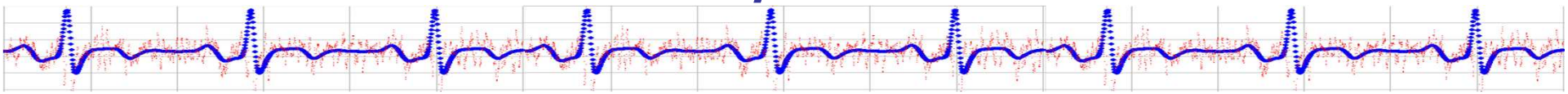
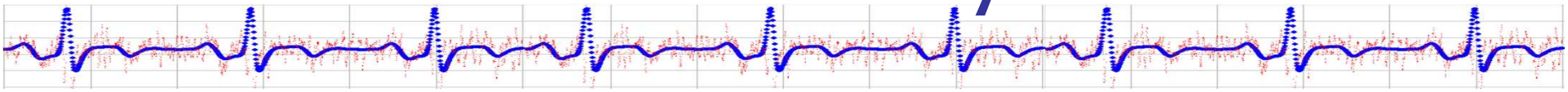
Empirical Research Methods in Information Science

IS4800 / CS6350



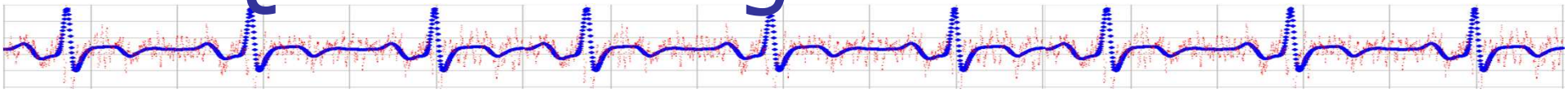
Lecture 4

Overview for today



- Quick reading assessment
- Ethnography
- Homework 1a
- Back to human subjects research (maybe)

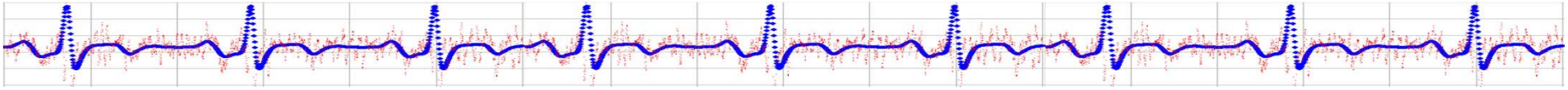
Quick reading assessment



Closed book, closed computer

10 minutes

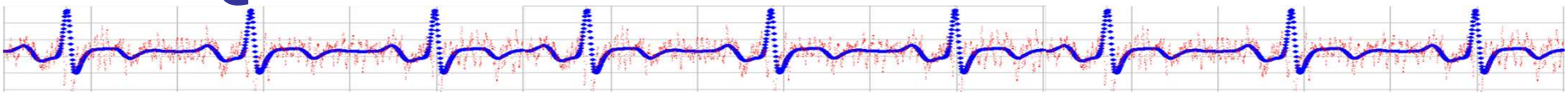
Homework for Wed



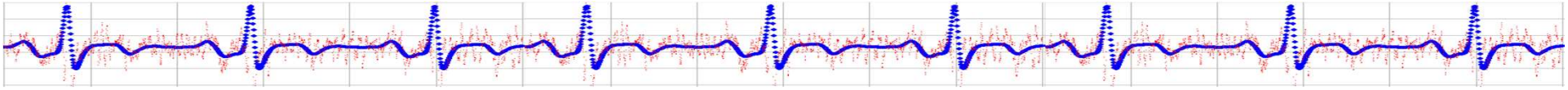
- No class Monday – MLK Day

- Reading: Research models (B&A Ch 4); Possibly a Python tutorial (if emailed)

Ethnography & Qualitative Research

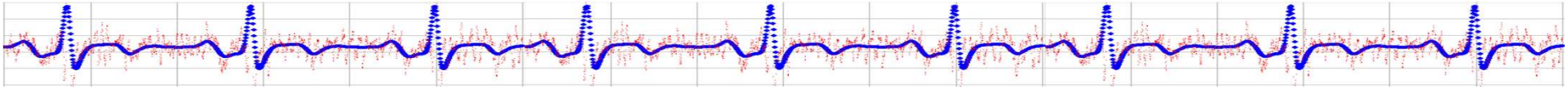


Overview of Research Methods



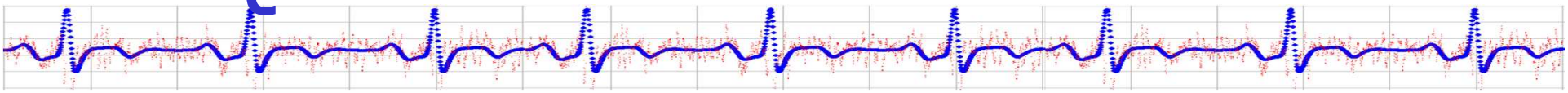
- Quantitative
  - Descriptive
  - Correlational
  - Experimental
  - Demonstration
- Qualitative
  - Ethnography
- Mixed

Quantitative vs. Qualitative Research Methods?



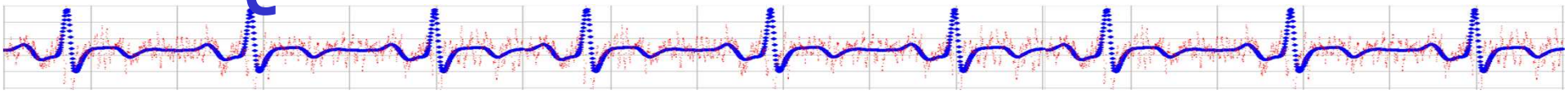
- Where did the methods come from?
- Kinds of data
- Kinds of analyses
- Kinds of explanations
- Exploratory vs. confirmatory
- Generalizable theories/relationships vs. in-depth analysis of particular cases

Quantitative research methods



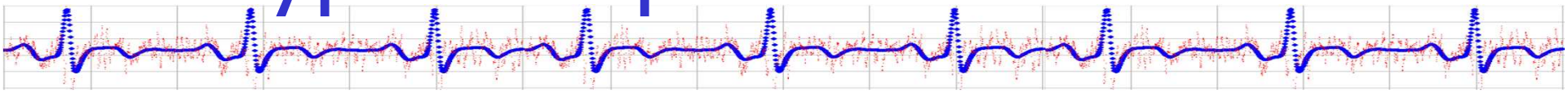
- Based on physical science research paradigm
- Important ideas: hypothesis, prediction
- Data in the form of variables: dependent, independent
- Attempts to "prove" a causal relationship between the independent variable(s) and the dependent variable

Quantitative research methods



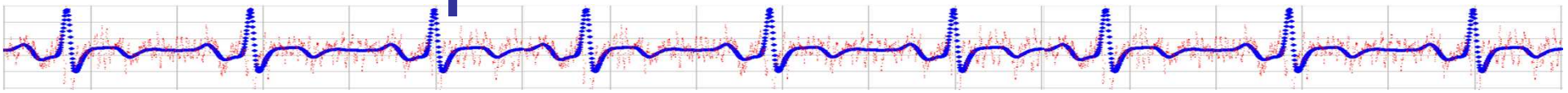
- Data collected – represented as tables
- Rows – observations
- Columns - variables
- Data is analyzed using statistics
- Proof in the form of statistical significance levels

