, and I appealed for local expertise to record a 30-minute video about a vision for ICT in our community. Two people stepped forward. One turned out to be an ex-BBC cameraman with a degree in sociology, the other a current Hollywood Special FX technician (he did the flying sequences in Superman I). Both of them happened to live within a mile of me... The video linked our ambitions to become the birthplace of a communications revolution with the achievements of former Harborough resident Thomas Cook, who did for the railway network what we are planning to do for the internet.

I set up a web site (http://www.harborough.org. uk/webcast/webcasthome.htm), sent out invitations via email and discussion lists, and soon had 250 registrations for the event from all around the world. On the big day, I went to Picturetel HQ in Slough where they had set up a "studio". Our plan was to have a 15-minute intro, followed by the community video during which we could assess questions keyed in by the audience, and finish up with 15 minutes dedicated to answering the questions. What actually happened was a revelation. Almost from the beginning of the webcast, questions flooded in and were answered by the audience themselves. Technical problems with the video and audio were discussed between Australia and Canada and philosophical questions about technology and society were debated at a global level, all in real time, whilst the webcast was going out.

There were some unfortunate difficulties with video and audio streaming during the live event (partly due to the level of demand we had created) but the foundations have been laid, key relationships with other global pioneers created, and the world is now our oyster. David Wortley Mass Mitec dwortley@massmitec.co.uk





David Wortley is owner and founder of Mass Mitec, a new media technology company specialising in community development through visual collaboration, knowledge sharing and e-commerce. He has now set up a permanent discussion forum for the use of virtual seminar technology for community building and corporate knowledge sharing (see http://www. egroups.com/group/virtualseminars) and is currently seeking finance to establish an Application Service Provider (ASP) business

News

CG elections coming up. Women alert.

Mimo Caenepeel University of Edinburgh mimo@cogsci.ed.ac.uk As is customary, this year's i3 Annual General Meeting (AGM), to be held at the i3 Annual Conference in Jönköping, will (among other things) elect a new i3 Coordinating Group (CG) for the year from September 2000 onwards.

A new CG is elected each year. A call for candidates is sent out by email in the run-up to the AGM, and all i3 members can propose themselves or other i3 members as CG candidates. All i3 members are entitlled to vote at the AGM as well.

The i3 CG meets four to five times a year to discuss and make decisions on i3 issues and policies. The meetings are normally held at destinations that are easily reached from most parts of Europe (Amsterdam, Brussels, London, Paris) or in conjuction with the i3 Spring Days or the i3 Annual Conference.

The CG serves an important decision-making function, and balance is an essential aspect of its make-up. Its members should represent different European countries, different projects and different research programmes. Given the fact that women play a strong role in i3 projects at all levels, gender balance seems a natural consideration as well.

In the case of the CG for the year '99 – 2000 ten male, and no female, candidates were put forward in response to the initial call for proposed members, and these ten men were elected unopposed at last year's AGM in Siena. When someone at the meeting drew attention to the absence of women

members, the newly-elected CG was granted power by the AGM to co-opt a further two women members (to bring its membership up to the agreed maximum of twelve). A new call, directed specifically towards women candidates, was sent out, in response to which ten women were put forward. From these the all-male co-opted two women members (Rossella Magli and Ana Paiva).

While this may (arguably) have been the best way of introducing an element of gender equity into this year's CG, the scenario as a whole remains warped and gives rise to many questions. Yes, there was not enough time between the initial call for CG candidates and the election of the CG at the AGM; nevertheless ten men were put forward first time round. If women were not interested, then why did ten women candidates emerge in response to the second call?

Wherever we look, there are enough men in decision-making capacities There are more than enough women in i3 who could make a valuable contribution to the i3 decision-making process. Let's hope that this is reflected this year in more women CG candidates first time round, so that there's no need for unsatisfactory half-measure measures after the event.

For more on the rules governing the decisionmaking process in i3, see i3net's contract at: http://www.i3net.org/about/i3-pp161198.html





LiMe launches series of weekly seminars

The i3 project Living Memory (LiMe) is organising a series of seminars on the theme 'Working with Open Communities'. 'Open communities' are more loosely defined communities, in contrast to workplaces, government and so on.

The series started at the beginning of May and will run till the end of July. The seminars are held at Queen Margaret University College, Edinburgh. Topics so far have included 'More tales from the Legible City: experiences building social virtual spaces' (Steve Pettifer); 'You've got mail: interactional properties and Social Organisation of Domestic Papermail' (Venetia Evergeti) and 'Literary Practices and their Role in how Local Knowledge is Sustained' (David Barton). On 17 July Alessandra Agostini is speaking on 'Reinforcing and Opening Communities through Innovative Technologies'.

