GILLIAN CRAMPTON-SMITH is the leading academic in the kind of interaction design taught at schools of art and design. In 1989 she established the first program in interaction design at the Royal College of Art in London. Now called the Interaction Design Department, this was the first program where graduate designers could learn to apply their skills to interactive products and systems. Under her guidance, the Research Studio achieved an international reputation as a leading center for interaction design. In 2000 she moved to Italy to set up and become Director of the Interaction Design Institute Ivrea, the first institute devoted exclusively to the study of interaction design.

The Craft of Interaction Design

Transcript of talk by Gillian Crampton Smith at *Innovation Forum Interaction Design*, Potsdam, March 2007

THE AIM OF THE TWO-DAY CONFERENCE *INNOVATION FORUM INTERACTION DESIGN* WAS TO FOCUS ON ALL ASPECTS OF INTERFACE AND INTERACTION DESIGN: MOBILE TELEPHONE AND MEDIA INTERFACES, PROBLEM SOLUTIONS AND PRODUCT VISIONS, WEB PAGES AND VIRTUAL WORLDS, ART AND COMMERCE, BUSINESS AND SCIENCE. USING BOTH CONCRETE PROJECTS AND VISIONARY CONCEPTS, CURRENT DEVELOPMENTS IN INTERACTION DESIGN WERE PRESENTED AND DISCUSSED BY REGIONAL AND INTERNATIONAL EXPERTS FROM THE DESIGN, RESEARCH AND BUSINESS WORLDS.

I've worked at several research organizations first at Apple, then at Interval Research in Silicon Valley, then I've been part of *Convivio*, which is a European research network. I can't say that regard any of these as truly design research organizations.

In the past fifteen years in London, Ivrea in Italy and now in Venice, I've been involved in developing what I would say is the craft of interaction design. A craft is a way of working that you develop entirely through experience without thinking about rationalizing it or systematizing it. And I believe that craft is essential to interaction design, and always will be. But I also believe that there could be ways of thinking about interaction design, ways of generalizing principles from experience and existing knowledge, just as in the twenties general principles about composition and graphic design were developed at the Bauhaus, or a new grammar of film was invented by Eisenstein and written about by Arnheim. These ways of thinking about practice make a platform in which people coming after

us can build without them needing to invent everything from the start.

So I think that we are now at a stage where through design research we might develop a discipline of interaction design as well as a craft. One problem in talking about design research is it's not generally accepted what it is, or what it should be. But I think that what we've learned over the past forty years, is not that computers will be able to design instead of us, but rather just how complex it is to design. Trying to make programs to do designs has given us insight into what it means to design. We also know that many designers work in a very intuitive way. They don't really know how they design. They manage the enormously complex synthesis of a design in a preconscious part of their mind. And the attempts to systematize design to derive design methods have been at best irrelevant and worst deeply mistaken. Indeed one of the proponents in the 60's of design methods, John Chris Jones, later completely repudiated his earlier views. I think the only way to research design is by doing design.

Let me rehearse three different arguments about design as research. The first argument is that design can never be research. It's not research it's something different. And by research usually here is meant the scientific method of proposing a hypothesis and experimenting to see if it holds water. Critics say design has no theory. It has no foolproof methods. Design intervenes, by definition, unscientific. Or, from a completely different point of view, design is intuitive –over rationalization risks ruining it. This seems to me a category error. George Steiner in the book *Real Presences*, writing about the Arts –especially literature– makes a point which I think also applies to design. He says, "There are in art and poetics no crucial experiments, no litmus paper tests. There can be no verifiable or falsifiable deductions in telling predictable consequences in a very concrete sense in which a scientific theory carries predictive force. One must be crystal clear on this. The analytic paradigm of tragedy in Aristotle's *Poetics* is patterned on, it is not verified by, Sophocles's *Oedipus Rex*."

What Steiner is saying here is that it makes no sense to talk about theories in the predictive scientific sense. Theories in the Arts, and I include design here, are a different kind of theory. Kandinsky made a similar point. He said in *Concerning the Spiritual in Art*, "[i]n real art theory does not precede practice but follows her." In short one doesn't invent theory about art and apply it, but reflecting on what has been done one derives a taxonomy to make sense of the instinctive practices that have emerged. So it is a fundamental mistake to impose on art and design the paradigm of the sciences.