Types of quantitative studies



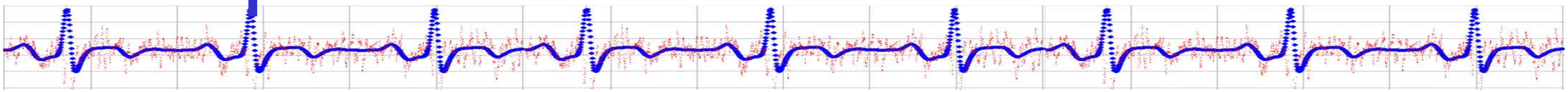
- Descriptive
- Correlational
- Randomized, controlled experiments
- Quasi-experiments ("naturally occurring" IV)
- Demonstrations (lacks IV)

Examples



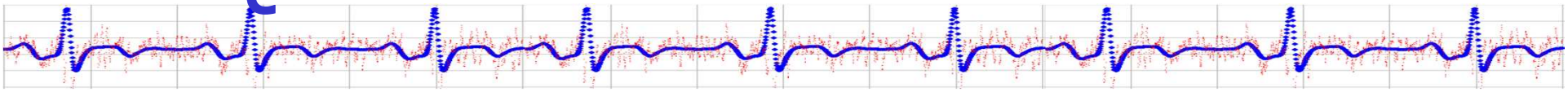
- H1: Icons with text labels are better than icons without text labels
- H2: Color displays lead to employees spending more hours each day working at their computers
- H3: More hours spent on the Internet by teenagers leads to increased psychological and behavior problems

Advantages/disadvantages of quantitative studies



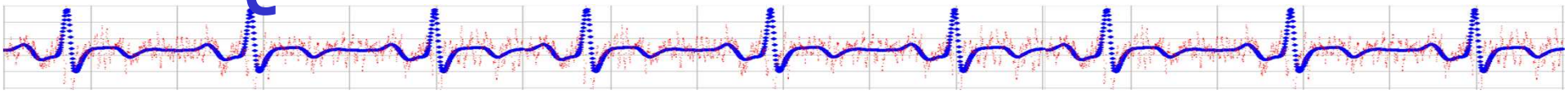
- Pros
  - Systematic rules and procedures already worked out, and can be followed
  - Traditional, accepted as "proof"
- Cons
  - Closed-ended questions may lead to ignoring important factors and relationships
  - Handling phenomena that are difficult to turn into variables

Qualitative research methods



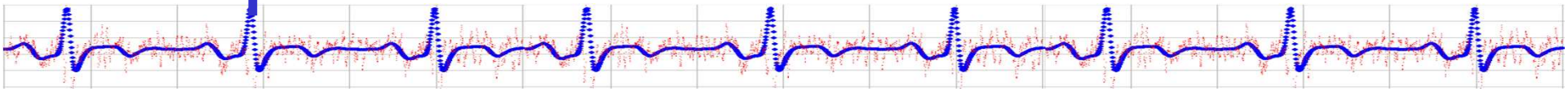
- Developed by social scientists
- Used for exploratory studies where important factors not yet identified
- Used for studies involving people's subjective experience

Qualitative research data



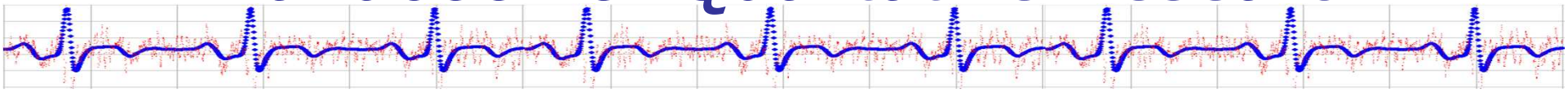
- Collection: field observations, open-ended interviews, focus groups, examining text-based artifacts (manuals, email logs, customer support logs)
- Types: Text, observations, video, audio

Advantages/disadvantages of qualitative methods



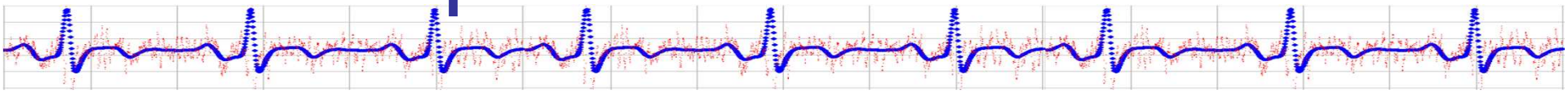
- Pros
  - More innovative, creative, and exploratory
  - Capable of addressing issues that do not lend themselves to being described by variables
  - Lets you discover things you had not thought of
- Cons
  - Conclusions may be "less credible"

Qualitative Research
Handbook of Qualitative Research

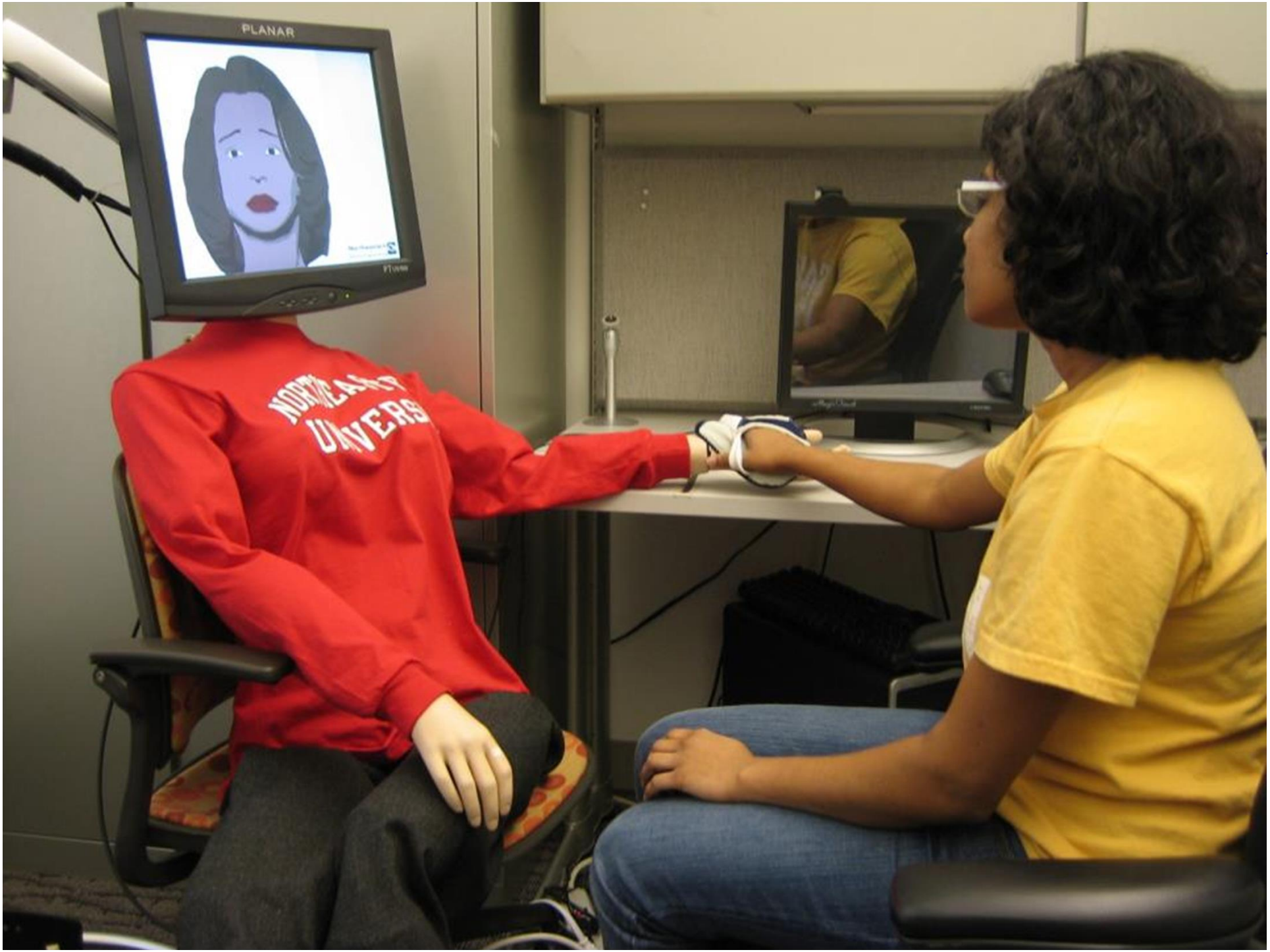


- A situated activity that locates the observer in the world
- A set of interpretive, material practices that make the world visible … that transform the world into a set of representations
- An interpretive, naturalistic approach
- Study of things in their natural settings, with interpretation in terms of the meanings people bring to the things they study

