Interview with Ben Shneiderman

About Voting Machines, Cars, Policy involvement of the HCI community and much more

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Interviewed by Ivo Weevers and Wouter Sluis
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Ben Shneiderman is a professor of computer science at the University of Maryland. He is founder of the Human-Computer Interaction Laboratory (http://www.cs.umd.edu/hcil). He received his Ph.D. in computer science from the State University of New York. He has written extensively on human-computer interaction and human factors in computing, including books, articles and editorial contributions and received the ACM CHI Lifetime Achievement Award in 2001 (http://www.cs.umd.edu/~ben).

During the conference Interaction Design and Children at the University of Maryland, we had the great opportunity to conduct an interview with Ben Shneiderman. We are very pleased to be able to share with you this conversation.

Which user groups in the past were very influential in your work?

Ben: The awareness of the needs of different users is vital. The most important lesson from my years of running studies is that other people are not like me. They behave differently; they use technology very differently, and in surprisingly ways. I enjoyed working with museums and other educational environments such as the International Center of Photography, Smithsonian Institution, and the Library of Congress. In these environments, patrons come up and try to use an interface for the first time. The public access projects are fascinating because you have to work with very diverse user groups. The bright, motivated and healthy people will take care of themselves. Part of our professionalism is to remember those who are not well, not so capable, do not have financial resources and have low motivational. We are responsible to make the technology accessible to all.

Your lab has a strong focus towards children. How do insights about how children use technology shape your ideas about interface design?

Ben: Each time I look at another type of users, whether it is young children or older adults, it helps me to design a better interface for all. We learn that young children having a hard time to use the mouse precisely. But elders, with diseases, also have a hard time using the mouse precisely. So we build interfaces with large buttons, or alternative input devices to make selections easier for those users. Thinking about diversity helps you to think about quality for all.

Children require larger buttons; however, expert users have other wishes. How does this fit into the picture of universal usability?

Ben: Mature technologies, such as automobiles, have adjustable mirrors, adjustable sound, adjustable chairs, and adjustable steering wheels. A large expense for making a car is to make it adjustable, which is good for everyone. The adjustability is a benefit for every user.
When it comes to user interfaces, providing user control over font size, button size, or contrast, benefits all users. The lesson is not small buttons or big buttons. The lesson is user control.

Recently, the fourth edition of your book 'Designing the User Interface' appeared. Which issues and experiences had a great impact, since the first edition 18 years ago?

Ben: Two interesting early projects were the HomeFinder and the FilmFinder. The first was a radical idea in 1991 and used sliders to browse search results for homes in the Washington DC area; the concept of pointing, dragging and selecting the objects of interest with sliders was a great success. And soon after, we did the FilmFinder. Christopher Ahlberg made that one, returned to Sweden to finish his Ph.D. and formed a company called Spotfire in 1997, which now employs 150 people

(http://www.cs.umd.edu/hcil/spotfire/). For me the great satisfaction is to see how an idea goes from an implementation and a pilot study, to more refined prototypes, maybe even becomes commercial and, travels in surprising and interesting directions. Working with students to develop new ideas is still a great satisfaction.
Another earlier project that had a huge impact was the Hyperties hypermedia system (see http://www.cs.umd.edu/hcil/hyperties/). It refined the idea of the link -- certain words are highlighted and you can click on them. The idea of clicking to jump somewhere was a radical idea. It was great thrill to see that that idea became part of the web and be used so widely.
Another difference: The first edition of the book talks about commands, menus and new ideas of direction manipulation. By now direct manipulation is the dominant idea. The current edition describes the desktop environment, the web, mobile devices in every chapter and promotes universal usability throughout.

Which issues will be important in the near future?

Ben: Creativity is the next challenge. We need to support individual creativity to enable more people to be more creative. Enabling people to create something and make it public, even by simple software tools such as blogs and Wiki's, generates a huge response.
Other important issues will be empathy, trust, responsibility and privacy. I start from the human needs – if you can support empathy and trust, you will be able to create a successful technology.

Information en knowledge overload will increase more and more. Do have some thoughts on how HCI can and will play a role in managing the information society?

