Qualitative Data Collection and Analysis

In this lecture

- Overview of observations, diary studies, field studies
- Interviewing in detail
  - Interviews that are done incorrectly are lost data
- Externalizing and analyzing data

Heuristic Evaluation of Gaming

- Thoughts on methodology?
- Thoughts on results?

Other Considerations: Qualitative Research

- How do we make qualitative results believable
  - What defines enough subjects?
  - What is evidence for qualitative results?

Collecting Qualitative Data

- Observations
- Diary studies
- Interviews

Observations/Field Studies

- Two different definitions of observational study that I use interchangeably
  - First is a field study: go out into the field and observe acts of interest
  - Second is closer to an experimental study, but with control punted.

Observations/Field studies

- Variety of formats for information
  - Handwritten notes
  - Drawings and sketches
  - Video recordings
- Format depends on level of detail and time available
  - Video takes significantly more time to set-up for and to analyze

Observational Exercise is Posted

- Notes + photos as most basic instance:
  - Develop some shorthand for capturing information quickly
  - Take copious notes for first two or three observations
    - As you observe additional subjects you become more attuned to what is important
    - Make sure early data isn't lost forever
    - General rule of thumb: record everything you can see in extreme detail
    - More data is always better

Observations: Strengths and Weaknesses

- Observational data is useful both for design and evaluation
- If analysis done immediately, can often be used as a first pass at insight
- Frequently augmented with other sources of information
  - Interviews
  - Diary studies
  - Video data

Observations

- I have an example from my past work that I'll talk about on exercise day …

Diary Studies

- Rooted in psychology and anthropology research
  - Definitely over 100 years of work
  - Linguistic development in the mid-1800s
- Process
  - Explain purpose of study to participants
  - Provide participants with some means of recording salient information
  - Participants collect information
  - Researchers analyze information
- Advantages
  - Relatively low-cost
  - Flexible (can study almost anything)
  - But some extra-burden on participants

Approaches to diary studies

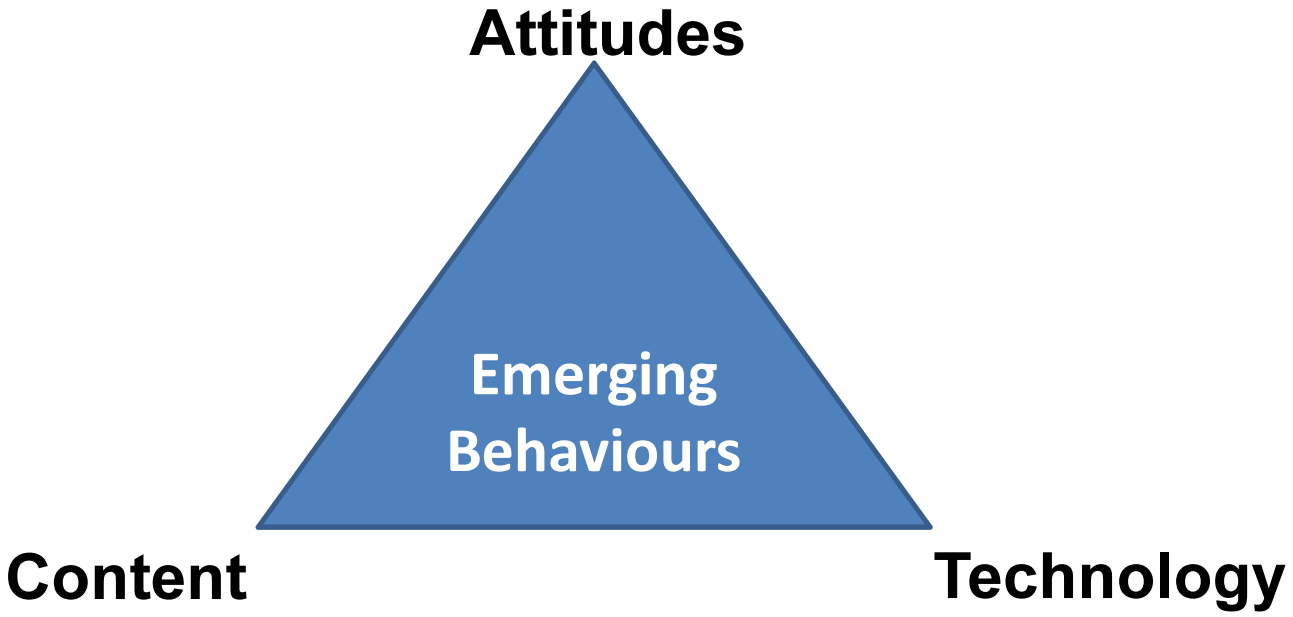
- Two approaches
  - Psychological style
    - Researcher identifies things to diary and subject diaries
      - Mobile device use
      - Task switching and interruptions
  - Anthropological style
    - Cultural probe
    - Subjects can submit anything of importance
      - Versus specific questions
    - Not limited to paper/written
      - Photos, video, audio, etc.
    - Common when researcher is interested in group but has little expertise

Conducting Diary Studies

- Make decision about approach
  - Are there specific data you want? Or are you interested in what might be important to participants
  - How much leeway in data you receive is tolerable?
- Structure data collection for maximum convenience
  - In psychology style, be explicit in data you want collected
    - Use semi-structured format for data
    - Too much or too little structure harms data completeness
  - In anthropological style, encourage creativity
  - In both, design a convenient mechanism for data collection
    - Also, provide alternatives
- Have a specific time frame for study
  - Let participants know what to expect
- Follow up with detailed interview
  - Use diary studies as prompts during interviews to elicit additional information