Argument two is that all design is research. This view holds that because each design problem is uniquely complex the way design culture progresses is not through predictive rules but through exemplars. Donald Schön argues in his *Reflective Practitioner* that designers work by developing a repertoire of solutions that they have seen or they've done themselves. And in the preconscious mind they match the characteristics of these solutions with the requirements they have to hand. So in this argument, every new design adds to the personal repertoire of the designer and to the general repertoire of the design community. I think this is particularly important for interaction design. People have been theorizing about architecture since Petruvius or before – two thousand years. We have been going very much a shorter time.

In 1990 when I started teaching at the Royal College of Art in London, there were hardly any instances of good interaction design to show people. We had to develop them ourselves. But there are now thousands of interaction design projects. But I think only a small proportion of these can be described as exemplary or significant for their discipline. So I don't think it useful to say that all design is research.

I do agree, however, with the third view... sitting on the fence: that some but not all design is research. Every five years in England, the Research Council tries to quantify the research output of every university department just to see how much money they will give them for research. And in

the beginning, we in the Design departments had tremendous trouble persuading the assessors which are normally from the sciences or from the humanities that what we do –which is making things– could be called research. But later they, with much prompting from us, they grew to accept a much more open definition of research. So they said that research is an original investigation undertaken in order to gain knowledge and understanding. It includes the invention and generation of ideas, images, performances, and artefacts, including design, where these lead to substantially improved insights.

So by this definition, research includes images and design but only if it aims to gain knowledge and understanding. This definition, of course, was framed for the academic context. So I would prefer to define a research project in design –whether academic or commercial– as one which, whether or not this was its aim, discovers and demonstrates knowledge or understanding in a form that can be generalized and applied to a wide range of design situations.

So how can we think about the design research project instead of an ordinary design project? I think a design project aims to produce an artefact or a service, whereas a research project aims to produce knowledge or insight. A design project seeks the best solution to the problem at hand, but a research project seeks knowledge and insight that can be generalized to a range of different problems. A design project needs a sure result. A research project doesn't know what the result will be.

I think the main difference between the academic and the commercial, in research, is that if an academic project fails in its original objective you can say maybe that you learned more than if it went smoothly. But if you say to your client, "OK, our experiment ruined your house, I'm sorry, but we did learn a lot on the way." I think he'll not be too pleased.

We like to distinguish between three different types of project. Theoretical projects for us as designers. That's theoretical as opposed to practical. These are for us to understand either how to design better, or to understand better what we can do in a new medium. What are its qualities and what are the constraint?

The second type of project I call experimental. These build future scenario prototypes into real contexts. And they allow us to try out in the world some of the theories that we've generated for ourselves as designers without worrying if they are going to fail or disprove our theories or disappoint our clients. And these projects often explore the space where experiments in the medium meet the needs and desires of real people.

A third type of project is applied which, myself, I don't really consider research, but of course applied projects do add to the some of the repertoire of individual designers and the design community.

Professor Johnson Laird used to say to his students: "research is not research until it's communicated." And I think research in interaction design needs new ways of communicating that are appropriate to it. Books and papers, the traditional way of developing knowledge, are not appropriate for things that are interactive, that change over time. I've been involved in Convivio, a European project which finished last year, of people involved in human-computer interaction. And one of the projects it supported was a project at the INRIA Research Laboratories in Paris which is for a museum of interaction design. And this is now at the prototype stage.

Donald Schön talked of the importance of the repertoire of examples for designers. The problem for us is there is no well-organized way for us to find good examples. We find them by accident. Today I've seen some great ones. And, if I hadn't been here, I probably wouldn't know about them. And this leads to people continually reinventing the wheel, or worse, inventing things that that some one else ten years ago discovered didn't work very well. The idea is that there should be an online repository of examples, like

the collection of a museum, and like a museum people will curate exhibitions which draw together particular issues. It might be different ways of designing for the small screen, for instance, or different selection techniques and what they're good at. And this initiative, I think, looks as though it could be complimentary to the platform of interaction design patterns that's being designed here.

