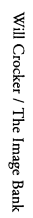
Innovation and Design: The Emerging Boundary Conditions

John Rheinfrank and Bill Hefley

All too often design is seen as styling and producing the peripheral effect rather than as primary innovation and the creation of significant, meaningful discontinuity. As designers, especially as interaction designers, we need to remind ourselves that the intent of design is to create wonder-full, meaningful experiences for people.



Will Crocker / The Image Bank

We need to remember that creating experiences means more than inventing a product. It means designing for innovation throughout the product life cycle-from communicating about planned products, through delivery, installation, use, diagnosis, and service, to product retirement/extension. We have a responsibility to design with the intended community of use, not just for users. Innovation, design, and delivery are multi-front negotiations and collaborative efforts among many different stake holders.

When we look beyond today's design practice, we encounter a set of evolving themes that can help us both define and move outside the boundaries of our field.

People Creating and Building for Themselves

People are no longer content with off-the-shelf, shrink-wrapped carefully worked-out products. Inflexible "solutions" are also becoming unacceptable. People want to build their own products rather than having other people build products for them. Creation has become part of the experience of use. Kits, examples, pattern books, and templates all help people build products. People configure their own desktops and computing environments. People are also adept at developing work-arounds to the formally accepted procedures and processes. Natural evolution and piecemeal growth are part of the build-it-yourself milieus. As designers, we can design the "clay" for people to use on their own, thereby putting the true design initiative in their hands.

Learning

Learning is crucial part of any experience. Activities that are commonly seen as routine benefit the most from embedded learning by supporting self-directed innovation. Individuals learn as part of the experience of use, as part of their interactions with the product. Reflection can also be encouraged in individuals. Groups of people benefit from the social construction of understanding which occurs through collab-

orative experiences of use. Weaving performance support into the substance of everyday work is one way of encouraging learning. Information could be made available when needed, rather than in a different place at a later time. Apprenticeship and mentoring are part of the social dimension of learning.

Beyond The Desktop As An Interaction Metaphor

Current desktop thinking is dominated by documents, files, and other paper-related things. It is also work flow-based and relatively isolated from the richness of activity in the world. Flexible work environments are a natural extension of the desktop paradigm. Candidates for the third interaction paradigm may lie in ubiquitous computing-in the embedding of computation within the physical world. Think about the richness of connections among people (communication and collaboration) and among people and information (knowledge/information spaces) instead.

Emotional Substance

There is a need for radically new aesthetics in "computational worlds" The current aesthetic paradigm is a combination of typewriting, office document environments, and, to a small degree, the arts and theater. The combination, has for the most part, been haphazard. We need to thoughtfully consider how to take advantage of the capabilities provided by rapidly converging electronic media. We need to invent and use an electronic materials design set. We need to develop new elements of style and substance. Current virtual environments are full of static, almost silly objects like buildings, rooms, etc. Imagine an electronic garden that would be engaging and alive.

Social Dimensions of Discovery and Prototyping

Innovation has traditionally been the province of the inventor. Another approach is to make discovery and innovation a social process-to involve people in the observation, conceptualization and prototyping of the objects and experiences they could have. Ethnographic research helps people discover things about their own situations which they may not have noticed before. People can "think things up," even though they are not designers.

Prototyping is an inherently social activity. People build things, show them to each other, and rebuild them all the time. In the software and interface design field, it is possible to have many rapid iterations of prototypes. As the prototypes move from soft to hard, the team working with them converges on the important ideas. Experiences need to be constructed from the social domain rather than the technical domain.

New Forms of Objects

We are facing the invention of entirely new types of objects. Embodied virtuality is a reality which lies just outside our grasp. And yet, we can design it. Ubiquitous computing will cause computing to disappear and to be ever-present at the same time in much the same way that electricity has disappeared and light is everywhere. New design languages will help us understand and use the computational resources available. By providing elements of design, guidelines for working with the elements, and examples of use, design languages will let us construct new ways of working and playing. New forms of objects and new types of objects will co-evolve. We need to be prepared to handle them as we are inventing them.

Change Management

As products change, the organizations that create and deliver them also change. This interplay of external and internal changes needs to be mastered. The most successful companies will be created as their products and the markets for those products are created. Motorola is an example of a company that has changed as its products have changed. Motorola invented cellular communications and built a business around it-a business that Motorola is constantly keeping fresh. We need to create the context for creating change and for designing ways of designing.

This characterization of the boundary conditions is incomplete. We invite you to send your own short descriptions of other themes, which may appear in the next issue of *interactions.*