

DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF TORONTO

CSC318S

**THE DESIGN OF
INTERACTIVE COMPUTATIONAL MEDIA**

Lecture 1 — 5 January 1998

INTRODUCTION

1.1	What are interactive computational media?.....	2
1.2	Examples of interactive computational media.....	2
1.3	The design of interactive computational media.....	4
1.4	What is the human-computer interface?	4
1.5	What is user interface design?.....	5
1.6	Some example problems with interfaces	5
1.7	The importance of the interface	5
1.8	What is human-computer interaction (HCI)?.....	6
1.9	The relationship of user interface design to HCI.....	7
1.10	Goals of the course.....	7
1.11	Some central themes of the course.....	7
1.12	Some questions to be raised.....	8
1.13	Some questions not to be raised.....	9
1.14	Course organization, assignments, evaluation	10

Ronald Baecker
Professor of Computer Science,
Electrical Engineering, and Management
University of Toronto

Copyright © 1991-1995, 1998, Ronald Baecker.
All rights reserved.

1.1 What are interactive computational media?

Interactive — Conversational with, responsive to user

Computational — Possessing processing power and memory

Medium (Webster's Third New International Dictionary)

“Something through or by which something is accomplished, conveyed, or carried on ...”

“a channel, method, or system of communication, information, or entertainment ...”

“the material or technical means for artistic expression ...”

Thus uses for creativity, thinking, problem solving

1.2 Examples of interactive computational media

Apple Newton, U.S. Robotics Pilot...

Personal Information Manipulators

Inexpensive, small, light, hand-held devices

Pen input with handwriting recognizer

Capabilities for address book, to-do list, and calendar

Communication via modem, fax, radio pager, infrared remote-control beam, local area network, & serial port

Synchronization with desktop computers

Issues and methods of differentiation

Price

Weight, size, form factor

Target users

Memory and peripherals

Interfaces to desktop computers

Software environment and capabilities

Interface, look and feel

User's model and metaphors — how user is to think about capabilities

These are general-purpose devices... there can also be similar special-purpose devices

For example, imagine a hand-held language translation machine for travelers

Target customer — Tourist, businessperson, student

Functionality — Words, phrases, sentences, single language, multiple languages

Software paradigms also create interactive comp. media

Spreadsheets

Personal finance managers (e.g., Intuit)

Research prototypes from our lab, to be discussed next week

Movie Authoring and Design (MAD) system —
Facilitating creativity in turning ideas, images, sounds,
and music into motion pictures

Synchronous Asynchronous Structured Shared Editor
(SASSE) — Facilitating collaborative writing,
especially in real-time, by teams of individuals working
on their own PCs that are linked over a LAN or a WAN

1.3 The design of interactive computational media

Key initial problem is brainstorming, conception,
envisionment of the application

This comprises both:
Functionality (function)
Interface (form)

Application concept then developed through a design process...
User-centred
Iterative
Multidisciplinary

1.4 What is the human-computer interface?

The boundary, meeting place, between human and computer

The human's image, or view of the computer

The way in which a computer system will behave

1.5 What is user interface design?

The design of human-computer interfaces

Need for inspiration, multidisciplinary insights

Need for craftsmanship, thoughtfulness, care

Need for design methodologies

Need for iterative refinement

Need for evaluation, usability testing

1.6 Some example problems with interfaces

To be contributed by the class.....

