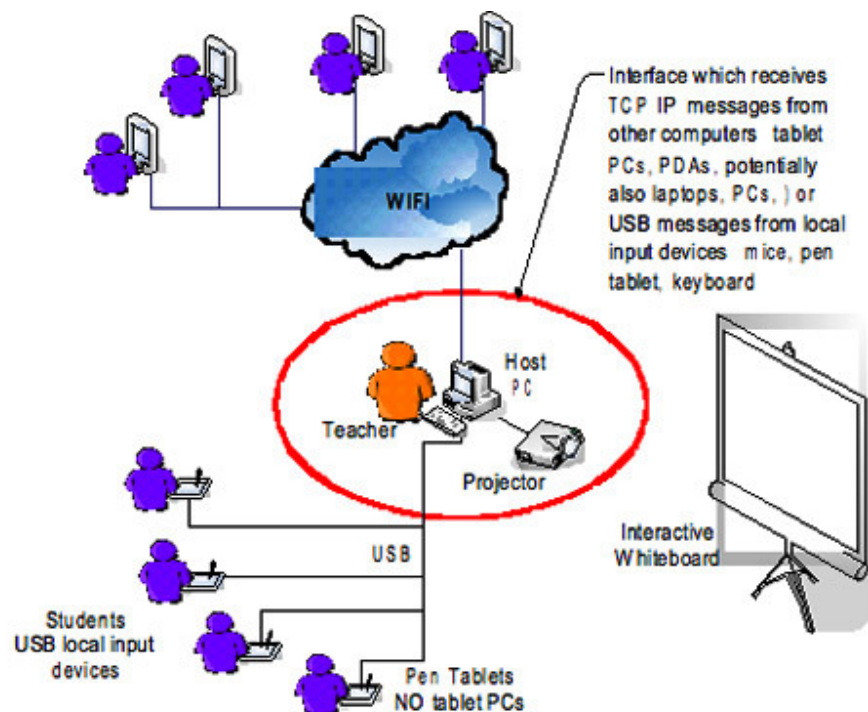


Easier Learning: interactive design patterns for classrooms

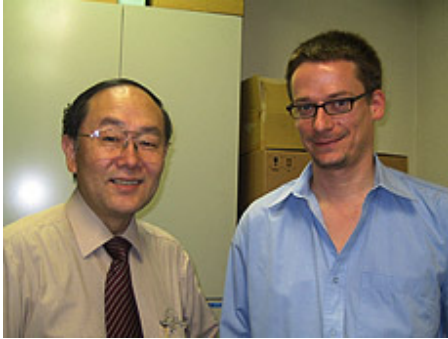
Category: [Worldwide](#), [Technology](#) 9 Apr 2007



As part of his research at Waseda university, Henning Breuer developed an interactive architecture for classrooms where students have a direct contact with the teacher's PC via their Wi-Fi or USB PDAs and Pen tablets they work with. The data is then projected to an interactive whiteboard with a touch screen.

Have you ever wondered (and probably meditated on that during long long classes) why the typical classroom / university setting can be so dull you just don't get the stuff into your head? Welcome Berlin-based [Henning Breuer](#) that specializes in interactive design patterns for learning environments: his research is about what kind of tools we need to work best in learning environments today. After four months of research at Waseda university in Tokyo, so PingMag grabbed him for a talk about his *interaction works* like his modified *tactile whiteboard* they were developing there...

