Fieldwork and Interdisciplinary Design.

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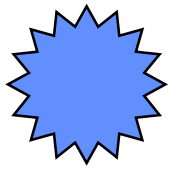


The Tutorial: Outline

- 1. Ethnography - what it is and how to do it
- 2. Some examples - understanding ‘failure’; understanding ‘trust’
- 3. Developments in ethnography - new settings and complementary methods - ‘cultural probes’
- 4. A quick look at ethics..
- 5. Tutorial booklet..

Dependable, Usable System Design: The ‘Social Turn’

- Understanding system failure - London Ambulance; Taurus; Ladbroke Grove etc
- Lucy Suchman - ‘Plans & Situated Actions’
- The importance of social factors - the need to seriously consider social factors in system design
- ‘Taking Users’ seriously - ‘becoming a user’ (Becker)
- System design as interdisciplinary

Doing Interdisciplinary Research: Close encounters with difficult words - ethnomethodologically informed ethnography

- ***'any group of persons - prisoners, primitives, pilots or patients - develop a life of their own that becomes meaningful, reasonable and normal once you get close to it, and .. a good way to learn about any of these worlds is to submit oneself in the company of the members to the daily round of petty contingencies to which they are subject.'*** **(Goffman, 1961: ix)**

Ethnography - Research Practice - ‘don’t think but look’.

- Ethnography -emphasis on **describing** the social activities of work
- focuses on how people **actually** order their activities through mutual attentiveness to what has to be done
- **‘turn to the social’** in systems design - **importance of social factors**
- Introducing information systems and the electronic delivery of services **has to be understood as a business, not a technological, issue.**

Ethnomethodology

- ***'to treat practical activities, practical circumstances, and practical .. reasoning as topics of empirical study, and by paying to the most commonplace activities of daily life the attention usually accorded extraordinary events, seeks to learn about them as phenomena in their own right'*** **(Garfinkel 1967)**

- **".. Some day you're gonna have to face the deep dark truthful mirror" Elvis Costello**

Ethnomethodology - the ethno ‘take’ on technology..

- “That’s a funny kind of thing, in which each new object becomes the occasion for seeing again what we see anywhere; for example, seeing people’s nastinesses or goodnesses, when they do this initially technical job of talking over the phone. **The technical apparatus is, then, being made at home with the rest of our world**.
- And that’s a thing that’s routinely being done, and it’s the source for the failures of technocratic dreams, that if only we introduced some fantastic new communication machine the world will be transformed. Where **what happens is that the object is made at home in the world that has whatever organisation it already has**.” Harvey Sacks (1972)

What is Ethnography?

- Ethnography is one kind of fieldwork
- Ethnography is naturalistic
- Ethnography is prolonged
- Ethnography is immersive- describe work as the skilful and socially organised accomplishment of parties to it.

'Types' of Ethnography.

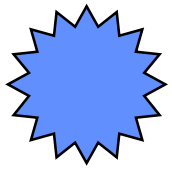
- **‘Concurrent ethnography’**: - on-going ethnographic study taking place at the same time as systems development.
- **‘Quick and dirty ethnography’**:- to provide a general but informed sense of the setting for designers.
- **‘Evaluative ethnography’**:- to verify or validate a set of already formulated design decisions.
- **Re-examination of previous studies’**: - to inform initial design thinking.

Concurrent ethnography

- sequenced process in which the ethnographic investigation of a domain precedes the design development of the system.
- thorough insight into the subtleties rooted in the sociality of the work and its organisation.
- declining rate of utility for the fieldwork contribution to the design.

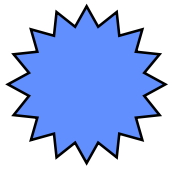
'Quick and dirty' ethnography

- provides valuable knowledge of the social organisation of work of a relatively large scale work setting in a relatively short space of time,
- ‘pay off’ is greater in that for time expended on fieldwork a great deal is learned.
- knowledge can be built upon for a more focused examination of the detailed aspects of the work
- provides broad understanding which is capable of sensitising designers to issues which have a bearing on the acceptability and usability of an envisaged system rather than on the specifics of design.
- capable of providing an informed sense of what the work is like in a way that can be useful for designers in scoping their design

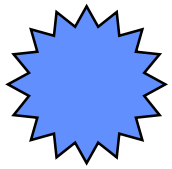


Evaluative ethnography

- a more focused version of the ‘quick and dirty’
- does not necessarily involve a prolonged period of fieldwork
- directed at a ‘sanity check’ of an already formulated design proposal
- used in evaluating a design.

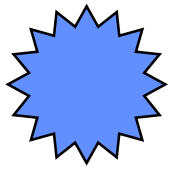


- could be developed as a systematic means of monitoring systems in use
- could be useful in ‘tweaking’ existing systems and/or to inform the design of the next generation of systems.
- modest redesign through periodic ethnographic field studies of system use may have considerable benefits



Re-examination of previous studies

- new approaches, new methods, new systems not only challenge existing methods and approaches but also lack experience and a corpus of case studies which can be used either as sensitising material or in informing preliminary design.
- especially useful where obtaining sight of general infrastructural CSCW principles is the prime goal.
- a way of sensitising designers to social character of settings
- performs a useful role in making designers aware of what to avoid and what the more specific issues might be.

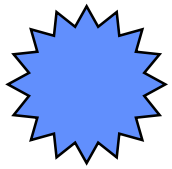


Lessons:

- **A variety of roles for ethnography in design**
  - ethnography has a role to play in various phases of system design and makes different contributions to them
- **Responding to the pressure of time and budget**
  - fieldwork of prolonged duration is not always necessary
  - much can be learned from relatively short periods of fieldwork
- **The importance of focus**
  - Successful ethnography is ‘focused’
- **The importance of previous studies**
  - contribution toward informing ‘good practise’ in CSCW design.
- **System and work design**
  - system design is work design
  - understanding the context, the people, the skills they possess, what kind of work redesign may be involved etc., are all important matters for designers to reflect upon
  - capable in highlighting those ‘human factors’ which most closely pertain to system usage

The Functions of Fieldwork

- Some obvious problems:
- Time and Cost
  - integrating the study
- The ‘in the head’ nature of some data
  - representing what you know
- The distributed nature of some data
- The problem of formalisation
  - data can be ‘messy’



The Functions of Fieldwork 2

- Establishing a corpus
- ‘sensitizing’ designers
- ‘informing’ requirements
- analytic complementarity
- evaluation

ACCESS

- a cluster of problems
  - gaining entry to the work setting,
  - gaining acceptability,
  - being able to ‘hang around”
  - problems arise from sponsorship by vested interests.
  - ‘sacred’ and ‘profane’ areas
  - gatekeepers and reverse gatekeepers
  - ‘open’ or ‘clandestine’ study.

The Role of the Fieldworker

- the ‘expert’ v. the ‘novice’
  - ‘wasted time’ v. analytic independence
  - the former requires someone who knows the domain
  - the latter requires someone comfortable with their own lack of understanding.
  - subjects become aware of the fieldworker’s developing expertise
  - ‘going native’.

The Role of the Fieldworker 2

- distinct psychological phases:
  - ‘everything’s really interesting’
  - ‘I don’t think I’ll ever understand this’
  - ‘ah .... right ....’
  - ‘this is really boring’
  - ‘I’ve not seen that before’
- accept the hours and conditions
- non-intrusive demeanour but not self-effacing. e.g. dress codes

Focus of the Study

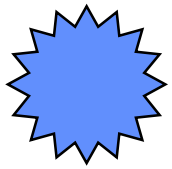
- the ‘innocent’
- ignore design concerns initially ?
- nothing is too trivial
- everything happens more than once
- dialogue between the ethnographer and the designer.