A Quick Example of Diary Study

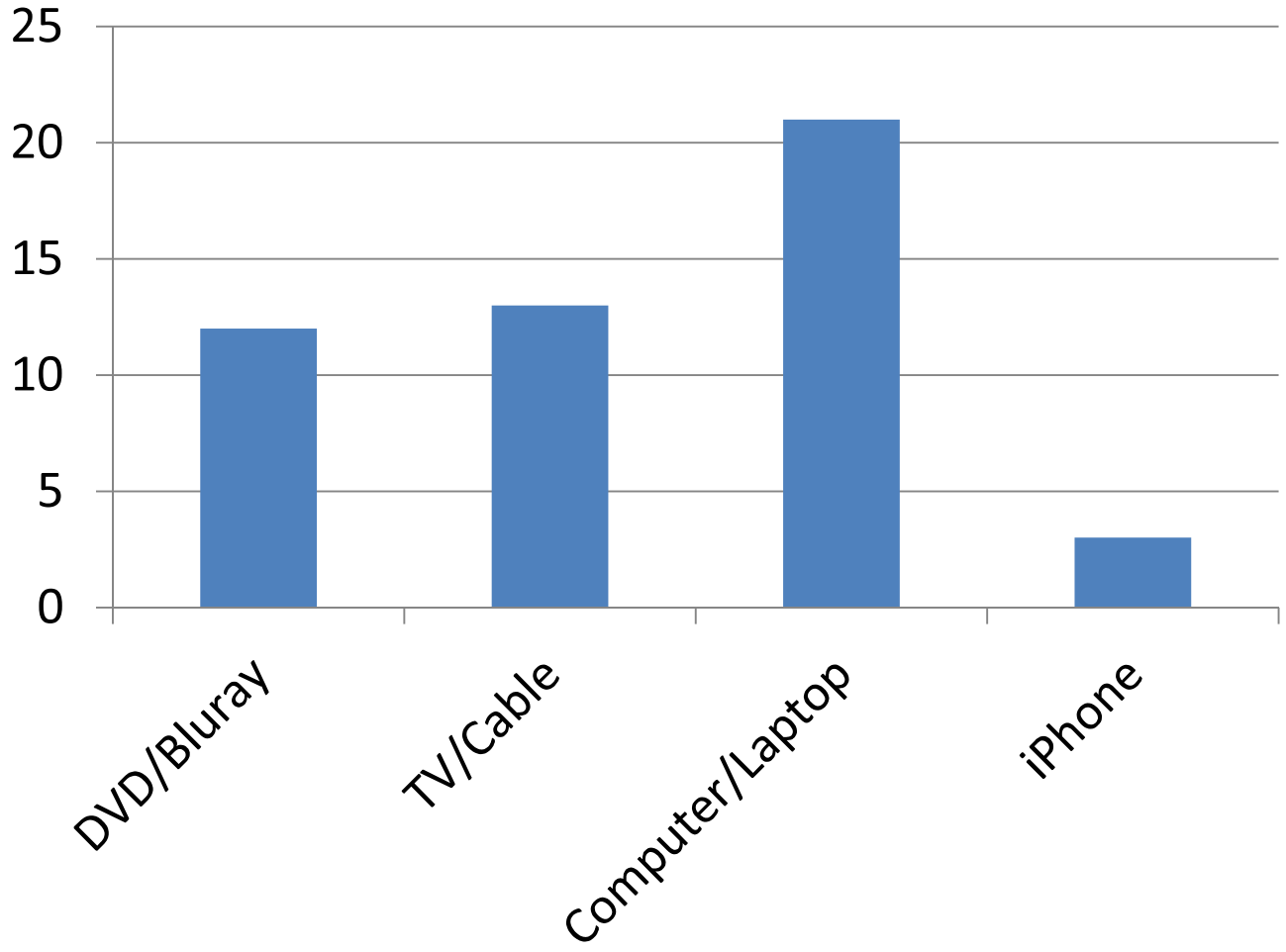
- Diary study to understand impacts of technology on video content consumption
  - What behaviours emerge from new technologies?



Data Collection

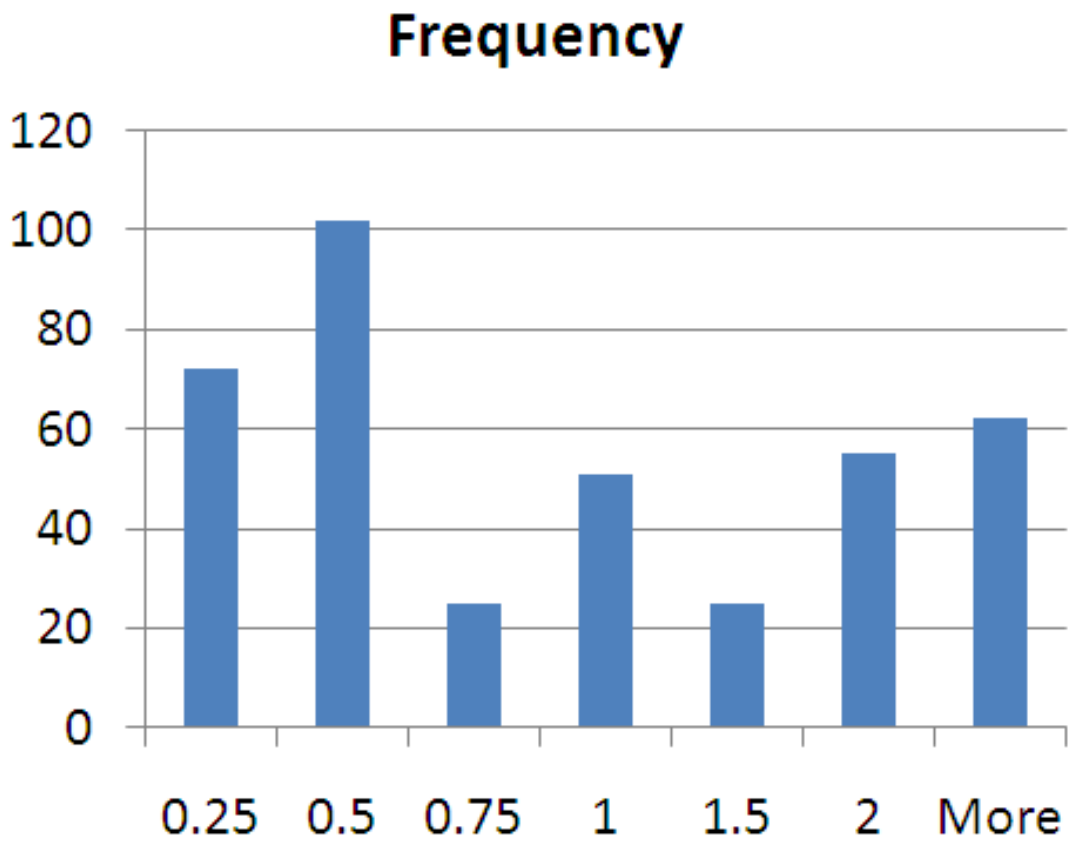
- Primary deliverable is a data set exploring modern digital video consumption
- 25 participants
  - All early adopters of technology
- Procedure
  - 7-day diary of video consumption
  - Exit survey to verify representative nature of data
  - Prompted exit interview using diary data