So I talked about three different types of projects, but I think that there are also three types of insight that we're looking for. We're looking insight about the medium and what's possible with the constraints of the technology. We're looking for insights into people, how they react to technology, and insights about process. How can we improve the way that systems and products are designed?

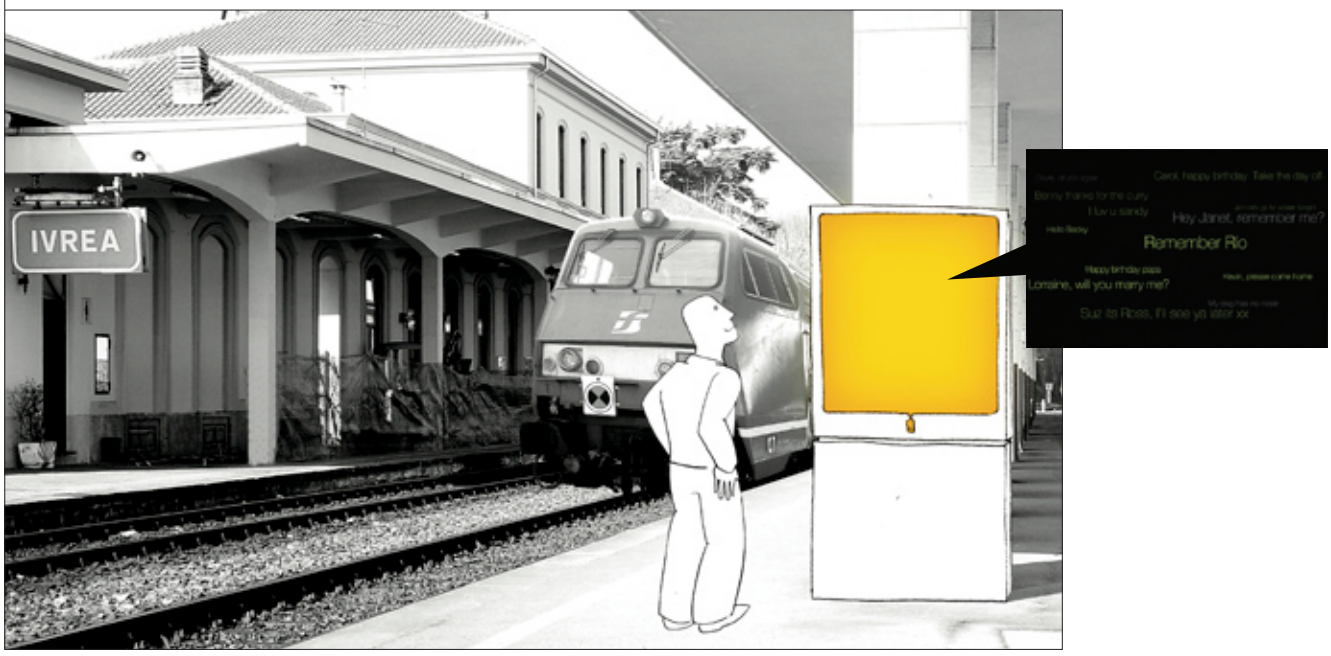
In the time remaining, I want to show you a few projects and they are particularly about the medium. What's it possible to do with the technology? What are the constraints? What kinds of forms and qualities can we achieve? How can we use form to communicate what it is? How can we make it communicate in implicit ways as well as explicit ways, which we expect in all kinds of other forms of art and design?