What to record

- anything and everything
  - conversation, movement, interviews, opinions, mysteries, unusual stuff, ‘how they know what they know’, different granularities
- notes are incomprehensible on their own
- become progressively more organised to ‘show something’
- data becomes ‘examples’

Asking Questions

- Don’t be a purist
- Knowing what questions to ask
  - subjects will provide relevant responses on the basis of what they know about the person asking the questions.
  - Don’t take answers too seriously early on.
- Discretion is important.
  - 'don't frighten the horses.'
  - don’t ask at the wrong time

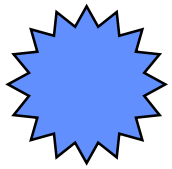


Asking Questions

- Don’t get obsessed with method.
  - Reliability and validity are not that important
- Don’t aggregate responses
  - understand the significance of different responses

Duration of the Study

- Distinguish between routine and exceptional.
  - what problems occur, how frequently, and what their significance is, how they are dealt with and with what degree of 'competence'
- no self-evident completeness rules, but
  - a. the flattening of the learning curve
  - b. Knowing what you haven't seen is a further test.
    - the ATC research

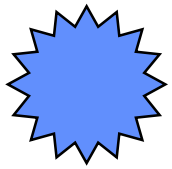


Analysis of Data

- The following analytic devices have been useful to us
- they strongly associate with *our* way of doing things
- they can be disposed of at will

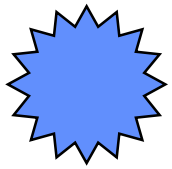
Analysis of Data 2

- The Ecology of the Workplace.
  - preamble to other analytic work.
  - easily made visual
  - illustrative of the way in which space must be organized in order that work can be effectively organized within the constraints of the current system.



The Ecology of the Workplace

- Example from ethnographic report
  - “the most commonly used materials, unsurprisingly are kept 'to hand'. Significantly, and for the same reason, each cashier position is surrounded by notes stuck to walls, etc. which contain ‘at a glance’ information, most of which relates either to various codes for use with the system, or to information which customers commonly seek.”

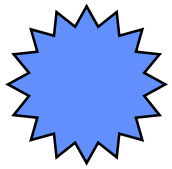


The Flow of Work

- Not Workflow
- Describing the work with all its contingencies
  - Orientation to Procedures
  - The Egological Principle
  - Social Organization of Work
  - Skills and Expertises

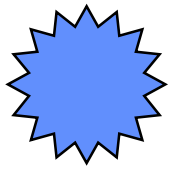
Orientation to Procedures

- ‘Mind the Gap’- procedures and their application
- Example from Ethnographic Report
  - “I had a man in last week who wanted to open four accounts ... I just had time to get them open ... there was a queue right out the door .... there was no way I was going to get the Statics done ...”
  - Customers are unpredictable



The Egological Principle

- ‘What must I do next’ questions
- How work is organised by the person doing it
- e.g. weaving interaction and technology



Social Organization of Work

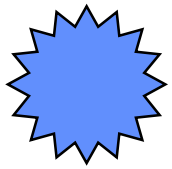
- Awareness of what others are doing
- Example from Ethnographic Report
  - Cashier 1: “What do I do about this account? ... its got nil written on ... you can’t open an account without any money in it, can you? ....”
  - Cashier 2: “its Mr .... just put it to one side until he pays the £100 ... he’s got over £30,000 in his other account ... don’t actually open the other account, just hold it ....”
- Ethnography contrasts with Workflow Analysis

Skills and Expertises

- process outcomes are not entirely a function of the technology
- skills are often unrecognised
  - local knowledge
  - obstructions to problem solving
- The limits of skill- training
- eg. Demeanour work- ‘keeping the customer satisfied’

Local Knowledge

- The ‘semi- codified’ form
- ‘bibles’
- the ‘Mavis’ phenomenon
- example from ethnographic report
  - officers universally:“carry these mortgage bibles around ... all this could be on the screen. You could have your frauds, like your dodgy solicitors and accountants ... but we want it all organized so you’ll use it ....”

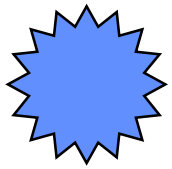


Obstructions to Problem Solving

- skills compensate for inadequacy of technology
- problems with technology may not be visible
- e.g. reluctance to use ‘help’ facilities
- experts and ‘tyros’
- the generational problem

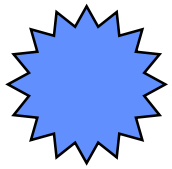
Clients

- Describing Ethnography to clients
  - “actually for the most part the things you’re telling me are things I already know ... but that doesn’t matter .... you’re giving me ammunition, and I really need ammunition” A Quality Manager
  - “we find your interest in teamwork potentially very powerful .... this organization would be extremely interested in anything you can do to help us design our teams ....” A bank manager
  - “I’m still not sure exactly what it is you do ... but the more I hear about it, the more I’m convinced it’lll be extremely powerful ....” A system engineer
- Sanity testing
- Organizational Knowledge



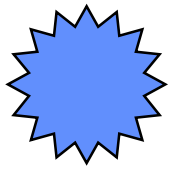
Writing Up

- Tailor the report to the audience
  - Purpose Statement
  - Executive Summary
  - Main Body
  - Further Research
  - Appendices



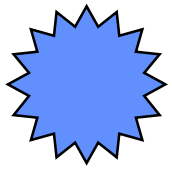
Debriefing

- Reports never replace the ethnographer
- Debriefing should be ongoing
- Debriefing is not a neutral activity
- The politics of the Organization
- People will draw the conclusions they want to draw



Conclusion

- the design of computer systems is the design of work and the organization
- A comprehensive and inclusive definition of ‘system’ is required
- ‘plans’ are necessary but not sufficient
- analysis of work is more than mere description

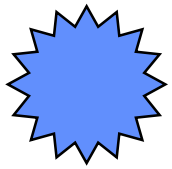


Unresolved Issues

- The relationship between ethnography and system design is still unclear- the problem of the generic
- Ethnography on its own provides no strategy

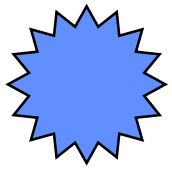
Ethnography Tutorial Part 2.

- Some examples - understanding ‘failure’; understanding ‘trust’



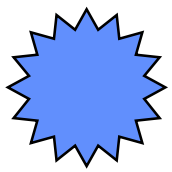
Dependability & Failure

"...how important it is to accept the reality of human fallibility and frailty, both in the design and the use of computer systems...all too often, the latest information technology research and development ideas and plans are described in a style which would not seem out of place in an advertisement for hair restorer." (Randell 2000)



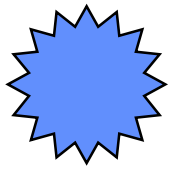
Understanding Failure

- "Dependability is defined as that property of a computer system such that reliance can justifiably be placed on the service it delivers."
- problems in defining and measuring 'failure'
- Attributes of dependability:
  - availability (readiness for correct service);
  - reliability (continuity of correct service);
  - safety (absence of catastrophic consequences);
  - integrity (absence of improper system state alterations);
  - maintainability (ability to undergo repairs)
- consider the actual practice of a socio-technical system rather than any idealisation
- need to broaden our understanding of what dependability & failure means



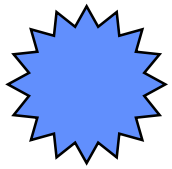
Dependability, Failure & Human Factors

- to improve system dependability, we can reduce the number of human errors made, include system facilities that recognise and correct erroneous states, and so on.
- when we start considering people using a system, the notion of failure becomes more complex.
- recognising failure more difficult because different users may have different models of how the system is supposed to behave
- some users may have learned how to work-round problems in the system, others may not have



Understanding Failure in Practice

- Interest in understanding failure - not necessarily explaining failure
- Comes from careful description and analysis of real time, real world system use
- Case studies:
  - directs attention to the means whereby people overcome 'everyday failure' through workarounds
  - highlights organisational responses to failure - raises and contextualises organizational issues concerning *management, scoping, coordination, timing, selection, prioritization, enforcement* and *agreement*
- **Abstract rules for dependability have to be applied within the real world**
- **Move away from 'failsafe' system - back to classic CSCW - "what to automate & what to leave to human skill and ingenuity.."**



Understanding Failure in Practice

- dependability is not simply a product of following or failing to follow agreed rules
- procedures are practically implemented - their applicability, their timescales etc are topics of dispute.
- even defining the scope of a problem in complex settings is difficult
- what should be taken into account; how matters should be dealt with, whether solutions are good enough are matters for discussion, negotiation and prioritization.
- Dependability - *dynamically responding in the best way* to problems as they arise

