Social Semiotics: Theorising Meaning Making

Jeff Bezemer

Manuscript submitted for in Nestel D, Greedy G (eds). *Clinical Education for the Health Professions: Theory and Practice.* Springer.

Key words
Social Semiotics, Learning, Clinical Education, Sign making, Communication, Multimodality

Overview

This chapter outlines a theoretical framework to account for practices of meaning making in health care, and sets out an agenda for clinical educational research. It shows how meaning making pervades all aspects of clinical work, and how it can be explored and made explicit within a framework derived from social semiotics. The chapter illustrates how the framework produces accounts of the ways in which clinicians make sense of and interact with the world, in situations where they give, review, and imagine care. It explores how clinicians interpret, and communicate through, human bodies, tools, and technologies, giving meaning to, and expressing meaning through, distinct material forms. In so doing the chapter begins to render visible the semiotic skills that clinicians develop to prepare for, provide, and evaluate clinical care.

Introduction

Clinicians make signs all the time. They look for, interpret, and/or produce, such varied formations as the yellowness of a human skin, the depth of a surgical stitch, the extent of a hand movement, the pitch contour, syntax and lexical items of spoken utterances, the waveform on a patient monitor, and the contrasts of entities rendered visible on an CT scan. This chapter explores how clinicians (learn to) recognize these forms as meaningful entities, i.e. as *signs*.

The chapter makes three contributions. First, it develops an encompassing model for understanding practices of meaning making that have hitherto been dealt with by separate branches of semiotics. Medical semiotics has been claimed to be one of the oldest branches of semiotics (Sebeok 1976); it explores how clinicians and patients interpret and communicate about the patient body. Social semiotics (Hodge & Kress 1988) developed from critical linguistics, and has to date engaged little with clinical work. Where it has, its focus was on communication and learning, rather than on meaning making more broadly (cf. Bezemer et al. 2012). The framework outlined in this chapter aims to encompass meaning making across all clinical work, providing theoretical means of recognizing, documenting and explaining how clinicians interpret the world around them, express themselves, and communicate with others.

Second, the chapter advances social semiotics by developing its foundational concepts to fit the distinct and multifaceted character of meaning making in the clinical world. Traditional

semiotics has brought forth conceptual models of the basic 'building bloc' for making meaning, the sign, and classifications of different types of signs (Saussure 1916; Peirce 1931). *Social* semiotics has advanced semiotic theory through empirical research, and refocused attention on the sign maker in the material world and the social mechanisms that shape meaning making. It has explored principles of and resources for, meaning making in public media, such as magazines, films, and social media; and in traditional pedagogic spaces, such as textbooks and classrooms (van Leeuwen 2005). The chapter will show that clinical education raises new questions for social semiotics, e.g. about the body as a resource and target for meaning making.

Third, the chapter draws from original qualitative data sets from research on clinical practice and clinical education in hospitals in the UK, along with examples from previously published research. They cover different types of texts and activities that involve a range of different technologies. Main data sources include video recordings of clinical work in the operating theatre (Bezemer 2015) and in-situ simulations of resuscitation events in a Paediatric Intensive Care Unit. These materials were explored through detailed transcription, annotation and micro-analysis (Bezemer et al. 2017).

Looking across these data sets, the chapter explores two kinds of semiotic work: interpretation and expression. The focal setting for exploring these phenomena is the clinical environment, where clinical work 'gets done'. Following this, the chapter considers types of activities and texts aimed at reviewing and projecting clinical work, respectively. The chapter opens with an outline of basic theoretical premises of sign making, and concludes with a discussion of implications of the framework for learning and clinical education.

Sign making

The sign is the basic unit of meaning making. Eco (1976), following Peirce, defines it as "everything that, on the grounds of a previously established social convention, can be taken as something standing for something else" (p. 16). The model of the sign adopted in this chapter originates from de Saussure (1916), and has been adapted by Kress (2010) to refer to conjunctions of meaning and a material form. *Social* semiotics is concerned with the ways in which people recognize (selections of) forms and invest them with meaning. Inscriptions, sounds, vibrations, shapes, shades and movements are all examples of forms ('signifiers') that can come to stand for something ('signifieds') to somebody.

