

# Ethnography and Systems Design

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# Ethnography and Systems Design

Ethnography is all about “going and having a look”. It is about finding out about the practices and settings in which your system is to be used.

Michael Lynch: *"Stop talking about science. Go to a laboratory - any laboratory will do - hang around a while, listen to conversations, watch the technicians at work, ask them to explain what they are doing, read their notes, observe what they say when they examine the data, and watch how they move equipment around..."*

# Ethnography

- Any definition will be wrong: there are diverse practices that go by this name
- Where some people talk about ethnography, others talk about 'fieldwork', or about 'qualitative enquiry' – lets not split hairs.
- Ethnographic practices include 'observing people', 'talking to people', 'participating with people', 'asking people to keep diaries', etc..
- The emphasis is on “description” rather than “explanation”: that there is something interesting to be seen and heard
- The aim is to get 'naturalistic', 'real world' data.

# Ethnography in Computing

- Ethnography has its background in social anthropology, but has morphed and grown through other fields including sociology and psychology and over the last two decades has been used in computing research.
- Ethnography for computing has peculiarities in that it seeks to produce 'observations' that are 'design relevant'.
- The 'observation' part is actually very easy, it's the 'design relevant' part that's not.

# Ethnography in Computing

Ethnography has been used to:

- 1: Produce system requirements
- 2: Highlight risks and design flaws
- 3: Produce general implications for design
- 4: To gain inspiration
- 5: To evaluate technologies
- 6: To critique technologies
- 7: To draw attention to “socio-technical” systems
- 8: To produce tests

# Examples

# Example: The Usability of Photocopiers

The 'Xerox' studies -

“Some would argue that the reason you evaluate new technologies in the laboratory is to minimize any “extraneous” influences (such as *time constraints*, *other users*, *alternative technologies available*) on users’ understandings of the technology. However, these “extraneous” influences are the “stuff” by which users form their understanding of the technology. The laboratory environment in fact may be a relatively poor place to evaluate a new technology because it is outside the everyday experiences of most users and may bear little resemblance to what goes on in everyday settings.” (Jeanette Bloomberg, 1988)

- Time constraints – users of photocopiers are usually doing something in a rush (an upcoming meeting, the beginning of class, etc.)
- Other users – users of photocopiers don’t read the manual, they ask other users how to work it (usually secretaries, who a) use them a lot, b) usually have their offices near a photocopier)
- Alternative technologies – users of photocopiers often tried to do things in the way they have done with other photocopiers (They do not ‘notice’ new features)

# Example: Plans and Situated Actions

More from Xerox...

Whilst you can have plans, procedures, processes etc, there is always work to make them work.

Pilot: I understand gate 14 is occupied? Do you have any instructions for.

Flight tracker: Uhm, should've left 10 minutes ago, *hopefully* (pause) they *have* pulled the passenger stairs. They should be leaving momentarily.

Pilot: Okay, thanks.

(Lucy Suchman, 1997)

Routine and procedure is a 'result' of work, not a 'cause'.



# Example: The Physical Properties of Paper

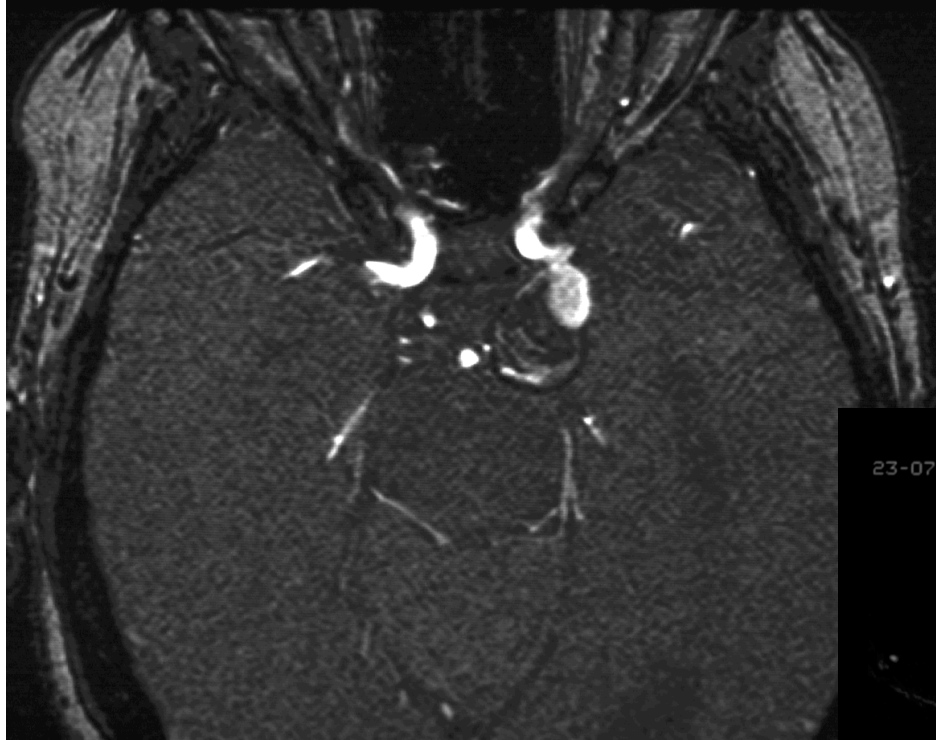
Whereas some paper based systems might be 'obvious' and 'easy' to computerise, it can be dangerous to treat paper as just a 'container of information'.

