What to Study in HCI? Interaction Design!

Bill Verplank
ME, Stanford University
<billverplank.com>

Abstract
Several diagrams are presented to frame the discussion of both "what to study" (research) and "what to study" (curriculum). My perspective is that of a a Phd researcher, now teaching "interaction design". I propose we study Interaction Design.

Author Keywords
interaction design; mentalities; styles; metaphors; paradigms.

ACM Classification Keywords
D.2.2 Design Tools and Techniques; H.1.2 User/Machine Systems; H.5.2 User Interfaces; H.5.m. Information interfaces; J.7 COMPUTERS IN OTHER SYSTEMS

Teaching CHI

The Xerox Star [1] was foundational for ACM SigCHI. At Stanford, Winograd brought "design to software" [2] and we developed an HCI program and a design course [3]. In 1992, I was on a committee that proposed a SIGCHI Curriculum [4] which was aimed at Computer Science departments.
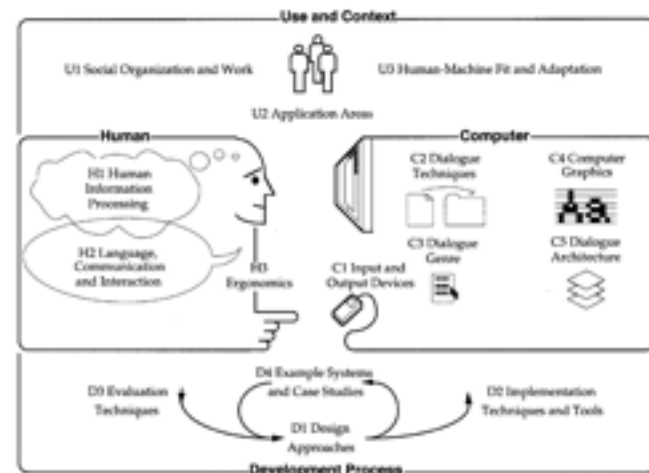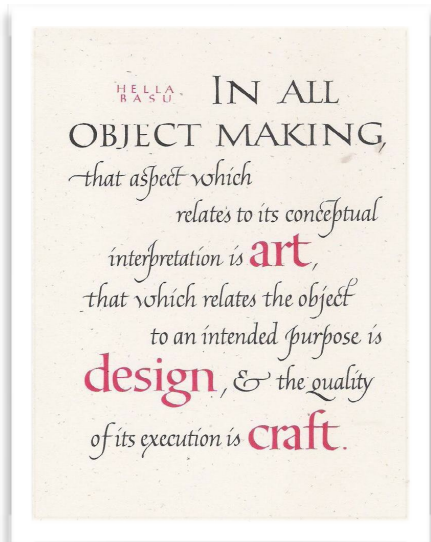

Figure 1. SIG CHI Curricula, 1992.

Since then, the field has expanded and the technology changed. Our focus was on what CS departments might teach. But now computers are not just "workstations" but ubiquitous and embedded. We need to teach "interaction design" for product-, system- and fashion-design where computer interaction is assumed.

Teaching Visual Thinking

In the '60s, Robert McKim developed "Experiences in Visual Thinking" [5] teaching how to draw, see and imagine. McKim's ideal of rapid visualization or "idea sketching" is the craft of doing all three at the same time. This is similar to the experience of any craftsman in direct engagement her materials: imagining, shaping, seeing all at the same time.

I like this quote from Hella Basu: "In all object making, that aspect which relates to its interpretation is ART, that which relates the object to an intended purpose is DESIGN, and the quality of its execution is CRAFT." Idea Sketching is a CRAFT. To learn a CRAFT, you must do it.
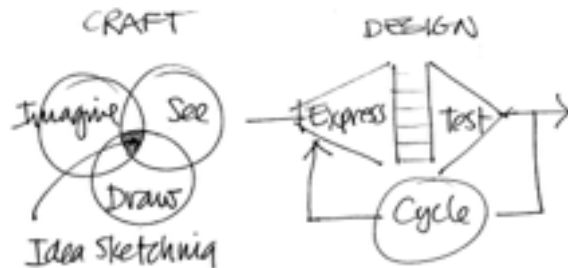
Craft vs Design

Figure 2. McKim's Visual Thinking: CRAFT or DESIGN [5].

DESIGN asks what the intended purpose might be. It necessarily separates activities. The Express stage values "fluency and flexibility" to generate a quantity and variety of alternatives; some call this brain-storming. After "Express" comes "Test" where alternatives are assessed and compared. Finally, in "Cycle" the next step or strategy is chosen.

Interaction

Figure 3. How do you DO?, FEEL? and KNOW?. [6, 7, 8]

An interaction designer asks three questions:

• How do you DO? — I did a masters thesis on providing both buttons and handles on a controller for supervisory control of a remote manipulator. My advisor called them "symbolic" and "analogic" command hardware for supervisory control" [9, 10]. Buttons are good for precise timing but handles can be more expressive. Do you make music with buttons or handles?

• How do you FEEL? — Marshall MacLuhan [11] described all media as either hot or cool. Cool media are like free jazz of the 60s; they are engaging and draw you in; hot media are formal and immutable, uninteresting.

• How do you KNOW? — I like the work of city planner Kevin Lynch who taught that when we first learn a city we like an over-view, then we follow paths from which we create "mental maps".

