"Just try to do it at the whiteboard"

Researcher-Participant Interaction and Issues of Generalisation

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Abstract— **This paper is about generalisation, it probes whether the work captured on video in three simulated design tasks is representative of software design in general, and it discusses how generalization features as a practical concern for the participants of the tasks. This paper draws upon Ethnomethodology and Conversation Analysis in order to look closely at interaction between participants and the researcher during the tasks. It finds no reason to believe the participants' skills, reasoning and methods are unrepresentatively enacted in the videos. It also finds that it is a concern of the participants to apply and exhibit their general skills, reasoning and methods in the somewhat unusual circumstances of the task.**

Keywords-component; ethnomethodology, conversation analysis, software design tasks.

I. INTRODUCTION

This paper concentrates on three videos in which pairs of professionals from the software industry work through a task to design a traffic signal simulator. The videos have been made at software organizations in North America: Amberpoint, Adobe, and an anonymous organization. In the Amberpoint video a male and female work on the design task, spending slightly under two hours on it. In the Adobe video two males spend slightly under two hours on the task. In the anonymous video, two males spend around one hour on the task. The task does not have a right or wrong solution; the conclusion is the point at which the participants feel ready to hand their design over to programmers. In each video, the camera is pointed at a whiteboard with the participants coming into shot as they approach the board and moving out of shot as they sit or move elsewhere in the room.

II. FOCUS: TALK

The work of the participants is to take one text (the design document) and produce a second text based on this. This second text is to be written on the whiteboard and is to be presentable to programmers (to whom the design will be handed over). Fundamental to the ways in which this text is transformed is talk. Talk constitutes the way reasoning is done and decisions are made.

There are many aspects of talk in the videos I have found interesting (for example agreements and disagreements, use of metaphors, problem organization, and turn taking). But when embarking on an analysis of any of these I found myself hitting the same problem – generalization. I was worried that any analysis I do would address features specific to this kind of simulated task rather than general features of design work. Essentially, do the participants act in these tasks as they would in the wild? The opening statement from the original transcription of the Amberpoint video seems to suggest that the participants are directed to do things (transcript 1).

Interviewer: Whenever you're ready. If you want to write anything just do it on the whiteboard.

TRANSCRIPT 1: AMBERPOINT (ORIGINAL)

Is the interviewer telling the participants that they must write on the whiteboard? Are the participants doing things in the video they would ordinarily do, or what they are told? Does the interviewer's preoccupation with videoing work at the whiteboard reveal or obscure what design actually is? This paper addresses these and related issues around generalization.

III. CONVERSATION ANALYSIS

To address talk, I will be drawing from the field of Conversation Analysis (CA). CA relies on detailed description of talk, and consequently requires the use of detailed transcripts. The aim is to capture not just what was said, but how it was said. Transcription too often deletes forms of interaction by using a conventional orthographic representation of talk [1]. Transcript 1 is an example of this, it is presented more as a play script than a record of what was said. CA has for 30 years been developing styles of transcription that capture elements of talk that are interactionally relevant. Gail Jefferson was central to these developments, and below I summarise the notation she developed (see [2]).

Ye:s:	A colon represents an elongation of a sound
,	A short pause
(.)	A pause
(8.0)	A longer pause, in this case roughly 8.0 seconds.
[ ]	Square brackets mark a period of overlapping speech. The talk it overlaps with will be below.
?	Rising intonation at end of sentence
.	Falling intonation at end of sentence
=	No pause between words
(( ))	Notes on action are contained in double brackets
(yes?)	Words in brackets with a question mark are what was probably said, but difficult to make out.

*	Represents a syllable of an inaudible word
°yes°	Whispered or soft voice
yes	Underline indicates emphasis, such as change in volume
(h)	Plosiveness, often starting laughter
Huh	laughter
YES	Capitals indicate loud voice
↑	Indicates next syllable has rising intonation
↓	Falling intonation
>yes<	Something said quicky
<yes>	Something said slowly
Uh/uhm	Equivalent to Err/erm

Using this notation can make the transcripts slightly harder to read, but as I will show, can provide the foundation for a more thorough analysis. This form of transcript is more accurate, but this does not mean it is 100% accurate. It is not easy to write down exactly what is said, and sometimes not easy to attribute particular things to particular people, particularly when they are off camera. Transcribing in this way overlooks more embodied and visual interaction [3], and at points in the paper I have to switch to descriptions of action. CA is not a linguistics of talk, but is extensively linked to Sociology and in particular the 'ethnomethodological' view that social order is achieved by people (through talk, interaction, writing, etc – see [4][8]).

IV. Opening Sequences

A. Amberpoint Opening Sequecnce

Earlier I quoted the opening lines of the original transcript of the Amberpoint video (transcript 1). In transcript 2, I offer my own transcription of this opening. In this transcript, "F" is the female participant and "M" the male. "R" is the researcher (I feel researcher is a more appropriate category than interviewer).