Diary Study – Equipment Used



Diary Study – Session Length

- About 3 hours per day on average of viewing across all participants



Selection Methods

Content Source

Diary Study: Strengths and Weaknesses

- Information accuracy
  - Good and bad.
  - Would I really want someone to know I watched TV show X with my wife?
  - However, on-going data recording.
- What, not why, not attitudes
  - I downloaded this vs why I downloaded this

Diary/Observations: Problems

- Both diary and observations take time
  - Time to collect data in diary studies
  - Time to observe tasks that you seek to understand with naturalistic observation
- One way to focus and compress time required to observe tasks or capture observations is to interview
- Special interviewing technique captures tasks in detail:
  - “contextual interview”

Useful Resource

- Robert Weisz, *Learning from Strangers: The Art and Method of Qualitative Interview Studies*

Interviewing: Setting the Stage

- Try to interview them in a meaningful environment
  - If about work, at work, etc.
  - No always possible (e.g. the paper, your exercise)
- Explain what you are doing in their language
- Ask their permission
  - If in formal component of course, give them consent form and let them read it
    - Give yourself busy work
  - Revisit consent form with them to answer questions
- Try to record interview
  - Will need their permission to use recording devices

Types of Interviews

- Structured
  - Specific list of questions
- Unstructured
  - No set topics at all
- Most common interview is semi-structured
  - Depends on project, though
  - Semi-structured means
    - Have a group of themes and example questions
    - Will use these questions when necessary to refocus
    - Are free to ask follow-up questions, or to continue down an unanticipated line of reasoning
  - These slides focus on this process

Set the stage

- Get acquainted
  - Ask:
    - What they do
    - How long they've done it
    - What their job entails
  - Do NOT use a check list of items

The Grand Tour

Could you walk me through …

Walkthroughs

- These are a reconstruction, not remembering
- Concrete versus general with natural ordering
  - Cause and effect becomes more apparent
- Recent is better
- Details naturally emerge
  - Avoids the tendency to summarize
  - As details emerge, you should continue to look for more details
- Examples
  - Walk me through your day
  - Walk me through arranging your last catering event
  - Walk me through a typical training day
  - Walk me through some recent mathematical problem solving you did

Contextual Interviews

- Walkthroughs transition naturally to contextual interviews
- People will point to artifacts
  - Bring these in
  - Can ask for a live demo, or a walkthrough of creating and using the artifact
- If they reference a tool, a message, etc., ask to see it
  - Tools, messages, sheets of paper, etc. help them remember details.
- Where possible, shoot photos of the artifacts and ask for samples if they can let you have them

Asking questions

- Don’t ask leading questions
  - Any question that suggests an answer is bad
  - Wording, intonation, or syntax
- Avoid closed questions
  - Do you like this interface versus can you walk me through how you use this application, describing what you’re doing as you do it?

Asking questions (2)

- Ask
  - When you don't understand something
  - When terms arise
- Avoid interrupting, though
  - Keep a notebook
  - We encourage our students to develop shorthand
    - Question marks in margins as they take notes, etc.
- Avoid generalizations
  - If they say "Typically you …"
  - You say: "What was a recent example of this? Can you walk me through what you did?"
- Indicate understanding, not agreement
  - "Mmm-hmm" versus "totally"

Asking questions (3)

- Be attentive
- Be well-dressed (but not formal)
- Enunciate
- Look at the person
- Sit or stand reasonably close, but respect personal space
  - If person moves away you are too close
- Limit what you bring
  - Folio with notebook (and consent forms if project)
  - Recording device (if project)

End the Interview and Deal with Data

- End the interview
  - Summarize with them what you learned
  - Thank them and **smile**

- Transcribe the interview
  - You get the details externally recorded
  - You begin the process of data analysis

Things to Avoid

- NO checklists of questions
- NO closed or leading questions
- NO questions that encourage generalizations (especially after get acquainted)
- NO focus on a specific system
- DO NOT interrupt
- DO NOT correct the person or try to teach them something you know
- DO NOT look away from the person, yawn, etc.

Data Analysis

Qualitative Research

- Definition:
  - Qualitative research is a situated activity that locates the observer in the world. In consist of a set of interpretive, material practices that make the world visible. These practices transform the world view, turn the world into a series of representations, including fieldnotes, interviews, conversations, photographs, recordings, and memos to the self. Qualitative research involves an interpretive, naturalistic approach to the world. Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them.
    - Creswell, page 36.

Two Views

- In the narrow
  - Getting data organized, externalizing data
  - Coding and clustering
- In the broad
  - Grounded theory and three-level coding of data
  - Strauss: Open/Axial/Selective
  - Glausser: Open/Selective/Theoretical
- In HCI

Analyzing data

- Qualitative data needs to be organized to be of use
- Use external representations of data: serve three purposes
  - Manage complexity of the data
    - Single digit versus six digit multiplication
  - Externalizes the data so that it is collectively owned
    - Model focuses interaction around data
  - Breaks the initial propensity to see data “in the small”
    - Need to find themes that generalize across users
    - Examining data via its external representation allows this
- One common approach is affinity diagrams
  - Other artifacts exist for additional details

Externalizing Data

- Distributed Cognition
  - A theory of psychology from mid-80s
  - Developed by Edwin Hutchins
  - Uses insights from sociology, cognitive science and activity theory
  - Emphasizes social aspects of cognition
  - Framework that involves coordination between individuals and artifacts
  - Two key components
    - Representations that information is held and transformed
    - Process by which representations are coordinated
    - E.g. Affinity diagram with post-it containing any and all possibly relevant data

