

Report from Basic Research Symposium at CHI 99

Yvonne Wærn and John McGrew

WHAT IS THE BASIC RESEARCH SYMPOSIUM?

Many people have asked us what basic research in human computer interaction may mean, and the answers are as many as the meanings of basic research in HCI. However, we are rather confident in what we mean by the basic research symposium at CHI. Here are some quotations from our invitation to potential participants.

The CHI Basic Research Symposium is a long-running special event that represents an opportunity for researchers and reflective practitioners from different disciplines and fields of practice to exchange ideas and insights from their own fields and thereby expand their vision of human-computer interaction. This two-day event is a cross between a mini-conference and a workshop. Participants are selected by a program committee that reviews submitted position papers to bring together a diverse group of researchers with innovative research underway. The symposium itself includes interactive research presentations and group discussions around common themes.

Topics and Themes

Like the CHI conference itself, the Basic Research Symposium's content is based on the research topics addressed in submissions. Past symposia have spanned all sub-fields of human-computer interaction ranging from human notions of time to interface construction tools, research methods, education and beyond. The program committee selects submissions based on quality alone, and then attempts to organize a thematic program.

Mission and Vision

The mission of the CHI Basic Research Symposium is to provide a venue where researchers conducting ground breaking, controversial, and emerging research can discuss that research with a diverse group of peers. This mission has three important components: ground breaking, controversial and emerging research; discussions; and diverse group of peers.

Ground breaking, controversial, and emerging research

The symposium does not seek "archival" research that has been well established and completed. Much of the research at the symposium will eventually mature into work suitable for the CHI conference and journals, but it is equally important to include research that may fail. This is not a venue for safe results.

Discussions

Participants in the research symposium do not simply present research with nominal time for questions; discussion and feedback are integral to the symposium, as are the total group and small-group discussions.

Diverse group of peers

Each year the symposium attracts a group of people from all over the world and from all disciplines related to HCI. Senior researchers and graduate students participate side-by-side in a non-threatening and lively atmosphere.

Our vision for this year's Basic Research Symposium is for each participant to leave with a better understanding of the research methods, goals, and frontiers of a wide range of HCI disciplines. Each participant should contribute to the

collective understanding and leave with new ideas for conducting, integrating, and applying research.

PREPARATIONS FOR BRS 99

We had many people who were interested in participating, and the reviews of their papers were in general very positive. We ended up accepting 15 papers, with a total of 20 participants. One participant was particularly asked to serve as a discussant. We were able to divide the participants into three topical groups, concerned with the following issues: interface design, co-operation and learning.

Group 1

Issues related to interface design: Relationships to physical events; contextual issues; sound as interface, measurement issues. The participants were:

- John H. Flowers (jflowers@unlinfuo.unl.edu). *A Need for Basic Research on the Use of Sound to Explore and Represent Data.*
- Lars Oestreicher (larsoe@nada.kth.se), Helge Hüttenrauch (hehu@nada.kth.se), Kerstin Severinsson-Eklund (kse@nada.kth.se). *Where are you going little robot? - Prospects of Human-Robot Interaction.*
- Albrecht Schmidt (albrecht@teco.edu), Hans-W. Gellersen (hwg@teco.edu). *Adaptive Context-Aware User Interfaces.*
- Leon Watts (leon.watts@imag.fr), David Thevenin (david.thevenin@imag.fr). *Principles of digital-physical fusion and Environmental Interactive Systems.*
- John F. McGrew (jfmcgre@ptss.com). *The Use of a Genetic Algorithm in Facilitated User Interface Design Sessions*
- Tom Stewart (tom@system-concepts.com). **Discussant**

Group 2

Issues related to co-operation: Analysis, support. Human versus computer? The participants were:

- Dahlbäck (nilsd@sics.se). *Some Suggestions for Expanding the Conceptual framework for HCI.*
- Françoise Détienne (Francoise.Detienne@inria.fr), Willemien Visser (Willemien.visser@inria.fr), Patrick d'Astous (dastous@rgl.polymtl.ca), Pierre Robillard (pnr@rgl.polymtl.ca). *Two complementary approaches in the analysis of design team work: the functional and the interactional approach.*
- Tom Gross (tom@ifs.uni-linz.ac.at). *Supporting Awareness and Cooperation in Digital Information Environments.*
- Christopher Lueg (lueg@ifi.unizh.ch). *Supporting Situated Information Seeking: Communication, Interaction, and Collaboration with Per Persson (perp@sics.se). AGNETA & FRIDA: Business and Pleasure?*