1	F	Sha:ll we go:?
2	R	Neueh? (1.0) Whenever you're [ready], wh[enever]
3	F	[yeah] [yea:h]
4	R	you're ready.
6	F	°yeah°
7	M	Okay ((possibly said by R))
8		(1.0)
9	R	Yeah you should go and use tha-. If you want to
10		write anything, just try to do it at the whiteboard.
11	F	(h) [huh huh
12	M	[huh [huh huh
13	R	[Its helpful for us.
14	F	WE CAN NOT WHISPER HERE [huh huh] huh]
15	R	[no it- (h)]
16	M	[huh huh huh]
17	F	huh huh (.)
18	R	Some people want to draw on paper [and] that
19	F	[Uhuh]
20		just makes it difficult for us
21	M	[Yeah
22	F	[Uh huh, Uh huh
23		(3.5)
24	M	Well, I mean, so, so, the end users, seem to be the
25		students (.) and the professor. Students need to be
26		able to: (.) ↑build these roads, but also, see the
27		results of what happens [when they] make changes.
29	F	[mmhuh]
30	F	So its like, both a a drawing tool

TRANSCRIPT 2: AMBERPOINT FROM 00.05:48

The opening remark of the Amberpoint video (line 2.1 – *the first line of transcript 2*) is not as transcript 1 described but is, in actual fact, a question. The question is directed by participant F at the researcher R. It is not possible to say why F directed her question at R, but the transcripts can be used to look more closely at how this question is handled.

As Sacks et al [5] explain of turn-taking in conversation, if a next-speaker is selected by the current speaker, that next speaker is obliged to respond (and troubles occur if this is not what happens). Here, R is that next-speaker. He seems a little surprised or unready to speak, starting with a sound that is hard to transcribe - "Neueh?" is the best I can do. R's answer "whenever you're ready" is said twice, the second time a little more clearly (lines 2.2 & 2.4). This answer makes it clear that it is the participants' decision as to when to start. It fulfils the researcher's obligation to speak, and cleverly gives little direction. I think the researcher could now reasonably expect the participants to do something, perhaps carry on reading, perhaps start talking, but either way to exclude the researcher from further interaction. But there are just a couple of short replies to R's answer (lines 2.6-7), and then a brief pause (line 8). The action is off camera at this point, and it would be interesting to see where the eye contact is here. In lines 2.9 & 2.10 R repairs his original, non-directive answer into a more directive one (lines 2.9-2.10), and I think this is because F and M do not act on the initial remark. Note, it is lines 2.9-10 that I am particularly interested in.

The second answer from R (2.9-10) is followed by laughter. Laughter peppers everyday talk, and is not necessarily a response to a joke or even to something funny [6]. The laughing is initiated by F (line 2.11), and M quickly joins in (line 2.12). R is the butt off this laughter, and on hearing it he qualifies his previous answer as "Its helpful for us" (line 2.13). This statement is later mirrored with a similar one "that just makes it difficult for us" (line 2.19). This is a kind of downgrading of the previous directive answer (lines 2.9-10), repairing whiteboard use to be something "helpful" rather than something to "try to do". The joke (line 2.14) and the laughter (lines 2.14-17), again positions R as a butt (the joke begins with the term "we", referring to F and M and positioning them as different to R). R's initial response is aborted (line 2.15), it is drowned out by laugher. It is only after F finishes laughing at her own joke, and a short pause, that R is able to continue. He says "some people want to draw on paper" (line 2.18), which seems to explain why he would have directed the participants to the whiteboard. The reason why F and then M laugh at lines 2.9-10 is, I think, because it is a statement of the obvious. The joke at line 2.14 certainly plays on making statements of the obvious. But perhaps M and F failed to consider that some people still do things like draw on paper

even when there is a whiteboard to use and a video camera is pointing at this whiteboard.

By line 2.23 this interchange between M, F and R has lapsed. At line 2.24 a new sequence of conversation begins, this time purely between M and F. This will be the case for much of the remaining two hours of video: M and F talk and R observes.

It is not possible to describe and explain precisely what is going on in the opening of the Amberpoint video, but through an analysis of conversation based upon a transcript in Jefferson format, our understanding of it can be vastly improved. The statement from the original transcript (transcript 1) "Whenever you're ready. If you want to write anything just do it at the whiteboard" has been shown to be an inaccurate version of what was said. The researcher certainly did tell the participants to use the whiteboard, but this was 1) something that the researcher did not expect to have to say; 2) a follow on from (and I would say repair of) a previous, non-directive answer to a question; 3) later repaired into something less directive, and 4) found laughable by the participants as a statement of the obvious. "Just do it at the whiteboard" was a statement of what was expected of the participants, but its adequacy as a statement of 'the rules' and the need to even state such rules is questionable to the participants and it is reformulated over a sequence of turns. The meaningfulness of this statement is, as with the other things that are said in the design task, malleable in the interaction between all parties in the conversation.

This analysis casts a new light on the opening of the Amberpoint video. It addresses and reduces the concern I initially had that the participants are being directed or coerced into particular actions through the video, but does not lay those concerns to rest. I therefore want to look at some further sequences of researcher-participant interaction in all three videos. How do these compare? Do they cast any further light on my concerns? To continue, I will compare the Amberpoint opening with the openings from the other two videos.

B. Adobe and Anonymous Opening Sequences

1	A	Okay.
2	B	Shall we uhh, start soon?
3	A	Okay.
4	B	°Or° (1.0)
5	A	Well where's the first place to start? (2.5)
6	B	Errr. <Shall we>, define (2.0) °uhh°, <an initial,
7		simple, intersection, an initial simple car?>
8	A	You mean tha the actual data structures?
9	B	I'm thinking, yeah, I'm thinking in terms of, model
10		view controller say start with a model (.) uhm, and
11		uhh start with uh simplest model, to get the, simplest
12		intersection (.) <flowing with cars and timing.>
13	A	Okay (2.0) something that we can build on?
14	B	Something that we can build on.
15	A	Okay. So what err, what basic, data structures are
16		we, looking at here?

