

Describing surgical gestures: the view from researcher's and surgeon's video recordings

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1. Video shooting as a social accomplishment

During my fieldwork in a surgical department, a general question emerged both from the surgeon's practices and from my own practices as a researcher : how is the intelligibility of the surgical gesture locally produced ? This question is crucial for the surgical activity, which involves a finely tuned coordination of gestures within a team and, in the case I studied, with a board of experts giving advice online at distance. The question is important for the researcher's understanding of the activity as well, and interrogates the relevant registers of her praxeological description. Thus, in this paper, I will focus on various devices producing the intelligibility of action and, first of all, on video recording as a central reflexive tool documenting and at the same time organizing the local order of action. In this perspective, video is neither conceived as a neutral nor transparent technique, but as a social practice by which members using video accomplish a particular accountability of the videotaped action.

The detailed ways in which video recordings are reflexively produced configure the very data of the analysis, shape them, give them a particular orderliness and meaning. It is therefore of fundamental importance to integrate into the analysis the practical ways in which recordings are produced, with their local contingencies and for all practical purposes. These aspects are neither marginal (so that we could possibly ignore them) nor problematic (so that they would "distort" the phenomena at hand) with regard to the use of the resulting materials for analytic purposes. On the contrary, the very ways of producing images give us central insights about the organizational features of the recorded practices themselves, revealing their local order and intelligibility as reflexively produced by their display to and for the camera.

In the case observed, this has important consequences, since the video I collected were made by two kinds of participants : the surgeons and myself as a fieldworker. For the surgeons, as we will see, the production of the video record is deeply tied to the production of their action; it is the very condition which allows the surgical procedure to be performed as seen and collectively defined by the participants. For the researcher, the production of a video record is the condition of its detailed analysis. These records raise the question of the specific accountabilities produced through these different perspectives, of the reflexive production of specific relevances and intelligibilities of the recorded action. Being interested in team work, a further question concerns for me the relevant description of collective action and of collaborative gestures which is made available by these different recordings.

Dealing with shooting videos and seeing images in surgery as practical accomplishments, this paper is an attempt to discuss the technologies by which gestures, embodied conducts and talk-in-interaction (Goodwin, 2000) are both documented and configured through the selection of particular viewpoints and of ways of shooting. Focussing on the way

professionals work with video, it is an attempt to question the kind of use the researcher, and not just the professionals she observes, makes of these images, and the kind of skilled vision she, too has to develop in order to account for these settings.

2. Video as a constitutive dimension of the performed action

More and more contemporary workplaces (Heath & Luff, 2000, Button, 1993) involve the use of images through technologies: that is the case of surveillance cameras in public spaces (Ball, 2000), airport control rooms (Goodwin & Goodwin, 1996; Suchman, 1996), underground station operation rooms (Luff & Heath, 2000; Luff, Heath & Jirotko, 2000), telecommunications control centers (Hindmarsh & Heath, 2000), science laboratories (Lynch, 1985, 1988), technologically-mediated professional environments (Luff & Heath, 1993), or computer-supported virtual spaces (Heath & Hindmarsh, 2000).

Medicine too is a workplace where interaction within and between teams is fundamental both for work to be accomplished and for learning to integrate a community of practice (Atkinson, 1995; Hindmarsh & Pilnick, in press ; Mondada, 2002); moreover, it is a peculiar place where to observe how images are actually used, produced, and exchanged within collaborative activities (Berg, 1997; Hartswood et alii, 2000); more specifically, surgery and endoscopic images used in laparoscopic procedures constitute a perspicuous site to observe for contributing to an approach of seeing *in* action and seeing *as* action (Mondada, 2001, in press).

Laparoscopic surgery is a technique consisting in introducing an endoscopic camera as well as other surgical instruments inside the patient's abdomen through small incisions and ports or "trocars". The endoscopic image is transmitted to monitors disposed in the operating room. The surgical team operates while looking at these screens. In this sense, laparoscopic surgery is an activity where video shooting - as well as the quality of the image, the chosen perspectives, the zooming movements - is a constitutive dimension of the surgical action performed (Mondada, 2003).