Social semiotics draws on four basic premises about sign making. The first premise is that sign makers draw on *regularities* and *conventions* developed from social histories. Over time, some forms have come to be associated with particular meanings among a social network, e.g. medical students, radiologists, theatre nurses, patients with Parkinson disease. The regularities are the result of social interactions. At the same time, they enable members of the network to communicate: they are generative, allowing people to guess, with some degree of plausibility, what others mean by, e.g., a gesture, or word; or how they might interpret 'natural' forms such as the yellowness of a patient's skin. Social semiotics

sets out to identify such regularities in sign making that a given network has developed over time in response to their social needs.

The second premise is that sign makers recognize *configurations* of and *relations* between different forms. For example, clinicians attach meaning to a collection of noticeable forms on a patient body. Makers and readers of a textbook make connections between (selections of) graphic elements that appear on the page: orthographic elements, diagrammatic elements, photographic elements, and so on. Parties to face-to-face encounters also make connections between forms of various kinds: a co-occurring string of sounds and hand movement may be recognized as a speech-gesture-whole, carrying meaning that is greater than and different to the sum of its individual parts. Social semiotics aims to identify the principles underpinning these combinatory operations.

The third premise is that sign making is always *particular* to a sign maker and a situation. That means that even if a network of sign makers can draw on a long history of social interaction and strongly developed shared understandings, their sign making is never entirely predictable. Shared understandings may have been made explicit in grammars, dictionaries, textbooks, and so on, yet these 'code books' do not account for the situated semiotic work of an individual sign maker. Sign makers use regularities in sign making as resources, rather than as prescriptions, in response to dynamic, unpredictable, emergent situations. The signs that people make, even when orienting to what appears to be the 'same' form, will vary depending on their prior professional/life experiences. Social semiotics sets out to identify how sign makers through each new semiotic act transform meaning potentials of forms, thus expanding possibilities for interpretation and expression (Kress 2010). The notion of *transformation* acknowledges that sign makers do not 'copy', or 'acquire', somehow straightforwardly 'internalizing' or 'absorbing' signs made by others (Bezemer & Kress 2016).

The fourth premise is that *semiotic effort* is gradual: the work that sign makers put into interpretation and expression varies. Their commitment is not evenly spread; some signifiers are given more attention than others. Engaging with Twitter, for example, 'reading' might mean anything from scrolling down five tweets per second to identifying tweets that might contain relevant information to skim-reading a text of 180 words and scrutinizing a CT scan of an atypical case that was posted. Equally, a clinician in conversation with a patient making a drawing to locate a disease will focus their efforts on those elements that they want to highlight and deem of particular relevance to the communication. Social semiotics aims to identify the principles of selection and distribution of effort. This includes a concern with the means that designers have at their disposal to shape the semiotic efforts of others.

Doing clinical work

Interpretation

To anyone entering a clinical environment, there is a wealth of 'stuff' to attend to and interpret. As sign makers, clinicians and patients engage selectively with that environment; they recognize some forms and subject some of them to interpretation. By selectively recognizing and giving meaning to forms, they build a subjective reality, their 'Umwelt' (J. von Uexküll 1936/1992).

Sign makers might recognize forms in any materiality. Clinicians are particularly likely to recognize forms on artefacts (artefactual forms) and bodies (corporeal forms). Artefactual forms are, for example, forms recognized on buildings, tools, documents and other relatively durable structures designed by other human agents, who may or may not be co-present. Corporeal forms are forms recognized on or in the bodies of other human actors who are co-present, physically or virtually.

Sign makers can attribute social functions to forms they recognize. First, artefactual and corporeal forms may be interpreted as having been produced to communicate, i.e. in deliberate acts of expression by another semiotic agent who is addressing others, for example, using speech, gesture, or image. Second, they may be interpreted as having been produced to accomplish practical tasks. For example, clothing, tools, and body movements may be taken to have been produced for this purpose.