TRANSCRIPT 3: ADOBE, FROM 00.05.04

1	X	((sounds of rustling paper)) Okay
2	Y	[huh huh huh]
3	R	[huh huh huh] (.)
4	X	Feels like school again
5	Y	[Yeah]
6	R	[huh huh] huh (2.5)
7	X	.hhh (4.5) Well, I want to <start, b:y, hearing, your,
8		summary, [of ,]this>
9	R	[(h)(h)(h) huh huh]
10	Y	>Gotcha<, uh:m, well, ee, I mean (.) >a little more
11		summary< uhh looks like basically, two pieces, the:,
12		interaction a:nd (.) code for, map that's: able to
13		manipulate, road systems.
14	X	↓Yeah=
15	Y	=With a whole bunch of details.
16	X	Yeah=
17	Y	Umm one that kinda=sticks out to me is err, >be able
18		to accommodate at least< six intersections: (.) uhh
19		>be able to< contro:l lights at the individual level.
20		So timings, how to get set off, from each individual
21		intersection

TRANSCRIPT 4: ANONYOMUS, FROM 00.05.13

Above are the openings from the Adobe and anonymous videos. Their main similarity to the Amberpoint video, I would say, is that they have an empty start. By this I mean that all three videos begin with several turns of conversation just to establish that the participants should "get started". In the Adobe and anonymous videos the opening turn is "Okay" (line 1 in both), which is then followed by a general comment about procedure "feels like school again" (line 4.4)/ "shall we uhh, start soon?" (line 3.2). These openings have similarities to the Amberpoint opening turn. In particular, the opening question in the Adobe (line 3.2) and Amberpoint video (line 2.1) is almost identical. The difference between these is, in the Adobe video the question is not directed at the researcher. In both the Adobe and anonymous videos the opening comment is followed by a more direct request about where to start. All three openings are 'empty'. I mean this in the sense that, in all three videos, the participants begin by establishing that they should start, but it takes several turns before any topics are put forward for discussion. It is as if the participants wish to avoid being the one to introduce the topic.

The anonymous and Amberpoint videos both contain laughter in the opening turns. However, the laughter in the anonymous video is laughing-with the speaker rather than laughing-at. In the anonymous video, both the participants and the researcher laugh together (4.2-3) and then the researcher laughs alone but along-with and on-top of (line 4.6) the ongoing conversation. This laughing by the researcher may or may not have been heard by the participants, and the way it is timed never means this laughter features as a turn in the conversation, meaning that although the researcher is laughing along with the conversation he is never really a part of it. Perhaps this laughter helps with putting people at ease, or perhaps the researcher just finds what these participants say funny.

After the empty starts, topics for discussion get introduced. In the Adobe and anonymous videos, topics for discussion are only introduced when directly called for, and even then contain only tentative starting points. In the Adobe video, possible starting points are made tentative largely by forming them as questions (lines 3.13, 3.16, and some later turns not in the transcript). In the anonymous video the initial ideas are presented in terms of "looks like" (line 4.11) and ones that "kinda sticks out" (line 4.17). The first ideas presented in the Amberpoint video are a little less provisional, with M jumping in with some points (line 2.24). But these are hardly presented in a confident or definite way.

I have noted some similarities and differences between the openings of the three videos. The crucial thing that comes out of this seems to be that all three have an empty, and arguably uninteresting start (unless you are interested specifically in starts – as this paper has been so far). The interaction between the researcher and participants in the opening of the Amberpoint video happened during this start, and so arguably did not interfere with anything interesting that might alternatively have taken place. An analysis of the design-work in all three videos would likely discard all three openings.

V. The Whiteboard

The concern at the start of this paper was whether participants are somehow made to use the board. I will now explore aspects of how the whiteboards are turned to and feature in practice.

A. Moving to the Board

1	M	Yeah I don't know if they can set the speeds, they
2		can set the, density (1.0)
3	F	Yeah (6.5)
4	M	Wanna draw something? (1.0)
5	F	Okay=
6	M	=Huh huh huh huh ((Walks to board)) (2.0) okay
7		(1.0) ((touching pens)) red and green well th, that's
8		red and green done (1.0) °just let me pu° ((puts sheet
9		on table)) huh huh ((taking cap of a pen)) (2.0) Well
10		so one little thing that says, laying out the roads
11	F	Laying out the roads so [you to need something]
12	M	[So you need to do some
13		kind] of visual, visual, isation of the map ((draws
14		horizontal lines)) where it can (1.0) yeah °I don't
15		know if we got° (2.0) ((erases lines))
16	F	Yeah, so its kind of infinite number ((M drawing
17		vertical lines)) of roads and intersections you can lay
18		out, so

TRANSCRIPT 5: AMBERPOINT, FROM 00.07.16

1	A	Okay (.) so what uh (2.5) hh what basic, data
2		structures are we, looking at here?
3	B	hhh ((walks to board)) (2.5)
4	A	We need something that represents an intersection
5	B	°Okay, so intersection° ((writes Intersection)) And
6		then we need a:, car. ((writes Car))
7	A	Car. (1.0) ↓uhh
8	B	We need, the notion of, time ((writes Time)) (2.5)
9		this is a simulation of time right?
10	A	Right (.) Uhhm, represent, amount traffic (.) or, uh,
11		traffic flow ((Researcher adjusts camera))

TRANSCRIPT 6: ADOBE, FROM 00.05.50

1	X	It seems (1.0) like a::, for this type of problem a good
2		first attack is just kind of uhh (1.5) you know a-, a
3		data analysis. You know so whats, ((moves to
4		board)) what pieces of [data] can we see, going on?
5	Y	[((coughs))]
6	Y	Mhum (2.0)
7	X	((picking up a pen)) Uhm ↑purple (1.5) Uhm .hh
8		(1.5) so we focus on (1.0) the ((writes data)) data
9		pieces (1.0) for this particular thing. Feel free to
10		jump in=
11	Y	O[kay]
12		[>I think<] we got signals ((writing signals)) we
13		got roads ((writing roads)) uhm

TRANSCRIPT 7: ANONYMOUS, FROM 00.08.16

Transcripts 5, 6 and 7 describe the conversations at the point at which participants start writing on the whiteboard. The move to the board differs somewhat in the Amberpoint video to the other two. The Amberpoint participants comment directly on using the board (line 5.4), whereas the inclusion of the whiteboard in the other two conversations is a little more seamless (although not completely so).