1.7 The importance of the interface

The early success of the Macintosh

“User-friendly,” “ergonomically designed” systems

“Look-and-feel” copyright issues

Economics

Hugh costs of interface development

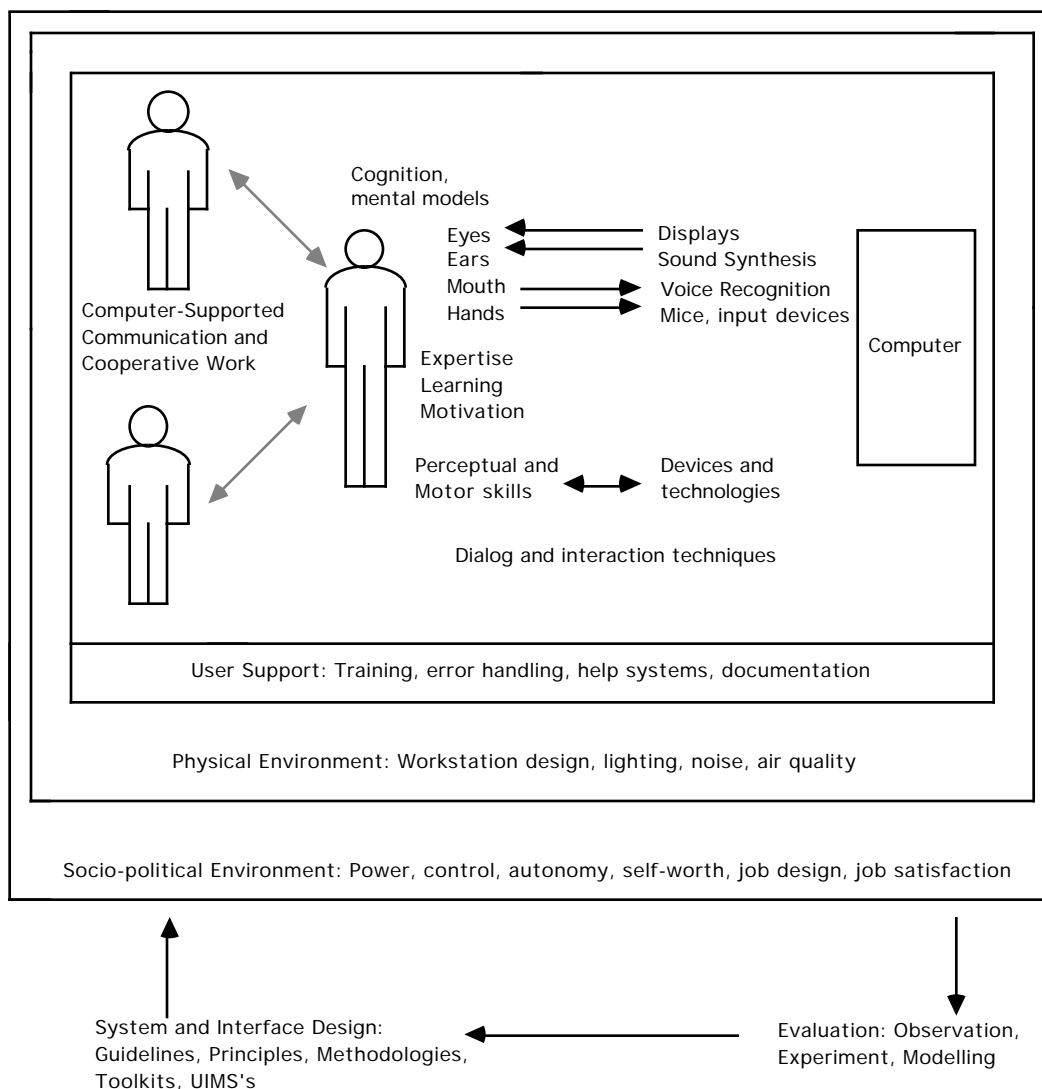
Even larger costs result from poor designs

1.8 What is human-computer interaction (HCI)?

The scientific study of humans as they use computers, and of the human-computer interface

A multi-faceted, multi-disciplinary endeavor (Fig. 1.1)

Figure 1.1 A diagram of Human-Computer Interaction



1.9 The relationship of user interface design to HCI

User interface design — a craft, design, synthesis, creation

HCI (CSC 428) — science, analysis, understanding

The goals — Design rooted in an emerging science —
A science grounded in and relevant to design

1.10 Goals of the course

Concepts of computational media and user interface design

Critical thinking about interfaces

Key design approaches, methods, tools, interaction techniques

Design and project team experience

Experience prototyping & evaluating systems with real users

1.11 Some central themes of the course

Value of multidisciplinary teams for idea generation

Insights to be gained from case studies (e.g., on video tape)

Importance of users' mental model, good representations

Strengths of different sensory modalities and media

Need for humility given the difficulty of the problem

1.12 Some questions to be raised

What are interactive computational media?

What is design, and how do we approach the task of design?

What design principles or methodologies can we use to design and build successful systems and interfaces?

What kinds of programming tools can assist us in the process?

What interaction techniques are effective in human-computer interaction, and how do they compare?

What sensory modalities are useful for human-machine communication; what are the salient features of each modality?

What media are appropriate to communicate using these sensory modalities?

How can we decide if a computer system or interface actually does what we intend it to do?

What happens when people learn a new system, and how does this differ from skilled usage?

So that the systems we build will be maximally useable, what else do we need do other than to write the code?

What physical problems do computer users encounter, and what can be done about it?

What are the research frontiers of interactive computational media design?

1.13 Some questions not to be raised

How can we evaluate and compare different systems or interfaces designed to solve the same problem? (CSC428)

How do we carry out a statistical analysis of the results of an experiment on two different interfaces?

How does the eye and visual perception work *in detail*?

What *precise* steps would we follow to guarantee that our screens look good?

How do we build formal mathematical models of user interfaces and of user interactions? (CSC428)

Which design methodology for interactive systems is the *best*?

What is a User Interface Management System? (CSC428)

When will we talk in plain English to computers?

How can we make it possible for everyone to use a computer?

Why might a computer system be effective in one organization and fail in another? (CSC300, CSC428)

What is a *good* use for a computer? (CSC300)

How widespread is automation likely to be, and what are the implications? (CSC300)

1.14 Course organization, assignments, evaluation

See the course overview handout

Pages 1-2: Important facts + course description +
 course objectives + texts and course notes

Page 3: Course calendar

Pages 4-6: Lecture topics and assigned readings
 Introduction
 Design
 Interactive technologies and techniques
 Observation and evaluation
 Interactive media and modalities
 The extended interface
 Research frontiers

Pages 7-8: The project, assignments
 1. Idea proposals
 2. Idea selection
 3. Concept development
 4. Design and prototyping
 5. Usefulness and usability evaluation
 6. Further iterative design

Page 8: Grading and evaluation

Page 9: Facilities, course staff

The design project —
 Interactive computational media for the elderly

**Be prepared to think and read and write a lot and
more generally to work really hard!!!**