Dependable Red Hot Action

- **The setting - rolling mill:**
- **Rolling Plate:The process (idealised)**
- **Varies according to slab quality - eg whether sprays on ..**
- **Slab pushed from furnace through washers**
- **Aligned/centred**
- **Information on monitor - slab quality - present width and length - width and length needed - turning point - finish at.. how to roll**
- **Pre-broadside passes - sprays to remove scale**
- **Going for width - measurement - one red light= measuring, two its got width - green lights - turn to roll for length**
- **Turns and aligns**
- **Scheduler reduces gauge at each pass - until finish point**
- **Final roll is reverse - rolls lifted for passing on to FM - sprayed**

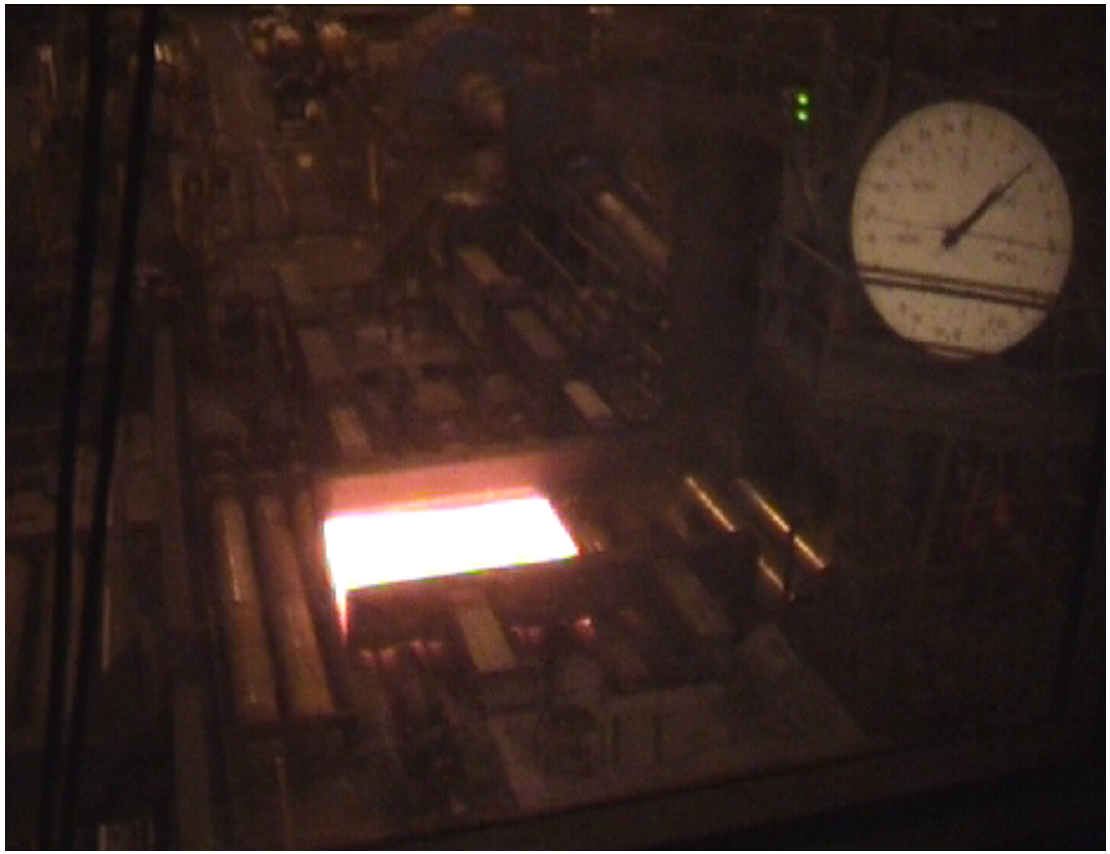
Rolling Plate: the Pulpit: The Controls

- Left: furnace monitor, load measures, mill light, screw inject (rarely used) levers (screw down; mill up and down
- Front: foot pedals turning slab - sending through to FM; head display - reference points
- Right: pad, main monitor; rack lever, amp meter, monitor for sprays etc; water, measure, temperature
- Outside: clock and lights

Pulpit Controls

Rolling Steel Plate: The Roughing Mill

- **The driver's view**
- **Slab is being centred and aligned**
- **Green light is on - turning**
- **Clock indicates the gauge**



Rolling Steel

Problems:

- **Turn-up - various shapes - ‘cobbles’**
- **Badly shaped slabs - ‘fishtails’**
- **Slab defects - from furnace - thermic shock etc**
- **Marking etc - influence quality of final plates**
- **Getting cold - more difficult to roll - especially in FM**

Problems

Ensuring Dependable Production: coordination, planning and awareness.

- “An operator only operates the system rationally and effectively if each operation is carried out with a view to the necessary cooperation with others … he has to take into account the preceding, concurrent and immediately ensuing operations. (Schmidt 1994: 26)
- **Awareness: Slab Quality**
- **“its 233 quality which is the worst one for turn-up.”**
- **"horrible plates these are .. from those Scottish bastards .. they've been turning up all night..”**
- **"first ones out (of the furnace) are always a bit temperamental.."**
- **Measurement Awareness:**
- **"This one's duff .. (what it had to be rolled to was less than the existing measure).."**
- **"I've got a plate here and I haven't got a measure.."**
- **"..after each slab we slack up to around 230 .. which is the guage of each slab .. in case the computer hasn't set up.."**

Dependability & Coordination

- **Coordination with Finishing Mill**
- **" .. (on mic) .. this fuckers creeping in reverse .. its going back to the Roughing Mill.."**
- **(on mic (indecipherable)) "He was letting me know that the front end was up.. so he was bringing it back just to knock it down.." (ie. Telling him not to put slab through RM until he's (FM) finished as plate was 30 metres long)**
- **If I send that at 49 .. its going to shoot up (turn-up in the finishing mill)..its 233 quality which is the worst one for turn-up..”**
- **".. instead of finishing at 35 .. I'll drive it down and put a bit more length of it .. less chance of it turning up then.."**
- **Coordination with Furnace:**
- **"I turned my light off .. because if I'd had turn up .. if I'd had problems with it I'd have had another one standing here getting cold and I'd have the same problems again..”**

Dependability & Professional Vision: “Houston's got a problem”

- *Vision - Looking at the slab...*
- **" .. sometimes you can sit here and look at it and think, 'that one's going to be a bastard'”**
- **getting the right shape .. the dogbone ..based on a 2600 slab and a nice set of rollers .. should end up with a nice perfect slab..but we’re not**
- *Vision - Interacting with the computer...*
- **"Last few passes .. manual .. because the computer at less than 45 pisses about .. does 4-5 passes .. that's what causes turn-up.."**
- *Vision - considering the technology…*
- **"Its Wednesday .. I'm thinking of the state of the rollers *(changed every Thursday)* ...they'll be hollow in the middle now.. this one will want to turn at 120 .. I'll do it at 118 .. that will offset the roller..”**
- *Watching the clock* **.. "the clock is out but only by about 3mm .. we use the clock because its easier to read .. we can anticipate the speed of the screw .. *(compared with head display)* .. if its going down in a pattern .. and it suddenly puts 15 on you know something's wrong.."**

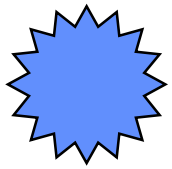
Dependability, Plans and Planning:

- “Despite our attempts to automate an ever larger set of control functions, and to build-in forms of automated reasoning and intelligence into these computerised control systems, there is still a crucial need for human agency to monitor and, if necessary, to over-ride computerised systems under special circumstances or unusual conditions.” (Rognin and Bannon 1997)

Dependability, Plans and planning: the scheduler

- **"for them to design scheduling .. is a bit like me trying to design a plane because I've flown in one..”**
- ***(Computer problems in FM .. computer giving wrong readings for number of passes .. giving wrong measures on every pass ..)*** **“can't put anything through in case it smashes the mill..”**
- ***(reference number gone)*** **.. "its not updating on the screen at all .. for some reason its not updating .. so there's obviously a fault somewhere .. that's why I'm in manual .. I don't trust it now because I don't know what its doing .. ..and the computer hasn't pushed now because it thinks I'm still at 230**