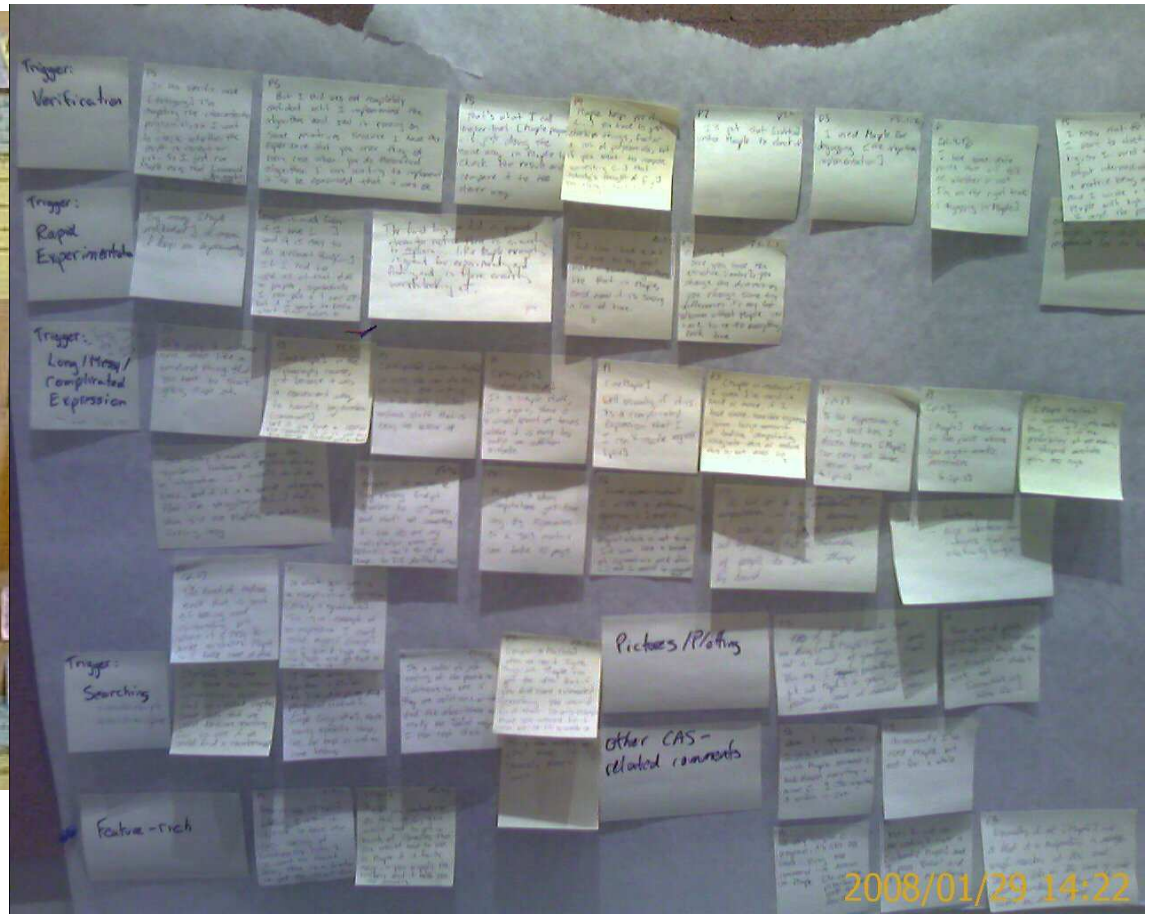
Coding

- Formalizes any interview data, diary data, observations, etc.
- In paper on heuristics for gaming:
  - Three-step process, involving more than one person
    - Separately develop categories by watching, reading, etc.
    - Separately populate those categories by watching, reading, etc.
    - Aggregate categories by combining like information from multiple researchers

Affinity diagram

- Organizes notes and data captured from your sources
- Data from sources should be in some externalized format
  - Transcripts
  - Photos
  - Handwritten notes
  - Any additional data you can get your hands on
- Goal is to combine all data in one place
- Information is combined as a hierarchy
  - All data relevant to a theme is shown together
- Uses post-it notes
  - Always
  - Yes

Affinity Diagram



Affinity diagram

- Affinity diagram is a diagram built from post-it notes
- Affinity is built bottom-up
- No starting categories, instead start with individual notes
  - A quote, an idea, a work process, a requirement, a need, an observation, a task, a problem, etc.
  - Put up one note
  - Look for notes that go with it
  - No justifying why a note goes with another
- The affinities you look for are notes that focus on similar intents, problems, or issues
- Called *open coding*

Affinity diagram

- When a group of notes gets large enough, add a label to the group
- Try to express affinities in language of users
  - Sourcing fresh vegetables is essential
  - Parents care about details
- Also form groupings of groups
  - Post-its allow frequent repositioning, which is essential to effective affinities
- Discuss placement and differing ideas if you are part of a group, or with your partner if you work alone
- Police your notes
- When misunderstandings occur, go back to data
- Try to put aside sufficient time to complete affinity
  - May take several hours