Moreover, in the events we will analyze here, a video image is not only transmitted within the operating room but also to a broader audience, looking at the image projected in a amphitheatre within the same hospital, as well as to a group of experts, sitting in front of the audience and looking at the image on smaller video display screens. In this contemporary version of the ancient anatomical theatre, the operation becomes a locus of experimentation for *teleexpertise* – experts being requested to give advice during the procedure – and for *teleteaching* – the audience being composed of medical professionals willing to improve their skills in this new technology. In this context, video image is not only a central dimension of the surgical work, but also a constitutive dimension of a threefold telemedical event constituted by the operation, the demonstration and the expert counselling. The coordination of three kinds of participants, the operating team, the audience of advanced trainees, and the experts, is made possible thanks to the video transmission of what is happening in the operating room - which functions as a "coordination centre" (Suchman, 1993).

There is a third sense in which video is constitutive of the production of the intelligibility of what is going on: the event as transmitted to the audience is recorded for archive purposes by the medical institution; it is also recorded with a separate camera by the researcher. Video shooting is not just a way of doing surgery; it is also a way of documenting surgery and, for the researcher, of doing her inquiry. Video will thus be considered here as a device which configures the very practice it displays and documents, from the multiple perspective of the surgeons and of the researcher.

3. Video shooting as an object of analysis

We are concerned, in this paper, by the fact that video shooting actively produces the peculiar orderliness of the events, gestures, conducts, talk it displays and documents. We are also concerned by the fact that members orient to this feature in the very production of the visual record, accomplishing it in accordance with their practical purposes and in a recipient-designed manner, related to the co-participants, audiences, and co-workers they are engaged with.

Thus this particular setting is an interesting locus of observation for video and visual activities, in many respects. It invites one to take video shootings and other camera activities as a topic of research. Therefore it allows one to develop an analytic stance going beyond the discussions of video as a methodological tool¹ or as a source of technical bias or as a way of producing records made transparent for the description of the events they document. It allows the development of, as Macbeth puts it, a "praxeology of seeing with a camera" (1999, 151) considering shooting as an embodied exercise of inquiry and analysis (1999, 151), as the "work of assembling visible social fields" (1999, 152). Camera movements, technical choices, and perspective making are an integral part of the social activities of interest here, embedded in talk-in-interaction and synchronized with it, therefore mutually elaborating each other, and further articulated with other bodily conducts, gestures, object manipulations, and the material environment. These activities are constitutive of the production of the visibility, recognizability, intelligibility of the phenomena at hand and contribute to define visual perception as a social and situated action. Seeing as a situated activity (Goodwin & Goodwin, 1996), professional visions (Goodwin, 1994) and visibility as a social accomplishment are therefore a central object of this praxeology.

4. Shooting as a professional task: surgeons' and researchers' video productions

This paper deals with the peculiarity of video data, questioning the ways in which data are constituted, within which devices are they assembled and organized, in order to gain a particular accountability. Two ways of collecting video data can be distinguished: the video can either be shot by the researcher or recorded by the participants to the action. In the first case, video is produced within the inquiry as a situated work. In the second case, video is produced for the practical purposes of the participants, here doing surgery and demonstrating the operation. In both cases, video is not a transparent document but an embodied accomplishment, integrating the recording and the analysis of the recorded event. This allows us to question the availability of the phenomena made observable, visible, seeable by the video record: how is this availability locally produced, secured, warranted and by whom?² Video embodies ways of seeing, embedding in the very way in which it is shot, the procedures by which the records assume an intelligibility. In this praxeology of seeing, seeing is not just a situated activity, it is a professional activity involving a "professional vision", the vision of the surgeon and the vision of the researcher.