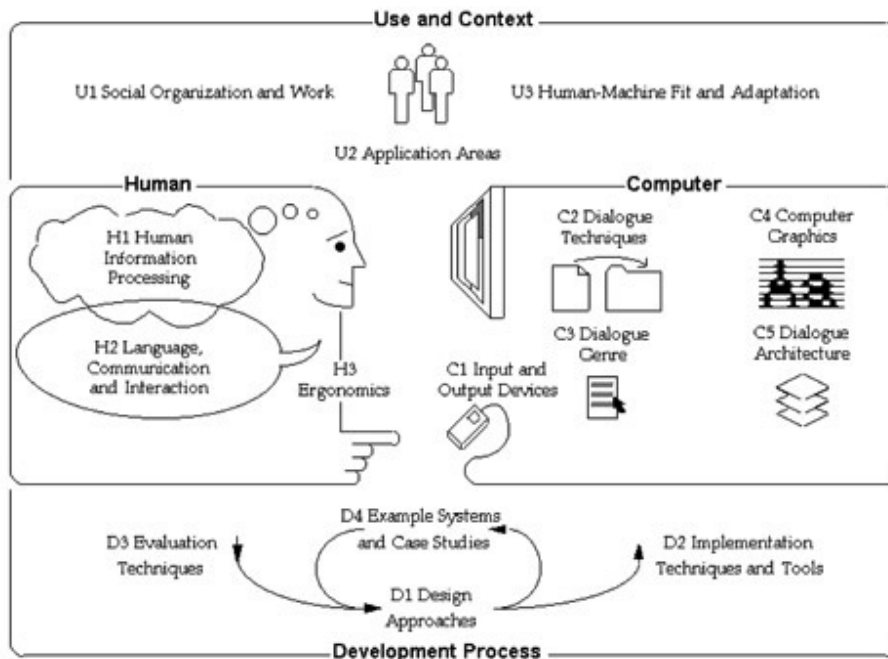
Written by Verena



Henning Breuer with Professor Matsumoto at Waseda university, Tokyo

Henning, you deal with *interactive design patterns for learning environments* not only with your own company Bovacon, also when you were part of the [Interaction Design Lab](#) at Potsdam university. For the last four months you enhanced your research at [Waseda](#) university in Tokyo. What do you exactly do?

My work is basically about [human-computer interaction](#), meaning the design, the implementation and the evaluation of interactive systems for human usability and to analyze the contexts of these usages. It is a mix of computer science, psychology and design, concerning everything connected with interactive interfaces, from recording devices to mobile phones to computers.



This is how it works between humans and technology: [scheme of human-computer interaction \(HCI\)](#) as explained by the [SIGCHI](#), the society for human-computer interaction.

And the practical approach of your work would be...?

...about the design of technology from the user's perspective. Interfaces should be of use and useful, helping people to know how to use it. With complex computerized systems this tends to get difficult, so my task is to design the things in a useful way according to cognitive or behavioral psychology. For example, part of my research is the aim to shift from the task-oriented usability engineering to an emotional design and user experience.

“Interaction design and information architecture sound like esoteric, highly technical areas, but these disciplines aren't really about technology at all. They're about *understanding people, the way they work, and the way they think*. By building this understanding into the structure of our product, we help ensure a successful experience for those who have to use it...” From Jesse James Garrett: [The Elements of User Experience](#)

So this is about eLearning, am I right?

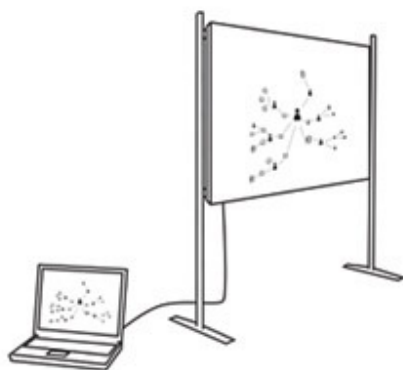
Not quite. *eLearning* is usually associated with *distant learning*, e.g. online learning. Though this gets the main attention in technical literature, most of today's learning situations take place face-to-face, for example in a class room. And despite of the many technical devices that are used in these environments, they are often badly integrated and the interfaces equally bad designed. *Mainly because they were originally developed for other scenarios than learning processes: most of the human-computer interfaces we are surrounded were contrived from the paradigm of Personal Computing, or, as I'd put it, the individual and his one interface*: it is always one person with one screen and one keyboard. In the late 60s, notably the works of [Alan Key](#) and others paved the way for computers to be widely deployed in everyday life. They coined the term of *Personal Computing* that got popular in the 80s. Closely connected to that is the notion of *task-oriented behavior*, as there is obviously always a user and a task: like for example sending an e-mail to someone. Regarding now the learning contexts, I try the shift from a *task-oriented design* towards a *learning-oriented design*.



A typical classroom environment. More engineered interaction, please.

The assumption would be now: as a learning person I first have to learn a task for succeeding the task itself. Also, if I have used one special interface once, I might have different preconditions for the next use. Maybe I have different aims the next time, or I simply learnt something since the last time I opened it. However, the interface of a software, like for example *PowerPoint*, always remains the same as it doesn't adjust to my enhanced skills or knowledge. It doesn't follow my progress and instead takes me as an abstract user.

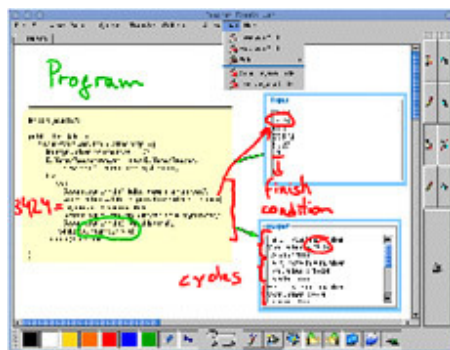
That was now part of your research at Waseda university?