For more information contact Katie Bates (Kbates@qmuc.ac.uk) or Eric Laurier (Elaurier @qmuc.ac.uk).

Campiello embarks on two months of experimentation and testing

The i3 project Campiello has entered the final development stage of its prototype, which is being tested in Venice and Chania (Crete) throughout May and June 2000.

Campiello has created a prototype of a multimedia system that people can interact with by means of personal computer, paper and large screen. The idea is to help art-city communities strengthen their social relations, regain possession of their neighborhoods and rethink tourism as a form of hospitality. In particular, Campiello lets people who are active in a local community create knowledge bases of the neighborhood and inhabitants, and then make this knowledge available to others The system allows both community members and tourists a better chance to comment on, evaluate and benefit from this information.

Experimentation started in Venice on May 30 and will finish on July 2. During this period classic flyers are being distributed in bars, restaurants, churches and other public places around town. At the same time the Campiello system is accessible from two stations in the Castello district, where residents and tourists can interact with it by means of its various interfaces. Concretely this means that residents can print out a traditional Venetian recipe, discover the names of the last craftsmen in the district, register for further info and advice about something on the basis of their own personal interests, discuss the evening's agenda after seeing the local program on a large screen, comment on performances, check out the opinions of others on the most disparate subjects, and so on...

The experimentation phase was opened officially on May 30 with a convention which included topics of discussion related to the Campiello project and the social impact advanced IT research in general; Simon Bensasson was one of the guest speakers. The convention was followed by a onehour Guided Tour of the Campiello system in the afternoon.

For more information: http://www.l3net.org/ser_pub/publications/ exhibitions/try_camp.html, and the Campiello web site: http://www.campiello.org



A Campiello "community wall"

New i3 members

Three new member sites have joined i3. They are:

- Universita degli Studi di Bari. Contact person: Fiorella de Rosis (fide@mbox1.flashnet.it)
- University of the West of England, Bristol.
 Contact person: Peter J Thomas

New faces at i3net

I3net recently hired two new people. A warm welcome to:

Nanett Mosumgaard, Nanett will handle conference matters and support the conference organising committee as well as the CG. She has a university degree in English and German (with a specialisation in technical and juridicial translations) and has many years experience as an executive secretary in the private sector.

Svend Kiilerich. Svend (who has a BA in German and English) was recently hired as i3net manager; he is the successor of Lars Heide, who has moved on to a position at the Copenhagen Business school. (peter.thomas@uwe.ac.uk)

• Universitaet Bremen – artec. Contact person: Wilhelm Bruns (bruns@artec.uni-bremen.de)



Nanett Mosumgaard Email: namo@nis.sdu.dk Tel: (+45) 65 50 35 54



Svend Kiilerich Email: kiil@nis.sdu.dk Tel: (+45) 6550 3543



The Foundation for the Disabled awards Niels Ole Bernsen the Research Prize 2000

i3 coordinator Niels Ole Bernsen was recently awarded a prestigious award (marked by a painting "that cannot be described in words" and DKK 100.000) for his efforts at improving the conditions for the disabled.

Niels Ole Bernsen is founder and head of the Natural Interactive Systems Laboratory (NISLab) at the University of Southern Denmark, which



is carrying out research into future interactive systems for ordinary users. Instead of focusing on the use of well-known interactive systems with screen, keyboard and mouse, NISLab is developing communication systems based on speech, which understand and communicate by means of gesture, speech, facial expression etc. This will enable disabled people to take part in the information society.

The Research Prize of the Foundation for the Disabled is awarded every year to one or more researchers who have contributed in a significant wa to improving the lives of physically disabled people. The award ceremony took place in the assembly hall of the National Museum, Copenhagen, Denmark, on Thursday 25th May 2000.

The i3 Partnership Programme is currently trying to organise a conference for teachers of disabled children, at which the most recent relevant i3 work in this area will be presented. For more information please contact Marc Blasband (cplr@worldonline.nl).

Marconi invests £40m in new research centre at Cambridge University

It was announced officially on March 30: the internet and telecommunications equipment group Marconi is to invest \pounds 40m (63 MEuro) in a new communications research centre at Cambridge University.

