Seminar:

Developing an HCI Curriculum for China

October 2005

Xian, Kunming and Beijing
Presenters introduction

This seminar will be presented by:

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University of Limerick, Ireland

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Thames Valley University, UK
Developing an HCI Curriculum

HUMAN ERROR. AGAIN.

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Workshop Aims

- To develop a joint understanding of the importance of human-computer interaction (HCI) and usability
- To share European experiences of designing and delivering university level courses in HCI / usability
- To identify and address issues relating to proposing and providing HCI / usability within the Chinese university context:
  - Localisation of content in relation to IT industry needs
  - Modes of delivery compatible with Chinese education system
Our starting point

- HCI in European Universities is found at several levels;
  - 2 hour invited lecture
  - full 4 year human-centred design curriculum.
- The location of HCI education in University varies
  - between disciplines (industrial design, Computer Science, Psychology, etc.)
  - between types of Universities, including distance / open learning education institutes.
- IESUP partners / presenters have participated in the development of HCI education in different countries with a variety of models, with different content and levels of depth, depending on the “market”.

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Agenda for today’s seminar:

1. Introduction
2. Global approaches
3. Curriculum design
4. The needs of the market
5. Building the Chinese Curriculum
Part 1

Introduction:
Systems Usability and HCI
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Systems Usability

- Encompasses
  - ‘traditional’ aspects of usability and Human-Computer Interaction (HCI)
  - recent developments in interaction design and ‘new usability’
Systems Usability: traditional usability

- Mainstream business systems
  - Business applications, PC software, web based systems
- IT failure rates
  - 31% of projects cancelled before completion.
  - 52.7% of projects costing 189% of original estimates
  - Standish Group 1995/98 (Survey 23,000 IT projects)
- Poor requirements, lack of user involvement, inappropriate user interface
Systems Usability: ‘new’ usability

- Ubiquitous computers in a global context:
  - From mobile communications to interactive domestic devices
  - Emphasis on small, multi-user and mobile systems
  - New usability methods required?
Usable devices?

- Mobile comms.
- Ticket machines
- iTV – interactive television
- Website
- Control applications
- PC Software
Usability: a definition

‘the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction within a specified context of use’...

ISO 9241-11
e-Government: UK Dept of Trade and Industry

- Portal for UK business
- Understand user needs
- Regular user based testing
  - Verify information architecture
- Clarify user responses
- Prototyping of all tools early and often: Power-point paper based
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Systems usability: for all levels of development

**Strategic usability:** socio-technical systems design

**Tactical usability:** user participative design

**Operational usability:** user-based evaluation
Usability and HCI

- Usable systems require usability ‘engineering’ – they don’t (often) happen by chance
- Usability is not (just?) a soft concept – it can be measured
- To implement an effective usability process you need to understand the discipline that shows us how people (users) interact with interactive systems (computers)
- This discipline is human-computer interaction (HCI)
- We believe that all those involved in developing interactive systems should know about HCI
  - But which people need to know what?
HCI in action
Human-Computer Interaction: a definition

A discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of the major phenomena surrounding them

(ACM)
Human-Machine Interaction: a basic model

machine

user

display info.  control info.
HCI: disciplines

- AI
- Sociology
- Psychology
- Engineering
- Art
- Design
- Comp. Sci.
- Linguistics
- Physiology
- Ergonomics
Interaction design: disciplines

**Academic Disciplines**
- Ergonomics
- Psychology/Cognitive Science
- Informatics
- Engineering
- Computer Science/Software Engineering
- Social Sciences (e.g. Sociology, Anthropology)

**Design Practices**
- Graphic Design
- Product Design
- Artist-Design
- Industrial Design
- Film Industry

**Human Factors (HF)**

**Interdisciplinary Fields**
- Information Systems
- Computer-Supported Cooperative Work (CSCW)

**Interaction Design**
- Cognitive Engineering
- Human-Computer Interaction (HCI)
- Cognitive Ergonomics
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Systems usability: some of the tools and techniques

- Iterative / evolutionary development
- User participation in design
  - Usability metrics and goals
  - User profiling
- Ethnographic techniques
- Task analysis
  - Prototyping
  - User testing / verbal protocols
  - Specify context of use
- Questionnaires, Surveys, Diaries
- Expert evaluation / cognitive walkthroughs
- Focus groups

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Questions?
Where to get help:

Organisations, Journals, Conferences, Books and On-line resources
Specialist Organisations

- The ACM Special Interest Group on Computer Human Interaction
- The British Computer Society Specialist Group on HCI
- The IFIP Technical Committee (TC 13) on Human-Computer Interaction
Specialist Journals

- Human-Computer Interaction
- International Journal of Man-Machine Studies
- Behavior and Information Technology
- International Journal of Human-Computer Interaction
- Interacting with Computers
Specialist Conferences