Dave Randall, in his ethnographic study of air traffic controllers, noticed that not only do air traffic controllers write down information on paper, but when it is important for another controller to know that information immediately (to avoid planes colliding etc.) they would literally throw that piece of paper at that person.

Marc Berg, in his studies of hospital work, pointed out just what an excellent 'bed-side' technology paper is for healthcare.

Of course there are problems with paper in both the situations, but systems designers were wrong to overlook the physical aspects of paper.

# Example: Radiology Reporting



MRI BRAIN/MRA CIRCLE OF WILLIS TECHNIQUE: Axial GRASE brain, 3-D TOF volume images circle of Willis. FINDINGS: There are aneurysms arising from both intracavernous internal carotid arteries. On the left, the immediate pre-cavernous and intracavernous portions of the internal carotid artery are dysplastic with a fusiform aneurysm. This has a maximum dimension of approximately 1cm. On the right, there is a larger more saccular aneurysm with a maximum dimension of 2cm. This also arises from a dysplastic intracavernous internal carotid artery. The source data images from the angiography and axial GRASE images demonstrate these aneurysms nicely lying within the cavernous sinuses. In addition, there are changes of small vessel cerebrovascular disease in the brain with small lacunar infarcts involving the right gangliocapsular region. COMMENT: Bilateral intracavernous internal carotid aneurysms. This is fusiform on the left measuring approximately 1cm. On the right, the aneurysm is larger and more saccular in nature measuring 2cm in diameter. Small vessel cerebrovascular disease. ESK/BNV

# Example: “Bionic Man”

The following is from an ‘auto-ethnography’ by Albert B Robillard. He is describing the pain of having to communicate by an ‘alphabet board’. He is in an ICU after developing a neuro-muscular disease.

[My ethnography is based on] three and a half months of hospitalisation, most of it in the ICU. The fieldwork is not recommended.

I found not having a “real time voice” the equivalent of not having any defense against what was done to my body, I had no control over the intensity or the painful effects of a given procedure. ... I could not even communicate simple information about my condition to my doctors and most of my nurses. It was very difficult to gain people’s attention and to hold it through the course of a conversation. The physicians operating under tremendous time pressures, would limit their visits to my room to 15 minutes, time enough for only a few, if any, of my laboriously formed sentences. They would suggest that I had to formulate what I said before they came. This suggestion left out the possibility that I might want to participate in any emergent conversation...

- The alphabet board is not useful for ‘emergent’ information, including telling a nurse they are hurting you
- People loose track of the conversation, they get confused, or start doing something else.
- People start talking ‘around’ you.
- The nurses and doctors have their own problems, they are too busy to make the alphabet board work, and too busy even to notice the problem in the first place.

# Example: “Bionic Man”

Robillard actually becomes very critical of technological ‘fixes’ - the attitude that his problems can merely be solved by more and more technology:

I met an interesting colleague who was both a linguist and an electrical engineer. ... I was quite amazed at his design of artificial speech for the specific situation of each client... He suggested I get a speaking computer to be mounted on my wheelchair. I told him I only use my wheelchair to go from the car to the office and back. (The assumption that I am in it all day is universal). I explained that my folding wheelchair is very uncomfortable and that it is beyond me why people expect me to remain there throughout the day.

My friend quickly told me that I should get a new wheelchair, one that did not fold up, and buy a van to transport it and myself. I explained, as I would do countless times, that I did not have the money to buy a van. I also pointed out that the wheelchair ... had been arranged for by the hospital through its special, almost monopolistic, relationship with a medical supply house... I was shown no other models. ...

There is always a tension between the financial demands of those who are constantly encouraging you to buy equipment to make life and communication easier and better, in theory, and the ongoing financial responsibilities to the household, including children. The mortgage must be paid whether you are disabled or not...

