

Understanding users - What is cognition and its role in interaction design

What goes on in the mind?

perceiving
thinking
remembering
learning

understanding others
talking with others
manipulating others

planning a meal
imagining a trip
painting
writing
composing

making decisions
solving problems
daydreaming

Attention

- The process of selecting things to concentrate on
 - Our goals
 - Information presentation

South Carolina

City	Motel/Hotel	Area code	Phone	Rates	
				Single	Double
Charleston	Best Western	803	747-0961	\$26	\$30
Charleston	Days Inn	803	881-1000	\$18	\$24
Charleston	Holiday Inn N	803	744-1621	\$36	\$46
Charleston	Holiday Inn SW	803	556-7100	\$33	\$47
Charleston	Howard Johnsons	803	524-4148	\$31	\$36
Charleston	Ramada Inn	803	774-8281	\$33	\$40
Charleston	Sheraton Inn	803	744-2401	\$34	\$42
Columbia	Best Western	803	796-9400	\$29	\$34
Columbia	Carolina Inn	803	799-8200	\$42	\$48
Columbia	Days Inn	803	736-0000	\$23	\$27
Columbia	Holiday Inn NW	803	794-9440	\$32	\$39
Columbia	Howard Johnsons	803	772-7200	\$25	\$27
Columbia	Quality Inn	803	772-0270	\$34	\$41
Columbia	Ramada Inn	803	796-2700	\$36	\$44
Columbia	Vagabond Inn	803	796-6240	\$27	\$30

Pennsylvania

Bedford Motel/Hotel: Crinaline Courts
 (814) 623-9511 S: \$18 D: \$20
 Bedford Motel/Hotel: Holiday Inn
 (814) 623-9006 S: \$29 D: \$36
 Bedford Motel/Hotel: Midway
 (814) 623-8107 S: \$21 D: \$26
 Bedford Motel/Hotel: Penn Manor
 (814) 623-8177 S: \$19 D: \$25
 Bedford Motel/Hotel: Quality Inn
 (814) 623-5189 S: \$23 D: \$28
 Bedford Motel/Hotel: Terrace
 (814) 623-5111 S: \$22 D: \$24
 Bradley Motel/Hotel: De Soto
 (814) 362-3567 S: \$20 D: \$24
 Bradley Motel/Hotel: Holiday House
 (814) 362-4511 S: \$22 D: \$25
 Bradley Motel/Hotel: Holiday Inn
 (814) 362-4501 S: \$32 D: \$40
 Breezewood Motel/Hotel: Best Western Plaza
 (814) 735-4352 S: \$20 D: \$27
 Breezewood Motel/Hotel: Motel 70
 (814) 735-4385 S: \$16 D: \$18

Two different ways of structuring the same information at the interface.

Perception

- How information is gathered from the environment
- Relies on human senses, especially vision
- Interdependent with other cognitive processes

Perception and interaction design

- Information must be perceived in the intended manner
- Use of whitespace, borders, contrasts, etc. in addition to grouping
- Present information in a form which will help recognizing its meaning

Example: Borders vs. whitespace

Results and Stats Thousand Oaks Promotions North Palermo Credit Union Wilner Hall	Highland Park Machesney Park Vallecito Mts. Rock Falls Freeport Slaughter Beach	Creative Writing Lake Havasu City Engineering Bldg Sports Studies Lakewood Village Rock Island
Performing Arts Italian Coaches Mckees Rocks Glenwood Springs Urban Affairs	Rocky Mountains Latin Pleasant Hills Observatory Public Affairs Heskett Center	Deerfield Beach Arlington Hill Preview Game Richland Hills Experts Guides Neff Hall
McLeansboro Experimental Links Graduation Emory Lindquist Clinton Hall San Luis Obispo	Brunswick East Millinocket Women's Studies Vacant News Theatre Candlewood Isle	Grand Wash Cliffs Indian Well Valley Online Courses Lindquist Hall Fisk Hall Los Padres Forest

Gelogy Manufacturing Management UCATS Alumni News Saso	Intercollegiate Bowling Wichita Gateway Transfer Day Job Openings Live Radio	Thinker & Movers Alumni Foundations Corbin Center Jardine Hall Hugo Wall School
Educational Map Physical Plant Graphic Design Non Credit Class Media Relations Advertising	Beta Alpha Psi Liberal Arts Counseling Biological Science Duerksen Fine Art EMT Program	Staff Aerospace Choral Dept. Alberg Hall French Spanish
English Graduate Complex Music Education Advising Center Medical School Levitt Arena	Religion Art Composition Physics Entrepreneurship Koch Arena Roster	Parents Wrestling Philosophy Wichita Lyceum Fairmount Center Women's Museum