Dependability Problems: Conclusions

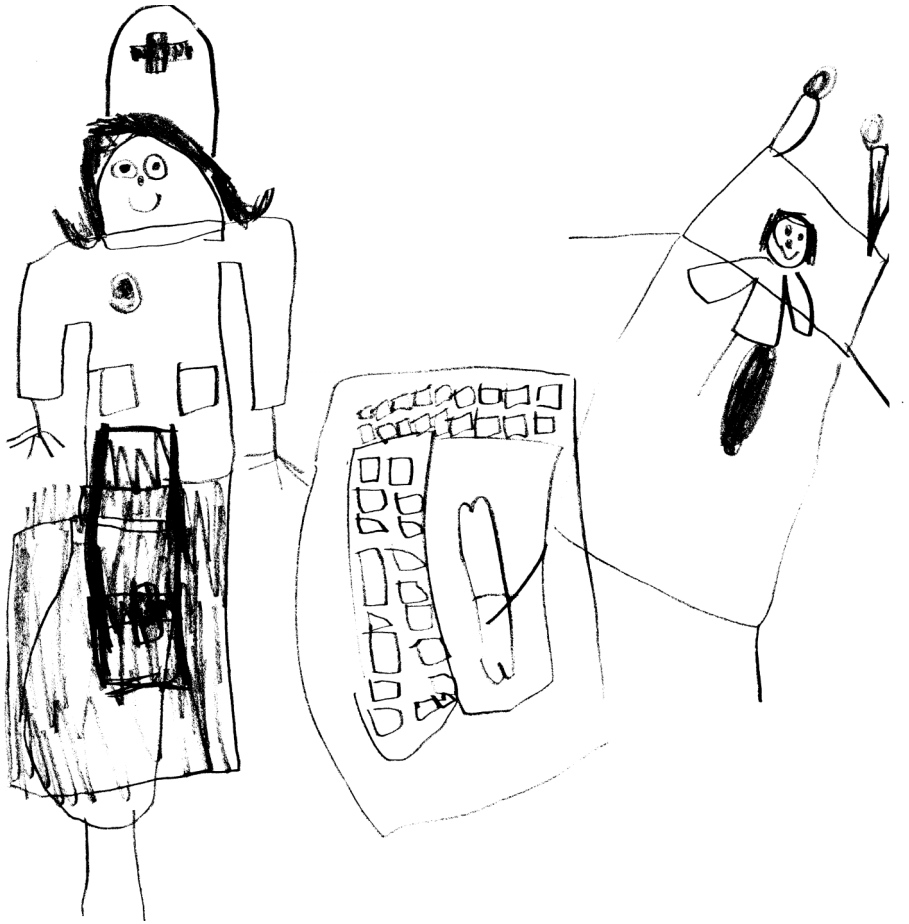


- **Awareness: knowing what's coming and how you did..**
  - **Awareness - what's coming out of the furnace (in Manager's office but not in RM) - may be useful for pacing and teamwork allocation (?)**
  - **reverse awareness - from shear lines to RM - may also be useful in taking off poor plates - at present no real, useful feedback**
- **Pulpit Controls:- providing info when needed..**
  - **Different demands - some measures to be on/near monitor; head display dismissed by many as 'going too fast to use in rolling - but useful indicator for when computer goes down; monitors - other displays rarely used - especially by less skilled drivers..**

- **Cobbles/Faults/Quality: Skill and the Computer**
  - **Cobbles etc - product of particular steel features - high manganese, no washes, poor sizing etc**
  - **Scheduler problems - revert to manual and low guages to drive down faster and prevent turn-up**
  - **Pacing - not pushing slabs through fast enough; poor combinations of steels and sizes? - bad slab planning - too much rolling in one direction**
- **Teamwork?**
  - **Differential levels of skill - different working 'tactics' - less skilled (younger) rigidly follow schedule but may cause problems in FM; skilled (older) able to rescue 'cobbles' more awareness of other working conditions; most dangerous 'intermediate' skilled?**

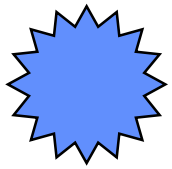
Trust, Usability & Dependability

- "Without trust only very simple forms of human cooperation which can be transacted on the spot are possible … Trust is indispensable in order to increase a social system's potential for action beyond these elementary forms" *Luhmann*



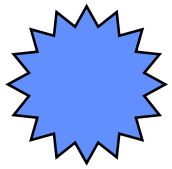
Philosophy & Trust

- Who needs philosophy? - philosophy as therapy..
- Stompka & Trust
  - basic grounds for the foundation of trust: - Reputation: Performance: Appearance
- Collaboration in complex organisations presupposes trust
- Trust is related to how and when information is achieved and who is responsible for achieving it.
- In complex collaboration forms, it is not only persons that must be trusted, but also different information sources that together can ensure better trustworthiness
- Knorr Cetina (1999:131) argues that 'trust' classifies participants in terms of what is known about them, ..and whose results are believable' - **implications for IT?**



Trust & Dependability

- Trust - a (the) central feature of dependability - obvious links to ideas about reliability, availability, security, safety etc
- Trust - a central feature of use - what happens to systems people don't trust?
- Trust - a (the) central feature of social life - its what makes social life 'social'



Trusting the Technology

- **".. there is no relationship of trust with a computer" (Shneiderman 2000)**
- **“For most of us, most of the time, our natural attitude in the taken-for-granted world is one which enables us to maintain our sanity in our passage through life and the daily round. Routines, habits …and the consistencies with which our interactions with each other conform to expectations, together provide the infrastructure for a moral universe in which we, its citizens, can go about our daily business. Through learning to trust others we learn, one way or another, to trust things. And likewise, through learning to trust material things we learn to trust abstract things. Trust is therefore achieved and sustained through the ordinariness of everyday life and the consistencies of both language and experience.” (Silverstone)**

Trust & the ‘real world’ - what comes out of the field studies

- Need to pay attention to the *social process of trust production* - unspecify “the social mechanisms which generate trust “.
- trust as woven into the fabric of everyday organisational life - as part of the ‘taken for granted’ moral order (Garfinkel 1967).
- trust can be viewed as a product of and incorporated into everyday work - trust is an achievement.
- trustability a product of mundane, everyday work - interactional competences - knowing how to preface, repair, produce formulations, tell stories, develop scenarios..

Trusting Technology: Trust & Expert Systems

- The Initial R2 Trial
- 12 month HTA/EPSRC funded field trial of a CAD tool.
- Extended investigation of reading practices.
- Usability issues for deployment in NHSBSP.
- Effects on reader performance:
    - Radiologists
    - Radiographers
- Detailed study of use, including how readers make sense of the CAD tool's behaviour

R2 Characteristics 1.

- **Performance characteristics**
  - Targets ill-defined and spiculated lesions in addition to calcifications.
  - Comparison between CCs and Obliques but does not signal that it has done this. Does not perform a comparison between left and right views (i.e. asymmetry).
  - The specificity of the system was increased for the trial
- **Prompt characteristics**
  - Calcification clusters are marked by a shaded triangle.
  - Ill-defined lesions are marked with an asterix
  - A circle is drawn around either prompt type if the system's confidence is high.

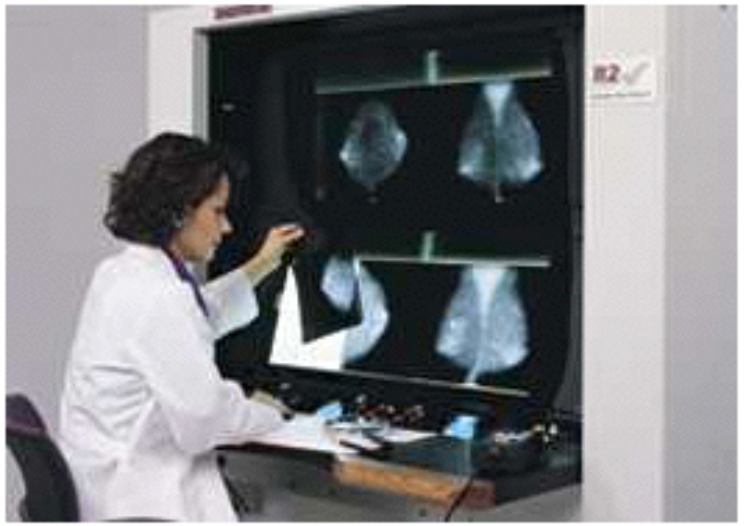
R2 Characteristics 2.

- **Operational characteristics**
  - The system consists of two components, a scanning and processing unit and a film viewer to display the prompts.
  - Each set of films is placed between a cardboard divider, each with a barcode that can be used to ‘call up’ the set of prompts associated with that case on the monitors
  - Once scanned the films are arranged to mirror the way prompts appear on the displays.
  - Films on the viewing box are scrolled up and down. When the button used to scroll the next set of films into view is pressed then the prompts screens are ‘switched off’ a further button needs to be pressed to see the prompts. In this way readers are encouraged to examining the films prior to examining the prompts.