Display of the interactive whiteboard you can use via its touch screen, connected to the teacher's PC.

First, I was funded by a research grant of [NICT](#), the National Institute of Information and Communication Technology, that made our project at Waseda possible: we tried to develop new methods for learning situations in the classroom in terms of hardware - with modified tactile boards, tablet PCs and PDAs that are connected to the teacher's PC via Wi-Fi or USB. Our enhanced tactile boards are now already used in several environments internationally and equipped with a touch sensitive surface.

So there are already tactile boards in use - but people use it the wrong way and you are now trying to find the right modification, as you mentioned to me?



Henning did some surveys in classrooms and university courses - this is how students would rather like to work: drawing more freely, making associative connections.

We observed the actual use in classrooms and university environments in Potsdam and in Chile: its use is often totally chaotic with the teacher switching between his or her laptop and the board. Also, teachers use it too often for their linear *PowerPoint* presentation and point to some note with their marker, which is not really suitable at all for this kind of presentation... Another situation would be for example at a language course where the teacher writes all over the board and, to begin new, he has to wipe out everything he wrote before. That's not very helpful if a student has a question concerning something that was written there earlier.

The whole face-to-face interaction is cut off due to the teacher watching his monitor and the students looking at the screen. This contradicts contemporary learning theory. In older times theories were about the teacher giving the knowledge to the pupils, pounding it into them. Today we share a view of knowledge always being actively constructed with the pupils having to contribute more actively, like finding out stuff and making their own assumptions. That leaves the teacher more with the part of a moderator.

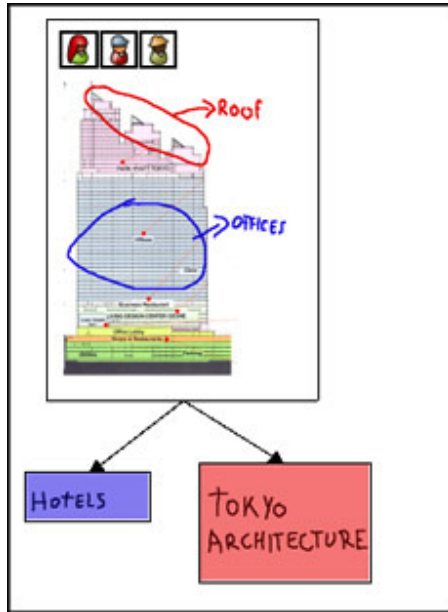


With the tactile whiteboard you can use it like a PC desktop - but work with your fingers on the screen: simply draw fields, mark them, connect them and generate new nodes to a network.

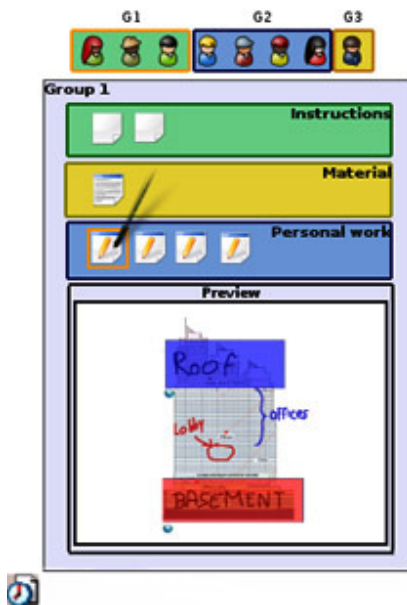
How do these whiteboards now work in detail?

Touch sensitive

means that inside there is a sensory network identifying where you hit the surface with different colored markers or your fingers. The interactive board has its own driver software and is connected to the PC, which is again connected to a beamer to project onto the surface.



The next step in gesture-based interaction: letting students use their PDAs/pen tablets for creating, importing or editing content...



The students' devices communicate with the teacher's PC and thus the interactive whiteboard. These are now screenshots of the whiteboard interface: on top see the icons of each student working on the board.

And how do you use it, as an enhanced computer desktop?

We developed several prototypes: with these you can for example execute gesture-based interactions. Meaning you do specific operations on the board that are recognized as certain actions from the software. Like you draw a field, mark it, color it and you can move it freely and generate new ones. You can zoom in and out, add nodes and link them to other pages thus creating a network. So you can generate and upload content, and use the board as a whole interactive space. You can even save it and send it to the pupils to their PDAs.

Reminds me of [Jeff Han's](#)

magical touch screen... Moreover, that sounds like another field of interaction that finally gets rid of the mouse! Thank you, Henning Breuer! For more information about his studies, check out the [Waseda](#) website for more.

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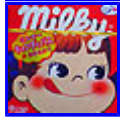
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