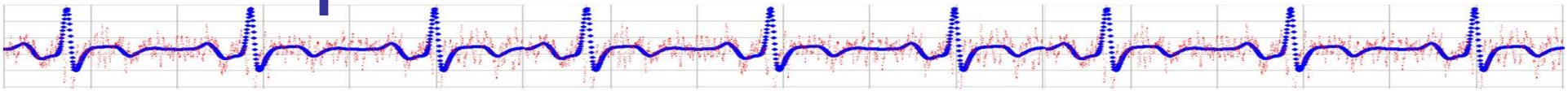
Example: Touchbot



Semi-structured interview following quantitative descriptive study


PLANAR

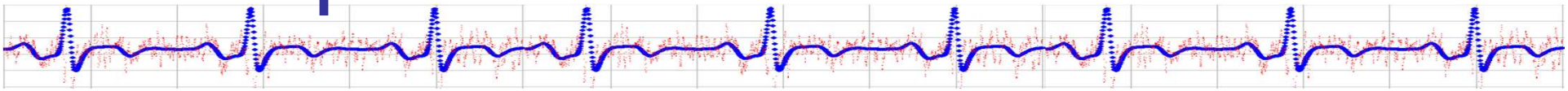
What were your overall impressions?



- #08: "I thought it was interesting. I've worked with a computer before, where you can tell it to do things... like my computer does that.. but the technology's not very good it doesn't hear you very well when it types things. So it seemed like, the recognition was really good. That it recognizes what you say. But the hand thing was weird.. I don't think it really felt natural, it wasn't like, it was squeezing you, it was more like a machine moving, and you're like 'oh, okay, it's moving'."

- #08: "Like I was thinking that if it was really grasping you then the fingers should move too, coz it was only just coming from the palm, so only felt that movement and not the rest of the hand, so that's why it didn't feel real."

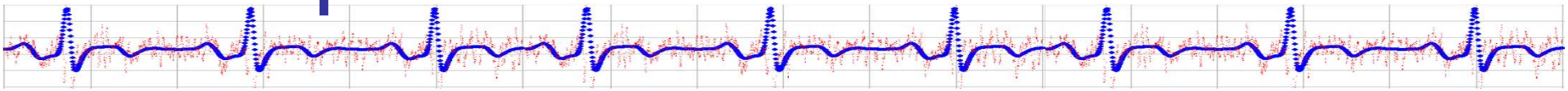
What were your overall impressions?



- #09: "I really thought it was very helpful, very informative and the information was presented in a non-threatening way. It helped my attention, and I think, although I know about skin cancer, about the SPF factors, I learned more today."

- #10: "I thought it was weird to have the body."

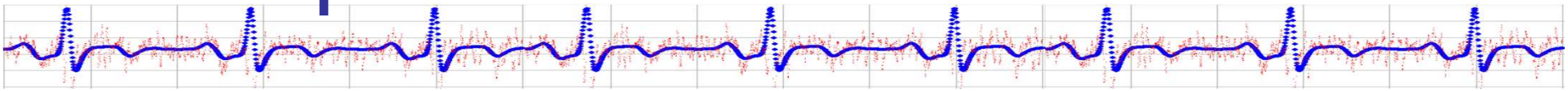
What were your overall impressions?



- #11: "I found it interesting. And, I've never conversed with a computer character, and it wasn't as bizzare or strange or disturbing as I ever might have anticipated. The material was well presented, …"

- #11: "The handshake, I think, needs some work. Not the handshake, the hand squeezing. I just found that, if you're trying to convey reassurance that it seems, um, distracting and/or even unproductive, because, it doesn't, the times that it would occur, seemed off, somehow. I'd have to study that more, be a part of, I think you could do just the hand squeezing focus, aspect, of this, I think if you wanted to make it more effective. Because once with all this conversation, and answering and so forth, and all of a sudden this glove will start puffing off her, and it seems like some sort of puff-out kind of apparatus as opposed to squeezing of the hand."

What were your overall impressions?

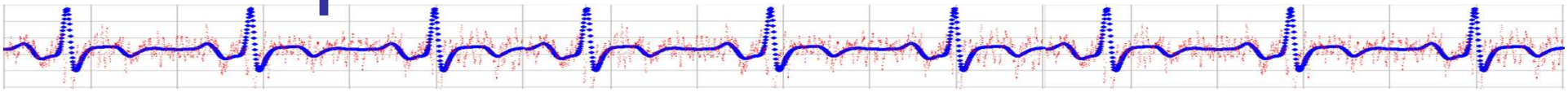


- #18: "Enjoyable, very different, very comfortable"

- #19: "I think it was kind of weird, once she was squeezing it, because you can't predict it, so that I kind of freaked me out I startled every time she was squeezing it..."

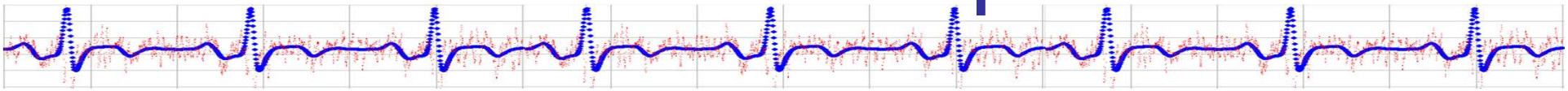
  "At first I tried to like figure out a pattern to figure out when she would squeeze it, but I couldn't. It was kind of normal.. I was like, I felt like I was reacting like I would to like a normal person, like I found myself nodding..."

What were your overall impressions?



- #20: "It was very awkward."
- #22: "It was awkward interacting with Laura, and it made it hard to concentrate on some of the things that she was saying"

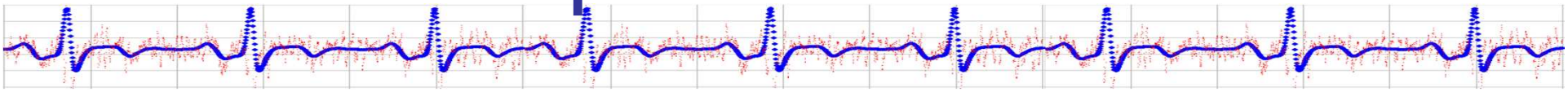
Details matter in quotes



- "It was very awkward."
- "It was awkward."
- "It felt awkward."
- "It was, uhh, I'd say, awkward."
- "It was *awkward*." [Emphasis included]
- "It awkward [*sic*]."
- "That hand was awkward!"
- "That hand was, [laughs], awkard!"

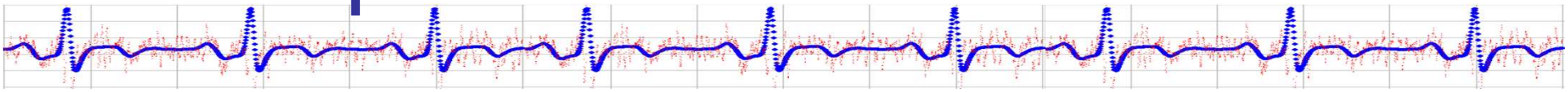
Audio or video needed to get this detail. Gesturing and facial expressions add more information as well.