In the Amberpoint video there is the question "wanna draw something?" (line 5.4) The decision to start writing on the board comes after a fairly long pause, and is accompanied by laughter (line 5.6). It seems likely to me that this laughter is connected to the comments about the board in transcript 2. The man then gives some commentary about the colours that are available. The colour of the pen is also mentioned in the anonymous transcript (line 7.7) but that is much more a comment of the pen that X happens to choose, whereas M in the Amberpoint video is purposefully arranging and choosing pens.

In all three videos up until this point, the participants have been talking about some of the basic features of the design. The participants in the Adobe and the anonymous video begin to list some of their points on the whiteboard, but the Amberpoint participants begin by drawing a diagram of the intersection. The Adobe and anonymous participants do also draw diagrams fairly early on, and the Amberpoint participants do start listing things in a similar style to the others. This difference in approach may reflect what becomes more generally apparent in the videos, that the Amberpoint pair are much more oriented to interface design and user interaction, or may just be a consequence of the lapse in conversation about more data oriented issues (line 7.5).

It would be difficult to argue that anything more than the laugher at line 5.6 of the Amberpoint transcript had anything to do with the researcher's direction for them to use the board (transcript 2). There is nothing here that suggests that the researchers are doing the task in a way that they don't find natural or intuitive.

B. The Setup of the Tasks

Figure 1. Back to camera (anonymous 00.09.04)

It must be clear to the participants that the researcher wants them to work at the whiteboard, without him even having to say it. In the discussion of transcript 2, I stated that the joking and laughing (lines 2.11-17) are related to the fact this whiteboard use is obvious. The sessions are organized in rooms with whiteboards, a video camera is pointed at the whiteboard, fixed to a tripod, so it must be clear what is expected or wanted without the researcher having to say it. Of course, some people may still go on to write on paper, as was made clear by the researcher in transcript 2 (line 2.18). Alternatively, the participants might do the task writing nothing whatsoever, but this seems very unlikely and would mark the participants out (in my opinion) as being a bit strange.

There are two things I think are worth commenting on here. Firstly, the participants often have their backs to the camera when they write, particularly in the anonymous video (eg. fig. 1). They do not seem concerned with writing in a way that is 'good' for the video, but write as I assume they normally would. Secondly, because the Adobe whiteboard covered a whole wall and the camera could only be focused on a small area, and because the researcher wanted a comparable whiteboard area to be used in all three videos, the researcher has marked out an area for the participants to work in (see the red lines to the left and right of the board in figs 2, 3 and 4). Early on into the Adobe video, when the participants begin writing on the board, the researcher adjusts the camera so that more of what the participants are doing can be caught on camera (figs 2 & 3, & line 6.11). There are no directions from the researcher for the participants to work in places visible to the camera. Most of the writing done by the Adobe participants is done within this marked area, however towards the end, the line to the right is breached (fig. 4) and this is done without hesitation, justification or apology.

While the participants are working within an obvious set of rules, in a location set up in a particular way, it is not true that their actions are directed as such. They are also prepared to break the rules when necessary. It seems fairer to say that the participants are making use of the resources available to carry out their task. They know what is expected of them, but prioritise getting the job done over doing things for the camera.

Figure 2. Original angle (Adobe 00.06.25)

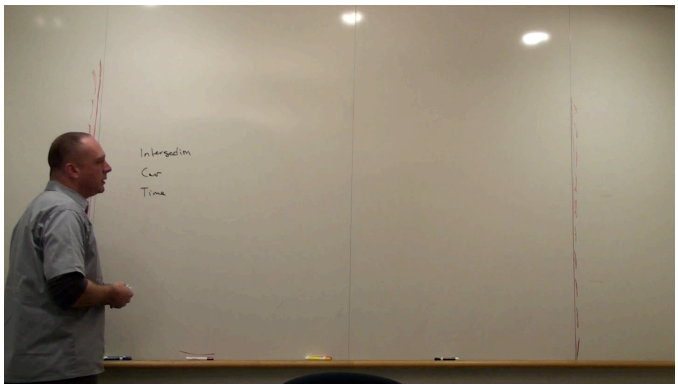

Figure 3. The adjusted angle (Adobe 00.06.41)

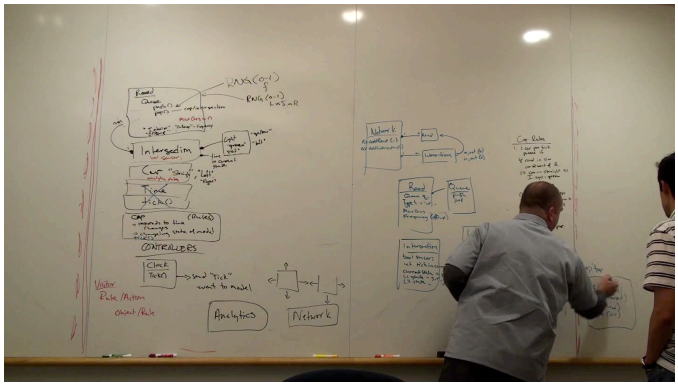

Figure 4. Writing outside marked area (Adobe 1.51.50)

C. Confusions About Image Capture

An issue related to participant-researcher interaction that I want to explore now is something that occurs in the Amberpoint and Adobe videos. The participants query the

researcher over the status of the video camera as a record of their actions that they can legitimately enrol in how they proceed. In the Amberpoint video this is related to the use of a stills camera (transcript 8). In the Adobe video, one of the participants wonders if they need to write something out fully if what they've said is already recorded (transcript 9).