Group 3

Issues related to learning: environments, mental models, narratives. The participants were:

- Dan Suthers (suthers@hawaii.edu). *Representational bias and collaborative inquiry.*
- Lydia Plowman (Lydia.Plowman@scrc.ac.uk). *Narrative and Learning.*
- Cañas, J.J., Antolí, A., Quesada, J.F. (delagado@goliat.ugr.es). *Predicting learning of new tools from knowledge representation.*
- Eva R Fåhræus (evafaahr@dsv.su.se). *Tutoring for Learning in Groups- Using Electronic Conference Systems*
- Michael Twidale (twidale@alexia.lis.uiuc.edu). *Design for Over-The-Shoulder Learning.*

GEMS FROM THE SYMPOSIUM

Here we want to point out some of the gems, without identifying any particular papers or people. The gems grew out of our discussions as much as out of the presentations. It is important to understand that a symposium is a collective activity, in contrast to the individual presentations at the CHI conference.

Gems from the Group Concerned With Interface Issues or "Beyond Eye and Hand"

Interface research has mostly been related to visual outputs and hand inputs.

In this group, other approaches were suggested and discussed. Auditory input, for instance, might be useful for applications serving tasks where the eyes are busy tasks such as in brain surgery or cockpits. A more traditional application of sound is as an assisting technology for blind/visually impaired users. In order to develop good applications based on auditory output we have to know more about auditory cognition, as well as the interaction between audition and vision, something to be considered in the development of multimedia.

Interfaces to interactions with the physical world

Another issue relates to the development of hand-held devices. These present quite new opportunities to indicate physical context to its users. We can see this as a development toward a more implicit interaction between human and machines. What about a device that can sense and adapt to its different positions: hand, table, suitcase, outdoors? Wouldn't it be useful to have a device that could keep quiet during meetings and adjust to the needs of a person walking, for instance? Technically, some context can be detected by the usage of sensors, but what sensors do we need to understand the relevant environment?

The relation to context may be still more evident when we approach the issue of how to benefit from household robots. How may we be able to interact with these, when we do not know in advance about their context? How may we talk to robots at a distance, and how can we repair errors? The use of such robots poses many basic issues, such as how to analyze the tasks for the robot and for its user, to identify how

much the robot has to know and to specify a relevant level of detail for the environment description to the robot.

These issues show that in the future we have to consider the interaction between the physical world and the software world more seriously than has been done hitherto. Such a consideration poses still more basic problems, such as how to integrate human being's interaction with the environment on the one hand and with the information in the machine on the other. We need a representation and a conceptualization that can cover this in theory as well as in practice. Some suggestions were given, but we believe the issue has to be considered more.

Design iterations

The integration between theory and practice is at present performed by human beings, and there may be an opportunity to develop their intuitive view on systems in a semi-formal way. Rather than looking for an evaluation of a system as something distinguished from system development itself, it is possible to represent subjective opinions on a system in a formal way. These representations may then be used in an iterative way to develop systems that may not be optimal but satisfactory to the users.

Gems from the Group Concerned with Co-operation Issues or "Breaking Out From the Individual - No User Is An Island"

In this group, the issue was approached of stretching out HCI to a wider range than the single user - single computer paradigm. This does not imply that we have to fall into the arms of CSCW paradigms.

Actual co-operation between people

One important aspect considers the actual co-operation between people. It is obvious that people during their co-operation approach many issues that are not included in the formal specification of their work. During design reviews, for instance, it may be shown that people not only review designs, but also suggest alternatives, argue for and against alternatives. It is also evident that people with different roles will have different goals. Users of a system are more interested in content, whereas system experts are more interested in form. We need both, but how may these aspects be integrated?

Another issue relates to the "social"

There is much more than direct co-operation to take into account in understanding the social aspect of HCI. New directions of research approach issues such as "social navigation", in searching for information on the web. It was suggested to populate the web with other users, and thereby offer them both awareness of and cooperation with each other. There may be much to gain by knowing how other people have navigated before. We may imagine shared bookmarks, as well as tracks of people. Of course following in others' footsteps raises privacy issues, a problem that most CSCW researchers are aware of. A way of solving this is to require people to ask each other for permission to follow. The social support can of course be extended beyond

the particular task of "navigation", to learning in particular and to knowledge development in general.