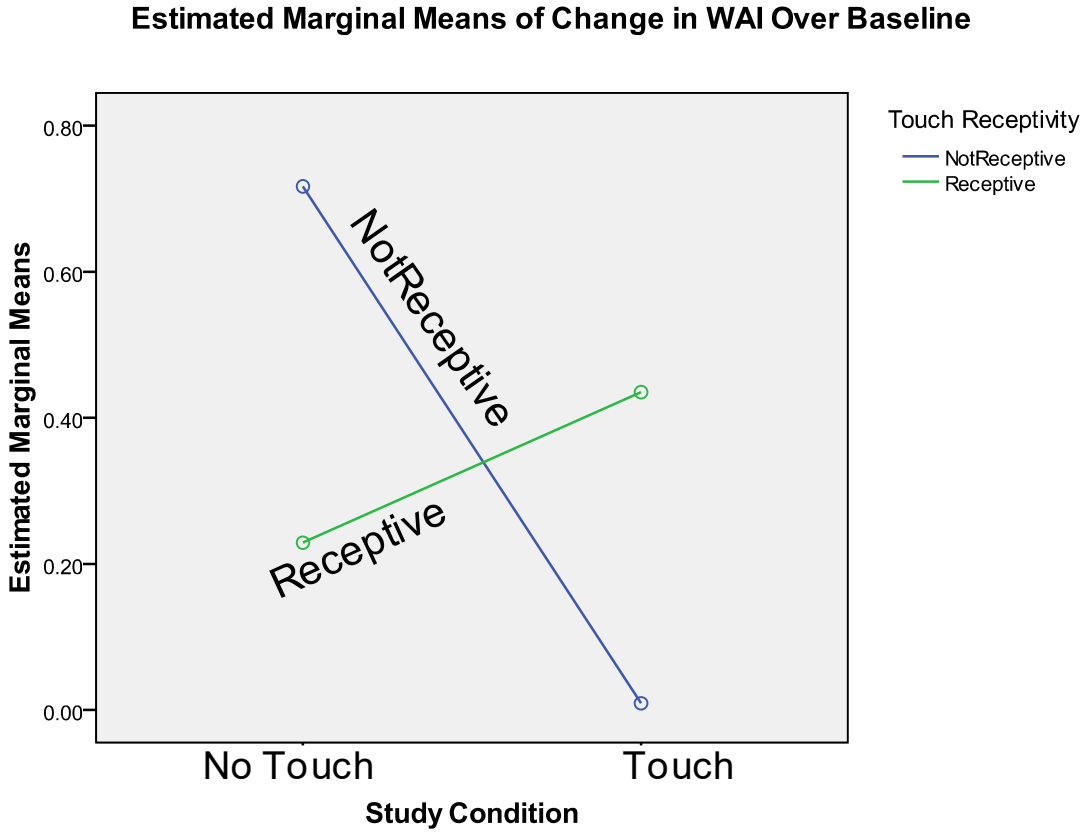
Follow-up



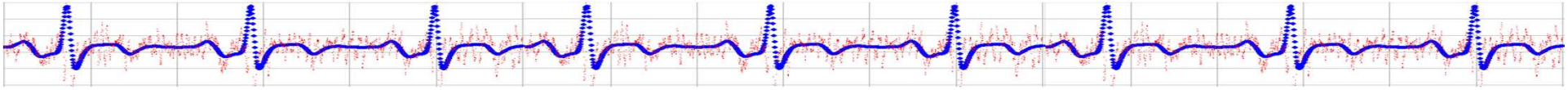
- Developed questionnaire for "touch receptivity"
- Conducted 2x2 experiment to test hypotheses

Empathic touch





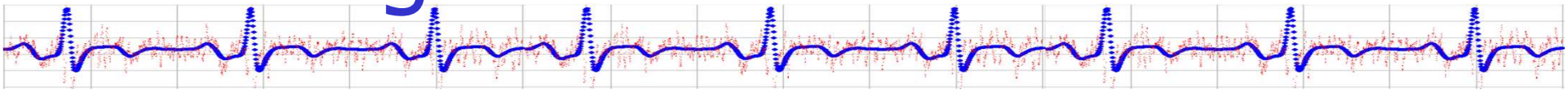
Mixed methods



- Pragmatic philosophy – find out whatever you can using whatever methods are possible
- Involves both qualitative and quantitative elements (at least 2 stages of research)

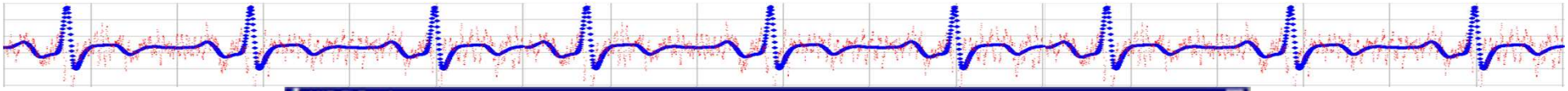
- Provides structure and flexibility, at the cost of more time and resources