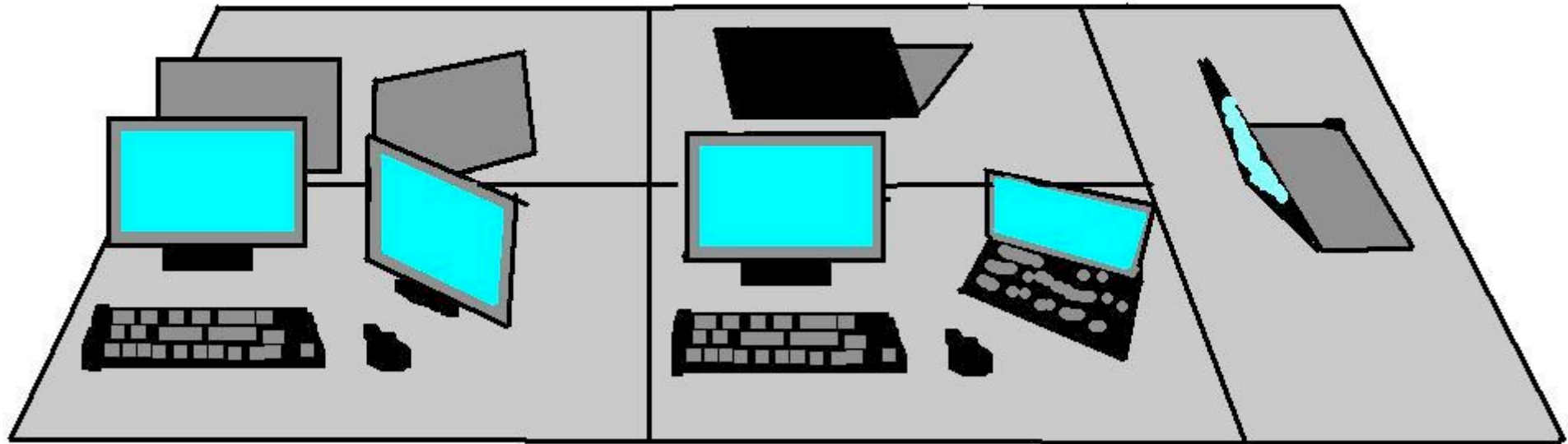
- Economic issues are actually something that gets highlighted again and again by ethnographies
- Designers seem to assume they are ‘above all that’.

# Example: Programming

Mark

Tom

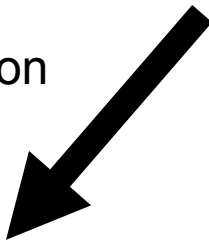
Sam



Dale

Pete

Gordon



- The requirements for, and testing of, a “push server”
- We will focus on conversations held in formulating the requirements and tests

# Development of a requirement



*A conversation about how well the push server is working for a particular customer:*

- *Gordon*    *“Is it dying a death?”*
- *Dale*       *“It’s okay for a couple of days ...” Dale goes on to explain that it makes so many connections that it takes gigabytes of memory.*
- *Pete*       *“Is that server memory? You know they need to be doubling the size of the server... they should be distributing the load... you know, which is a bit of a cop out... but if they’ve got someone who understands Oracle then they should be able to role out to a couple of servers...”*
- *Dale*       *“Its difficult.”*

- Dale      *“Well they were going up to 1000 users ... the impression I got was they want to make it enterprise wide.”*
- Gordon   *“Enterprise wide sounds like a critical issue.”*
- Dale      *“[The Customer] doesn’t seem that concerned.”*
- Gordon   *“Something doesn’t sound right to me... you know last year I was getting phone calls at 6am... we’ve always known the push server is something we need to see to again and again... and you know we’re going to get scarier customers than [This Customer].” He explains they might get a large repair company as a customer.*

- Gordon *“How do [Company Y] do their code? Can we not nick it?!”*
- Pete *“I don’t know who they are.”*
- Gordon *“[Name of Product Y]”*
- Mark *“Aren’t they on their own gateway?”*
- Gordon *“... They have a push server effectively.”*
- Pete *“Really?”*
- Gordon *“...so it has 100 million people connected to it. It’s alright you don’t have to go to 100 million straight away!” There is laughter.*
- Gordon *“But it would be good to know how much time ...”*
- Gordon *“So are you confident if we had a connection manager that the problem would just go away? Or is it just one thing in the scalability?”*
- Dale *“... I don’t know the way out of it.”*
- Gordon *“I’ll speak to [Customer X], and I’ll speak to [Customer Z] but the push server is likely to be three or four weeks work.”*

- *Gordon*    *“We’ve never figured out a way to test it other than get someone with 500 users*
- *Pete*        *“No, you could actually write a program that makes several PCs write loads of connections.”*

Testing

- *Pete*      *“5000 – Amazing! Now I’m going to send one message to all 5000 back.” All messages are dispatched: “5000 calls on the API!”*

*As the messages get sent back the programmers comment on them coming through. Again this is successful so, after a joke about testing being finished, they decide to double the amount of messages:*