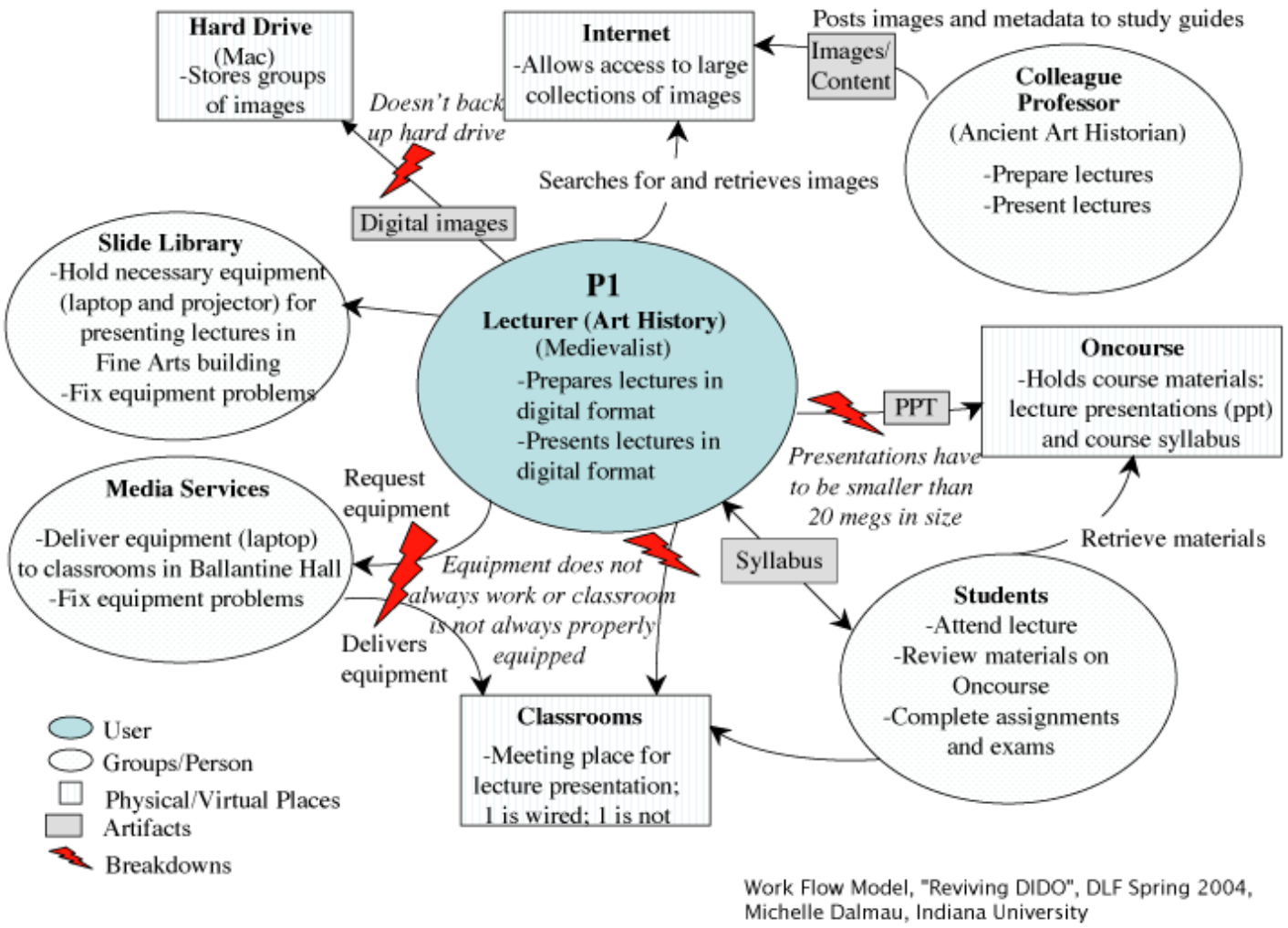
Presenting Data

- "Walking" the affinity is a good start
  - "Three main themes emerged from our analysis of interview data …"
  - "We structured our observations around two themes: …"
- Issues may appear where you need additional detail
  - Good to be able to follow-up with participants in initial data collection
  - Allows validation of hypotheses that emerge from the affinity

Other Models

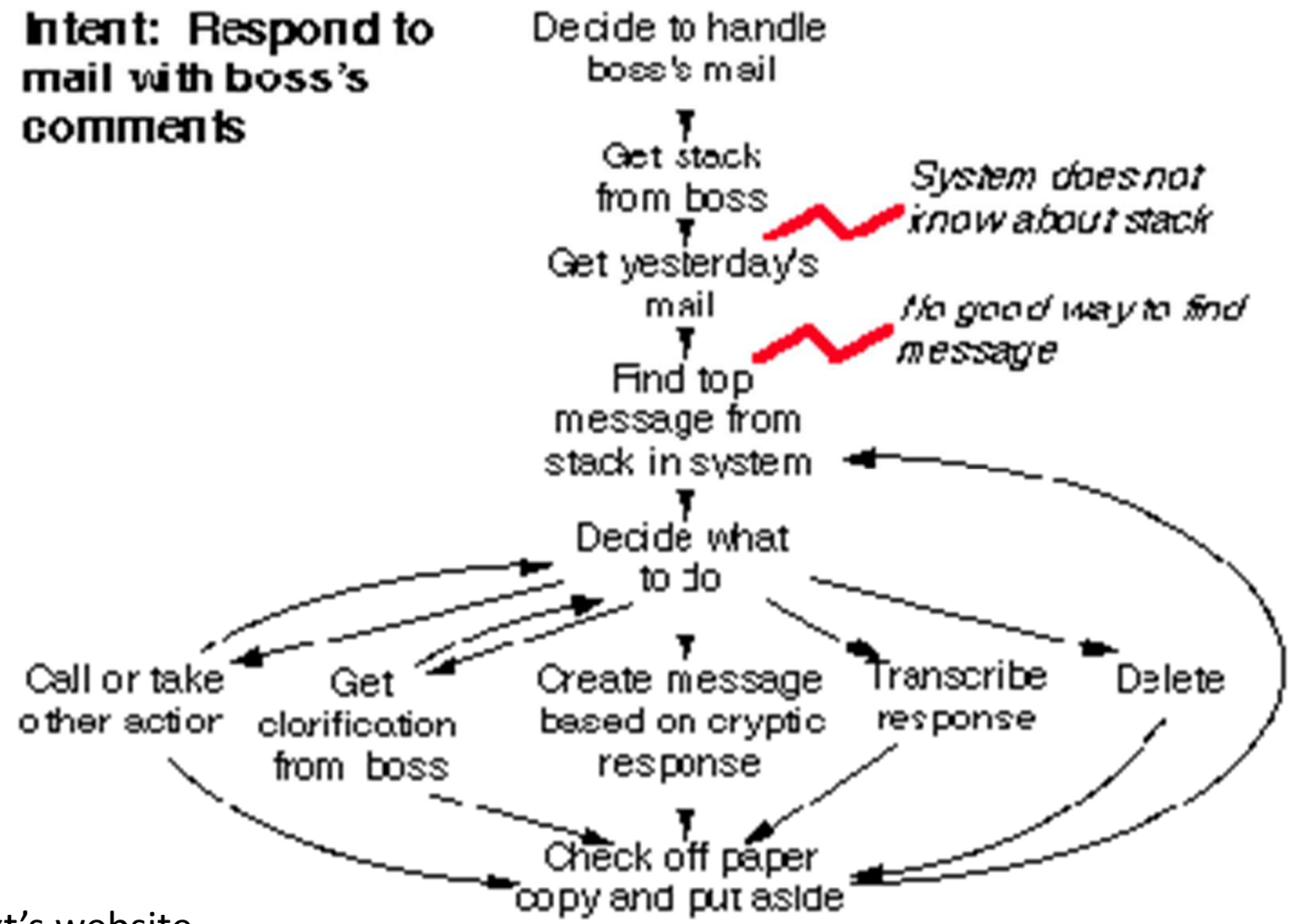
- CS 449 formalizes analysis of specific types of information collected during qualitative inquiry
- There are specific types of information associated with any type of qualitative data capture
  - Work place
  - Artifacts used
  - How information travels
  - How tasks are actually performed
  - People's attitudes toward others and toward the task

Flow Model



Work Flow Model, "Reviving DIDO", DLF Spring 2004, Michelle Dalmau, Indiana University

