Methods for analysing video: from grounded to content analysis

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Our session today

- Examine different techniques to analyse video
- Further links: suggested tools, web links, tutorials
- Discussion/Q&A

Different types of videos

- Video recording research inquiries
- Participatory videos
- Cultural probes

"… a rich and varied set of materials that… let us ground [our designs / processes / policies] in the detailed textures of the local cultures"
(Gaver et al 1999)

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Three video analysis approaches

- Whole-to-part inductive (grounded analysis)
- Part-to-whole deductive (content analysis)
- Manifest content (Critical Incident approach)

“Two main analysis” divide

Analysis is like fishing:

- whole-to-part (inductive approach)
- You may want to catch tuna so you fish in certain parts of the sea BUT you throw your nets out and catch everything including the things you DO want and DON’T want

- part-to-whole (deductive approach)
- You find the best river for the fish you want, you have one line, a specific bait for a specific type of fish

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Whole-to-part inductive [grounded analysis]

Whole-to-part methods

- Conversational analysis
- Discourse analysis
- Thematic analysis
- Grounded theory

“Both qualitative and quantitative approaches share a common concern with theory as the goal of research”

(Henwood & Pidgeon, 1992 p.101)

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Grounded analysis

- Data in whatever form is broken down, conceptualised and put back together in new ways
- Analysis stages: 3 levels of coding:
  - Open
  - Axial
  - Selective

Open coding

1. **Concepts** are identified.

2. Concepts are grouped into **categories**

3. **Properties** and **dimensions** of the category identified

Open coding: detailed

- ***Concepts are:-*** Conceptual labels placed on discrete happenings, events, and other instances of phenomena
- ***Categories are:-*** where concepts are classified and grouped together under a higher order – a more abstract concept called a category.
- ***Properties are*:-** characteristics pertaining to a category
- ***Dimensions are*:-** Location (values) of properties along a continuum

Open coding: analysis

- " When I want to have a personal conversation **(private interaction),** I encrypt the message **(security measure).** I think that makes the email private **(Securing privacy).** Stops people from listening in **(Surveillance)."**

- *Concepts are:-* **private interaction, security measures, securing privacy, surveillance**
- *Categories are:-* ***Interaction, privacy, security***

2nd stage in-depth

Take a section of an important point in your data and start to code **concepts**

If you want, you can also review categories

Open coding

Category Class	Property	Dimension	Dimensional Range
surveillance	Being observed	frequency	often .....never
		scope	more .....less
		intensity	high.....low
		duration	long .....short

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Part-to-whole
[Content Analysis]

Applying models

- Focus on specific issues – pre-defined.
- Re-using existing models
- Quicker & easier to apply
- Issues of ‘fit’ and subjectivity

Iterative OR Storyline

- With inductive approaches there are issues of decide, continue OR close
- Continue until saturation point (only repetitive concepts, issues occurring)
- Summarise analysis with high-level story-line combining abstract relationships with detailed findings

Attention Content & Interaction Pattern Approach

- Review 10-second intervals
- If multi-tasking, code for 1 second (primary, secondary, tertiary focus)
- In the first table, code hardware foci (the what), second table software/function used (the why)

Attention content analysis 1

Table 1: Hardware / People (what)

Time Code / sequence identifier	**Participant identifier**	**Primary Focus of attention**	Secondary Focus of attention	Tertiary Focus of attention
01:10 01:10 [EXAMPLE]	P1 P2	Tabletop P1	Book Tabletop	None None

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Attention content analysis 2

Table 2: Software / Function (why)

Time Code / sequence identifier	Participant identifier	Primary Focus of attention	Secondary Focus of attention	Tertiary Focus of attention
01:10 01:10 [EXAMPLE]	P1 P2	Tabletop P1	Book Tabletop	None None