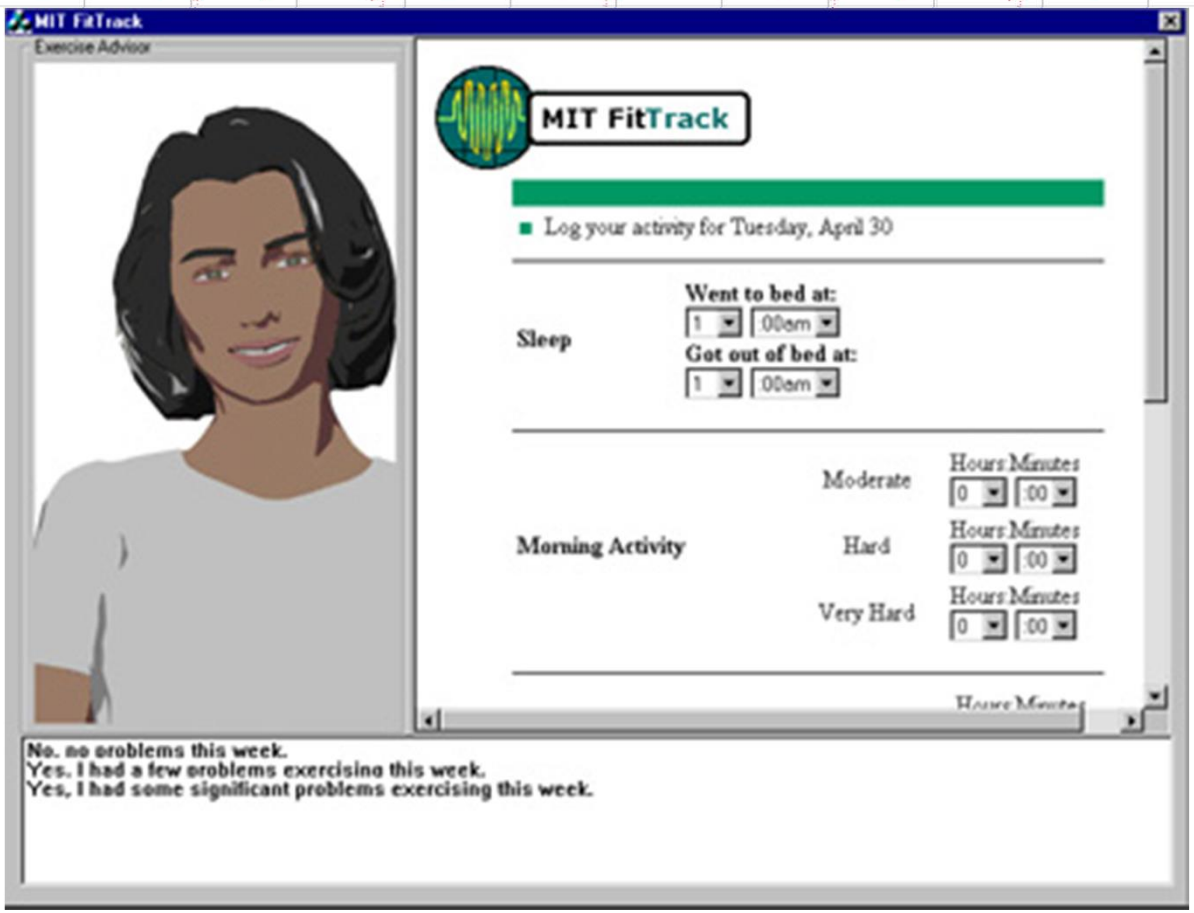
Examples of mixed-method designs



- Pattern 1: "Instrument" data followed by in-depth interview to get insight on the reasons for the observe relationships and capture any insights you overlooked in study design
- Pattern 2: Exploratory study followed by survey or experiment to generalize the results – representative of a long-term research program

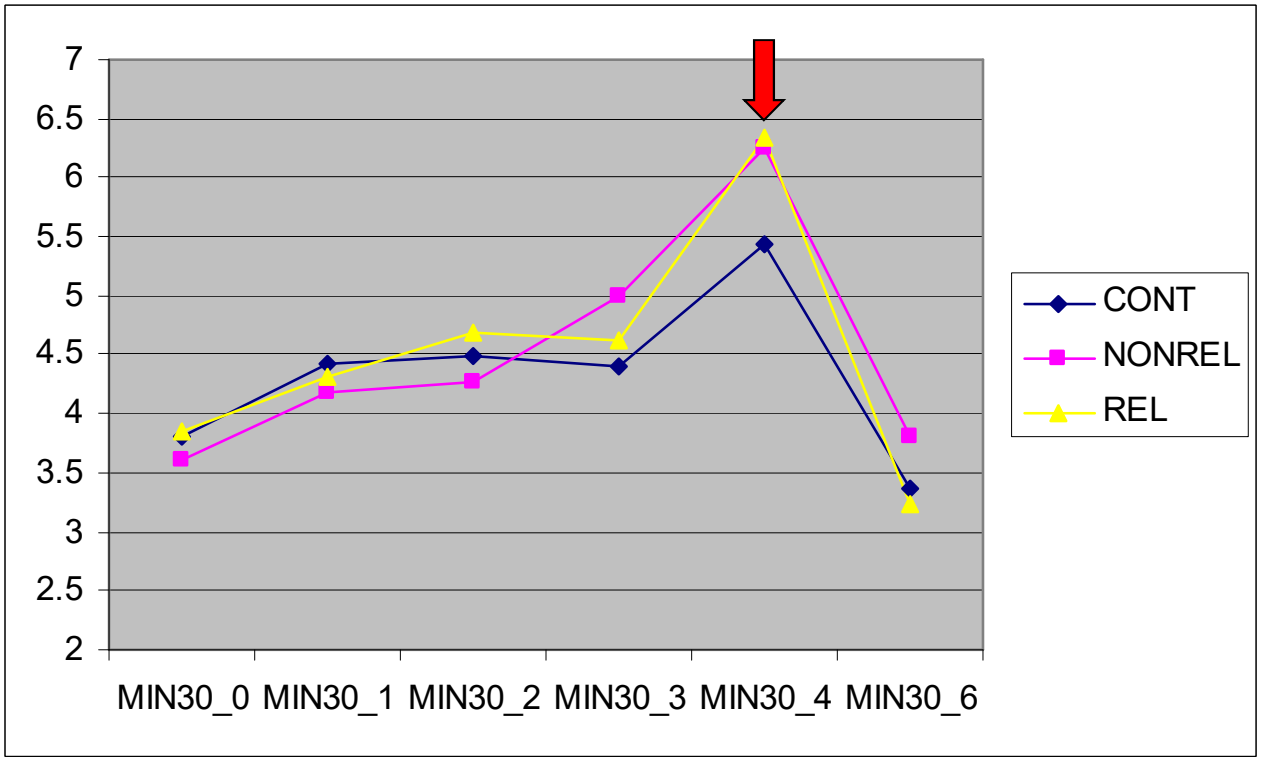
Intervention efficacy study: MIT FitTrack





Behavioral results

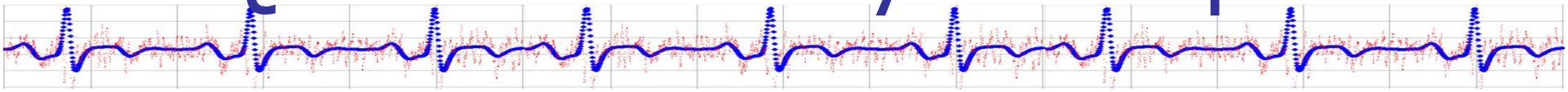
Days per week over 30 minute goal



Only difference between groups is WK4,
CONTROL < AGENT
p=.06

Significant increase
WK0-WK4 p<.001
Significant decrease
WK4-WK6 p<.001

Understanding WHY: Qualitative analyses help



Motivator: Most felt responsible to her

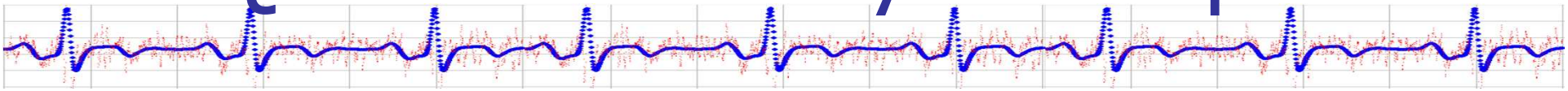
When I said I couldn't exercise I felt bad. When she said "are you sure you can't exercise?" it would make me think about it. (NON-RELATIONAL)

It sort of kept me motivated, because I always do more if I know I'm responsible to someone. (RELATIONAL)

It kept you on your toes because you didn't know if you were going to meet with the animated person. (RELATIONAL)

As silly as it sounds, I find that I found a little motivation to exercise knowing that Laura would ask if I did or not. Now that I don't have anyone checking, I find it harder to get motivated. (RELATIONAL)

Understanding WHY: Qualitative analyses help



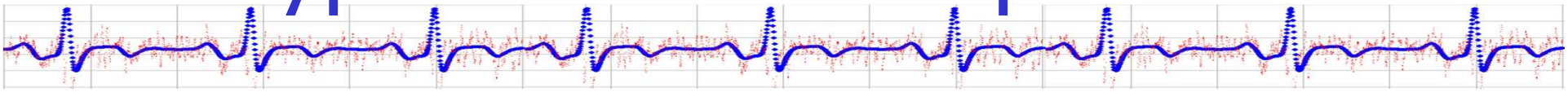
Repetitiveness: Most frequent complaint

The first couple of days I was impressed by it. But, there didn't seem to be a lot of variety going on after that, so it kind of lost my interest, it lost the engagement factor. Maybe, six or seven days into the study I could almost predict what she was going to say, and once the engagement was lost you sort of lose the power of the animated instructor. ... (NON-RELATIONAL)

Like 15 days into the study when I could almost predict what she was going to say, it became easier to do things like check my mail in between her responses. … Even with just little bits of variety your mind doesn't shut off. (NON-RELATIONAL)