Sequence Model

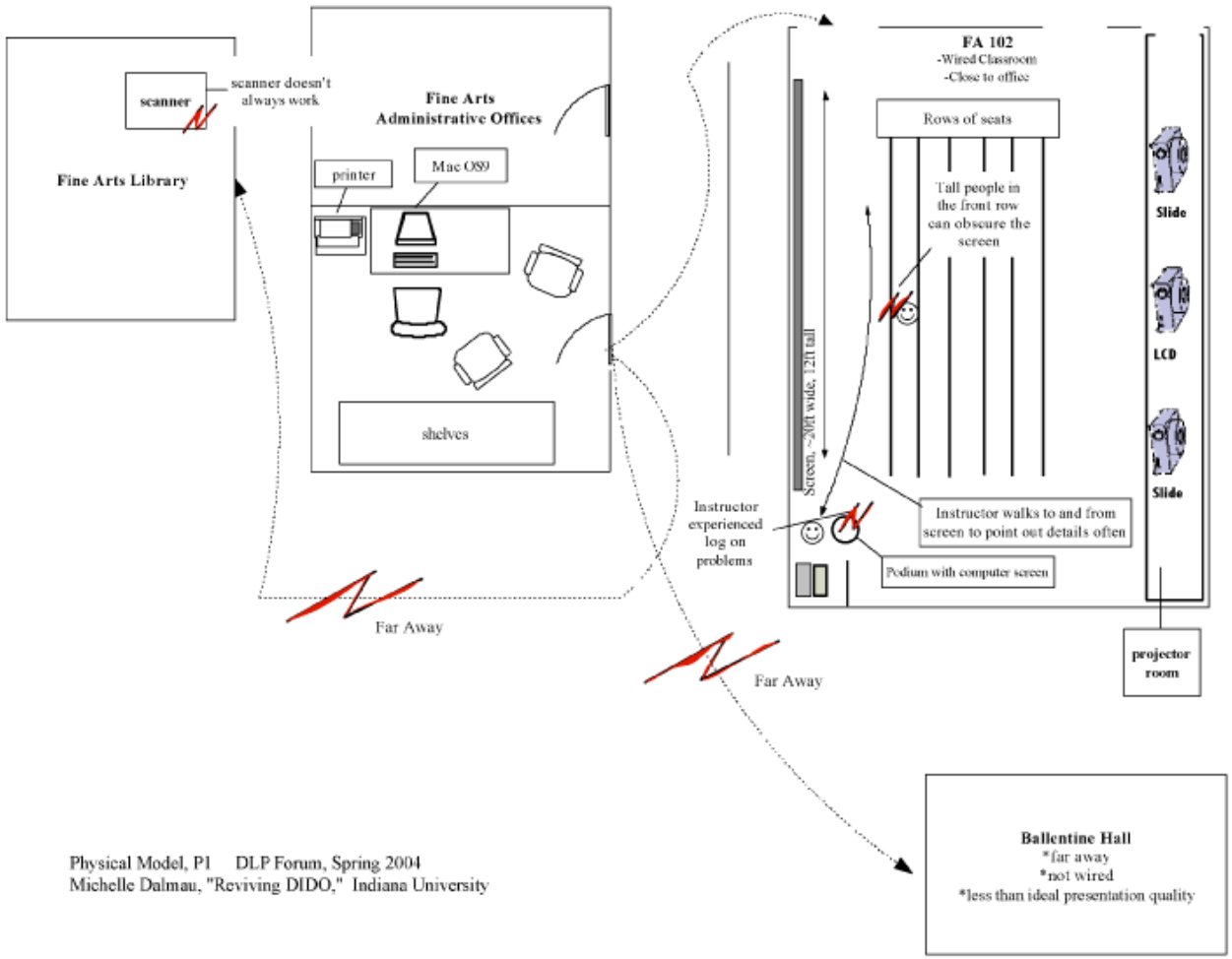


From Incontext's website

Sequence Model (2)

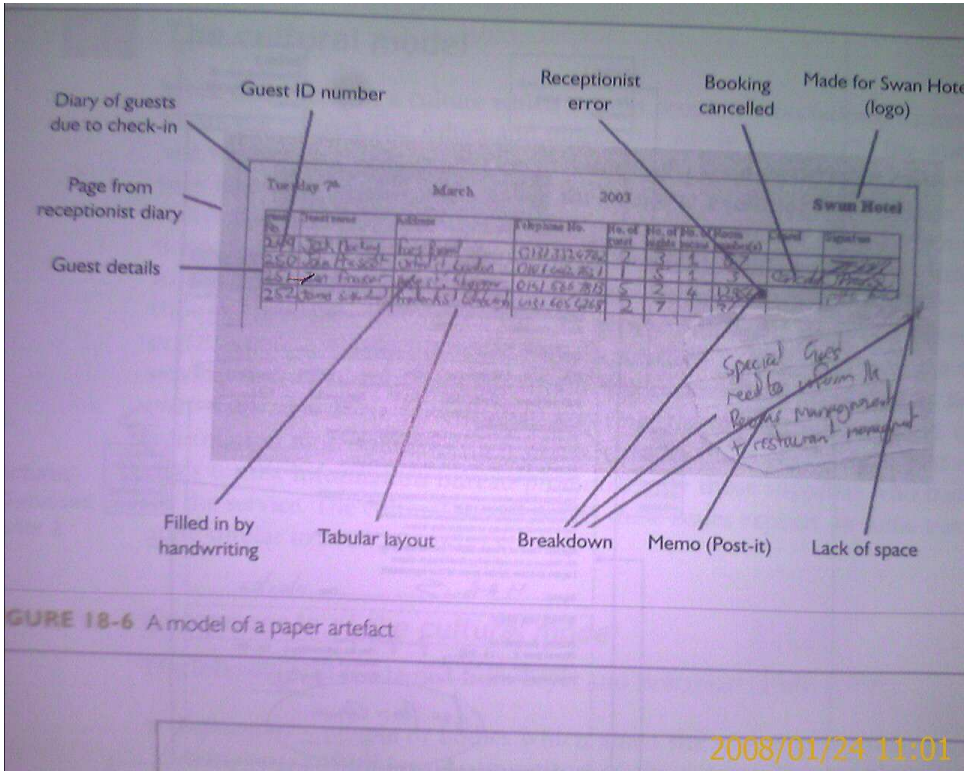
Intent: Needs to prepare 4 lectures for A214: Life and Art of Ancient Rome – Roman Religion	
	Trigger: Class meets tomorrow afternoon, need to have first lecture ready
Note: In progress: PPT, Netscape 4.x and file Finder windows open before we arrived. Loyal MAC (OS 9.x) user.	Prompted by syllabus – topic for this week, Roman Religion
Intent: Recycle PPT – use a base PPT rather than start from scratch	Find existing PowerPoint (PPT) lecture on similar topic
Note: Keeps all the existing images/PPT slides	Copies (Saves As) PPT as A214 for Roman Religion Lecture
Intent: Colleague normally teaches this class (A214)	Goes to Classical Art Historian's course web page (A210) – Bookmarked
Intent: Colleagues usually has good images (from DIDO)	Browses "Roman Gods" link (see Artifact A210 home page)
Note: Image quality assessment is automatic and very subjective	Identifies desired image /assesses quality
Intent: Expand lecture with reliable resource	*Downloads image (CTRL+Click) to "Download Image to Disk"
Note: Knows keyboard shortcuts	
Intent: Dynamically builds own image collection	*Saves image to "Roman Art" folder
	No sub-folders – many, many unique images in one folder
Note: Steps identified with * are done fluidly and repetitively while preparing lecture. Steps will not be represented for every image found as such but in shorthand: Integrates image	*Renames image (long, descriptive names)
	*Copy and Paste image into PPT slide
	*Resizes/Positions image in PPT

