Summary of Task Analysis, groups, and IST 331

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Ways to organize the course

ABCS

ACT-R cognitive architecture
(ch. 12: CDs and Gulfs, optional)

Spiral model
Summary of User Behavior (Ch. 1-10, 14)

1. A description of users and their tasks are useful for design
2. There are regularities in user behavior, including learning, perception, action, & social aspects of behavior
3. But: Users have a range of behavior (normal curve or wider)
4. But but: they are not all “completely different”
5. Users have limited capacities for processing information
6. Users don’t know themselves
7. All users make errors; experienced users can often correct errors

- A description of users and their tasks are not intuitive to designers (the fundamental attribution error of design, vs. fundamental attribution error of social psychology)
- There are social aspects that should not be ignored in design
Ways to Learn about Users (ch. 1-10, 11-13, 14)

- **Read**
  - Textbooks and books (Ritter, Baxter, & Churchill; Axelrod)
  - Journal articles (Card, Moran & Newell; Ritter, Freed, & Haskett; McNeese)
  - Book chapters (used in book)
  - Conference papers (Gilmore (FDUCS website; Byrne et al.)
  - Tech reports (Kieras)
  - Videos (Kegworth)
  - Web sites (Agre)

- **Apply theories (e.g., TA)**

- **Run studies (all labs, ask users)**

- **Write/speak (all labs, presentations)**
Read about Users
e.g., FDUCS, Ch. 5

- People have limited working memory
- They have trouble retrieving and have biases
- This leads to a fallacy of the expert that they get better without explicit, recorded feedback
- Interviews with users or yourself are thus not (completely) predictive
- Observing raw behavior and published theories* are better
- Researchers are good at finding the building blocks of these equations (and you are now much better too)

* Just google it
From social psych. and sociology studies (ch. 8 & 9)

- Network effects
- Diffusion of Social Responsibility
- Social effects on decisions
- Factors of team performance
- Social loafing
- Majority/minority effect
- Cognitive dissonance
  - Who you are / Who you want to be / who you want people think you are.
Axelrod on Interactions (ch. 9)

- Interactions can be summarised with payoff matrix
- People prefer high payoffs
- There are sometimes unstable positions
- Good systems create payoffs to encourage the behavior they want
- There are ways to encourage behavior:
  - Make players public
  - Make their history public
  - Make payoff matrix public
  - Payoff what you want to encourage
- Tried to do this in IST 331
Agre on Networking (near ch. 9)

- People are in networks
- Scientists and researchers are people
- Find a problem
- Find others interested in it
- Help build your network, help others
- Everything he says is true
Task Analyses (ch. 11)

- **General**
  - Uses, types, why, limitations

- **Cognitive and Hierarchical TA**
  - *(FDUCS; Ritter, Freed, & Haskett, 2005)*
    - Extremely easy to use, fast, simple, clear
    - For all users behavior, dual tasks not represented, no learning, cannot be tightened, no timing

- **KLM (CM&N; FDUCS)**
  - Very easy to use, fast, simple, clear, timing, can be tightened
  - For expert behavior only, can’t do dual tasks, learning

- **GOMS (Kieras; FDUCS)**
  - Easy to use, fast, simple, less clear
  - For expert behavior only, can’t do dual tasks easily

- **Best solution for TA creation is to employ a variety of methods**
  - Questionnaires and interviews
  - Observational studies
  - Examination of competing, or similar products
  - Literature review
  - Unstructured user input. Spontaneous feedback, even on plane
Activity Theory (fix to Ch. 11)

There are tasks that are not tasks, but activities: painting, team building, designing, writing.

Interaction between task (tools and object), user, and community.

Emphasis is not on single user but context.

“Descriptive rather than predictive”, but that is incomplete criticism:
Activity theory suggests context and aspects to consider in design.
Empirical Evaluation (ch. 12)

- When you can’t do gold standard of users and their tasks
  - Might not know: users, tasks, context, task frequency, how things fit together, etc.
- When you are driven by new technology
- There are tools for detailed activity analysis of users of a system studied systematically
- Human behavior analysis is still an active area of research
- *Running behavioral studies a guide* [free PDF in PSU lib]
Cognitive dimensions (ch. 13)

- In the end, HCI does not tell you what to do
- It can only note tradeoffs
  - Easy to use may mean 20 cents or $200 of hardware or $1M of development
  - Learnability of new and existing users on a release
- Ch. 13 note some of these tradeoffs and how design must address them
Example Cognitive Dimensions (ch. 13) [optional]

- Hidden dependencies, relationships
- Viscosity, ease of change
- Role-expressiveness, objects/functions mapping
- Premature commitment, how soon does the user (or designer) have to decide something
- Hard mental operations, how easy are the sub-steps
- Abstraction, how abstract are operations and objects
- Error—susceptibility, how easy it is to err
- Consistency, how uniform the system is (in various ways, including action mapping)
Computational Summaries of Users (ch. 14)
Risk-Driven Spiral Model (ch. 14)

- Major phases of all projects
  - Explore, value architect (design) build, test
- Risk-driven
- By known risks
- Each HCI method reduces different risks
- This is where 413 will start
- This is my best theory of system development
- Your project was done within it
Projects: Examples and Rubric

- Use example projects as minimum
- Look at maximal use of references, & structure (which helps hold it together)
- Look at book and papers referenced in book for how to use figures, tables, and references
- Author, contact details, date, pages, screen shots, segues, paragraphs, figures, tables
- Paperwork due with project
  
  http://acs.ist.psu.edu/ist331/project-report-form.txt
  
  http://acs.ist.psu.edu/ist331/example-report.rtf
Conclusions (ch. 1-14)

- Know your user and their tasks
  - Data gathering
  - Formal task description
  - Read, watch, listen, talk

- Social aspects
  - Know your user's social context and motivations

- Modify technology to support user and tasks, broadly defined
  (it’s not just time, but also errors, $, development, other risks, training time, lives, radiation, publications, CO$_2$…)
Announcements

- Cache web sites (ist331, FDUCS)
- You are allowed to have proofreaders from within the class
- Bring resume on paper if you want feedback at any point
- Levels of processing:
  - https://en.wikipedia.org/wiki/Levels-of-processing_effect
  - https://www.reddit.com/r/science/comments/5gtd78/dont_study_for_exams_by_studying_instead_take/