In the beginning I was extremely motivated to do whatever Laura asked of me, because I thought that every response was a new response. Whereas, towards the end I could tell what she was going to say to a couple of my responses. (RELATIONAL)

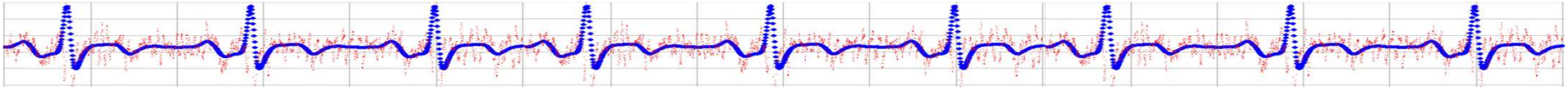
Applications of the methods: Hypothetical examples



- Studies of computer/supported learning
  - Experiment, quasi-experiment

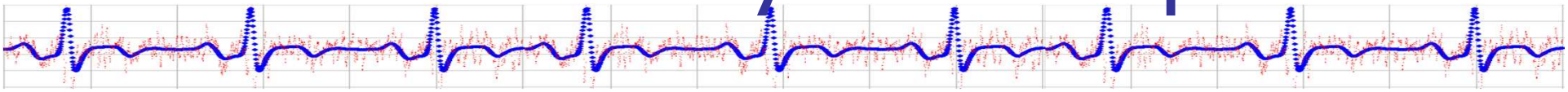
- Studies of IT impacts in medicine or computer-supported collaboration (in general)
  - Case study, ethnography for groupware
  - Grounded theory study of chat groups

Some qualitative research methods



- Content analysis
- Case study
- Ethnography

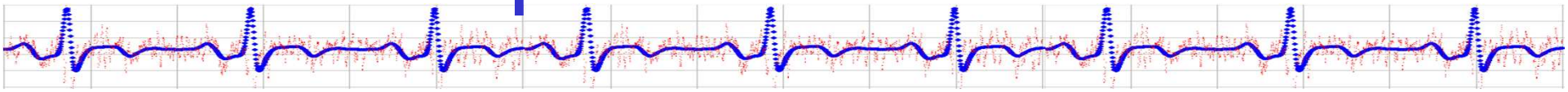
Content analysis example



You want to review all 14,000 emails sent to customer support over the last year to determine…

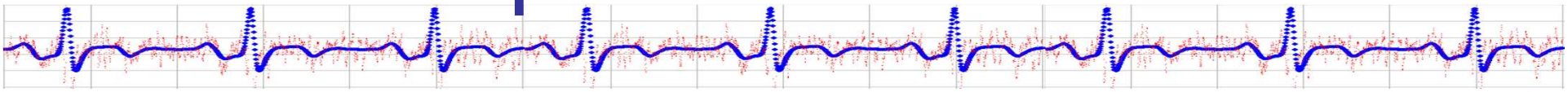
- How many of them have positive things to say about your company?
- ?

Some qualitative methods



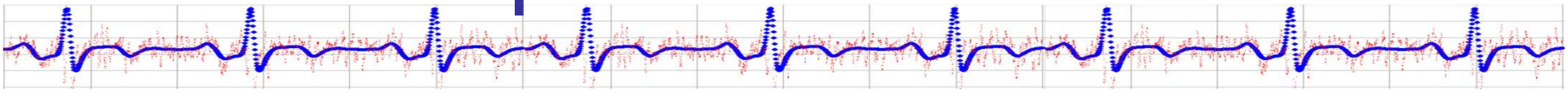
- Case study research
  - Explore in depth one activity or project
  - Limited in time and place
  - Data collection by observation, interviews, artifacts . . .
  - Goal: tell a coherent "story" with lessons learned
  - Most common methodology for IT empirical studies

Some qualitative methods



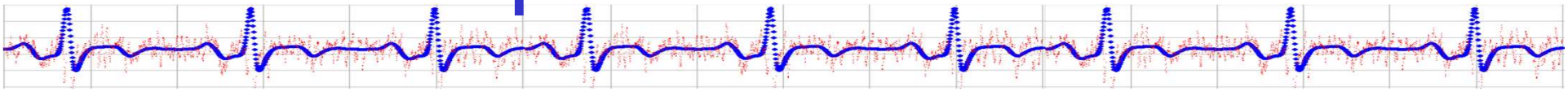
- Case study research
  - In-depth, longitudinal examination of a single instance or event
  - Not randomly selected; selected for expository or other purposes
  - Usually performed retrospectively
  - Not necessarily qualitative, e.g., time-series analysis
  - Less formal methodology

Some qualitative methods



- Case study research: types
  - Illustrative case studies describe a domain
  - Exploratory case studies are a way to gather initial information about a new field of inquiry
  - Critical instance case studies review a situation of unique interest (e.g., failure analysis)

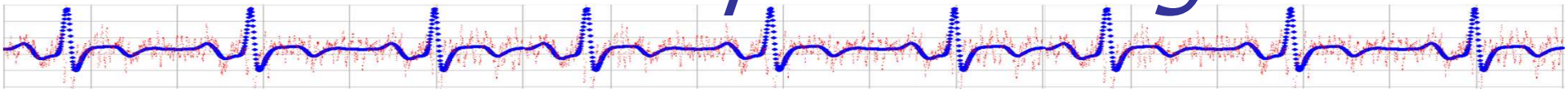
Some qualitative methods



- Ethnography
  - Observation in natural setting
  - Observer may become part of the group to experience
    directly how its members interact
  - Goal: identify patterns of interaction (power structures,
    problem-solving/goal achievement)

Analytic Induction

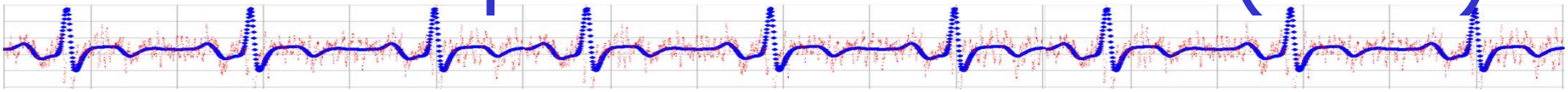
When to stop recruiting?



1. Phenomenon tentatively defined
2. Hypothesis is developed
3. A single instance is considered to determine if hypothesis is confirmed
4. If hypothesis fails, then phenomenon or hypothesis is redefined
5. Additional cases are examined and, if the new hypothesis is repeatedly confirmed, some degree of certainty results
6. Each negative case requires that the hypothesis be reformulated until there are no exceptions

AKA Continue collecting data until you reach "thematic saturation"

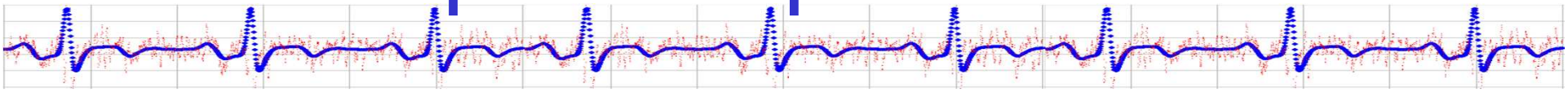
Some qualitative methods (cont.)