Physical Models

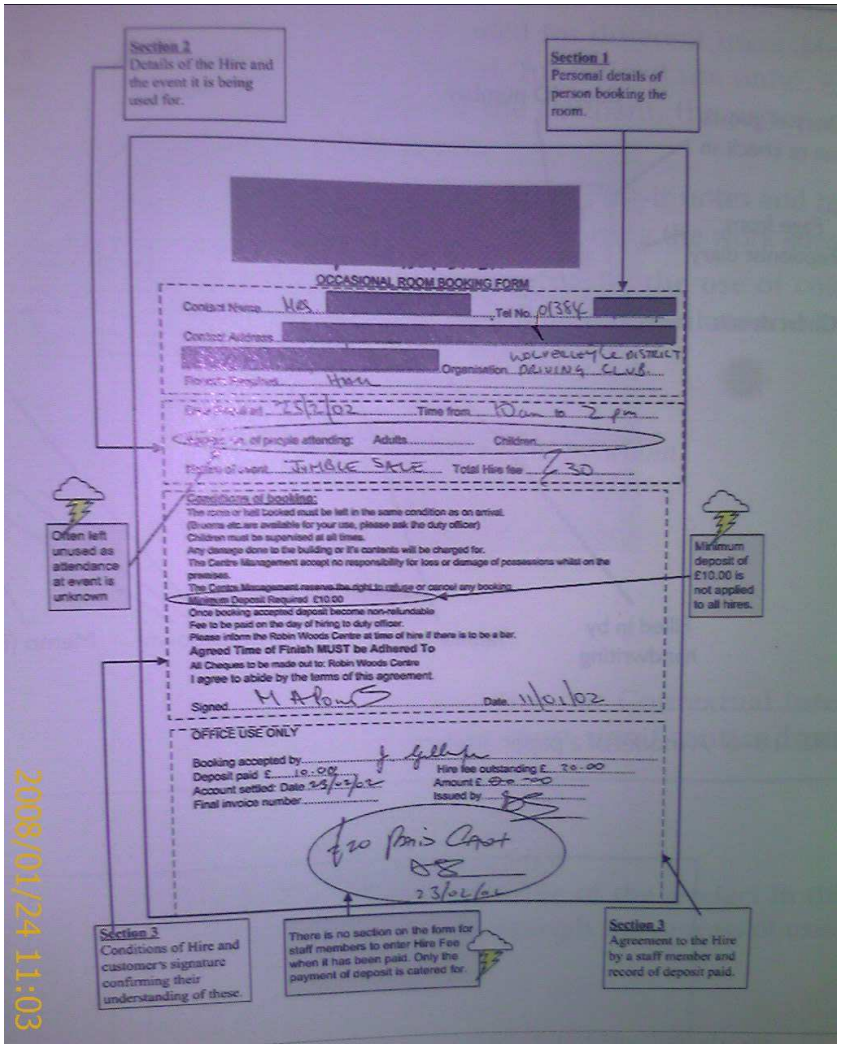


Physical Model, P1 DLP Forum, Spring 2004
Michelle Dalmau, "Reviving DIDO," Indiana University