- ACM CHI Human Factors in Computing Systems Conference
- BCS HCI SG Human-Computer Interaction Conference
- IFIP INTERACT Human Factors in Computing Conference
- International Conference on Human-Computer Interaction (HCI International)
- APCHI – Asia Pacific Conference on Human-Computer Interaction
Specialist Books

- Human-Computer Interaction, Dix, Finlay, Abowd and Beale, Pearson / Prentice Hall (3rd edition)
- Human-Computer Interaction, Preece et al, Addison Wesley
- Interaction Design, Preece, Rogers and Sharp, Wiley
- Human-Computer Interaction in the New Millenium, carrol, Addison Wesley
- Designing the User Interface, Shneiderman, Addison Wesley Longman, 3rd Edition
HCI Web Resources


www.hcibib.org
Usability Web Resources

www.usabilitynet.org

www.usabilitynews.com
SESUN Web Resources

www.sesun-usability.org

www.sesun.org.cn
Part 2
Global approaches:
HCI at University level
UK BSc Subject Benchmark Statements

HCI is a standard element in the computing curriculum in the UK
HCI is a recognised element in the computing curriculum globally.

IFIP Working Group
http://www.ipo.tue.nl/ifip-wg13.1/
Developing an HCI Curriculum

British HCI Group
www.ics.heacademy.ac.uk/Events/HCINapier/index.shtml

Workshop Objectives

- What is the value of HCI to students? to industry? to society?
- How do you measure professionalism in HCI?
- Is there a core undergraduate curriculum for HCI?
- When is an HCI course not a HCI course?
- When does HCI become Multimedia and when does it become Interaction Design?
- What will a HCI course look like in 20 years time?
ACM SIGCHI Curriculum (1992!)
## ACM Content of HCI (1992!)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>N</td>
<td>The Nature of HCI</td>
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<td>N1</td>
<td>(Meta-)Models of HCI</td>
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<td>U</td>
<td>Use and Context of Computers</td>
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<td>U1</td>
<td>Human Social Organization and Work</td>
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<td>U2</td>
<td>Application Areas</td>
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<td>U3</td>
<td>Human-Machine Fit and Adaptation</td>
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<td>Human Characteristics</td>
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<td>H1</td>
<td>Human Information Processing</td>
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<tr>
<td>H2</td>
<td>Language, Communication, Interaction</td>
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<td>H3</td>
<td>Ergonomics</td>
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</table>
ACM Content of HCI

C  Computer System and Interface Architecture
   C1  Input and Output Devices
   C2  Dialogue Techniques
   C3  Dialogue Genre
   C4  Computer Graphics
   C5  Dialogue Architecture

D  Development Process
   D1  Design Approaches
   D2  Implementation Techniques
   D3  Evaluation Techniques
   D4  Example Systems and Case Studies

P  Project Presentations and Examinations
Questions?
Part 3

Curriculum design:
Goals, models, formats, content examples
(Source: Gerrit van der Veer)
Experiences from the European continent

Gerrit van der Veer was involved with:
- Dutch Politechniques and Universities
- Dutch Open University
- Spanish HCI group common university course material
- Romanian HCI in Computer Science and in Psychology
- Italian Communication Sciences curriculum
Types of HCI curriculum

There are many different types of HCI curriculum. Type depends on the goals as well as on the “environment”.

Goals:
- making aware
- making familiar
- develop specialists
- develop leaders
Making aware

- **All** software engineers, AI, cognitive psychologists, ergonomists, should be triggered to ask specialists

- (Small) **part** of a relevant course, e.g., introduction to software engineering, cognitive psychology, AI applications

- E.g., 2-4 hours of class, 1 chapter in handbook
Making aware: content

Content:
- what is the problem with user interfaces
- human factors in interactive systems
- mental models vs. design models vs. system image
- design: task analysis, interface specification, prototyping, evaluation
Making familiar

- In depth **theoretical** insight and some **hands on** experience, enabling to collaborate in design teams

- One or two University **courses**

- **E.g.,** 20 lecture hours, 100 student hours, possibly followed by actual design project (8 plenary sessions, 100 hours of group work)
Making familiar: content

Content:

- schools in HCI and user interface design, multidisciplinarity
- ergonomics, psychology, engineering, (location dependent)
- theories and models in HCI
- design techniques
Developing specialists

- Specialists for **research** and **design** of interactive systems, as part of a feasible university curriculum

- A **minor** inside a curriculum (cognitive psychology, computer science, communication sciences)

- E.g. **4 courses** during Bachelor + **2** during Masters phase
Developing specialists: content

Content:
- a relevant selection from:
- Intro in HCI;
- User interface design;
- Task analysis;
- Human information processing;
- Software engineering;
- Graphical design;
- Information representation;
- Multimedia, etc.
Developing leaders