Perception in practice

- Meaningful graphical representations
- Careful use of different media
- Legible fonts, proper colours
- Feedback

Memory

- Short term memory
 - Very limited, only handful of items
- Long term memory
 - Ability to store and retrieve pieces of knowledge
 - Ability to recognize faces
 - Ability to memorize names
 - Ability to recall
 - Ability to associate pieces

Memory overload

- It is impossible to memorize everything
- We can't select what we remember and what we don't
- But we can present information in a form that is more likely to be remembered
- How we present information
- In what context the information is presented

Recognition vs. Recall

- Recognition
 - Recognizing familiar image
 - Visual cues
 - Associating operation with image
- Recall
 - Recalling information from memory
 - “What was the command to do this operation”

Example: File management

- Different types of files
- Large amount of files
- Creating subsets of files
- Tagging
- Coloring
- Icons

REFERENCES

- Sharp et al. (2006): Interaction Design
- Norman, D. (2002): Design of Everyday Things
- Oulasvirta, A. (2005): Interrupted Cognition and Design for Non-Disruptiveness

Social underpinnings and Scandinavian vs. US. traditions in participatory design of information systems

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2 BACKGROUND: THE SCANDINAVIAN CHALLENGE

- In 1971, **Scandinavian academics and unions**, led by **Kristen Nygaard**, began a series of projects aimed at empowering labor in its struggle with management, particularly in terms of the introduction of new technologies.
- Nygaard and his collaborators chose to work with unions in the **manufacturing industry**.
- Nygaard's work was overtly political.

THE SCANDINAVIAN CHALLENGE

- CRA(Collective Resources Approach) projects(**led by Kristen Nygaard**) dealt with how new technologies were introduced into workplaces and how they devalued workers' traditional craft skills, deskilling jobs, removing workers' ability to make decisions, and intensifying work.

THE SCANDINAVIAN CHALLENGE

- In the UTOPIA project, led by Pelle Ehn, the academics began to realize that workers had to be empowered to provide practical alternatives to management-based initiatives. That is, workers had to be able to describe a computer system that could automate work while still valuing their craft skills and upholding their autonomy.

THE SCANDINAVIAN CHALLENGE

- The problem was that the workers had no experience in systems design. Thus they could not begin to speculate on how to build such a system. So the UTOPIA team began experimenting with a range of techniques for discussing and exploring the possibilities, including **mockups** and other **low-fidelity prototypes**, but also “future workshops” and organizational toolkits.

THE SCANDINAVIAN CHALLENGE

- The UTOPIA project failed to produce a working system, but it did produce a design approach and a range of techniques for participatory design work.
 - mockup
- Based on UTOPIA and other projects that came after it, the Scandinavians issued the “Scandinavian challenge” in a 1987 book: develop and use design approaches that encourage industrial democracy.

“UTOPIAN” MOCK-UPS (SCANDINAVIA)

- Mock-ups: low-fidelity prototypes
- These prototypes serve to introduce new technologies
- One of the techniques pioneered in the UTOPIA project
- It became a central technique in participatory design.

“UTOPIAN” MOCK-UPS (SCANDINAVIA)

- Mock-ups became important in bridging the experience of researchers and workers.
- Mock-ups had several advantages:
 - an easy way for researchers to introduce new technologies.
 - workers were able to explore how these new technologies might fit into their existing tacit knowledge about their craft, allowing them and the researchers to refine the design in ways that made use of their existing skills.

COOPERATIVE PROTOTYPING (SCANDINAVIA)

- Cooperative prototyping developed as a part of the cooperative design approach that emerged in the wake of UTOPIA.
- Like mock-ups, prototypes in the cooperative prototyping technique served as a common design language for designers; provided a way to try out common solutions before committing to them.

PICTIVE AND CARD (US)

- As the “Scandinavian challenge” began to be publicized in the US, many academics and researchers became interested in taking up the challenge.
- Two of the more notable results(Michael Muller):
 - PICTIVE (Plastic Interface for Collaborative Technology Initiatives through Video Exploration)
 - CARD (Collaborative Analysis of Requirements and Design)

PICTIVE AND CARD (US)

- Muller wanted “to enfranchise users in the design of systems that would have impact on their work-lives”
- Indeed, in sidestepping the unions, Muller found that his focus broadened to workers other than end users whose work lives would be affected

PICTIVE AND CARD (US)

- PICTIVE's interpretation of the Scandinavian approach resembled cooperative prototyping: it “emphasizes a tradition of
 - user participation in workplace decisions in improving the quality,
 - productivity, and satisfaction related to computing systems”

PICTIVE AND CARD (US)

- Tudor developed CARD to complement PICTIVE with a “macroscopic” approach that allowed workers to develop Workflow.
- CARD originated as “an informal or semistructured card game that supports collaborative analysis and critique of a software system.