Aspects of a social interface

Another approach to interface design is to look for other aspects of interfaces than time to learn, time to perform a task, or other efficiency related aspects. When interfaces are getting more social, such as when we have agents or advisors at our screen, what aspects are then important? New categories of users may need new ways of looking at systems. What about presenting information in a humorous way? One of our participants showed an example of such an interface, that arouse a good deal of questions: Who would benefit from such an approach? Since users differ, it might be necessary to give the user an opportunity to set the level between serious browsing and humorous comments. Another follow-up of such an approach is to make user comments searchable - by for instance "emotional annotations".

Gems from the Group Considering Learning Issues

Learning has traditionally not belonged to the central issues of HCI.

However, CHI 98 broke the ice by having a track on learning issues. We propose that HCI may benefit from studying learning issues, as well as the opposite. In this particular group we found the following issues to be educational.

Multi-modality has to be analyzed

Time has passed since people thought that multi-modality *per se* was beneficial for learning (and interfaces). Instead it has been recognized that the efficiency of multi-modality, as all other HCI issues has to be related to the particular tasks the users have to perform. It is evident that co-operative learners may need some mechanism to keep track of issues they have discussed, and even better, some mechanism to support them in seeing what relationships they still have to elaborate. Matrices for presenting relationships might be better in this respect than graphs. However, it should also be asked if the representation may hamper the collaboration between students. This presentation considered work in progress, and we are very interested in seeing some data later.

Structure of material

Learning as well as knowledge needs some kind of structure, and one of our participants suggested that a "narrative" might be used as a hinge for the material to be presented. This is an interesting thought. Much of earlier research has been focused on conceptual structures, or mental models. However, such structures seem to be unstable, at least if we try to assess them in learners. Maybe a narrative is a more "natural" way of conceptualizing a structure.

Human support in technical settings

As most of us may agree upon, no user or learner may be left alone. Two presentations stressed this insight, and suggested some kind of learning systems design to cope with it.

First, it was shown that distance learning requires more work in order to keep students online. Both co-operative students and the teacher need to be in touch with the distant learners. Since distance learning implies that learners often are very alone, it is important to provide them with personal feedback. It is not enough to have fixed questions that are corrected at a distance. In a constructive learning situation, the learners also require a social context to be motivated to continue.

Another insight lies in the observation that people often "look over the shoulder" of experts performing at a computer. We all know the feeling that we miss something important, when we see an expert easily solve a problem with which we have struggled for hours. Can this "over the shoulder" learning be caught in an instructive system? We had a couple of glimpses of the possibility, glimpses that made us curious on the following steps.

AN OUTSIDER'S LOOK AT HCI RESEARCH

What does an outside critique say about the current research within HCI?

The following are the viewpoints of a journal editor with a long experience in editing a central journal. He meant that a journal editor wants short, condensed article and clear language with focus on problems. What he gets seems to be long articles with obscure language and narrow, disciplinary focus. Further, in terms of research, he sees theoretical research which is abstract, to general and difficult to apply to practical problems. On the other hand, he sees applications that are very specific and difficult to apply to other domains.

In general, we can ask ourselves if we can do better? This is a challenge to be carried with us for future CHI-work, both within and outside the Basic Research Symposium!

GENERAL REFLECTIONS

It might seem as though the issues considered at this symposium generated more questions and loose ends than answers and solutions. This might be irritating for designers, who want practical advice, as well as for HCI researchers who would like to see where basic research is going. However, we believe that research continues with small steps forward, and that one of the first steps consists of daring to leave issues open. Those issues that might be solved at once do not belong in basic research. When we have found a solution, the issue is moved from outside of basic research to the domain of applications. Thus, although we might find basic research swept in mist, the mist and mysteries move forward, leaving solved issues behind.

We welcome you to join us! We encourage you to bring your ideas and thoughts to the basic research symposium. The basic research symposium continues, as long as there are basic research issues to discuss.

Authors

Yvonne Wærn
Department of Communication Studies,
Linköping University, SE 581 83 Linköping, Sweden
Yvonne.waern@tema.liu.se

John McGrew
Pacific Telesis Shared Services
5850 Las Positas Boulevard
Pleasanton, CA 94588, USA
jfmcgrew@msg.pacbell.com