- Curriculum that aims at both PhD researchers, and industrial practice (design team managers)

- E.g. a full 4 year Bachelor and Master (variant of Information Sciences); a 2 year post master (after Psychology, Industrial Design, Computer Science, ..)
Developing leaders: Content

Curriculum contains typically:

- 50% courses in computer science, software engineering, ...
- human aspects (ethnography, psychology, HCI, user interface design)
- artistic design (graphics, music, text), history of modern culture
- multimedia applications, web design
Models for development (1)

A mixture of the following:

- Collaboration of existing experts (Spain, 6 universities, different faculties)
- Co-development and apprentice-ship (Romania-Netherlands)
- Evolution of existing courses / curriculum: Twente Univ. of technology (Nl): from classical ergonomics to cognitive ergonomics
- Curriculum building based on market study (both student input and industry output): VU Amsterdam (Nl)
Fit in / relate to / existing curriculum

Keep link with core discipline (which one: computer science, psychology, industrial design?)
Formulate academic level goals; content; balance between theory, skills, practice
Consider (a) buying in courses from other disciplines; or (b) developing multidisciplinary expertise “in house”
Course material: find existing material (presentations, handbooks, websites); translate; adjust; develop your own
Market study

Bootstrapping: sketch an intended curriculum, find out about input and output wishes, redesign, etc.
Make use of scenarios for jobs, projects.
Ask potential students about names of curriculum and courses, duration, educational background in high school
Ask industry about current practice, needs for specialists, known problems in education
Example Curricula (1)
University of Luton
Andy Smith
University of Luton:
BSc. Computer Science / Computing Interaction Design

HCI Modules

Year 1:
- User Requirements

Year 2:
- Usability and Evaluation
- Interface Design Environments

Year 3:
- HCI Engineering Theory
- HCI Engineering Practice

BSc Modular Scheme
- 8 modules per years
- Total 24 modules

HCI modules core and / or options on BSc Comp. Science.

All five modules needed for BSc CID (as core) plus other computing core and option modules
Example Curricula (2)
University of Limerick
Liam Bannon
Masters in Interactive Media (Dept. of CSIS)

- Intake from variety of backgrounds - computing, art, graphic and industrial design, education, media studies
- Original Plan - LIT School of Art & Design collaboration - Studio orientation
- Part skill-based...Part conceptual
- Interaction Design
- Understanding People and their Activities
Masters in Interactive Media (Dept. of CSIS)

- Methods
- User-centred design methods
- Conceptual Design - scenarios, storyboards
- Rapid Prototyping - mockups, video prototyping, demos
- Evaluation methods
- Large individual projects - space for creativity
Siena Design Project

- Participation of European programmes of interaction design
- Siena, Stockholm, Limerick, RCA, London.....
- Design Brief - public spaces and new technologies
- ~ Apple, Interval Design competitions... (Joy Mountford)
- First year...2003
- Linking into Convivio activities....
The Cardboard Box Garden.
Kieran Ferris

- The purpose of the Cardboard Box Garden is to show how computer technology can be used in innovative ways to stimulate discovery, play and adventure among children.
“Building Blocks as Graspable Interfaces for Children’s Interactive Television”

MSc in Interactive Media

Paul Adams – 13/05/02
Developing an HCI Curriculum

this is what children do...

sleep - listen - speak - dance - dress-up

play - learn - watch - eat - fight - help - draw - laugh - cry - smile

pretend - school - music - toys - clothes
what's wrong with this?
these are blocks...
3 - Cubes as an interface: a graspable interface

...a ‘graspable’ interface...
Questions?
Part 4
The needs of the market:
University education and ICT industry in China
Group work questions (1): market need

- What is the market need for HCI in Chinese Universities? What factors are influencing this need?

- Is the Chinese ICT industry significantly different from its competitors in Asia and the West?
  - domestic vs. off-shoring markets?

- How do we promote HCI in China?
Part 5
Building the Chinese Curriculum:
Approaches to HCI in China
Six Golden Rules to Shake the Students Mind

IFIP WG13.1 INTERACT99 Lars Oestreicher (ed.)

- Read thought provoking literature
- Observe real users using real tools
- Analyse the findings in the observation
- Mix the results from the analysis with theory
- Redesign the artefact
- Iterate the observation phase
Group work questions (2): problems and approaches

- Does the practical nature of HCI / usability fit in with the Chinese approach to teaching and learning?

- What differences might there be in a ‘Chinese HCI’ curriculum compared to a ‘European HCI’ one?

- What resources are needed and how will these be funded?

- How can SESUN help?
Developing an HCI Curriculum

SESUN

- Visit
- www.sesun-usability.org
- www.sesun.org.cn

We hope you enjoyed the seminar and hope to keep in contact

Andy and Liam

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