The ImageChecker® is Easily Integrated into your Normal Clinical Workflow

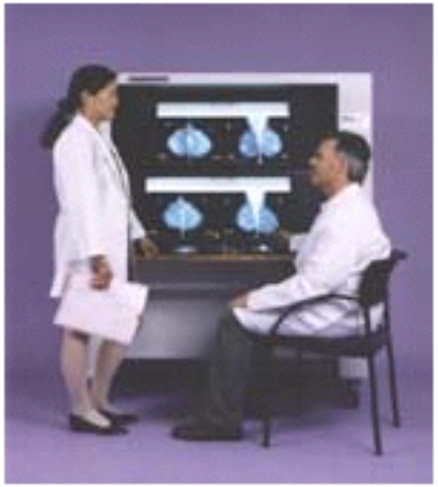
1 Input films into the R2 Processing Unit. The digitized films are automatically processed by the R2 proprietary neural network algorithms.

2 Place the current and prior films on the R2 Motorized Viewer. The films are



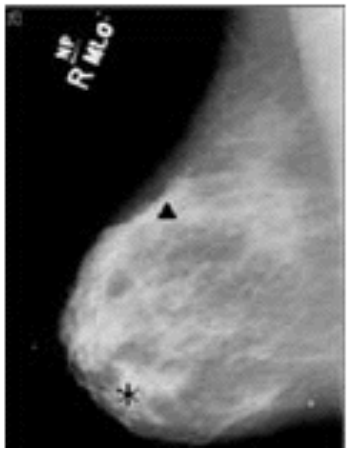
conventionally displayed for viewing by the reading radiologist.

3 Read the mammograms as you normally do, looking for signs of cancer, and make your interpretation.



4 Display the ImageChecker® output images by pressing the one-button display activator. The ImageChecker® displays its search results on small monitors located just below the mammograms. It does *not* mark the original film.

5 Review the ROIs displayed on the ImageChecker's® monitors. Compare these "road map" images with the original mammograms. Update your interpretation, if necessary.



R2
ImageChecker
R2

R2

Test set-up

- Explanation of R2 and CAD systems - detection not diagnosis
- Explains how system works - masses and calcifications
- Explains prompting and thresholds - means that there will be a lot of false prompts
- Explains test set
- Questionnaire - Post-test questionnaire and review
- Given test booklet with explanations….
- More cancers than in a normal reading; no previous films or notes available

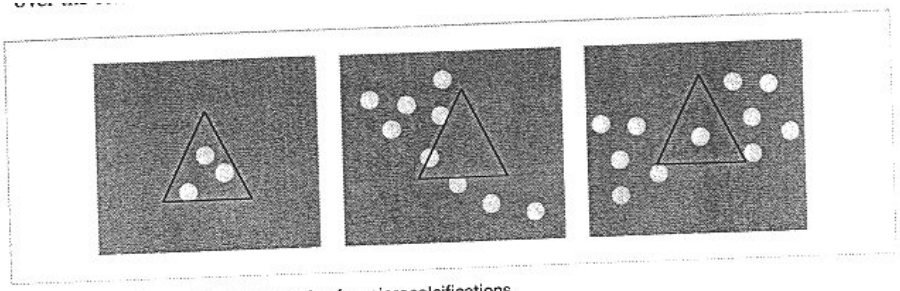


Figure 1: Marker positioning examples for microcalcifications.

The System has been designed to mark only patterns associated with microcalcifications. However, normal structures in the breast can sometimes satisfy the algorithm's criteria for patterns associated with microcalcifications and will also be marked, as shown in Figure 2.

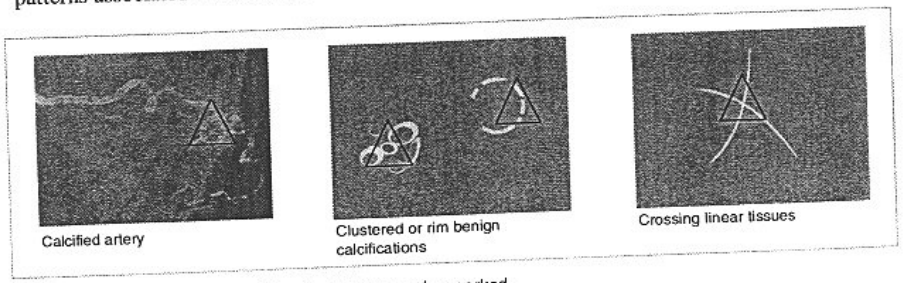


Figure 2: Examples of normal structures that can be marked.

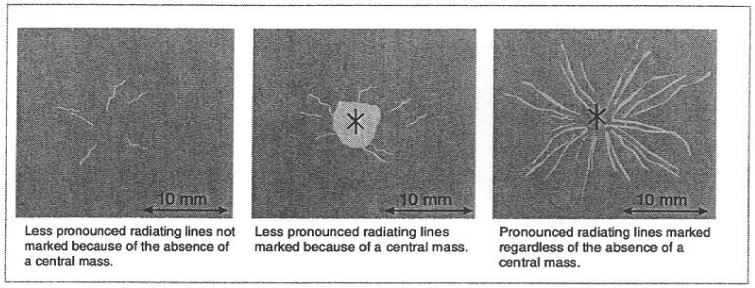


Figure 6: Relative effect of central density and radiating lines on whether feature is marked.

Normal structures in the breast can sometimes satisfy the algorithm's criteria for patterns associated with masses and will then be marked, as shown in Figure 7.

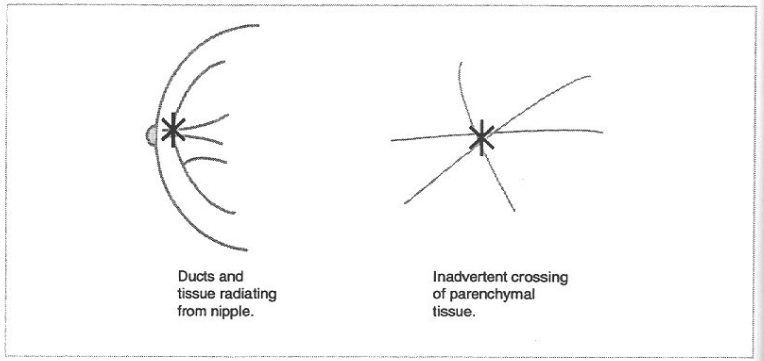
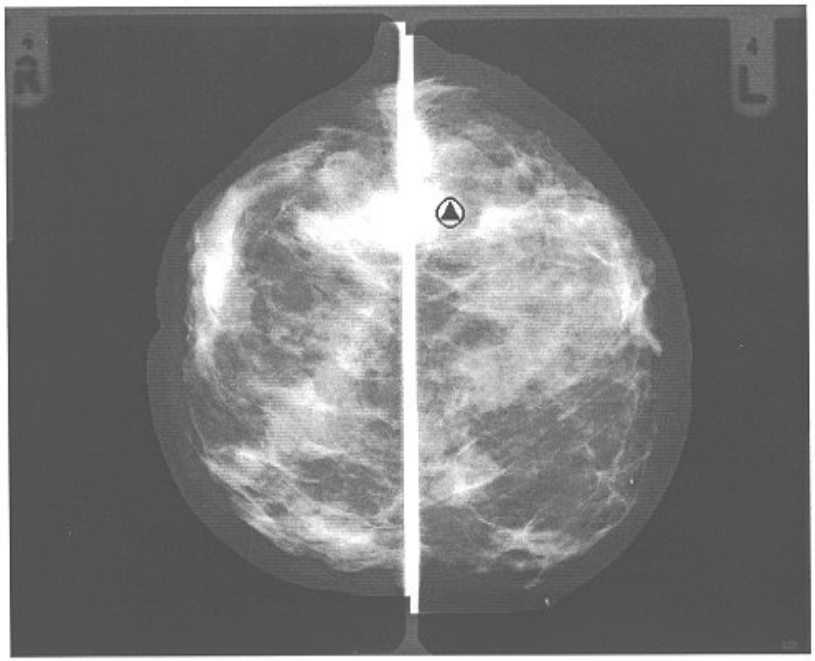
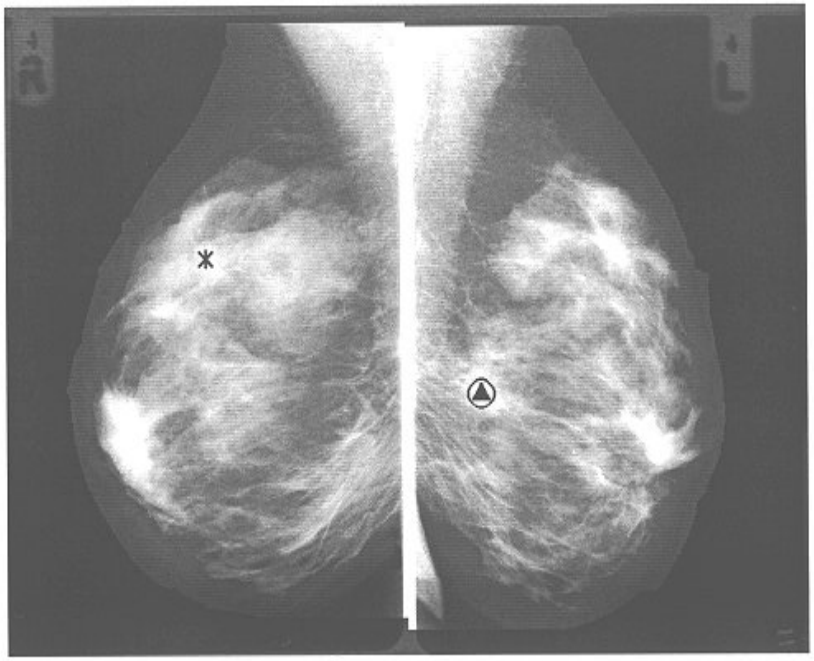