1	F	So (.) Um, So somehow time, daytime um, time of
2		day (.) ((writes Time of Day)) possibly also plays
3		a role ((steps back, steps forward, steps back))
4		(.)
5	M	This is where I pull out my camera cause I wanna
6		erase stuff but I don't want to lose this, so (.) but I,
7		but I don't know if, I mean you've already got this
8		on there so, [th]at's okay or
9	R	[u]
10	R	Yeah, I mean you can totally erase, yeah anything
11		you need to [you know for your own purposes
12	M	
13		[okay
14	M	okay, but I don't wanna, I, that's always one of my
15		concern, that's always one of my concerns =
16	F	=Um huh=
17	M	with writing on the whiteboard is like, I have some
18		great ideas here but now you need to like reshuffle
19		a little bit an
20	F	Un hmm
21	M	um and so yeah, I would , I would just pull out a
22		camera um
23	M?	°where's a camera?°
24	R	°that's mine°
25	R	°(way more?) than rewind° ((laughs))
26		((camera sound – taking a photo))
27	R	Okay ((camera handed back to researcher?))
28	M	Cos like I, how can I , I wanna get rid of this stuff
29		and be able to, deal with this, and things like that,
30		um (.)
31	M	[Lets just, lets just take a look at the requirements
32		]
33	F	[So, so, so, so
34		] so one thing is dealing completely, just with
35		drawing the map, where are the streets=
36	M	yeah
37	F	What are they, how long the distances between
38		them and all that

TRANSCRIPT 8: AMBERPOINT, FROM 00.48.44

Firstly, about the question from M (lines 8.5-8). It is a subject change in the conversation, following a short silence and the movement of F away from the whiteboard after she has been writing something. It is not initially formed as a question, but begins as a statement about how M would ordinarily proceed by pulling out a camera, but is twisted into a question at the end and directed at R. R's initial response is to confirm that its okay to erase, but M goes on to talk about cameras and eventually the researcher lends him one to use. So as with transcript 2, the researcher gives a minimal, non-directive answerer that could act as a cue for the participants to carry on working between themselves. But again the participants draw R into further interaction.

Why does M make these comments about the camera? M says "I don't want to lose this" (line 8.6), and the partially inaudible joke at line 8.25 is presumably about a still image being easier to access than rewinding the tape. But somehow it seems as if the image is more for the researcher's benefit, or even for 'demonstration purposes', than for M and F to use later. There are several things going on. One thing is that M is attempting to transition the conversation between M and F in quite a significant way at this point, he wants to bring the phase in which they have been accumulating ideas to an end, and begin to focus in on some of these (at line 8.33 F stops him from achieving this by interrupting him with more ideas). The other thing is that M is going to efforts to do (or perhaps demonstrate) what he would ordinarily do. At line 8.5 he says "This is where I pull out my camera", a general statement about what his actions ordinarily are at this sort of point in a design task. At lines 8.14 and 8.15 he puts his concern in a general way: "that's always one of my concerns… with writing on the whiteboard", and at lines 8.21 and 8.22 he says "I would just pull out a camera". A lot of the justification for using the camera at this point has more to do with what he would ordinarily do rather than with what he needs to do on this particular occasion. Note, this justification is made not (just) to R, but to F (who acknowledges what M is saying (lines 8.16 and 8.20)). The image is not just to produce a record, but is a demonstration of ordinary behaviour, and a prop in an attempted transition by M to a new direction in the work he is doing with F.

There is an interesting parallel with a sequence from the Adobe video:

1	A	Currently, the way you do that, i::s, you, um, click
2		on the edges, to create roads. And then, where the
3		roads meet, you have an intersection.
4	B	Right (.) Okay, so, I want to create intersection ((" I
5		want to create intersection" is written on the board)).
6		Do we wanna, do we wanna then annotate, or are we
7		letting the video camera (.) ((A laughs)) capture our
8		description? I think we can assume that we have a
9		video camera rolling ((A laughs)), and we'll go
10		through user [stories]
11	R	[((clears throat))]
12	R	To ((M1 and M2 turn to face R)) some extent you
13		should just be able to explain it, you don't have to
14		have everything written down
15	B	Written down okay ((M1 and M2 turn back to face
16		board)) (.) Alright so that's a user story okay

TRANSCRIPT 9: ADOBE, FROM 1.22.34

In this case, the issue is not about keeping a record, but that the participants do not want to write down something they have talked about. This is a similar sort of confusion about the status of the camera; can what is captured by the camera be enrolled by the participants in their plans and decisions on how to proceed?

Note that the participants do not turn around when the researcher clears his throat (line 9.11). This cough is just a cough, it does not appear at what Sacks et al [5] call a turn relevant position. When R does interject, at a point where B has completed something he was saying, both A and B turn to face him. This is one of the few cases in which the researcher interjects into the participants' conversation (he has been directly addressed in the other transcripts so far). The handful of other interjections are covered in the next section.