Ben: I think there is a lot of work to do in expanding on the ideas of information visualization. Creating well-organized information-abundant visual displays is important. I think the computer is a visual machine. We need to look more at pointing, zooming, dragging and selecting. I think we are only at the beginning of understanding how to implement direct manipulation. We need to scale up from a thousand to a million items on the screen. We need to use human perceptual skills more effectively. The notion of pre-attentive visualization tells us that one red dot stands out in a field of a million yellow dots. We have the capacity to spot outliers, to see trends, and we are only at the beginning in getting to understand how to design for greater success.
Additionally, we need to tame visual technology, so that it can be used for variety of applications. For example, I'm quite annoyed that airline reservation systems and Google are only text-based. They should have a graphical interface. I would like to look at thousands of search results at one time.

The last decades we saw a rapid development of new technologies and often the user came second or last. Although HCI is approaching, how do you think user-centered design can keep up with the new technologies?

Ben: It some cases user-centered design lags behind the development of new technologies. I have seen many technologically-centered proposals that were expensive, unproductive, and wasteful efforts. Examples are natural language speech interaction and anthropomorphic characters in business applications. One of the most important things that the HCI community has to accomplish is to put HCI first. That is also the spirit of the book *Leonardo's Laptop* (http://mitpress.mit.edu/leonardoslaptop). Focus first on human needs. Think about how we want to change the world, what people need in their lives and from that derive an agenda. That is a very important strategy, which I call generative theories. We have theories in HCI that are descriptive or predictive (like Fitts'Law), however, we need generative theories that will enable us to invent new technologies.

People in the HCI field try to think from a user point of view. People outside our field don't know this. How can expand our field and explain these principles outside the borders of the HCI community?

Ben: It happens by making success stories. *Leonardo's Laptop* talks about a theory based on human needs, based on relationships and activities. This creates a matrix of possibilities that I use to suggest novel mobile devices. I think the strongest opportunities for change are in E-government, e-healthcare, e-learning and e-business.
Look at online voting. There, we have a problem about trust. But when I look at what the technologists are doing, it makes me angry. The New York Times from last Sunday has a major editorial about voting machines "Who tests voting machines?" The whole focus of the article is the security and the reliability of the voting machines. But there is no discussion of the interface! You

could have a perfectly tested secure system, which was highly reliable from a software engineering point of view and total failure from the user point of view, because it is incomprehensible and therefore users will not trust it. Ben Bederson has led a project to test six different voting machines. I participated as an expert reviewer and I found that none of them is mature and adequately usable. Even if implementers make the technology sound, without the right interface, they are wasting their time.
And unfortunately, these voting machines will be used during the next elections. We will have problems. At the previous elections we had a problem with the voting form (butterfly ballot). That was just a matter of the interface. There was no issue of software reliability. Many people working in the voting area still don't get the message that a central issue is usability. Even after the 25 years of great successes of HCI, we are still struggling to make these issues visible to the general public.

Another example of an interface failure, which had a huge societal impact, was the problem of the FBI search interface for terrorists and the resulting September 11th attacks. Do you have any thought about HCI in relation to society?

Ben: With respect to terrorism there are serious concerns. The FBI's system for searching allowed only a single word search. So, users could look for 'aviation', or they could look for 'school', but they could not search for 'aviation school'. When a Congressional hearing was examining the performance of the FBI, the Senators were discussing this issue of interface design. For a short time HCI became a national issue.
I am in favor of technology that will enable airlines to screen passenger lists to search for those who are potentially dangerous terrorists. But we also have to protect citizen privacy. I'm concerned about the data mining efforts, and I supported the US ACM as an opponent to the Total Information Awareness project, that fortunately was cut out of the US government. There are excesses we need to be aware of. Professionals in HCI need to participate in these policy issues. If law enforcement agencies are going to use face recognition or other technologies, HCI professionals have to be involved. These are not easy issues, there is no perfect solution and no easy answers, but I do think it is important for HCI professionals to contribute their skills.

Do you recognize issues in the HCI that still need more attention?

Ben: One disappointment is that the HCI community is not sufficiently involved in policy issues. We are not stepping forward to participate in setting national research agendas. I would like to see the Dutch SIGCHI community propose a research agenda to the government prioritizing topics for research support. And that should happen in each country. I would like to see members of the SIGCHI community on governmental advisory boards for all socio-technical issues. Other technology groups, such as graphics, networking, and high-performance computing have organized their leadership to propose a research agenda and then they seek funding from the major government agencies. They are very successful; because they have joined together and they have a clear message that proposes a way forward. We need to do much more of that within the HCI community. We are mostly concerned with our own projects, when we should be thinking about the bigger picture.