¹ Although discussions about video as a valuable methodological tool, allowing the observation of human conduct in its natural settings, remain very important because the tool is as yet in its infancy (cf. Heath, 1997, Lomax & Casey, 1998; Jordan & Henderson, 1995).

² This focus on the researcher is neither an argument for a relativistic stance, nor for complacent self-observation, but reveals some fundamental properties of the local order of the researched phenomena (cf. Lomax & Casey, 1998).

In order to describe the specific accountability of both records, we will analyze two views on the same event taking place in the operating room, one shot by the researcher, and the other one by the surgical team. Our aim is not to establish an ironical confrontation between them, but to topicalize the question of the production of video data and of the possibly multiple perspectives and practical purposes embodied in this very production³. Thus, the analysis concerns the kind of accountability of the surgical procedure which is specifically accomplished through these two records: it questions the way in which video recording reflexively produces a specific relevance and intelligibility of the performed action.

5. Analyzing researcher's video records

The moment observed here is a routine activity: the surgeon has to clean the optics before to continue the dissection he is performing. This implies taking off the endoscopic camera from the patient's body, cleaning it, reintroducing it and returning to the surgical procedure, which is explained for the audience watching the operation at distance⁴.

Excerpt 1 - the researcher's shot (TC28091-OR1 46')

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1 MAI      ((@handles the @optic; introduces the optic @within the trocar))
   cam      @general view@zooms @stays close--->
2 MAI      °°ça° va pas°°@*
           it doesn't work
           *takes off the optic--->
   cam      --->@zooms quickly back@
3          @(3s)*
   MAI      ---->*
   cam      @general view, comprising the screen-->
4 MAI      *°°okay°°@
           *reintroduces the optic, looks at the screen*
   cam      ----->@
5 MAI      *@holds the hook*
   N        *@puts away the pliers she had prepared; helps cleaning the hook*
   cam      @zooms and stays close--->
6 MAI      you see how important it is to have a very clean optic/
7          *(3s)*
   N        *handles the pliers*
8          *(2s)*
   ASS      *takes and holds the optic*
9 MAI      *how easier we can i#de@ntify:/* . the anatomical landmarks/*#
           *takes the pliers from N * introduces the pliers *
   cam      ----->@zooms back; general view ---->
   im       #im1 im2#
10 X       <beep . beep . beep . beep . beep . beep . beep . beep (19s)>
11 MAI     so here again i deal/ . with the liver/ . with
12         the [triangular ligament/ .]. h and: as mo:re my liver &
13 X       [b e e p ]
14         &will be retraced up[wards/ . as easier/ ]. will [be the&
15 X       [b e e p ] [b e
16         &identification o]f the vascular landmark of the gland\
17 X       e p ]
18         beep@

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³ As Lomax & Casey remark, "there is a shortage of material which discusses the practical aspects of 'doing videoing' and the implications of this process for the production of data" (1998, 1.2). See however Relieu (1999, 71ff) on collecting video data about blind people walking in the urban space.

⁴ Transcription conventions are explicitated at the end of this paper; the way of transcribing adopted here chooses to figure the camera movements and the screen displays in separate lines, in order to make available these phenomena in their detailed temporal relation both to activity description and to talk transcript.

cam -->©



im 1



im 2

This excerpt is recorded by the researcher from the feet of the patient: it is a general view, with some zooms on the operating theatre, narrowing the perspective onto the exchange of instruments between the nurse, the two assistants and the chief surgeon. These zoom movements in and out materialize the work of inquiry as it unfolds in real time; they show how the camera contingently looks for, finds or loses a frame for documenting what happens⁵. Moreover, zooms are a procedure for selecting and highlighting a particular area of the surgical theatre made relevant for the work observed (and *as* it is observed). For instance, zooms out (li 1, li 9) are coordinated with Dr. Maires's gestures (taking off or introducing various instruments) and his gaze. This gaze, particularly, redefines the "contextual configuration" (Goodwin, 2000) of the ongoing action, by switching his attention from the instruments located on the surface of the patient's body (im. 1) to the monitor in front of him displaying the patient's anatomy (im. 2). Thus, zooming out accompanies and performs a "contextual re-configuration", the changing definition of the relevant space of action.