The research centre is to rival the MIT Media Lab in the US. In the words of one insider, it is "designed to provide intensive hothouse research and help Britain challenge the American leadership of the global e-revolution". It is hoped that the centre will provide the foundations for high-growth, cutting-edge companies, and that it will inspire new products.

The deal includes \pounds 10m from Marconi to build research facilities at the Cambridge site. The company will also provide \pounds 18m to fund a six-year research programme, which will involve around 200 scientists, and \pounds 12m for a laboratory staffed by a further 200 of its own researchers.

Consultations taking place for Advanced Learning Environments

The European Commission is currently consulting on RTD for 2001 and beyond regarding Advanced Learning Environments. A first discussion paper has been produced, feedback and ideas are currently being explored. www.proacte.com/fora/index.htm

where you will find the reports and discussion fora.or contact Peter Wintlev-Jensen (Peter.Wintlev-Jensen@cec.eu.int)

For further information please consult:

Fourth IST call expected to be launched any time

The fourth IST call for proposals is expected to be launched towards the end of June. It will address two action lines, namely III.3.3 (Multilingual communication services and appliances) and III.5.1 (Support measures).

A pre-proposal feedback service is available. Details of the pre-proposal submission form are available at:www.HLTCentral.org/hlt/call-for-proposals/ outline-online_call3.asp More information on current and planned calls is available at: www.HLTCentral.org/hlt/call-forproposals/index.asp Any queries should be sent to hlt@cec.eu.int

Building Tomorrow Today

Community, Design and Technology Jönköping, 13–15 September 2000

Nyborg '98. Siena '99. Jönköping 2000. i3 AC 2000 is the third i3 Annual Conference, and the most ambitious one to date. It features a strong conference programme, invited speakers of international

Conference content and structure: four pillars

Parallel thematic paper sessions of invited and refereed papers.

Topics include:

- Smart homes
- Microworlds and agents for learning
- Physical-virtual environments
- Information spaces and visual interfaces
- Collaboration and community computing
- Story-telling and narrative

Ample time for open discussion. Results of the thematic sessions will be reported on at special plenary sessions.

http://i3-ac2000.informatik.uni-duisburg. de/content/paper.html

Invited speakers

- Pierre Dillenburg (University of Geneva)
- Pelle Ehn (School of Arts and Communication, Malmö)
- Hiroshi Ishi (MediaLab, MIT, Cambridge (MA))
- Henning Johansson (School of Education and Communication, Jönköping



University)Interactive performances

Live performances involving audience interaction and multimedia technology.

http://i3-ac2000.informatik.uni-duisburg. de/content/performance.html

Workshops

Practical sessions with a clear focus and a lot of scope for discussion. Special emphasis on the interaction between designers of a system and its (potential) users.

http://i3-ac2000.informatik.uni-duisburg. de/content/workshop.html

Exhibitions/demonstrations

A spacious area of the conference centre has been reserved for project exhibits and demonstrations.

http://i3-ac2000.informatik.uni-duisburg. de/content/exhibition.html





Location, conference centre, hotels

Jönköping is a lovely city with a flourishing university. It is situated on the southern part of Lake Vättern, near Sweden's longest lake-side beaches (which are about five minutes walk from most of the city hotels). If you come by plane you'll get a wonderful view on your way in, whichever direction you come from..

The conference will be held at the Elmia Conference and Trade Fair Centre, which offers bright, spacious conference facilities (including an attractive exhibition space) and excellent technological equipment.

Conference participants are offered a choice of seven different hotels, one of which is at the Elmia Conference Centre, with the other six in the centre of Jönköping. All offer a high standard of accommodation and special rates for conference participants as well as substantial weekend reductions. There will be frequent buses between the city hotels and the Elmia Conference Centre during the conference, as well as coaches taking particpants from the Scandic Hotel Elmia to the various city centre events.

All hotel bookings need to be made through the Jönköping convention bureau by 11 August 2000, using the form on the web (http://www. itprojekt.com/btt/) or by telephone (+46 36 10 71 71) or fax (46 36 10 77 68).

On the social agenda (among other things)

- Wednesday 13 September: conference dinner with evening entertainment at the "spegelsalen" ("mirror hall") of the Stora Hotellet in the centre of Jönköping
- Thursday 14 September: all conference participants are invited to a big party to celebrate the opening of a new building which brings the whole of Jönköping university in one location.

A special "post-conference" programme will help you explore the city and its beautiful surroundings — on your own or in the form of various organised activities.

Childcare

Childcare will be provided if there is sufficient interest. Please contact Marilyn Panayi (panayi@nis.sdu.dk) for more information.