CONTEXTUAL DESIGN (US)

- *The United States, 1998: Hugh Beyer and Karen Holtzblatt: Contextual design*
- Contextual design is a well-developed set of techniques for examining a workplace, gathering requirements, and developing solutions based on those requirements.
- Prototyping is just one part of the contextual design process.

CONTEXTUAL DESIGN (US)

- **Contextual design phases**
- First Researchers observes work of the users and interviews them.
- Then design team reviews interviews and notates relating to observation and make several descriptions of work models.
- These models are merged so that designers can get a macrolevel view of the work
- Based on these models, the design team creates a User Environment Description (UED), an outline of the new system to design. The UED leads to a series of low-fidelity prototypes.

CONTEXTUAL DESIGN (US)

- contextual design's encourages workers to make minor changes and suggestions – but explicitly *not to* become designers themselves.
- democratic vs. capitalist
 - “It's workers job to do their job, not design systems”

SUMMARY

- Participatory design started in Scandinavia through a partnership between academics and trade unions (**Kristen Nygaard**).
- The participatory design approach was developed in the Scandinavian countries in the 1970s and 1980s.
- PD emerged in Scandinavia as part of a movement for industrial democracy

SUMMARY

- Scandinavia (participatory design)
 - End user as part of design team
 - Users have democratic control over changes in their work
- US (contextual design)
 - Capitalist
 - Worker isn't designer
- PICTIVE AND CARD (US) are response to the Scandinavian approach.

References

- This documentation is based on Spinuzzi, 2002, <http://doi.acm.org/10.1145/584955.584986>

UCD

A look at some past PD projects

Norwegian Computer Centre

- 1970, 1980
- Norway
- Vidal Keul and Kari Thoresen
- Earliest PD project
- Focus on providing knowledge how the new technology could affect the working environment and supporting design systems attuned to specific local situations

Development, Democracy and EDP

- 1970-1981
- Denmark
- Kensing, Jacobson, Kyng, Marthiassen
- Large scale project
- Objectives were to increase trade union influence on introducing IT technology and develop research and education in the field of system work.

IS for Local Authorities

- Late 1980s
- Italy
- Ciborra, Gasbarri, Maggiolini
- Participation was used as a tool for negotiations
- Aim to develop an information system for local socioeconomic info to be used in planning activities by local authorities.

UTOPIA

- 1981-1985
- Sweden and Denmark
- Bödger, Ehn, Kyng, Sundblad
- Probably the best known PD project
- First attempt on influencing the actual development of technology.
- “Contribute to the development of powerful skill-enhancing tools for graphical workers”

Local government and School Information System

- 1984-1986
- Germany
- Mambrey, Opperman, Tepper, Schmiddt-Belz
- Focus on workers to investigate task automating.
- Providing information systems

Florence

- 1981-1987
- Norway
- Bjergnes, Bratteteig
- Providing patient info and reducing paperwork. Developing instruments for nurses to use when using computers.

Study Circles

- 1985
- Finland
- Vehviläinen
- Main goal to improve the knowledge and skills of working in the office + having computer systems that support this.

Self-Managed Office Automation Project

- 1987-1988
- Canada
- Clement, Zelechow
- Aiming to assist academic department secretaries to have better control on computerization of their work

Human Centered Office Systems Project

- 1987-1989
- UK
- Green, Owen, Pain
- Goal was to help the workers in having their opinion on the development of the new integrated library system package

PROTEVS

- 1989-1991
- Sweden
- Friis
- Focus on investigating the potential of PD to affect the relationship between the users and the developers

Participation

- Creation of technology assessment criteria and guidelines (Kensing, Keul)
- Creation of new organizational forms including support infrastructure (Clement, Green, Vehviläinen)
- The design of specific computer systems (Bödger, Bjergnes, Mambrey)
- Development of participatory techniques (Bödger, Friis)

Overview

- Users are able to participate in IT development under appropriate conditions
- Users: “we know nothing about technology”
- Understanding the system/workplace does not always lead to positive attitudes
- Users now have better understanding on IT and are more self-confident

Suggestions

- Remember that PD is complex process
- PD Dependant on organizational contexts
- Project should be: “fun and interesting!”
- Animators who know the work setting needed
- Address users' immediate needs