- *Pete*      *“I’m thinking about trying 10000, so we have to change to 2000 messages each ... I think my machine will potentially fail with 10000 sockets, we need to change our offsets. Double them both, all of you.”*

- *Pete*      *"We've still got 15 users missing."*
- *Tom*      *"I've only got 200 and something through."*
- *Pete*      *"Waiting queue monitor pointer exception, exception in thread. There's a problem with the push server, it broke!"*
- *Mark*      *"It's got to be something straightforward but it could be hard to find."      He checks through files but there is "nothing obvious right now ... Why would it do that? It doesn't make sense."*
- *Gordon*      *"My connections died – could it be anything to do with that, maybe?"*
- *Pete*      *"One message failed and caused the whole thing to stop."*
- *Mark*      *"We want to sort the whole thing out higher up, it should still continue      if the message fails rather than bothering to try and understand why the message failed. In reality it should just try and send it again."*
- *Pete*      *Looks at the code "There's nothing on this thread to handle general exceptions."*

*- Dale spends some time fixing the problem. After it is fixed he explains:*

- *Dale      "I found the peek problem through doing a code walkthrough, the pattern of the messages currently being delivered served as the verification... it's often easier just to walk through the code when a problem arises. The rr counter was being modified by the peek and remove. It was saying it was looking in one place when it was looking elsewhere."*



# Ethnography - How to do it

# Ethnography - How to do it

- If you can sit in a lecture and make some notes, then you already have the necessary skills!
- There is no 'method' prescribing how to do ethnography, there are "practicalities".
- The absence of 'method' does not mean an absence of rigour, rather rigour is relative to the thing you are studying
- Don't try to be "scientific" - remember the attempts to be 'scientific' in evaluating photocopiers led to mistakes.
- Just shut up long enough to listen to other people (a lot of academics seem to find this difficult!)

# Ethnography - Practicalities

- 1: Getting access
- 2: Deciding how long to stay
- 3: Deciding what to record
- 4: Deciding how to record it
- 5: Deciding when to ask questions
- 6: Whether you need to do background research
- 7: Knowing when to take a lunch break (and not miss anything!)

How these “practicalities” should be worked out is relative to the place you are studying, and the kind of design project you are working on. No method can give you a solution that satisfies these practicalities for any given study, you’ll have to use your own intelligence!

# What about ethics?

- I'm not going to go deeply into ethics here – there are Ethical guidelines for Lancaster University researchers available on the web, and guidelines from organisations such as the BSA.
- Some organisations (particularly the NHS) have their own detailed ethical guidelines and approval procedures.
- Some basic rules: don't put yourself or others in danger, don't upset or embarrass people, don't observe 'private' things without permission, make data anonymous, and don't keep data about people for longer than you need it.

# The difficult bit – Theory

- Ethnography gets wrapped up with lots of different ‘theories’, for example: actor network theory, ethnomethodology, conversation analysis, distributed cognition, activity theory, grounded theory, marxism, feminism, etc.
- Theory is really important to psychologists and sociologists, but for us getting the design job done is much more important. Theory is important in so far as it can help cast light on something, but can get taken far too seriously.

# Ethnography - What it achieves

- Ethnography is rarely “earth shattering” – it is often uncovering details which other people already know. - That is it is uncovering what the people you are studying already know.
- Maybe these people don’t know they know this!
- More often, the people you are studying might not know it is relevant
- Also, most people don’t have the time to produce the kinds of detailed descriptions about their work that ethnographers do.
- Systems designers however might not know this stuff, or might not have had the time to work it all through. The main role for ethnography is pointing out things that *should* be obvious to designers but for various reasons aren’t.
- Sometimes systems designers might thank you for the insights, but other times ethnographers are the bearers of ‘bad news’

# Ethnography - What it doesn't achieve

Ethnography doesn't

- Tell you what's in peoples' heads - but what people do and say is often far more relevant to know
- Tell you about 'abstract' things - you look for 'observable things' rather than 'human nature', 'western society', 'motives' etc.
- Replace other forms of research - You can integrate ethnography with other studies
- Tell you about everything (other places, rare events) - but 'routine', 'ordinary', and 'everyday' things are very important
- Predict the future
- Do your innovation for you

# Some Further Reading

Web:

Mark Rouncefield's tutorial:

<http://www.comp.lancs.ac.uk/~rouncefi/Tutout.html>

Books:

Bruno Latour - Science in Action

Edwin Hutchins - Cognition in the Wild

Lucy Suchman - Plans and Situated Actions

Andy Crabtree - Designing Collaborative Systems

Dave Randall - Fieldwork for Design

Bonnie Nardi - A Small Matter of Programming

Marc Berg - Rationalising Medical Work

Albert B Robillard - Meaning of a Disability