For more information

To join the conference mailing list for further information, please send email to majordomo@i3net.org with the sole text body: subscribe cdt (subject is irrelevant).

or contact:

Building Tomorrow Today i3net secretariat The Natural Interactive Systems Laboratory University of Southern Denmark, Forskerparken 10 DK-5230 Odense M, DENMARK Tel : (+45) 6550 3551 Fax: (+45) 6315 7224 Email: namo@nis.sdu.dk

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Flying?

Scandinavian Airlines System (SAS) is the official airline for i3 AC 2000 and will fly you to Jönköping Axamo airport (via Copenhagen). At the time of the i3 Annual Conference, a larger aircraft will be in service on the Copenhagen — Jönköping route.

SAS offers special reductions for all conference participants (all ticket categories) flying to Jönköping. To take advantage of the reduced price, you need to present your personal SAS code (which you will receive with your conference registration confirmation) to your local travel agent or any SAS ticket office, at the time of your booking. Upon arrival on 12 September you will be welcomed at the airport by SAS staff who will escort you to buses taking you directly to your hotel or the Elmia Conference Centre.

SAS also offers a conference check-in facility at Elmia.

Book review

dot.community

LindaTetzlaff IBM, TJ Watson Research Center lst@us.ibm.com





Jennifer Preece: Online Communities, Designing Usability and Supporting Sociability. Wiley, June 2000 ISBN 0471805998

Community (always an elusive term) on the Web is pressed into service by civic activists, hobbyists, patients, businesses and educators alike. In Online Communities, Jenny Preece pragmatically defines her subject as regulated social interaction among people, with a shared purpose, mediated by a computer. Communities touched on support distance learning, medical and social support, playful interaction and professional interaction. Forms include chats, bulletin boards, listservs, MOOs, MUDs. Roles cover participants, moderators, lurkers and experts. The book broadly surveys issues related to the social aspects of Web computing, emphasising the relationship between application structure and social effect. The subtitle division into issues of sociability and usability is a pervasive organising principle for the text, with sociability directed outward to the sociological concerns of interpersonal interaction. and with the purview of usability constrained to issues of learnability and ease of use.

Dr. Preece draws extensively on empirical research and prevailing wisdom primarily from the disciplines of human computer interaction (HCI) and computersupported cooperative work (CSCW), but also from sociology and psychology. Preece's own work in online communities drives the vision and



contributes to empirical foundations of the book. Throughout, observation, theory and solid common sense inform strategies for design, implementation and administration of online community.

The book targets a broad readership, ranging from students to community administrators and developers to researchers. It makes no assumptions about previous knowledge; it is not technical, and it avoids specific product or technology recommendations, preferring instead to focus on the relationship between relevant user considerations and functional features of the software and applications. In an effort to be a self-contained text, it reviews state-of-the-practice HCl guidelines. As a result the book most broadly serves the needs and interests of people embarking on online community development, and computer science students interested in social computing applications. Advanced students in HCI programs and HCI researchers will be interested in material focusing on the special concerns of online communities, but will want to skim or skip sections on usability.

The book is organised into two parts: Part One introduces the reader to the world of online communities, both by example and by the research that informs it; Part Two explores the pragmatics of developing, running and nurturing online communities. Amply referenced chapters explore various aspects of this online world, cataloguing social and usability considerations, detailing case studies and augmenting with further examples and commentary. Each chapter concludes with a consolidating summary, an annotated bibliography and complete references.

The book exposes numerous opportunities for research, both by explicit suggestion and as it sweeps across the relatively virgin territory of issues in online communities. Developed as an adjunct to a semester length course, the book is a natural text, and to the best of my knowledge unique the domain. Explicating its use in the classroom largely by example, it is well organised and rich with possibilities for satisfying and effective group projects. Its insightful consolidation of important considerations of this evolving genre will be of interest to professional readers as well.