Grounded theory research

- Data collection from artifacts and interviews
- Develop a set of categories and a model telling how they relate to each other
- Goal: explain the meaning of what is observed
- Involves an iterative process of data collection/theory formation

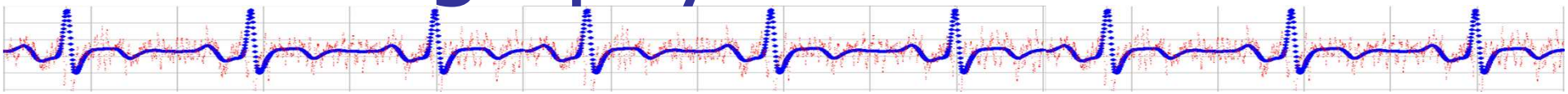
Examples of qualitative studies



- Case studies of failed system development or deployment

- Ethnographic studies of workgroup practices prior to introduction of new technology

Ethnography



The art and science of describing
a group or culture

Bronislaw Malinowski

- 1914, Anthropology grad student, traveled to Papua, New Guinea
- He became stranded.
  - WWI, as a Pole from Austria-Hungary in a British controlled area, he was unable to leave.
- After a period in which he actively avoided contact with the native Trobrainders, who he considered to be "savages," Malinowski finally decided, out of loneliness, to participate in their society
- After he did so, Malinowski learned the local language, formed close friendships with the people and is even rumored to have fallen in love with one of the islanders
- It was during this period that he conducted his fieldwork on Kula and produced his theories of participant observation, which are now key to anthropological methodology

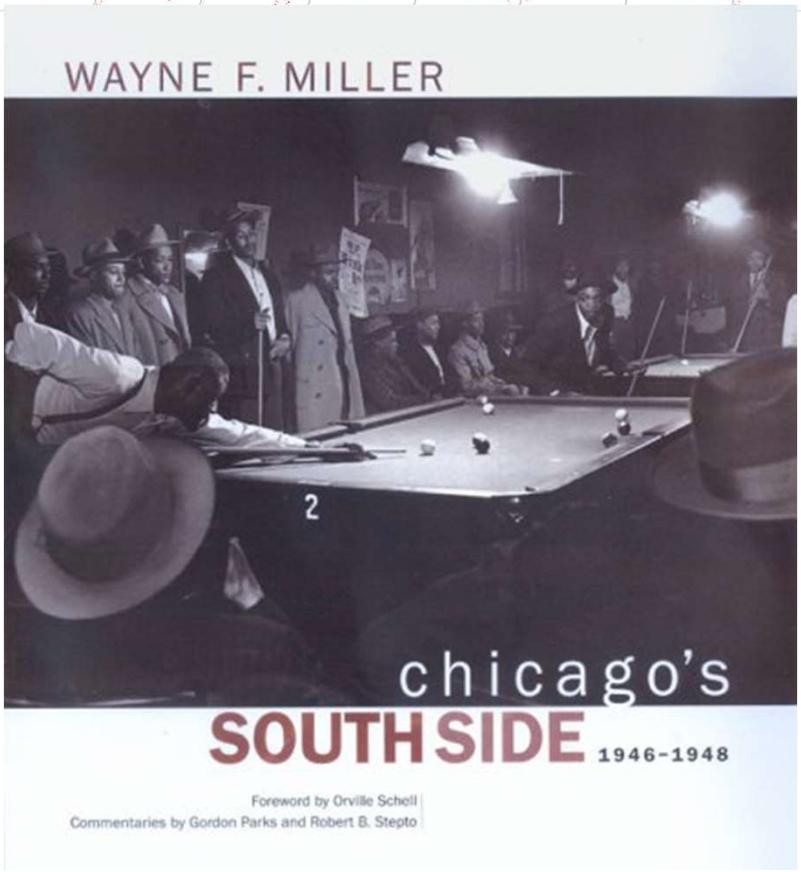
Ethnography

1915: Bronislaw Malinowski

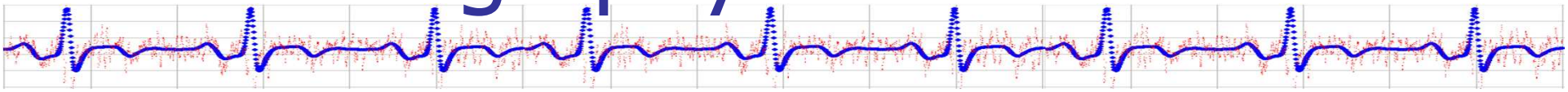
- Start of cultural anthropology
- Purpose: to become intimately familiar with a way of life by living it ("emic" perspective)
- Method: use multiple sources of info
  - "Things are not what they seem."
  - People can't always tell you what they do
- To make authoritative claims about a culture you must have been there, done that

Ethnography

- 30's-60's focus on ordinary life
- "Chicago sociology"
- Studies of cat houses, insane asylums, jazz clubs, wine alleys, public toilets, race tracks, etc.

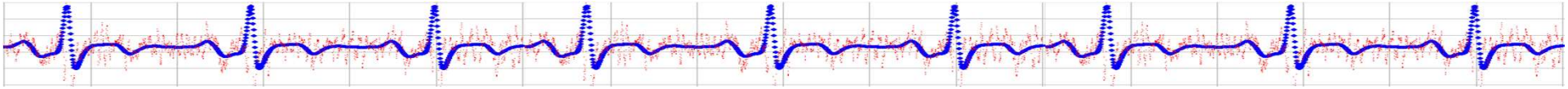


Ethnography



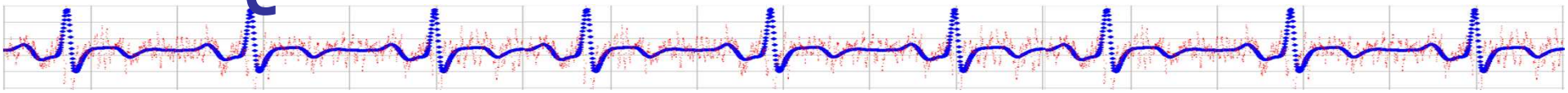
- Formally – the analysis, interpretation and write-up of all information to form a holistic description
- "Triangulation" – checking one source against another
- Be aware of your own biases & preconceptions

Ethnography fieldwork methods



- Participant vs. non-participant
- Overt vs. Covert (ethical issues?)
- Observation
  6 months – 1 year (not!)
- Interviews
  - Formally structured
  - Semistructured
  - Informal

Questions



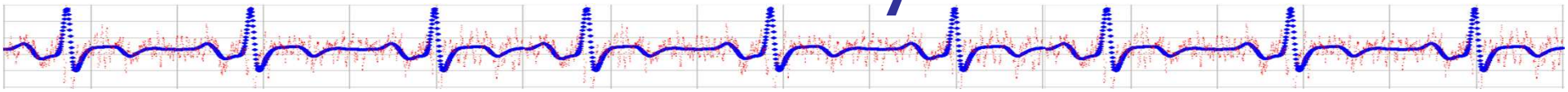
- Interview
  - Grand-tour questions
  - Open-ended
  - Closed-ended
- Questionnaires
  - Open-ended
  - Closed-ended
  - Partially open-ended (“other”)

Ethnography exercise: Ideas for a digital intervention

Observe carefully:

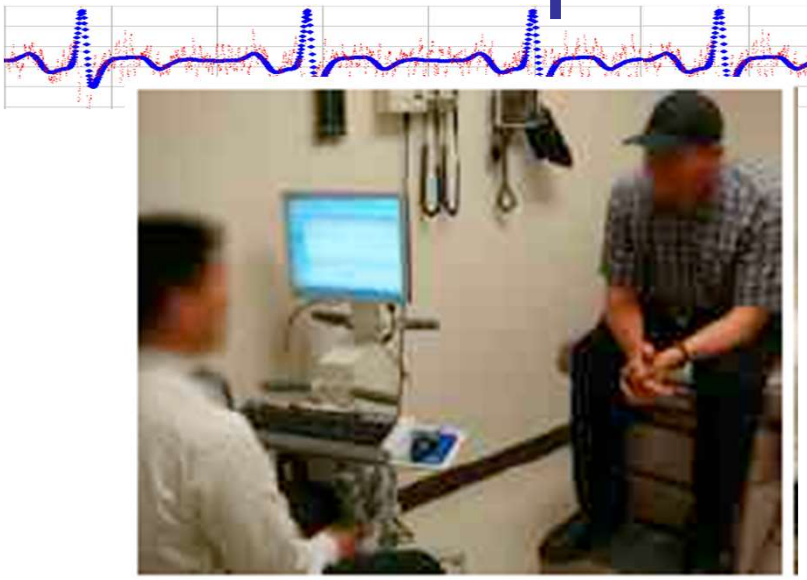
https://www.youtube.com/watch?v=JCjmNZewoOg