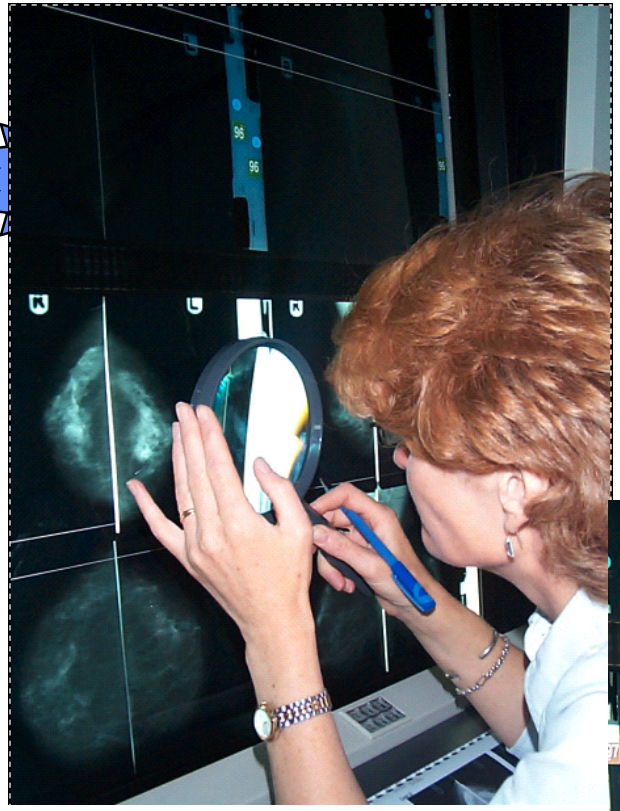
Figure 7: Examples of normal breast structures that can be marked as a potential mass.

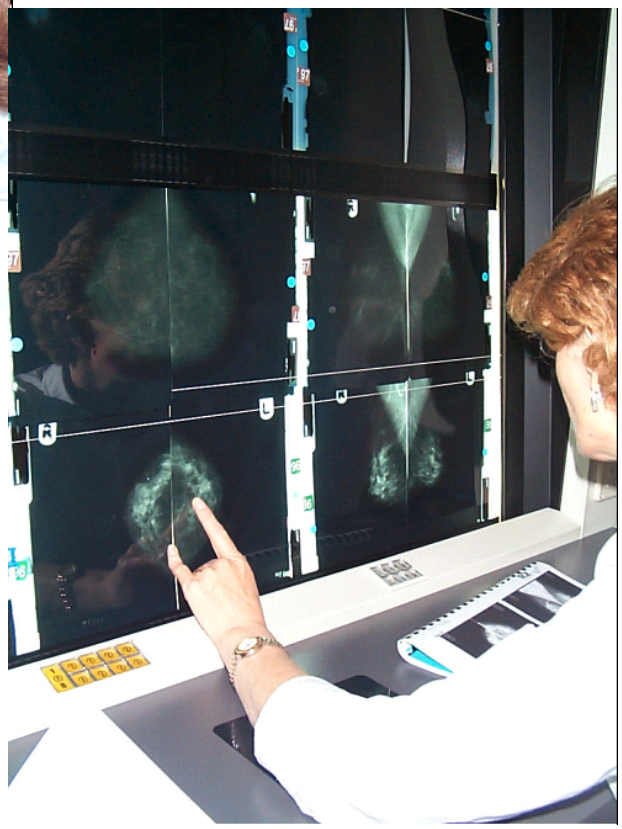
Case 22

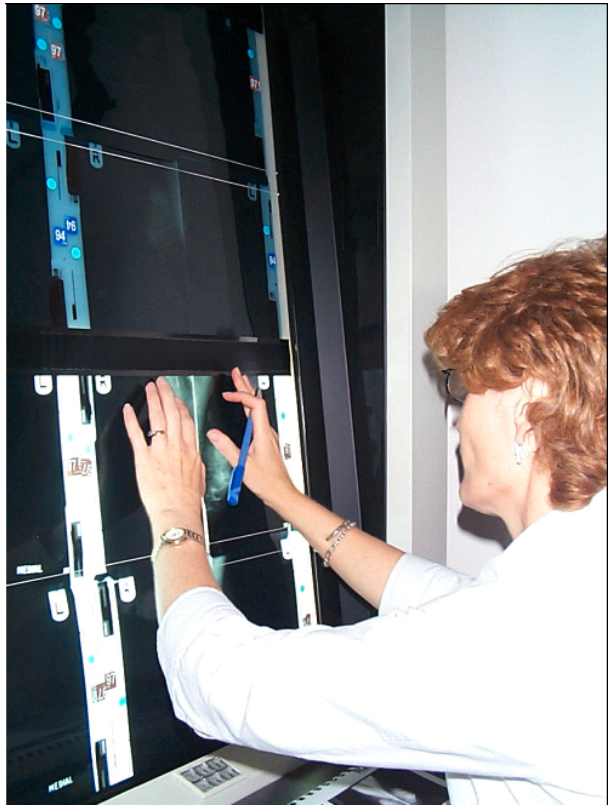




Please mark and number any areas of abnormality on the images. For each feature please indicate the type of abnormality with degree of







Evaluation - what might cause readers to ‘trust’ or ‘mistrust’ the technology’?

- **Strengths**
  - **Picks up subtle signs and stimulates interaction** between film reader and the technology - "Those micros that the computer picked up .. I might have missed it if I was reading in a hurry .. I'd certainly missed them on the oblique.."
  - **If machine prompts made to look again** "This is a case where without the prompt I'd probably let it go .. but seeing the prompt I'll probably recall .. it doesn't look like a mass but she's got quite difficult dense breasts.. I'll probably recall..”
  - "This one here the computer certainly made me look again at the area..”
  - **Consistency** (trust?) - " .. its just the fact that its more consistent than you are .. because it’s a machine.." (but threshold?)
  - **Interaction between R2 strengths and their reading strengths** & weaknesses

Weaknesses

- **Too many prompts -** "so many prompts .. especially benign calcifications .. you've already looked and seen there are lots of benign calcs..”
- **Prompting the wrong things -** benign, artefactual..
- "I'll not recall .. what the computer has picked up is benign .. it may even be talcum powder..”
- **Missing obvious prompts -** issues of trusting the machine
- Some of the obvious cancers were not prompted - **Computer detection does not always behave as expected** "That’s quite a suspicious mass on the CC ..surprised it did'nt pick it up on the oblique.." (Points to area) "I'm surprised the computer did'nt spot it .. its so spiky .. I'd definitely call that back.."
- **Prompts as distractions -** "this is quite distracting .. there's an obvious cancer there (pointing) but the computer's picked up a lot of other things.."