Future events

Links to all events on this list are available at http://www.i3net.org/mail/i3news/

Third Workshop on Human-Ccomputer Conversation

3-5 July, 2000 Bellagio, Italy

IV2000, Symposium of Information Visualisation in Digital Libraries IEEE International Conference on Information Visualisation 19-21 July, 2000 London, England

AOIS-2000, 2nd International Bi-Conference Workshop on Agent-Oriented Information Systems 30 July, 2000 Austin, Texas, USA (at AAAI-2000)

Integrating Information from Different Channels in Multi-Media-Contexts 6-18 August, 2000 Birmingham (UK) (at ESSLLI 2000)

> AMCIS 2000, 2000 Americas Conference on Information Systems 10-13 August, 2000 Long Beach, California

ISSEI2000, First International Workshop on Developing Creativity and Large Mental Outlook in Computer Age 14-18 August, 2000 University of Bergen, Norway (at CLMO'2000)

DIS 2000, Designing Interactive Systems 2000 17-19 August, 2000 New York, USA

ECAI'2000/PAIS 2000, 14th European Conference on Artificial Intelligence Prestigious Applications of Intelligent Systems 20-25 August, 2000

Berlin, Germany

CAS'2000, Eurographics Workshop on Animation and Simulation '2000 21-22 'August, 2000 Interlaken, Switzerland

ECAl'2000 Workshop on Artificial Intelligence In Mobile Systems 22 August, 2000

Berlin, Germany

ECAl'2000 Workshop, Ontology Learning 22 August, 2000 Karlsruhe, Germany

AH2000, International Conference on Adaptive Hypermedia And Adaptive Web-based Systems 28-30 August, 2000 Trento, Italy IGC2000, First linternational Workshop on Iteractive Graphical Communication. 30-31 August, 2000

London, UK

KES 2000, Fourth International Conference on Knowledge-Based Intelligent Engineering Systems & Allied Technologies 30 August-1 September, 2000 Brighton, UK

Workshop On Haptic Human-Computer Interaction I September, 2000 Glasgow, UK

Euromicro Workshop on Multimedia and Telecommunication 4-7 September, 2000 Maastricht, Netherlands

> HCI 2000 Usability or else! 5-8 September, 2000 Sunderland, UK

CVE 2000, ACM Collaborative Virtual Environments 2000 10-12 September, 2000 San Francisco, USA

> The i3 Annual Conference 2000 13-15 September, 2000 jönköping, Sweden

One-day workshop on Evaluation of Information Systems 15 September, 2000 London, UK

ICDVRAT 2000, Conference on Disability, Virtual Reality and Associated Technologies 23-25 September, 2000 Alghero, Sardinia, Italy

HUC2K, The Second International Symposium On Handheld Aand Ubiquitous Computing 25-27 September, 2000 Bristol, UK

International Workshop on Tools for Working with Guidelines 7-8 October, 2000 Biarritz, France

ICMI'2000, The Third International Conference on Multimodal Interfaces 14-16 October, 2000 Beijing, China.

ICSLP'2000, International Conference on Spoken Language Processing 16-20 October, 2000

i3net member sites

Austria

University of Vienna

Belgium

Linc vzw Public Library of Tumhout Riverland Next Generation - Starlab Université de Liège Vrije Universiteit Brussel

Denmark

Aalborg University Aarhus University LEGO Dacta Odense University

Finland

Abo Academy University Helsinki University of Technology Nokia Research Center

France

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Germany

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Greece

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Ireland

University College Dublin (UCD) University of Limerick

Israel

Ben-Gurion University of Negev (CFE)

Italy

Alcatel Italia Comune di Reggio Emilia Consiglio Nazionale delle Ricerche Domus Academy Innovative Devices & Engineering for Automation (IDEA) ITC-IRST, Istituto per la Ricerca Scientifica e Tecnologica ROMA RICERCHE Scuola Superiore S Anna (SSSA) SKYDATA Università degli Studi di Bari Università degli Studi di Siena Università di Milano

NL

ACS-Interactive Media Research & Projects IPO - Instituut voor Perceptie Onderzoek Meru Research Netherlands Design Institute Philips International Philips Research Laboratories

Norway

Human Factors Solutions (HFS) SINTEF Telecom and Informatics Telenor R&D

Portugal

Centro de Novas Tecnologias da Informaçao, Lda. Instituto de Engenharia de Sistemas e Computadores

Slovak Republic

Univerzita Komenskeho V Bratislave

Spain

IETT (Instituto Europeo de Transferencia de Tecnología) IIIA - CSIC Consejo Superior Investigaciones Cientificas Institut d'Investigacion Intelligencia Artificial REM Infographica Universidat de Barcelona Universidat Politecnica de Madrid Universidat Pompeu Fabra

Sweden

Göteborgs Universitet Högskolan för lärarutbildning & kommunikation Hogskolan i Halmstad (NCFL) Landskrona Kommun-Emalskolan Levande Böcker Royal Institute of Technology KTH Swedish Institute of Computer Science SICS Uppsala University

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