Zooms highlight the coordination of the hand work of the team, they show the team in action. For instance, at l. 5, the camera zooms in, and comes back only at l. 9, just prior to the introduction of the plier. In the meanwhile, Maire has already begun (6) to comment on the image quality, which is consequential to the fact that he just cleaned the optics, found a video perspective and delegated the endoscopic camera to the assistant. The situated work of inquiry thus documents and focusses on the collaborative work of the team, the complex intertwining of its members' hands and arms, the preparatory work of assistants and nurses whereas the surgeon's attention and talk is already focussed on the endoscopic image. Different streams of action are thus revealed, with different perspectives, relevances and timings.

6. Analyzing members' video records

These actions are made accountable in a very different way in the second shooting, produced by the surgical team and by two technicians located in a control room, mixing in real time two

⁵ These movements can be analyzed in a very similar way than Macbeth's (1999, 155) description of the discovery and the shooting of a fight in progress by Tim Asch in a Yanomamo village. Macbeth shows very well how the shot can be dealt with as a "temporal course of action" (1999, 140), where the viewfinder finds, constitutes, and looks for the order of the event during its unfolding, exhibiting his endogenous intelligibility, the way in which a coherence and a continuity is locally assembled. This camera perspective or view is characterized by its "discovering" in situ the shot phenomena, i.e. by the way in which it deals with and integrates the contingences and practical circumstances of the shooting, marked by the changes of framing, sudden zooms, and chaotic camera movements. The way of shooting reveals the way of searching for and finding the local order - sometimes the way in which the cameraman learns to look at it. Cf. also Relieu (1999) who shows how shooting necessitates an anticipation that presupposes an analysis of the course of action.

images, the endoscopic view (images 4, 5, 6) and the external view (image 3). The former is produced by the optical device inserted in the patient's body; the latter by a fixed camera in the ceiling⁶ of the surgical room.

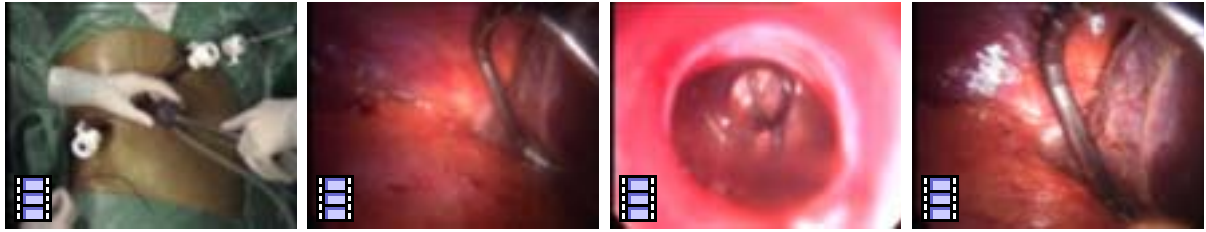
Excerpt 2 - the surgeons' shot (TC28091-D1 33')