VI. Further interactions with the Researcher(s)

In each video, talk between researcher and participants is fairly limited, the researcher remaining largely silent. This section covers much of the remaining researcher-participant interaction.

A. Announcements

1	F	So, the there is a, a whole, some sort of a do dah
2		dialogue for configuring cars, and cars behaviours,
3		although, I really again, some should be pre-
4		manufactured you know
5	M	Yeah
6		(.) ((M steps back))
7	R	So there's about forty five minutes left
8	M	Okay
9	F	Oh okay
10	F	laughs ((shrugs and moves forward))
11	M	Blahh
12	R	((laughing))
13	F	Lets start coding ((laughter))
14	M	I know ****
15		(.) ((whispering between researchers?))

Transcript 10: Amberpoint, from 1.05.51

1	M	I think what I'd do is a, I would put a red here to say
2		they are stopped like this, and then I would, I, since
3		green means go I would just use an, arrow through
4		like this to say the traffics going through in that
5		direction
6		(.)
7	R	[Just about]
8	M	[Just to keep] the traffic flowing ((turns to face I))
9	R	Just about 20 minutes more
10	M	Okay (.) ((drawing on board)) something like that, I
11		mean we could do a whole lot more

Transcript 11: Amberpoint, from 01.30.56

1	A	Maybe we can, err, use this space
2	B	Sure ((begins wiping something from board))
3	R	You have about ten minutes left
4	A	[Yep
5	B	[Alright
6		(.)
7	B	So err, seems like a lot, I guess we can erase this
8		((turns to face R)) these now
9	R	Yes, unless you need it for your own purposes
10	B	No=no=no okay, alright, maybe we could just hijack
11		the rest of this board

Transcript 12: Adobe, from 1.39.36

Transcripts 10, 11 and 12 contain announcements by the researcher. This is not a complete list of all the announcements (for example there is one at 1.06.42 in the Adobe video).

The announcements in transcripts 10 and 12 are made during pauses in the conversation. These announcements are not said on the dot at which there are *n* minutes remaining, but are made at times at which the participants' conversation will not be interrupted. This timing of an announcement by the researcher relates both to what can be heard and seen, so in transcript 10 there is a lapse in conversation accompanied by a moving back from the whiteboard (line 10.6), and in transcript 12 there is a decision to erase something followed this action (lines 12.1 & 12.2). The announcement in transcript 10 is timed in a similar way (pause at line 11.6), but R and M speak at the same time (line 11.7 and 11.8). R abandons what he is saying, and M continues speaking until he gets to the end of his utterance, to what Sacks [5] calls the turn relevant position. M then turns to face R. This turn to R selects R as the next speaker. Sacks et al [5] explain that conversations rely on people not speaking at the same time, and that when this does happen there are mechanisms for repair. Here that repair is done by one person finishing what he is saying and then selecting the other person to speak. Note how M gets precedent over R here, M is allowed to finish and then he gives R a turn. This is quite the opposite of R being in control of what is happening.

In transcripts 10, 11 and 12, the announcement by R is acknowledged and then it seems as if the participants are about to carry on. In transcript 11 they do carry on but in 10 and 12 there is some subsequent talk between researcher and participants. In transcript 10 there is some laughter and then joking about starting to code (line 10.13). Following this point the participants do in fact switch their activities, by erasing some of what they have written and beginning to focus. This switch was premised by M earlier in transcript 8, but it is only now that it actually happens. This might suggest the researcher's announcements can bring about a switch in activity, but clearly that switch had been on the cards for a while, and the lapse at line 10.6 may have been the point at which it would have occurred anyway. In transcript 12, B asks R a question (lines 12.7 & 12.8). The participants were already erasing when R made the announcement, and now B is checking with R that this is okay.

B. A Question

1	M	((turns to face R)) How much time do we have left?
2	R	Err, about 15 minutes.
3	M	((turns to face board)) So, theres, um, ((writes on
4		board))

Transcript 13: Amberpoint, from 1.37.18

Here, the researcher responds to a question (about time remaining). This is dealt with matter of fact way, and

following the reply M goes on talking at the board. This question appears just after M and F have embarked on a new activity (they decided to draw an ER diagram).

C. *Endings*

1	F	So you can mix and match
2		(8.0) ((M finishes drawing diagram, puts cap on
3		marker, puts it down and moves away from board))
4	M	Its messier than my usual whiteboards ((laughing))
5	F	This is (.) Ji, when Jim is present only Jim does the
6		board, as you see ((laughing)) his handwriting, his
7		ability to use markers is remarkable so no one
8		approaches the board he's very good ((laughs))
10	M?	(You drew a car?) ((laughter))
11	R	Um , so you gotta couple of minutes if you wanna
12		do anything else, but err, [its up to you
13	F	[errr,
14	F	lets see, lets see
15	M	I wanna clean my hands ((laughs))
16	R	you can wash them if you want to first
17	F	Err what I would do is, err summarise the err,
18		unclarities that we have from Professor E
19	M	Un huh

TRANSCRIPT 14: AMBERPOINT, FROM 1.47.19

This is the point at which the Amberpoint participants finish writing at the board. This announcement from the researcher (line 14.11) follows a noticeable switch in the conversation from action to more evaluative and jokey comments aimed by the participants at the researcher. It is treated as an ending by the researcher, but in an open way giving room for the participants to proceed if they want to. At line 14.11 the researcher offers them more time if they want it, and at line 14.16 the researcher offers the opportunity for M to wash his hands. M and F seem very much in control of this being the ending.