Interaction Design

Figure 6. Framing interaction design. Verplank [6, 7, 8]

At the top are overviews, along the bottom are details. From left to right, the columns could be called motivations, meanings, modes and mappings, the process from left to right might involve observation, invention, engineering and appearance.
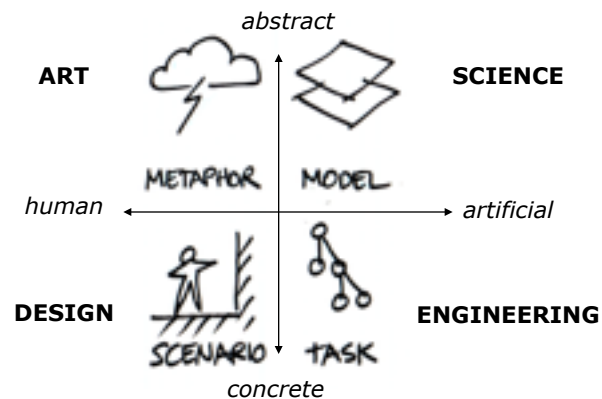

Figure 7. The core of the interaction design framework.

At the core of interaction design are the key tools of creativity. They range from abstract to concrete and from human to artificial. The four quadrants are ART, SCIENCE, DESIGN and ENGINEERING. Rich Gold [12] describes his four careers a spanning all four quadrants. He calls them "4 hats" invoking de Bono's "6 hats" [13]. Any good team should span this space of attributes; you can seldom find one person to do them all. The best teams are opposites: Gates (bully) needed Allen (hippy); Jobs (visionary) needed Wozniak (nerd).
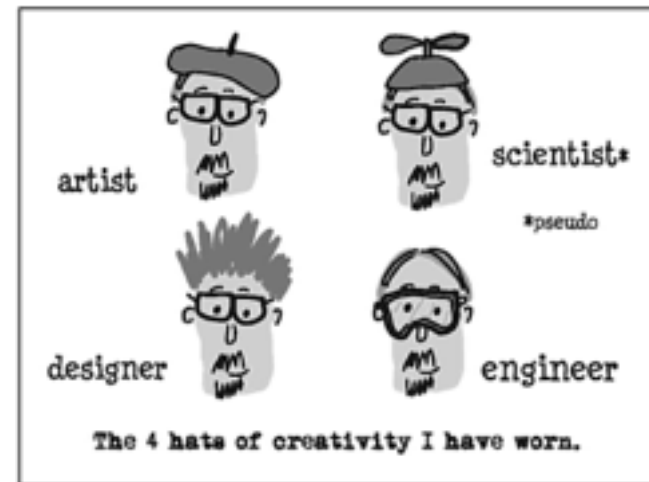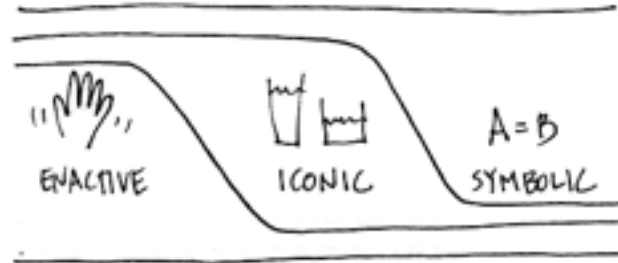

Figure 8. Rich Gold's four careers [13].

Mentalities

My view of the field of computer-human interaction is informed by an understanding of the various "mentalities" that human's have. Alan Kay draws the following figure. You can see it in a video [14].

ENACTIVE   ICONIC   SYMBOLIC   A=B

We are born with kinesthetic or "enactive" knowledge, the next stage is "iconic" or visual thinking where we can be fooled by tall being more than wide (Piaget's famous experiment) and finally, we develop our "symbolic" verbal and mathematical abilities.

TUI   GUI   TTY

The recent history of user-interfaces has followed the reverse of these stages. Teletypes (TTY) are symbolic, GUIs iconic, TUIs enactive. Each of these styles of interaction has an underlying metaphor and paradigm.

The metaphor for a TTY is dialog with a PERSON; this has challenged not just user-interface designers but the field of Artificial Intelligence. The GUI supports direct manipulation of a TOOL; the "user" has a "task" to accomplish and we can measure productivity as task-completion time. The metaphor for MEDIA is expression, engagement and entertainment.

Negroponte predicted that computers will re-define media and gave us a "school" called the "Media Lab". Computers have become more a part of how we communicate, engage and express.
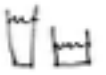

MEDIA   TOOL   PERSON

I wonder if we might predict (invent) future or more fundamental paradigms. Steve Jobs gave us a more powerful metaphor by realizing that computers were not personal tools for learning (the APPLE metaphor) but made a business which is more about FASHION.

Underlying metaphor of computer as TOOL are all the protocols and standards for representation and communication. The metaphor of computer as VEHICLE reminds us of all the standards that must be agreed on and the culture, commerce and politics involved. Where does the PERSON metaphor lead? Beyond intelligence, there is LIFE. Can computers not just become sentient but evolve like plants, animals and planets?

FASHION   VEHICLE   LIFE
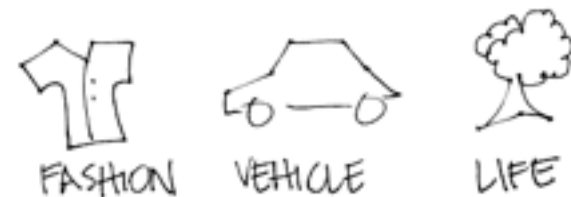
Summary

What to study: A framework for interaction design.

mentalities

ENACTIVE   ICONIC   A = B SYMBOLIC

styles

TUI   GUI   TTY

metaphors

MEDIA   TOOL   PERSON

paradigms

FASHION   VEHICLE   LIFE

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