Some General Conclusions:

Developing Trust

- Need to understand **how readers use prompts** - eg reaction to false positive prompts
- Ensure radiologists develop a correct **understanding of the system's scope and function** - eg incorrect notions about asymmetry; understanding prompting rate; understanding prompt characteristics
- Ensure that **prompting information is used appropriately** - view prompts after view scan
- Understand **how use of system changes over time**- impact of reading procedure and modification of system
- Issues of **dependability and trust - ability to make sense of how the tool behaves - 'accountability' & 'technomethodology'**
- Co-development - co-production - becoming one of Garfinkel's hybrid bastards

Other Interesting Issues

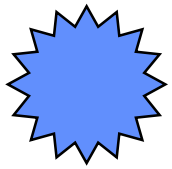
- **<u>Trust & Professional vision</u>:** Ways of seeing- techniques of reading scans and ‘seeing cancers’
  - Overall view- magnifying glass; search patterns; measuring; comparing in the opposite view; aligning scans; looking ‘behind’ the scans
  - "masking really helps on a dense breast ..helps you concentrate on the more suspicious areas..”
  - “Start at top at armpit..come down ..look at strip of tissue in front of armpit..then look at bottom .. then behind each nipple .. the middle of the breast..”
- Interest is in the interaction between the technology and ‘ways of seeing’ - and ‘trusting the machine’
  - 'I'm having trouble seeing the calc its picked up there ..(pointing) . I can only think its an artefact on the film (a thin line at the edge of the film)
  - "I'm surprised the computer did'nt pick that up .. my eye went to it straight away..”

- Readers' professional vision concerns being a competent practitioner: - distinguish between 'normal' and 'abnormal' - 'territories of normal appearance' 'incongruity procedures' - all features of 'trust'
  - "This lady's got lots of little blobs everywhere .. but they're not very interesting and I'm going to let her go.."
  - "" .. just making sure there's nothing the other side (using fingers) .and there is .. a bit of chalk but its harmless..
  - (aligns scans) (using fingers) "so what I thought was an asymmetry is probably completely OK"
- 'Ecology of interactional practices' for making work accountable - 'readers' code'?
  - "We were always taught .. when you've found one cancer look for the second"
  - "I don't always use the magnifying glass to see something .. I use it to make me pause .. or confirm .."
- Interest is in impact of technology on 'incongruity procedures' and 'interactional practices'

Trust: Calculation and Calculability: the social organisation of calculation in reading..

- Both R2 and the reader are involved in ‘calculation’ work? - R2 algorithm - Reader 'educated calculation' 'wide eyed guestimation’
- Study testifies to the routine work of deploying and displaying a system of rational calculability
- Calculation and calculability is a members problem - **achievement and display of proper calculation is a feature of the ‘trustability of the diagnosis**
- Routine work of making a system of calculability operate - reading routine - **routine is a feature of trust**
- Reasoning is shaped by contingencies - talcum powder; dense tissue
  - “Well, if it’s a completely lucent breast, and it’s been well positioned -- a good technique -- then you can be almost completely certain. It’s very difficult to say that anything is completely normal, and you don’t know for instance if the lesion has been left off the mammograms. It’s really only in the completely lucent breasts you can be as confident as possible.”

- General, everyday issues - How is the ‘formula’ to be applied in specific cases? What are the determinants of its applicability? What are the requirements of making it work? the point is to arrive at some efficient and reasonable, defeasable estimation of 'how things stand'
  - - ‘if you know they are on HRT for instance you might accept patches in one (film) where you wouldn’t accept in another’
- Sensitive towards the set of criteria for correctness and what is required for their satisfaction
- Awareness of skill - “My approach tends to be to look (positively?) for things that I know I’m not so good at ... there are certain things that you do have to prompt yourself to look at, one of them being the danger areas.”
- Interest is in the impact of the technology on calculation work - how the technology influences calculations, what ‘account’ is made of the prompts etc - issues of ‘trust’ and calculation



Ethnography Tutorial Part 3

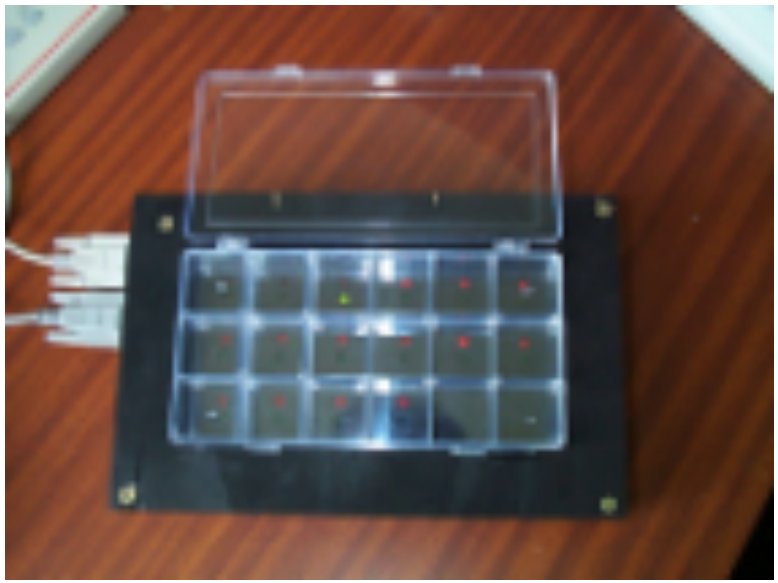
- Developments in ethnography - new settings and complementary methods - ‘cultural probes’

Sensitive settings & user needs

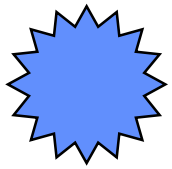
- The ‘turn to the social in design’…BUT.. how do you do it?
- Methods for identifying user needs in sensitive settings are not well developed
- Obdurate problems that make direct observation intrusive, disruptive and inappropriate

Fieldwork: Domestic Settings

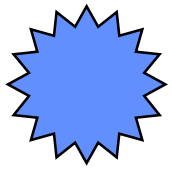
- The movement of digital technologies out of the workplace brings with it the need to develop new techniques to consider how technology might relate to and support everyday activities
- Elderly - disabled - hostel and semi-independent living for former psychiatric patients
- Developing devices to support independent living - empowerment not new technological forms of dependence
- **Developing new methods** - ‘cultural probes’...



Research questions



- Settings include a residential hostel for former psychiatric patients, a stroke patient and her family, the elderly living at home
- Questions about the organization and coordination of domestic space - ‘everyday rhythms’
- Specific issues to do with the availability and use of existing technologies and their affordances.



Design questions

- Major challenge for designers:

  “**… to pay heed to the stable and compelling routines of the home, rather than external factors, including the abilities of the technology itself. These routines are subtle, complex, and ill-articulated, if they are articulated at all ... Only by grounding our designs in such realities of the home will we have a better chance to minimize, or at least predict, the effects of our technologies..**” **Edwards & Grinter**
- **“Designers instinctively design for able bodied users.. “**

Cultural probes: from inspiration to information

- Direct observation requires supplementation
- Cultural Probes - Gaver, Dunne & Pacenti- Presence project - ‘inspirational’ use
- There is nothing new about ‘cultural probes’..
- Adapting Cultural Probes to open up communication channels and foster an ongoing dialogue with the members of our user groups
- Generate key insights into their unique needs.

  … offer fragmentary glimpses into the rich texture of people’s home lives. They allow us to build semi-factual narratives, from which design proposals emerge like props for a film

Cultural probe pack.