In transcript 14, as was seen in transcript 8, the participants begin to talk about what 'ordinarily' or 'always' happens with their using a whiteboard (lines 14.4 to 14.8).

1	B	Its almost just a [**]** or something
2	A	[Yeah]
3	R	So, just another minute or so if you guys want to wrap up
4	B	Alright
5	A	Okay
6		(.)
7	B	And then I guess the cop just…

TRANSCRIPT 15: ADOBE, FROM 1.50.00

Unlike the Amberpoint ending, the researcher tries to bring the Adobe participants to a close. The announcement suggests wrapping up rather than demands it, and the participants carry on with what they were doing.

VII. DISCUSSION

I have now covered most of the ways in which the researcher interacts with the participants. This discussion section will summarise the findings and look at a little more data in order to strengthen some of the points.

A. *Are the Participants Directed?*

This paper began with a concern about the participants' use of the whiteboard; is it something that the participants are directed to use? Emblematic of this was the statement "Whenever you're ready. If you want to write anything just do it on the whiteboard." (transcript 1). But analysis of the videos, through the use of more detailed transcripts relaxes this concern. Firstly, the statement was wrongly transcribed. This is something that is common for early-stage transcripts (ie a first pass by the researcher, or transcripts returned by a professional transcriber) and simply goes to show any transcript should as far as possible be routinely checked against the original. Secondly, the direction to use the whiteboard does actually happen, but should not be taken out of context. The direction is made after a non-directive statement appears to fail, and is then downgraded. The direction is in response to an unexpected question. Also, the direction is found laughable by the participants. Thirdly, only one video contained such a direction in the opening, and yet all three followed a similar pattern in the way the participants get started on the task. Fourthly, the participants have no trouble in working off camera, or with their backs to the camera or working outside the marked boundaries. Fifthly, there is nothing to suggest when and how the board is used is in any way not what the participants would prefer to do, and indeed some of the whiteboard use is explained by the participants with reference to their usual methods of working. Finally, the researcher interjects and responds to questions in quite a minimal way, attempting (not always successfully) to be unobtrusive.

This is not to say all is well with the tasks. Clearly the tasks have been set up to solicit a particular kind of performance. There are also confusions the participants face over what role the camera is and can play in the ways they go about their design. So while I do not think there is anything to show the participants are being made to act in unusual or strange ways, the situation that they find themselves in is inherently unusual and strange. I will come back to questions of 'the situation' in the next section. For now, to help explore the issue that the researchers are working naturally in unusual circumstances, I want to look at researcher-participant interaction another way. I have said that interaction between researcher and participants is rare. What is going on for the rest of the time? Do the participants forget the researcher? I think its more the case that they carry on regardless of the researcher. In a sense they are making effort to act as if he was not there. I will give two illustrations of this from the Amberpoint video.

At one point in the Amberpoint video, the researcher appears in shot (around 00.15.40). Without saying anything he moves in front of the camera and does something on the floor. It seems likely to be something like playing with the power supply. M is at the whiteboard talking, and carries on without

acknowledging the researcher, but when the researcher turns his back to return to his position behind the camera, M steals glances at R and the floor where R was doing. I don't want to read too much in here, but it suggests that the participant is aware of the researcher and yet purposefully acting as if unaware. The researcher is generally ignored, but that ignoring requires certain forms of effort. The researcher stays out of conversation, but the participants also actively ignore him.

As an analogy, at around 1.41.30 M's phone rings. He pauses what he is saying briefly as he rejects the call (and/or switches it off), but then just continues speaking where he left off. The phone is an interruption, but not remarkable for the participants or a source of problems in any way. For most of the task, the participants may well be acting as if the researcher wasn't there, but this does not mean they are acting in any false way, they are acting in a way that ignores and works around anything that is not relevant or intrusive to what they are doing (i.e. a phone). On the other hand, anything that is relevant (eg. the available marker pens, the whiteboard, announcements of time remaining) is adopted and enrolled into their decisions, reasoning and work through the task. Things that may or may not be relevant (eg. the video camera) can become troublesome and their status becomes a topic of concern for all parties.

B. Can Findings from the Videos Generalise?

Never having visited Amberpoint or Adobe, and having little idea who the anonymous participants are, I cannot compare the participants' ordinary work against the tasks captured on camera. But then what would a comparison settle? Work on one day or on one project in these organizations may well differ to that on another (for example depending on what meeting rooms are available, whether a manager is watching, who the customer is and what they want, etc.) So I will approach generalization in a different way, and believe I can comment upon it drawing directly from the videos.

In the last section I touched upon generalisation by saying the participants act in natural ways in unusual circumstances. While what we are seeing is, I argued, *ordinary* design work, it is clearly also *situated* design work. Many of the skills and practices of design seem portable between situations (and of course software design is done in many different places, and many different contexts – and here in these videos is just another context), but the ways in which design methods are implemented here, specifically, are with reference and relevance to this specific situation. Sacks et al [5] say of conversation that it is both context independent and yet context sensitive, and this is where we also arrive with an analysis of design skills. This is not a paradox, but recognises that skills and methods, if they are to justifiably and usefully *be* skills and *be* methods, must be generally applicable but must also always be implemented and exhibited in context relevant ways. Generalisation is therefore an issue for the participants themselves, appearing as a problem of 'how do I apply what I know and find useful to this situation' and in turn 'how does what I'm doing relate to what I know and have found useful'. We have also seen participants concerned with accounting to the researcher how what they are doing exhibits the ordinary. We've seen this manifest in transcripts 8 and 14, where I noted the comments made by the Amberpoint participants about what ordinarily happens. This is not phenomena unique to the videos or to design; as Sacks [7] shows, people continually render things ordinary through talk. To better articulate this, I want to explore it a little further with reference to the Adobe video.

