



## Knowledge interaction design begins with “what the person who will use it wants to do”

Interviewer: Takashi Mikuriya

— **You basically did your research training in the United States, right? How did you find Japan’s academic research environment upon returning to Japan?**

I spent 8 years in the U.S., which formed the foundation of my research. I cannot say exactly what the physical differences between the research environments are, but in terms of research styles, I feel that the value of discussion that drives research forward is not well understood in Japan. If we organize workshops overseas using research funding, in Japan one is often told to “concentrate more on research, not so much on traveling.” Although to those providing research funding it apparently only looks like as if people are getting together to give presentations, in our field of research it is essential to meet and debate with other people.

Fielding questions and opinions in response to one’s own remarks further develops ideas. In other words, the general sense is that, rather than imparting information directly as is, other people’s comments benefit one’s research by disturbing it. In Japan, the research environment works by “giving” and “receiving” information, where one only asks a question because one wants to know the answer. It seems to me that Japan does not have the kind of culture that asks questions, debates or responds in ways that facilitates understanding the background to the question.

— **Is this peculiar to your field of research or is this more an issue of the so-called Japanese mentality towards research?**

If someone invents something, in Japan the invented “object” is held in high regard. But in the U.S., very little is made of what this “person” did before their invention because they are deemed to have the ability concomitant to being able to

invent what they did; thus, the “person” is held in high regard. I don’t think this depends on the particular field.

— **Although we can evaluate an object which already exists because it is tangible, the future of the “person” who invented it is uncertain. In Japan, very little is invested in the “future” of researchers. Given this, please tell me about some of the topics of research currently underway.**

In the field of Human-Computer Interaction Design, we are studying methodology and approaches for designing software systems and information technology used by those engaged in research and knowledge-building. For example, when simulating experimental data, in contrast to interface design, which begins from the point of view of “how to show the results to people,” interaction design is a field with begins with “what the person who will use it wants to do.”

— **You mentioned that Japanese may be misunderstanding the word “design”**

Let’s take an example from home design. An architect asks his clients what kind of home they would like. Rather than ask only about the direct requirements such as “white walls, a red roof…” and so forth, he asks the clients about the kind of lifestyle they would like to realize and then designs their home accordingly. The same holds true for software systems. (Rather than only ask directly about what kind of functionality the client wants,) we ask what kind of work the person who uses it wants to do and what kind of research they want to conduct, then construct a system based on how it should be according to the client’s needs. In general, there is a strong tendency for entrenched agrarian cultures – Japanese, for example – to take something given to them and adapt it

for their own uses. In contrast, in hunting cultures such as Northern Europe, problems are overcome with the will to conquer one's environment. I believe this manifests in their approach to design as well.

### **The perspective from which to go about manufacturing, along with the processes and mode of expression.**

— **I see. Your research faces the twofold challenge of being both creative, in and of itself, and changing things that cannot be seen, such as culture. By the way, what kinds of things have you considered for business?**

Now in the age of intelligent home appliances, electronics manufacturers are up against the issue of the digital divide. Rather than reducing the number of buttons on a TV remote control from 40 to 20, for example, eliminating the digital divide is returning to the basic focus of what the user wants to do when watching television. That said, the number of buttons on a remote control might not have been much of an issue to begin with. We are working together with industry on this kind of research. Being able to provide users a better overall experience by changing our way of thinking from "simple" to "comfortable", "easy to use" to "happy to use" is, in a certain sense, one of the responsibilities of an information-related researcher.

Looking at the issue from the direction of what kind of experience we want users to have from the get-go rather than laying out the existing parts and deciding which is easier to use, manufacturers are only now starting to realize that not only were products difficult to use because there was not enough consumer testing, but they are realizing that they have an even more fundamental issue at hand. We do not have answers like 20 buttons are better than 40 buttons. We provide them with perspectives from which to go about manufacturing, along with the processes and mode of expression. I feel that it is extremely enjoyable and meaningful to work together with industry on the things we have so far emphasized and created in a research setting, and then give these shape in people's everyday lives.

### **Cleanly tying together comfort and pleasure, underlain by sound logic**

— **That's interesting. This means that your research is worth conducting because you do not yet know the answer, so you conduct your research together with industry, right?**

For these companies, it is an unprecedented form of industry-academic collaboration. In the past, products gain widespread popularity by businesses' efforts to productize and mass-produce while researchers have retained patents for them. In our case, patents do not matter so much; it is more along the lines of: let's think together about what has yet to be developed. As I mentioned earlier, the conventional model may have done well in a time when value was said to lie in "objects", but when the perspectives and knowledge of "people" become an issue, we need to work together.