The first project that I am going to show you is by Victor Viña. He was asking: what are the basic ways you can think

1

1. *Box*. Victor Vina. Interaction-Ivrea, 2003

2



2. *Mobile Embodiements*. Analia Cervini, Juan Kayser, Mack Thomas, Stuart Penny, Gianni Tozzi, Giulio Ceppi. Interaction-Ivrea, 2003

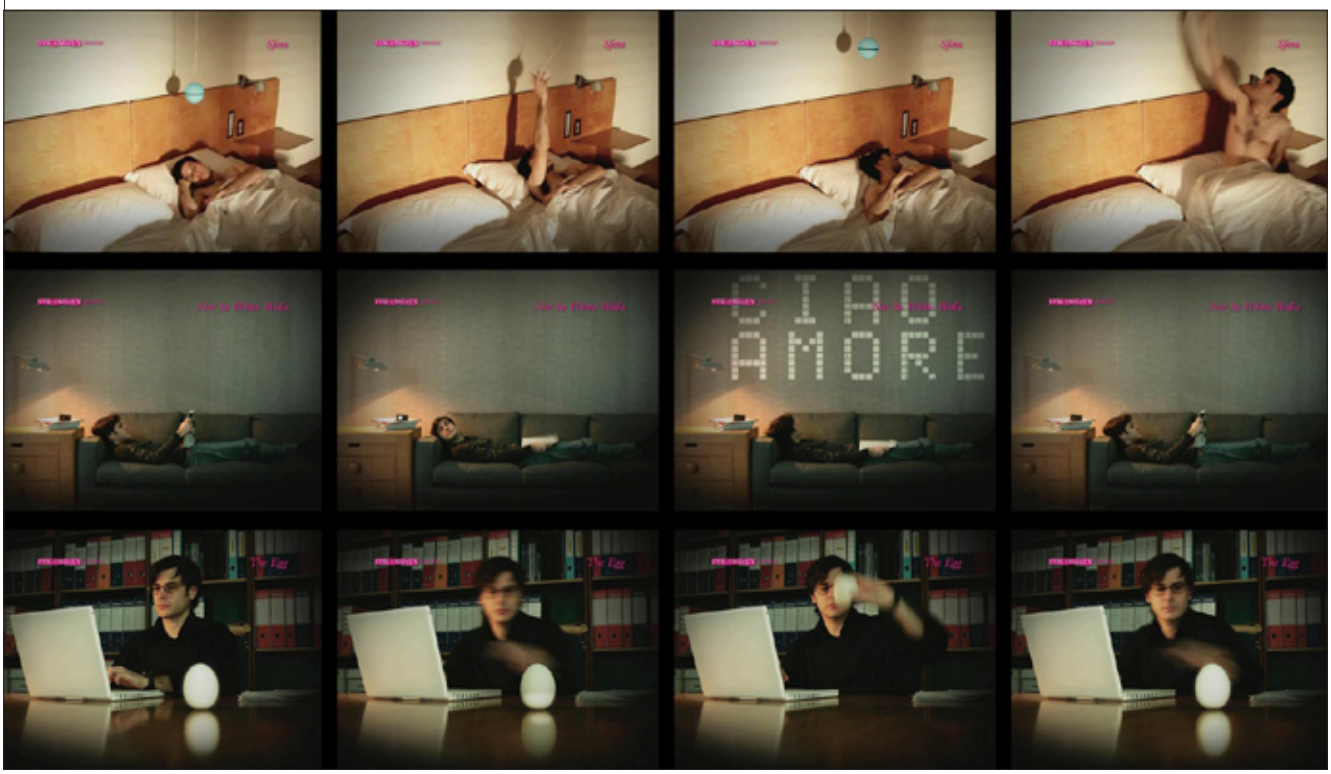
about networked objects? And if networked objects could speak to each other, what on earth would they say? He wanted to develop a system which would allow designers to experiment with these in a way that was relatively free and that they didn't have to worry too much about the intricacies of the prototyping. So he produced a large array of boxes each made out of cardboard and visually very similar because he wanted people to concentrate on, not what they looked like, but on how they behave.

Each can do a simple thing. An input behaviour or an output behaviour. They can speak, bounce, print, and make a sound whose volume you can change. Some boxes you can speak to. Any simple activity you could think of could have its own type of box. And all the boxes in a space are potentially linked by a wireless network which, in turn, is linked to the World Wide Web. Some of the boxes in our headquarters at Ivrea were there, but others were distributed abroad. Each box knows where it is and it knows the time and it knows where all the other boxes are, as well. And to allow the designer to experiment with them, Victor made a visual programming language. Wherever they are in the world, all the boxes can be represented as icons on a screen. By drawing an arrow between any input box and output box, the designer routes the flow of information between the real boxes. You can thus design and test interactive systems in a clear and simple way.