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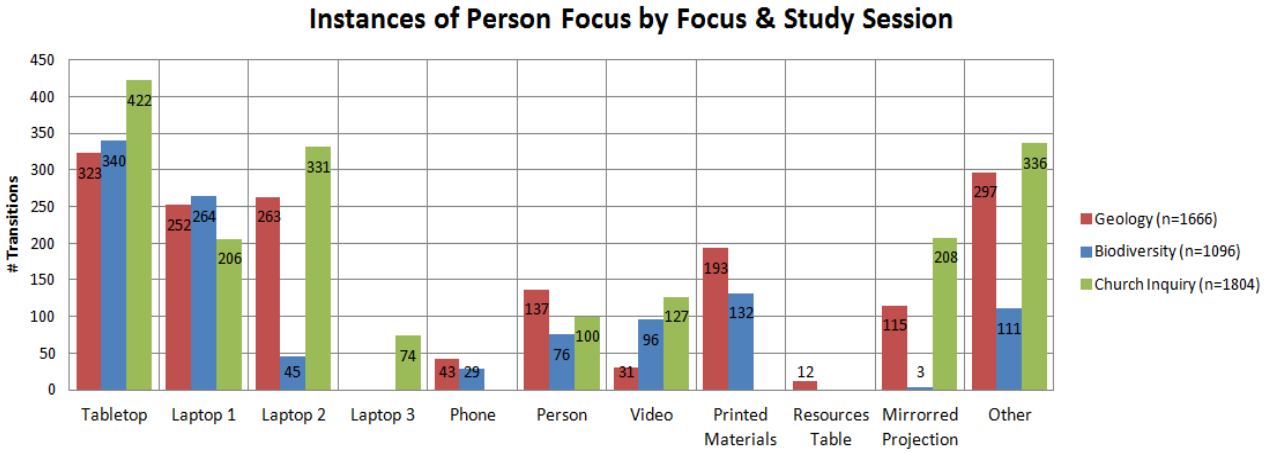
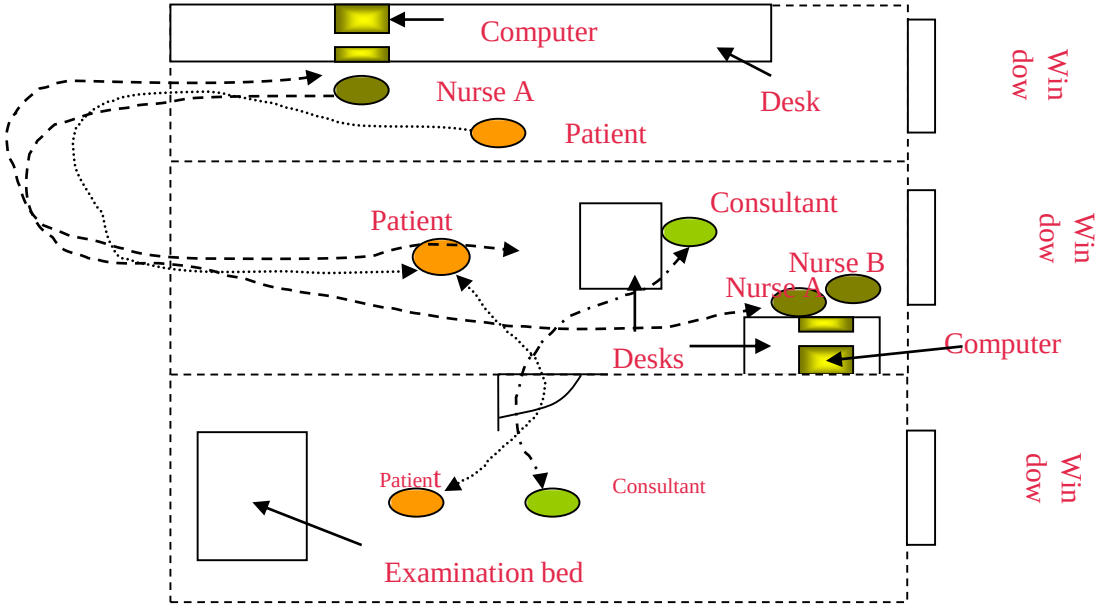
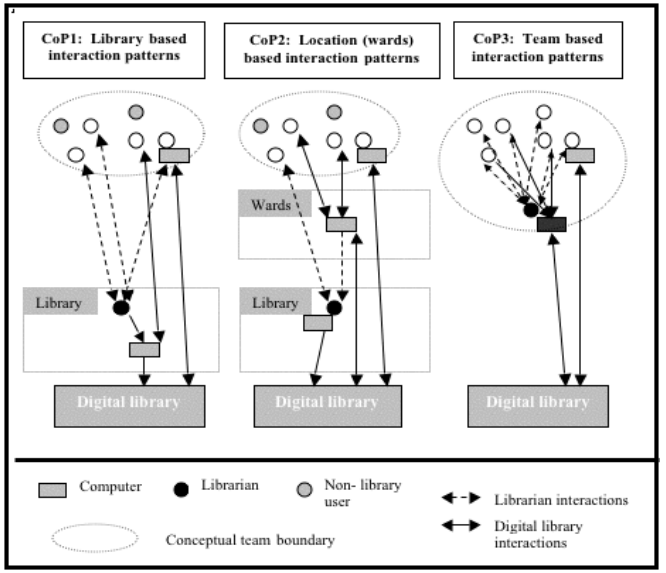
Interaction patterns