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1 MAI Δ((dissecting with the hook))
  scr Δinternal view ----->
2 MAI *(can i see; clean) the optic/*
  *hook and pliers are taken out*Δ
  scr ----->Δ
3 ©(1s)©
  cam ©endoscopic camera comes out©
4 MAI Δhh ((clears throat)) hhh
  scr Δexternal view ----->
5 (6s)
6 MAI °xxx° -kay/#
  im #im 3
7 *(6s)*
  MAI *reintroduces the optic*
8 MAI °okay\ . voi:là\Δ# . non ça va *pas/#
  here it is . no that doesn't work
  *takes out the endoscopic camera -->
  scr ext.view ---->Δ internal view ---->
  im #im 4 #im 5
9 MAI tiens ça*Δ s'(il) te plaît°
  hold that please
  ----->*
  scr int.v.-->Δ external view -->
10 (2s)
11 MAI °again°#
  im #im 6
12 (9,5 s) Δ
  scr ext. v.-->Δ
13 MAI Δ°okay/ . voilà\ tu m'écartes ça comme ça/° h xx you see how
  here it is\ you separate that for me like this/
  scr Δinternal view ----->
14 important it is:/ to have a very clean optic/ .. <hold the
15 camera please/ ((faster))> . how easier we can identify: . the
16 anatomical landmarks/
17 (2,5s)
18 MAI ((introduces the pliers and then the hook))
19 *(19s)
  MAI *dissects --->
20 MAI so here again i deal/ . with the liver/ . with the
21 triangular ligament/ .. h and: as mo:re my liver will be
22 retraced upwards/ . as easier/ . will be the identification
23 of the vascular landmark of the gland\Δ*
  scr int. v. ----->Δ
  diss. ----->*

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⁶ Cf. Lebaron & Streeck on the recording done by a surveillance camera mounted in the ceiling and the effects produced by its aerial perspective - and the way in which the analysis is contingent upon the embodied perspective of the camera (1997, 23-4). The camera is here considered as "a very component of the institutional process that it records" (1997, 24).



im 3

im 4

im 5

im 6

In this excerpt, the endoscopic view is predominant - as generally in the records produced by the surgical institution. This defines in a specific way the working environment that is dealt with as relevant by the medical team and the participants, prioritizing the main focus of the surgeon's gaze over the preparatory work done by technicians, assistants and nurses.

This choice has a series of consequences. For example, in the researcher's view the nurse's work is in the frontstage, displaying her skilled activity of preparing the right instruments for the surgeon and of giving them to him at the right moment. This view is a way of circumscribing the surgical team, composed by a nurse, two assistants, and the chief surgeon - although excluding other professionals such as the anaesthetics team for example. In the surgeons' view, centred on the anatomy, the nurse is invisible, and the various team members are present only by means of the instruments they hold: they are metonymically present by their skilled gestures of holding the camera, retracting the liver, dissecting. The operation appears here as a collective endeavour in another way, namely in the distributed and finely coordinated handling of the instruments.

The collective space of action is shaped very differently as it is made available by the audio track as well. The first view, taken with the camera microphone, shows a very noisy environment, with unrecognizable voices, with various alarms sounding. This is certainly a central feature of the busy life of the workplace. It has two consequences: on the one hand, the instructions given by Maire in a low voice and in French to his team are not audible; only another talking activity, the explanation, oriented, in English, to a different recipient, the distant audience, is understandable. On the other hand, one other peculiar sound is in the foreground of the first excerpt: the beeping (exc. 1, l. 11ff). This beep is the sound signal of the activation of the dissecting hook manipulated by the surgeon. Excerpt 1, line 8, we see that this beeping suspends the explanatory talk for a long time, more than 19 seconds, while Maire concentrates on the operation more than on the demonstration.

The second view, recorded by a microphone placed on the operating surgeon, displays a different sound environment, very quiet, with the chief surgeon's clear voice in the foreground, even when he speaks in a lower voice. Teamwork is made available in the switches between English and French, as well as from a louder voice and a lower voice – their distribution being related to the design of a particular participation space, distinguishing between the international audience and the local team (Mondada, 2001). The suspension of talk during the hook dissection is observable in the long pause (19); after it, dissection continues in overlap with the explanation. Hook dissection and explanation are two intertwined but distinct activities, which can either overlap or alternate. The way in which they are articulated accomplish the operation as a more or less problematic, risky, attention-demanding task, as a routine performed in the background of talk or as an activity absorbing the attention of the team, suspending the talk. Ultimately, it is the logic of the surgical action which shapes the organization of the ongoing turn.