I, myself, do not have much of a sense for design, but I do

think, "Oh, I see, so that's how it is" with regard to students' or other members' proposals. It is fun when "smart people" come up with ideas. I would be even more thrilled if I could provide this kind of setting, look at or feel that which comes from it, and, to perhaps exaggerate it a bit, if it contributed to the happiness of humanity. My undergraduate major was formal specification description, which is a field similar to mathematical verification, so I am influenced by that as well in that I believe in cleanly tying together comfort and pleasure, while formally underlain by a sound logic. Design is deeply enjoyable because it combines logical beauty and sensible fun.

— **This has something in common with aural history, doesn't it? By this I mean that, after coming to RCAST and talking with researchers in information communications and artificial intelligence, the way I define aural history has changed dramatically. In the past I used to focus only on the interviewee as the speaker, and describe aural history as skillfully drawing out the speaker's public experiences and recording what is said, but recently I feel that this does not seem to be the case. I have come to see the importance of the interaction between speaker and interviewer, and the creativity that comes from that setting. In this interview as well, I, the interviewer, and you, the speaker, happen to be in the same place talking about a particular subject. This is a temporal experience, but it becomes an aural history if we have a good record of it. I have now come to see the importance of the interaction between the two parties.**

### **Coming up with information technology for helping people to be more creative; this is knowledge interaction design**

At the University of Colorado, I worked on a computer system, with all sorts of knowledge crammed into it, which interacts with humans who input information into it. Upon taking up kitchen design as a subject of study, we got very little new information from a professional kitchen designer when we asked in advance, "What rules do you use when designing a kitchen?" However, when the know-it-all computer suggested that "the dishwasher should be placed to the right of the sink," the kitchen designer began to respond by saying, "No, that can't be right. We should instead..." On the other hand, a person unfamiliar with kitchen design would accept computer output as a piece of information and that is where it would end. This was most interesting indeed.

I feel that software systems can be used as a catalyst for educating knowledge, ideas and more creative approaches from humans. I call this knowledge interaction design. If an interviewer of aural history says something good, then this may lead the speaker to say something good as well. Someone with domain knowledge can actively interact with a system and create something new. Coming up with effective designs for information technology is the interesting part of this research.

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## Links

### RCAST

<http://www.rcast.u-tokyo.ac.jp>

### KID Lab: Knowledge Interaction Design Laboratory

<http://www.kid.rcast.u-tokyo.ac.jp/>

## Recent Publications

### Presented Papers

Y. Yamamoto, K. Nakakoji. "Interaction Design of Tools for Fostering Creativity in the Early Stages of Information Design". International Journal of Human-Computer Studies (IJHCS), Special Issue on Creativity L. Candy, E. Edmonds (Eds.), 2005 (forthcoming).

Y. Yamamoto, K. Nakakoji, A. Takashima. "The Landscape of Time-based Visual Presentation Primitives for Richer Video Experience". INTERACT2005, Rome, Italy, September, 2005 (forthcoming).

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K. Nakakoji, Y. Yamamoto, M. Akaishi, K. Hori. "Interaction Design for Scholarly Writing: Hypermedia Structures as a Means for Creative Knowledge Work". Journal for New Review of Hypermedia and Multimedia, Special Issue on Scholarly Hypermedia, S. Buckingham Shum (Ed.), Vol.11, No.1, pp.39-67, Taylor & Francis Group Ltd, Oxon, UK, June, 2005.

Y. Shirai, M. Matsushita, K. Nakakoji. "Jikkannkyo ni okeru dankaitteki joho teiji no tame no intarakushon dezain no wakugumi" (An Interaction Design Framework for Incremental Information Presentation within a Real World). IPSJ Journal, Vol. 46, No. 7, pp. 1618-1636, July, 2005 (in Japanese).

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(in Japanese).

A. Takashima, Y. Yamamoto, K. Nakakoji. "Tansakuteki de-ta bunseki no tame no jikanteki na gaikan to shosai no hyogen oyobi intarakushon ni kansuru kenkyu" (Representations and Interactions of Temporal Overview and Detail for Exploratory Data Analysis). IPSJ Journal, Vol. 44, No. 11, pp. 2767-2777, November, 2003 (in Japanese).

K. Nakakoji, Y. Yamamoto, A. Aoki. "Interaction Design as a Collective Creative Process". Proceedings of Creativity and Cognition 2002, Loughborough, UK, ACM Press, New York, NY, pp.103-110, October, 2002.