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Critical Incident Analysis

The critical incident technique (CIT)

- Original article by John Flanagan* in 1954
- Fairly robust and sound qualitative method
- *"Consists of a set of procedures for collecting direct observations of human behaviour in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles…"*
- Outlines procedures for collecting observed incidents having special significance

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* Flanagan, John C. (1954) The Critical Incident Technique. *Psychological Bulletin* 51 (4): 327-359

Examples of use

- In HCI: the focus of the incident is often on events where something either **goes unexpectedly well**, or **badly** – can be used to inform the design of further software iterations
- In education: technique has been adapted to uncover **breakthroughs** and **breakdowns** in teaching and learning activities (which can later be probed through retrospective interviews with the participants)
- However, the meaning of the terms “breakthrough” and “breakdown” are contextually bound

Example of a breakthrough

Breakthroughs are observable critical incidents which appear to be initiating productive new forms of learning or important conceptual change

BREAKTHROUGH					
Describe incident and its level of importance for learning (1 low – 5 high)	Relevant conditions prior to incident	Relevant conditions after the incident	Role of technology	Role of collaborators	KEY issue identified
5	'In Here' students discussing map and position of fault line with 'Out There' students	Map was found to be incorrectly drawn	Synchronous communication carried out through phone; internet access enabled access to maps; digital camera and video camera enabled capturing of field data to send back to 'In Here' team	Students "In Here" were able to use additional resources to feed information to those students "Out There"	"Official" geological map used by the students had been incorrectly drawn

Example of a breakdown

A breakdown is an observable critical incident where a learner is struggling with the technology, is asking for help, or appears to be labouring under a clear misunderstanding

BREAKDOWN					
Describe incident and its level of importance for learning (1 low – 5 high)	Relevant conditions prior to incident	Relevant conditions after the incident	Role of technology	Role of collaborators	KEY issue identified
3	"Out There" students had requested further information about a particular rock type from "In Here" students	"Out There" students made field sketches and annotations of layers of rock found at the field site	Temporary problems with Internet connectivity meant "In Here" students could not get online and so had to resort to using reference books instead – this took longer and some information was not available that would have been expected to have been found online.	Technical support was provided to re-enable Internet connectivity but this took some 20 minutes to restore, so that students "Out There" only had some data made available to them until this time	That many resources were only available online – maybe some of these should be locally cached (if possible) in case of future similar episodes, or printed off.

Next steps

- Look at breakthroughs and breakdowns
- Start to categorise into **themes** to provide an overview of the critical incidents that occurred
- Can also define these incidents as **explicit** (e.g. if analysing e.g. video diaries/data being directly captured/recorded by the participants themselves) or **implicit** (e.g. incidents arising from the natural interactions of the students with the technology and each other)
- Can triangulate with other methods of data analysis to get a more detailed picture of events

Tools and tutorials for video analysis

- Atlas.ti (see https://www.youtube.com/user/ATLASti01 and http://tinyurl.com/atlasti-video)
- Nvivo (see "Coding Audio and Video in Nvivo": http://tinyurl.com/nvivo-video)
- Transana: http://www.transana.org/
- Diver: http://diver.stanford.edu/

Discussion / Q&A

- Any questions, comments, thoughts?

Further reading

- Flanagan, John C. (1954) The Critical Incident Technique. *Psychological Bulletin* 51 (4) pp. 327-359
- Anastopoulou, S., Sharples, M., Wright, M., Martin, H., Ainsworth, S., Benford, S., Crook, C., Greenhalgh, C. and C. O'Malley (2008) Learning 21st Century Science in Context with Mobile Technologies. *Proceedings of the mLearn 2008 Conference: The bridge from text to context*, University of Wolverhampton, pp. 12-19.
- Carroll, J. M., Koenemann-Belliveau, J., Rosson, M. B. and M. K. Singley (1993) Critical incidents and critical themes in empirical usability evaluation. *Proceedings of People and Computers VIII,* Cambridge, UK: Cambridge University Press, pp. 279-292
- Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: Cultural probes. *Interactions*, 6(1), 21-29.
- Henwood, K. L. and Pidgeon, N. F. (1992), Qualitative research and psychological theorizing. British Journal of Psychology, 83: 97–111. doi: 10.1111/j.2044-8295.1992.tb02426.x