Interestingly, in excerpt 2, the comment precedent to the hook dissection (13-16) is entirely devoted to the image quality and its consequences on the accomplishment of the visibility of the anatomy. But the importance of the optic is not just *said*, it is *performed*: By switching

between the internal and the external view, by repeatedly inserting (im. 3) and taking off (im. 5) the optic, Maire highlights the contrasting quality of different images (im. 4, im. 6), and thus displays the relevance of an adequate optic for going on with the interrupted procedure. In this way, the relevance of camera movement, position, and quality, as constitutive features of the operation, demanding a skilled manipulation and an interactive coordination (as showed by the instruction to the assistant, exc. 2, l. 14-15), is put at the centre of the participants' attention.

Camera movements are not only a team's practical concern. They produce a common focus of attention for the audience, the experts, and the team. This common focus defines the operating theatre space, its centre and periphery; it organizes the visibility of the landmarks, it produces the very possibility to "see in common" and to act collectively. In this excerpt, "seeing in common" is furthermore accomplished by the explanation which is first addressed to the audience, ex. 2, l. 13, "you see" referring to the optics, and then l. 15 with the pronoun "we" in "we can identify the anatomical landmarks" creating a common participation framework where seeing is taken-for-granted (there are no pointings here, contrary to other sequences) thus considering seeing the landmark as a skill of all the participants, making them belong to this community of practice, defined by its "professional vision".

Washing the optics is an action displayed with different relevances in both the researcher's and the surgeon's views. The discontinuity it provokes in the surgical procedure is made visible in the first view by an increased activity of the hands and arms crossing each other while exchanging the instruments; in the second one it is incarnated by the switch between the internal and the external view, implying a radical change of the image on the action.

These views provide for an accountability of the ongoing action which is neither contradictory nor identical⁷: they embody different perspectives, different professional visions (Goodwin, 1994) - one focussed on the collaborative work of the team, and his alignment with the patient's body and the various technological devices; the other focussed on achieving the visibility of the anatomy, through a good disposition of the operative field, an adequate choice of the optics, skilled camera positions and movements, allowing both an exposure of the field necessary to the operation and a display of the field necessary for its demonstration.

My analysis attempted to highlight the different, situated, reflexive structuring organization of these two views, by presenting two different transcripts, and by developing two different analysis. In this respect, this analytical exercise aims at showing that surgical gestures - as well as embodied conduct and talk-in-interaction in general - are not transparently available thanks to video technology : their very analysis depends from practical decisions, technical skills and equipments, and local difficulties. In return, these aspects are not considered - within an ideal dream of transparency - as limitations for the analysis; instead, they are considered as displaying - and thus as making available for further reflexive analysis - constitutive features of video shooting - either for professional or for scientific purposes - which are constitutive features of the very setting too.

Transcript conventions

[overlapping
. ..	pauses shorter than 1 second
(2s)	length of pauses in seconds
xxx	incomprehensible segment
/ \	rising/falling intonation

⁷ One could propose to combine both views in order to have a more global view of the phenomena: this strategy poses another series of problems, arising when one deals with various shootings as with homogenous perspectives able to be combinable and capitalizable.

exTRA accentuated segment
 : vowel lengthening
 (see) uncertain transcription
 (see;clear) multitranscription
 par- truncation of a word
 ((laugh)) comments
 < > delimitation of phenomena noted in (())
 & continuation of current turn
 = no gap between turns (latching)
 h aspiration
 °okay° low voice
 © © indicate the beginning and end of the camera movements (cam in the margins)
 Δ Δ indicate the beginning and end of a particular kind of screen (internal or external) (scr in the margins)
 * * indicate the beginning and end of a participant's activities
 #im 5 indicates the exact location of the picture within the transcript
English indicative translation of French aims just to guide the reader along the french transcript

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