This *Box* project, you will have noted, really has very little to do with people. It's a highly abstract exploration of the medium. What you can do with it. How you can think about it. And how you can structure a system to allow people to experiment with it. When he showed it in an exhibition and invited people to invent their own box systems, everyone got the idea and some of the best results came from children.

Another project about the potential of the medium is *Mobile Embodiments*, by Juan Kayser, Analia Cervini and Jan Christoph Zoels. They asked the question, given that services in computing and mobile devices are getting so complex and the devices are getting ever smaller, is there a way to extend the mobile phone out into the world. So they invented displays situated in the domestic or urban environment for which your mobile phone could be the trigger. A park bench, for instance, delivers you surround sound. An ATM prints out a little message from your

3



3. *Strangengely Familiar*. Interaction-Ivrea, 2005

mobile device. A public ticker-tape system displays your SMS as you pass. This again was research into the medium of interaction design. Given existing technologies, what different approaches could we take to make them more usable, more useful, more satisfying.

Strangely Familiar was a project done by Heather Martin, Massimo Banzi, Reto Wettach, and Yaniv Steiner and was the first project that students did in physical computing. They were asked to rethink the normal alarm clock radio or the phone answer machine. And the only rule was: No buttons. The range of prototypes produced include an answering machine that forces you to have a clean desk or an alarm clock that pulls you out of bed by raising itself everytime it rings.

These projects would not have been possible with the platforms that we developed at Interaction Ivrea and this was not something that we started out with the intention of doing but it grew into something much more important than we had imagined. And we were lucky enough to be able to build on the work of Ben Fry and Casey Reas had done at the Media Lab with John Maeda, to begin with. And then we developed both physical computing boards and the forum that allowed experience to be exchanged. So this is the web site for *Processing*, and I'm sure many of you have seen it. And these are the two hardware boards that we developed also in conjunction with the Potsdam School. I think the strength of this is, of course, the boards, the language, but at least half of it is the fact that you can go onto the forums; you can find some one that has had a similar problem to you and get it solved in some way.

This is a map which shows between 2001 and 2006, how it developed, how there were a series of different projects. At the bottom there's the development of *Processing* which has

been translated into many different languages. This just would not be possible without the Internet.

I want to end on the need to make a difference. Johnson Laird said, "research isn't research until it's communicated." I like to go a bit further and say research isn't research until it makes a difference. OK... maybe I don't really believe that, but I remain frustrated that after twenty years of interaction design research and many excellent ideas about new ways of interacting with our information devices, we still spend our lives humped in front of a tiny screen tapping with two fingers in Microsoft Office.

So how can we make research that makes a difference? We need to communicate it, of course, but we need to think, to whom and why? And how can they digest it? How can they retain it? How can they use it? And we must think about how are designs can make it out into the world. Good ideas, sadly, are not enough. They need to be truly desirable by people not necessarily like us. They need to be technologically feasible and, most important, economically and politically sustainable both inside a company and outside. That said, whatever we must design must add to the richness and strange beauty of existence. And what could be more rich and strange than Venice –where we live and work today. The challenge for us here in Europe as designers in the cultural as well as the technological sphere, is to design things that support the rich variation of European cultures rather than imposing a global techno-culture, the same from Seoul to San Francisco to Sienna. In Venice this challenge is acute. It is a city of 60,000 people which hosts 16 million visitors a year. And it's constrained by its very particular geography. How can we use technology here without loosing the quality that is so special about the city? These are the issues that we are trying to explore with our students at IUAV.

This term as their first physical computing project we set them to design installation in the city to provide information in a beautiful and engaging way. One team decided to make an installation in the fish market in Venice to explain the ecological problems of the Lagoon: over fishing, disturbance, pollution, and so on. The market is busy every morning, so it could work only after the space has been sleuthed down at midday, with the lingering smell of fish... so here, you're getting a third of the experience, no smell, no sound, but the fishies move beautifully. This was the prototype. We were helped a lot by the scene painters –so the floor is made of wood and paint. And it's a proto-type so we discovered that children are not heavy enough to make the fish work...