1	A	Yeah, right now we've said ((points at crossroad)),
2		yeah right now we've said, you double click you can
3		control, ((pointing to 'f' at top left of board)) the
4		frequency, of, the ((points at car, then waves finger
5		across)) car creation on that road, but what about
6		the:, how do you, ((circles finger around area of
7		board)) how do you err ((taps board, and then begins
8		to back away from it))
9	B	If we want to
10	A	((continues backing off)) Yeah, it's (never) going to
11		work. Its that's:, that's: ((shakes head))
12	B	I'm wondering with half an hour left if we need to
13		uh, think about how to=cos I think one of the,
14		((reaches to pick sheet up, copied by M1)) goals here
15		is to communicate this to, if if we're playing the
16		roles of architect, how to communicate it to. ((looks
17		at sheet)) so we: ((looking through sheet))
18		(7.0) ((both participants looking through their
19		information sheets))
20	A	So two things, design the interaction, which we're,
21		kind of, have been doing here, design a base, basic
22		structure of the code. Which we've done, here,
23		maybe we should more, formally.
24	B	((reading from sheet)) You should design the basic
25		structure of the code, okay so really the desired
26		outcome right, so we need ta, communicate the
27		interaction UI. But then we need to, design the basic
28		structure of the code that will be used to implement
29		the system.
30		(3.5)
31	B	So I'm thinking, maybe, uhm, (3.5) so, maybe uh
32		(1.0) one one way that I've found effective in
33		communicating, UI interaction is uh, is user stories,
34	A	Okay
35	B	So we could come up with a list of user stories
36		around, uh I as a s:i. Err, uh I as a user of the
37		system, want to uhm, create a, a, a, a road in my
38		simulation, so that I can see traffic flow across it
39	A	Yeah
40	B	And then, come up with, progressively, uh starts
41		with the simplest user story, and progressively add
42		user stories, and then, uh maybe have pictures to
43		illustrate how in our system those user stories will
44		be, achieved.
45	A	Okay
46	B	Uhm, so I think that might be the best, way to
47		communicate interaction design.
48	A	Okay
49	B	Erm
50	A	I like that.
51		(3.5)

52 B Number two:, so maybe once we've done that we can
53 then, erm think about UML diagrams for our class
54 structures, um err trying, I I'm not quite sure how to
55 document or communicate the, control flow.
56 A Yeah
57 B We can, tackle that when we get there.
58 A Okay. So do you want to write user stories maybe
59 uh. We'll use kind of this
60 B Yeah sure
61 A Or
62 B Yeah we can erase it. I'll be right back.

TRANSCRIPT 16, ADOBE

At lines 16.12-17, B discusses communication with reference to "playing the roles of architect". So in what way are the participants acting? It is not as if they are not being themselves during the task, but rather they are orienting to what is called for them to do by the information sheet, and more generally to what is good practice in communicating design. In this transcript they establish what they describe at 15.46 as "the best way to communicate interaction design". This best practice was established after B states what he has, in his experience, found effective (user stories – lines 16.31-33). As with the explanations of photographing the board in transcript 8, the audience of this statement about best practice is as much the other participant as it is the researcher. So here we can see the participants orienting to a general role (system architect) and best practice, but not returning to text-book definitions of practice but to individual, previous experience. Interestingly the participants are figuring out, discussing and learning from each other what best practice might be at particular points in the task, and consequently the best way forward at that point in the task. Generalisation here therefore, is a concern not just for researchers, but features as a practical concern and means for making decisions within the task as it took place.

This form of generalization is described by Randall and Sharrock [4] as a form that is relevant to but repeatedly overlooked by design studies. They say design studies, treat generalization as an analyst's concern (and a job for Sociological or Psychological theory), rather than a practical concern for those doing the work being analysed. They state:

> "Attention to the real-time, in situ composition of courses of social action … does not involve any simplistic opposition between individual idiosyncrasy and collective generality. It is an elementary observation, after all, that individual courses of action are themselves embedded in social organizations, and that the depiction and the conduct of those courses of action is unavoidably [and] reflexively related to that same organization. … General policies, principles, rules, standards, and the like have to be applied in particular circumstances, and it is just as much in satisfaction of these generalities as in departures from them that 'situated' action is observed." ([4] p.191)

VIII. CODA

This paper represents work-in-progress, and will benefit from discussion at the workshop that has been arranged to look at these videos. Three important goals for my participating in the workshop are 1) to improve the transcripts, 2) to get further information about the setup of the tasks and what was going on behind the scenes, and 3) to help better articulate my arguments. There are also a handful of points about method that could be developed in this paper 1) this paper goes some way to undermine the argument that ethnography gathers more natural data than task-based study, 2) this paper could, if necessary comment on its relation to cognitive studies (it – as Lynch [8] puts it – explores cognitive topics without cognition), 3) it may be possible to comment on the state of transcribing in design studies, and 4) it may also be possible to comment more generally about the various ways in which conversation is treated, mistreated, and generally ignored in design studies.

Finally, it has not been my intention to undermine the work of the researchers who produced these videos, or the people who participated in them, and nor does this paper do so. An analysis of anyone's work will reveal things that could have been done better, but as they say – hindsight is 20:20. Distributing these videos for general analysis is both a brave, and very admirable move.

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Results described in this paper are based upon videos and transcripts initially distributed for the 2010 international workshop "Studying Professional Software Design", as partially supported by NSF grant CCF-0845840.".