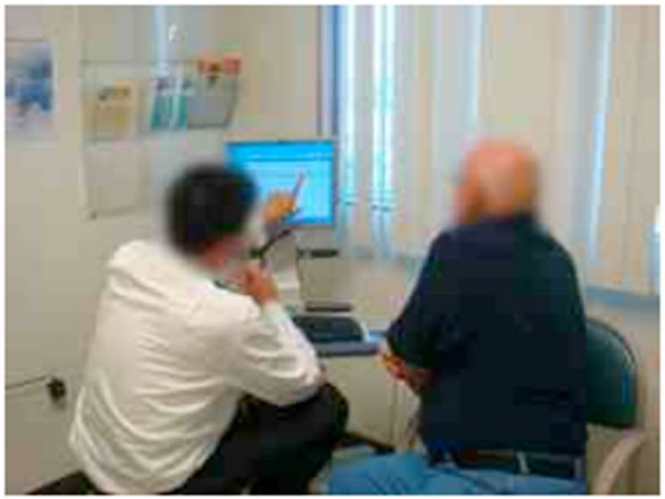
Grounded theory



- Now that you've collected your field notes and interview transcripts…
- What do you do?

Example studies: Chen

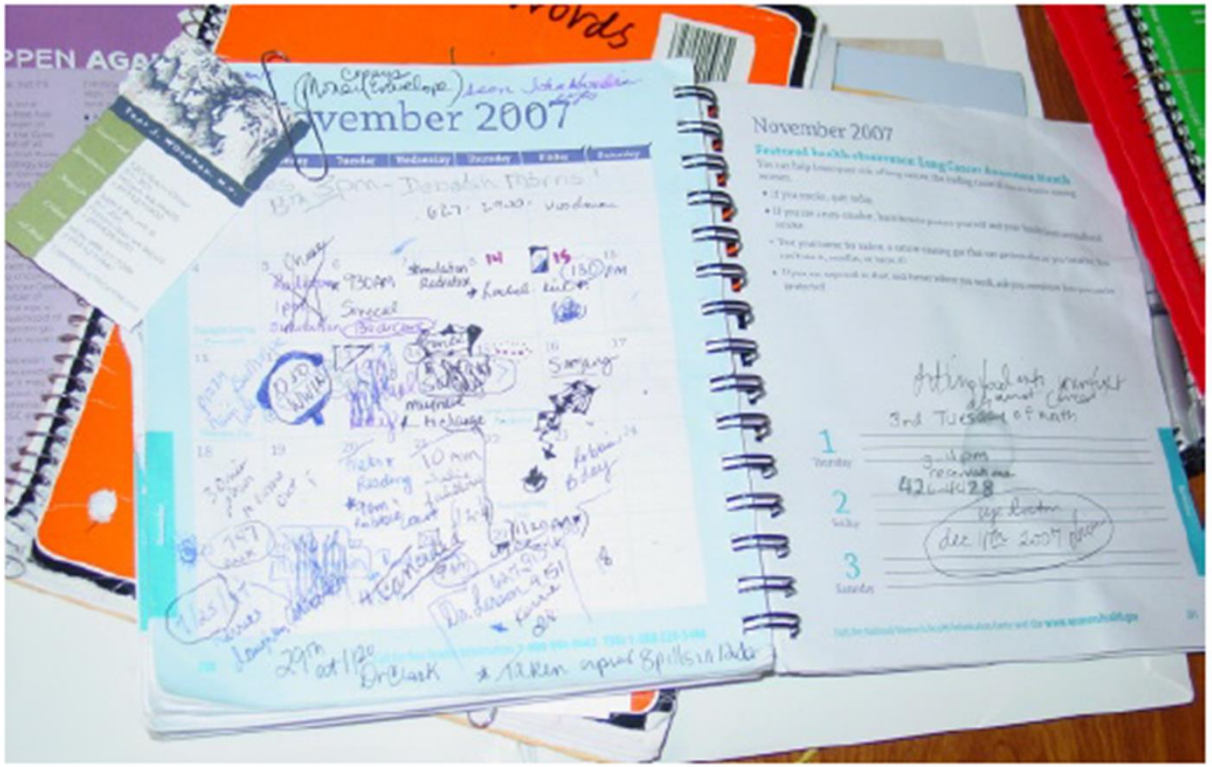




- Methods?
- Data?
- Findings?

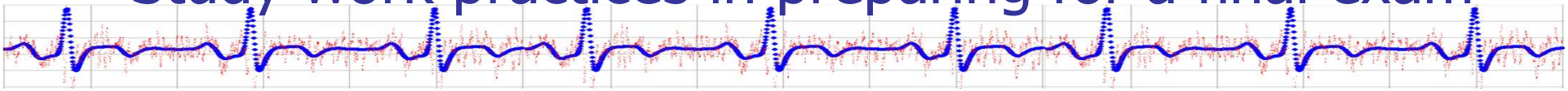
Example studies: Klasjna

- Methods?
- Data?
- Findings?



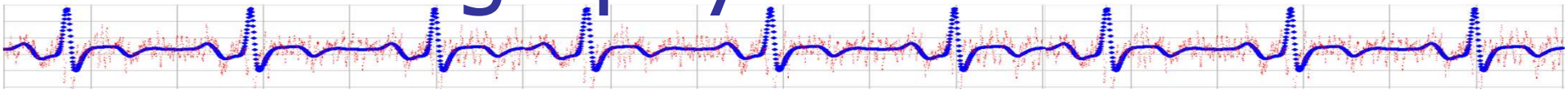
Exercise

Study work practices in preparing for a final exam



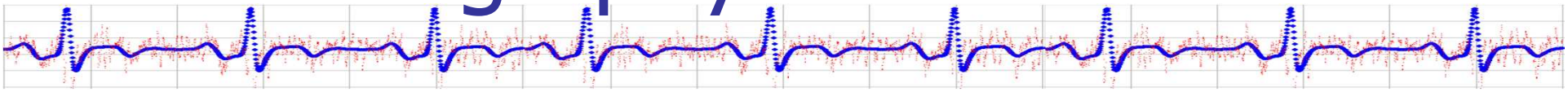
- Break into groups
- Pick one person to be an "expert"
- Other members take turns interviewing the expert about their work practices in preparing for a final exam.
  - Pay attention to the kinds of questions you ask.
  - Make notes of patterns, artifacts, etc.
- Analyze the results wrt any information system needs
- Collect as specific data as possible (e.g., quotes, times, durations, frequencies, etc.)

Ethnography Homework



- Goal: Use ethnography to motivate an idea to make ISEC first-floor more effective and/or efficient
  - Pick a location where talking is acceptable and spend an hour people watching with a notebook and pencil.
  - Identify an activity you find interesting.
  - Watch several people do it.
  - Interview two or more about it.
    - Don't forget to obtain verbal consent!
- Write it up. Be as detailed as possible.

Ethnography homework



- Turn off ALL devices
- Put away all distractions
- Observe
- Get bored, make notes, count, study minutia
- …. Then patterns of the not-so-obvious emerge