Artifact models



GURE 18-6 A model of a paper artefact



Cultural Models

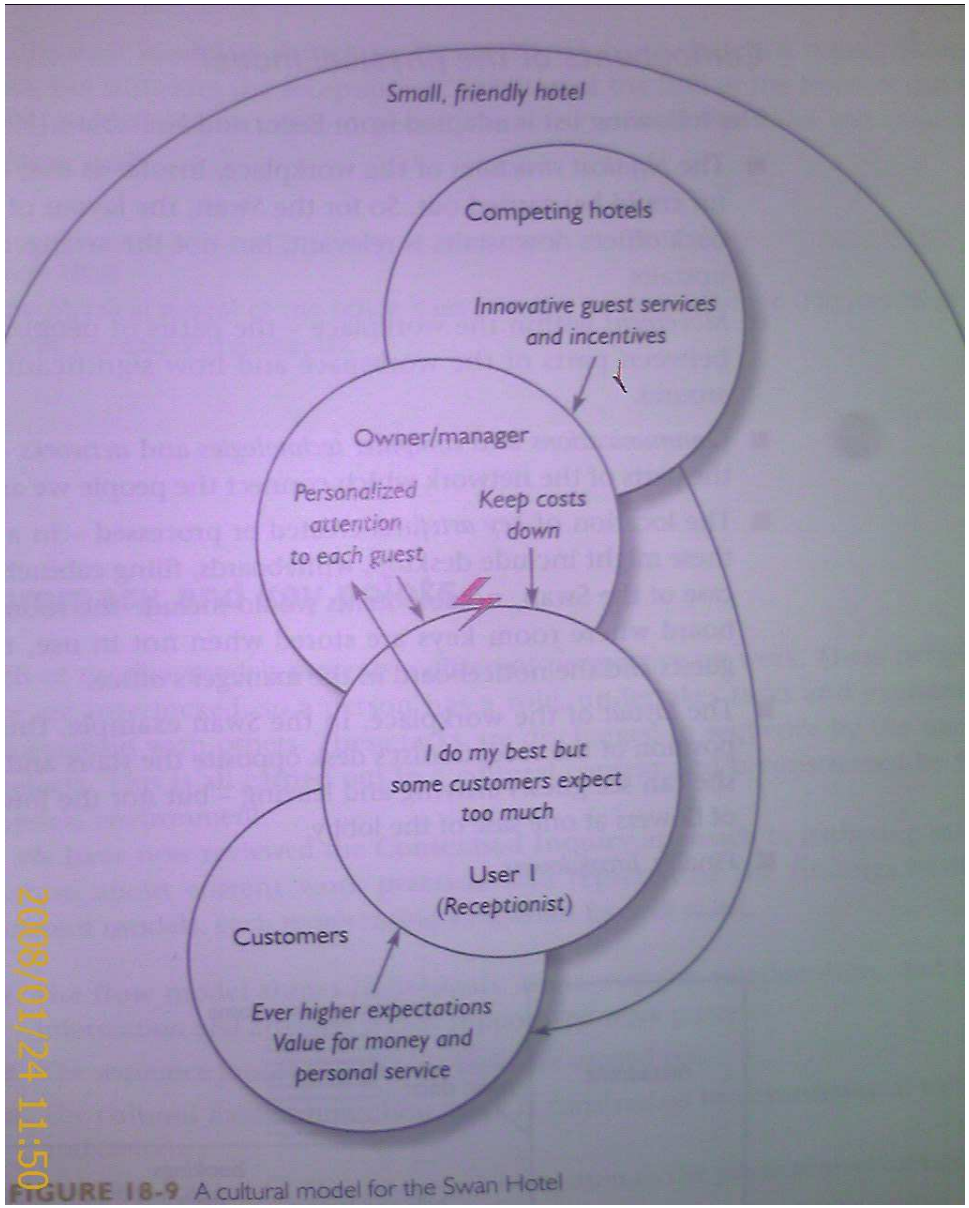


FIGURE 18-9 A cultural model for the Swan Hotel

A Philosophical Perspective on Qualitative Research

Qualitative Research

- Philosophical assumptions and intersection with practice
  - Ontological
  - Epistemological
  - Axiological
  - Rhetorical
  - Methodological

Ontological

- Questions
  - What is the nature of reality?
- Characteristics
  - Reality is subjective and multiple as seen by participants
- Implications for practice
  - Researcher uses quotes and themes in words of participants and discusses alternate perspectives

Epistemological

- Questions
  - What is the relationship between researcher and researched?
- Characteristics
  - Researcher attempts to lessen distance between him-/herself and topic
- Implications for practice
  - Researcher collaborates, spends time in field, becomes an insider

Axiological

- Questions
  - What is the role of values?
- Characteristics
  - Researcher acknowledges that research is value-laden and that biases are present
- Implications for practice
  - Researcher openly discusses values and includes his or her own interpretation along with interpretation of participants

Rhetorical

- Questions
  - What is the language of research?
- Characteristics
  - Researcher writes in a literary, informal style using the personal voice, uses qualitative terms and limited definitions
- Implications for practice
  - Researcher uses an engaging style of narrative, employs language of qualitative research
  - Should be engaging and easy to read

Methodological

- Questions
  - What is the process of research?
- Characteristics
  - Researcher uses inductive logic, studies topic with context, and uses emerging design
- Implications for practice
  - Researcher works with particulars before generalizations, describes in detail context of study, and continually revises questions from experiences in field

Characteristics

- Many, and varied. More to be aware of these
  - Natural setting
  - Researcher as instrument of data collection
  - Multiple data sources, words and images
  - Analysis of data inductively, recursively, interactively
  - Focus on participants perspectives
  - Emergent, not preconfigured design
  - Holistic view of phenomena
  - Researcher may need to reflect on his or her role, readers role, participants role in shaping study
- Best suited to studies where an issue needs to be "explored"
  - Common when not enough information to design, evaluate, test, etc.

Approaches to Qualitative Research

- Narrative
- Phenomenological
- Grounded Theory
- Ethnography
- Case Study

Narrative

- Useful for capturing life story of one or two individuals
- As a result, uncommon in HCI
- Procedure
  - Select one or a very small number and gather stories through multiple types of info. (diaries, letters, family members, documents and photos, etc.
  - Collect info about context, personal experiences, home life, jobs, etc.
  - Analyze and restory participants stories

Phenomenological

- Experiences around a concept of phenomenon
  - Either interpreting lived experiences or describing experiences
- Method
  - Develop a phenomenon of interest to study – examples include anger, professionalism, what it means to be underweight, what it means to be a gamer, what motivates game selection, etc.
  - Try to bracket out your own experiences
  - Collect data through in-depth interviews, multiple interviews, about 5 to 25 individuals
  - Two questions: What have you experienced in X? What context or situations influenced your experiences?
  - Pull out significant statements about phenomenon (horizonalization) and develop clusters of meaning
  - Write a description of experience and context that influences experience, and extract essence of phenomenon

Grounded Theory

- Goal is to generate or discover a theory
  - Check out Voida's "Wii all play" paper
- Rigid structure (as practiced in HCI)
  - Interview participants about X, how it unfolded, walkthoughs
  - Re-interview for more detailed questions: What was central, what influenced or caused, what strategies were employed, what effect occurred, etc. Other forms of data may be collected. Goal is to saturate model
  - Three states:
    - Open coding: forms categories using affinities.
    - Axial coding: Identify a central phenomenon in data, explore causal conditions, context, consequences, etc. Repeat on other data points.
    - Selective coding: Extract hypotheses, propositions, story lines that connect phenomena

Ethnography

- Examines shared patterns within a cultural group (situated together)
  - UW Gamers (ethnography) versus DS gaming (grounded theory)
  - Many forms
- Process (overview)
  - Identify a specific group, one that has been together for period of time
  - Select themes across group. Begin by trying to determine patterns about cycles, events, themes
    - Culture is an ambiguous term
  - Do fieldworld where group lives/works, participate with group, contribute, collect artifacts to describe group
  - Form overall impressions of group culture and describe

Case Study Research

- Group, but not entire culture, just one issue or problem
  - Narrower in scope, more common in CS that true ethnography
  - Popular in psychology, medicine, law, politics, etc.
- Method
  - Identify issue to study
  - Collect interviews, video, photos, documents, etc.
  - Create a narrative describing case, then analyze themes within. Goal of themes is not to generalize, but to fully understand. Use context, if multiple instances look within and across instances of issue, etc.
  - Assign meaning to issues – essentially lessons learned.

HCI Research

- Tends to be a bit sloppy about mixing methodologies
  - Not too big a problem in my opinion, as end result is what matters
    - Story of someone = Narrative
    - Essence of what was observed and why = phenomenological
    - New big theory of what is seen = grounded theory
    - Culture of a group = ethnography
    - Issues experienced by an identifiable group = case study