- a disposable camera, photo album, visitors book, scrapbook, post-it notes, pens, pencils and crayons, a set of postcards addressed to the researcher, and a map.
- not explicitly ‘designed’ - present - modified over time
- instructions:

  These items are Cultural Probes - but don't worry - they're just a way for us to find out more about you, your everyday life, what you think and feel. We'd like you to use them to tell us about yourself - and below are a few ideas you might want to think about. Ignore these if you like - nothing is compulsory - do as much or as little as you like. We hope its fun. I'll come back to collect them in about a week

TECHNOLOGY AND YOU

This section asks about how you feel about the electrical items in your home

I use the following electrical items most regularly
1) KETTLE
2) MICROWAVE
3) MUSIC CENTRE
4) WASHING MACHINE
5)

You can draw or attach a picture of the most useful item to you here

I have most problems with the following electrical items
1) REPLACING LIGHT BULBS (I WAIT UNTIL SOMEONE CALLS)
2)
3)
4)
5)

IT'S OVER TO YOU

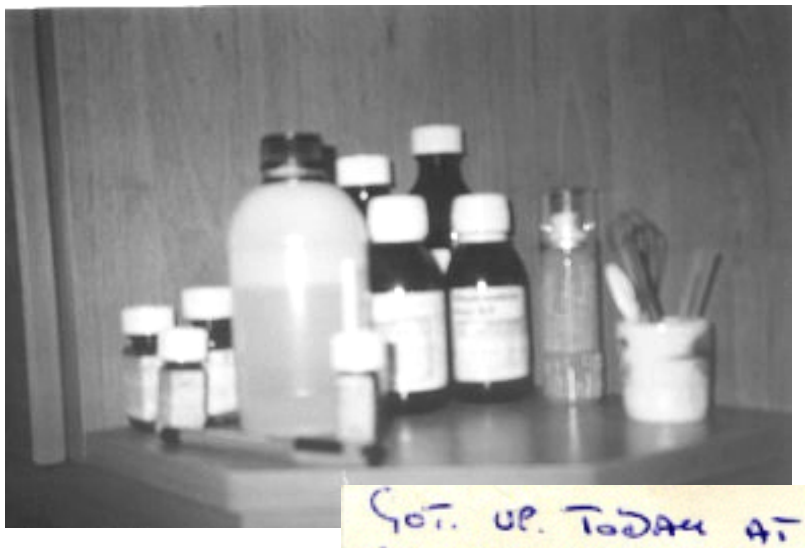
Please let us know what your concerns and fears are as well as your aspirations

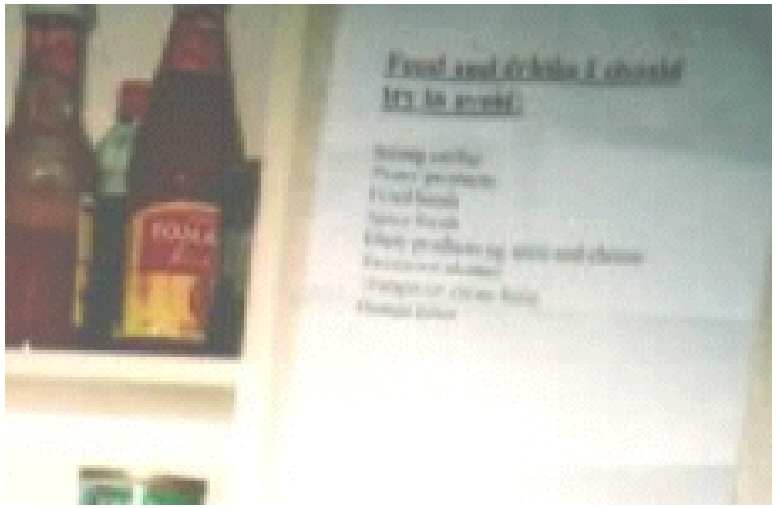
The following things are a major problem to me
1) REACHING CUPBOARDS

Abiding concerns

- Major preoccupations - medication; safety and security; communication
- Reveal ‘temporal rhythms’ of social life (Zerubavel 1985)
- Rhythms readily perceived - visiting rounds, movement of residents into, around and out of the site at various times of day, medication delivery, resident and staff meetings..
- Importance of knowing that events should happen in a regular and predictable order, what people were doing, and where they were...

Abiding Concerns: Health & Medication

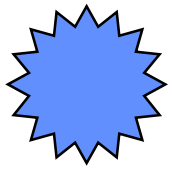




GOT UP TODAY AT 10 O'CLOCK GOT PLAN IN MY BACK AND LEGS HAD TO SAY IN BED 17 HOUR LONG(ER) BECAUSE I COULD GET GET UP. TOOK SOME PHONE OF THE FLAT. GOING TO DAY CANATLE THIS AFTER NOON MY HEAD HAS GOT A BAD PLAN IN MY HEAD AND IS GOT GOING AWAY.

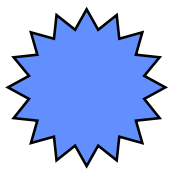
Fragmentary Glimpses and User Requirements

- Problems? - misusing the probes? ‘sore legs and naked bottoms’ - inspirational use?
- Supplementing ethnography in sensitive settings
  - - providing access
  - - beginning a ‘conversation’
  - - from ‘provocation’ to ‘reassurance’



“I can tell you something but you have to be careful what you make of it” (Sacks)

- The problem of trivia… what is the data? - commonsense understandings about the home.
- ‘So what’ - grounding design in the mundane world - avoiding stupid mistakes
- Having modest expectations……& rethinking assumptions..
- *“They may seem whimsical, but it would be a mistake to dismiss them on that ground: for unless we start to respect the full range of values that make us human, the technologies we build are likely to be dull and uninteresting at best, and de-humanising at worst.”* Gaver 2001.



Ethnography Tutorial Part 4: Some stuff on ethics..

- Why does computer design and use merit special ethical attention?
- Computers permit a novel range of behaviours that bring ethical principle into force – eg surveillance, privacy etc
- Complexity of computer systems makes the consequences of actions difficult to predict – (old ethical argument about science?) – can people be blamed for not being omniscient?
- Need for technical skills and knowledge – ethical debate is framed by what is technically possible – but – paradoxically - it is unlikely that there will be technical solutions to ethical problems

Philosophy & Ethics

- Philosophy & Ultimate questions – the meaning of life, good and evil, personal identity, knowledge and certainty… etc
- Philosophy does not provide answers – philosophy as therapy – clearing the fog of confusion
- Ultimate questions – Plato, Bilbo Baggins and Miss Nude America (and Groundhog Day) - **Why be moral?**
- Issues of responsibility, safety, security, risk, trust – can be seen as ethical issues
- Ethics and positive action - not doing something is not a morally worthwhile option..?
- Choosing which ethical principles to defend..

Philosophical bases for morality

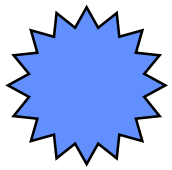
- Teleological v deontological approaches
- Teleology – consequentialism – variants – self-interest, prudentialism (Equus?), contractarianism (Hobbes), utilitarianism (Mill), virtue, altruism…
- Deontology – notion of essential rightness or wrongness regardless of consequences – eg basic human rights
- Duty based ethics – fidelity; reparation; justice; non-injury; beneficence etc
- Rights based ethics – knowledge, privacy, property

Ethical Responsibility & The Design Cycle

- Responsibilities as Researchers and Responsibilities as Producers-Workers
- Ethics as an academic and a practical concern
- Ethical issues and stages of research and development
- Initial research - Design - Deployment - Evaluation

Research & Ethics

- "Whether anyone was harmed or inconvenienced by the research is the basic 'minimum question' of research ethics; did the researchers act responsibly, to leave the world no worse a place by reason of their investigation?" Sapsford & Abbott1992:25-26
- "... the sociologist should subscribe to the doctrine of 'informed consent' on the part of subjects and accordingly take pains to explain fully the object and implications of his research to individual subjects..."
  "In all circumstances, investigators must consider the ethical implications and psychological consequences for the participants in their research. The essential principle is that the investigation should be considered from the standpoint of all participants; foreseeable threats to their psychological well-being, health, values or dignity should be eliminated...."



Computing Codes of Ethics - The ACM Code

- Series of Kantian Moral Imperatives
- General Moral Imperatives – (motherhood & apple pie?) - Contribute to society & human well-being
- Avoid harm to others - Be honest and trustworthy etc etc etc
- Mundane Ethics - Doing The Best You Can

Practical Ethics: the bureaucratic and the bogus

- Bureaucratic - ethical protocols
- ‘Bogus’
  - Informed consent
  - Anonymity
  - Privacy
- Moral cowardice as an ethical principle
- Ethical Issues in Design and Deployment
- Understanding the consequences of interventions - care pathways, human rights, privacy etc - trying not to kill people
- Doing The Right Thing - Practical ethics - trying to behave like a decent human being…..whilst covering your ass...
- Don’t be stupid