Any form can be subjected to interpretation, i.e. be made into a sign, including forms produced for practical purposes. For example, scrubs can be read as a sign of health and safety regulations, and a body movement as a sign of what someone is going to do next; perhaps even as signs of what the interpreter is expected to do to facilitate the completion of the task. For example, an ICU nurse might establish when and how to assist an anaesthetic trainee preparing for intubation on the basis of interpretation of the anaesthetist's bodily actions. A consultant anaesthetist might establish when to provide what instructions or when to take over from the trainee on the same basis. A team leader might interpret repeated attempts to intubate as signs of trouble, and propose to the member giving chest compressions to stop for a moment. Thus the communicative and practical functions of forms are not always separable, all the more so when teams work on the tacit agreement that a particular body movement should be taken as instruction, as is often the case in clinical settings.

A special class of corporeal forms that clinicians attend to are what they call 'signs and symptoms'. In Western medicine, 'symptoms' refer to signs made by the patient, i.e. certain sensations experienced by the patient are described by them as 'dizziness', or 'nausea'. 'Signs' are signs made by a clinician, who observes forms directly, such as skin colour, or, indirectly, using tools such as a thermometer. These forms are often thought of as 'natural signs' that have not been produced for communicative (or indeed practical) purposes. Alternatively, living organisms may be treated as semiotic agents that communicate with each other, their host (the patient), and their environment (e.g. the clinician). In that

perspective, the patient body becomes “an inextricably complex *text*” (Sebeok 1985, p. 2, my emphasis).

Social semiotics is particularly interested in how clinicians and patients develop semiotic resources to *read* and communicate about this ‘body text’ in their respective social networks. The underlying disposition of clinicians that shapes this ‘body text reading’ might be described as a ‘professional vision’ (Goodwin 1994), or more specifically, as the ‘clinical gaze’ (Foucault 1963/2003). Of interest are “the terms […] that physicists […] have worked out to transpose sign processes of their fields of phenomena into the human language and that can be interpreted as translations (Jakobson 1971)” (T. von Uexküll 1986, p. 209). These meaning making practices underpin all clinical action and all expression in response to engagement with a patient body. It includes practices of seeing, touching and hearing through which the clinician comes to recognize forms as instances (‘tokens’) of categories (‘types’) developed and shared within the clinical community, and an expressive repertoire that enables them to represent and communicate about these forms.

Technologies assist health professionals by mediating sensory experiences, e.g. a stethoscope amplifying sound, or a laparoscopic monitor magnifying the view of the camera. Other technologies, such as the patient monitor, help *translate* sensory experiences. They have taken over some of the sensory and semiotic work from clinicians, automatically rendering measurements (‘sensations’) into numerical values (e.g. thermometer, or pulse reader) or graphic representations (e.g. imaging). New technologies are taking over more and different kinds of semiotic work. For example, computer vision supports the detection of breast cancer, thus shaping a judgement that was traditionally made by radiologists. These changes are having profound effects, and warrant further social semiotic research.

Interpretation is shaped by many social factors, including training, experience, and role. Clinicians recognize different forms and attach different meanings to forms they recognize, whether on a patient, a colleague, or an artefact such as a CT scan (efforts to minimize these differences are discussed in the following section). The same applies to processes of selection for interpretation from a wider field. Take the Medical Fellow (a post at resident level) in Figure 1. When he arrived by the patient’s bedside, he looked for the Foundation Doctor (doctor within first two years of graduation from medical school) who paged him. When she started presenting the case (“Hi, this Katie, she’s just come from theatre…”), she changed her gaze in accordance with the information she provides about the patient. When she said that Katie is hypotensive and tachycardic she looked at the patient monitor, thus drawing attention to the evidence of that claim. When she referred to a nurse who was preparing bolus, she looked over to her. All the while, the junior doctor followed her gaze. The Foundation Doctor’s gaze thus shaped the Medical Fellow’s engagement with this clinical environment. Some minutes later, the consultant (attending physician) arrived, called in by the Medical Fellow. Unlike him, she scanned the environment as she arrived, displaying orientation to the patient, infusion pump, patient monitor, and some members of the team, respectively. Their differing approaches to the environment are illustrated in Figures 1 and 2.

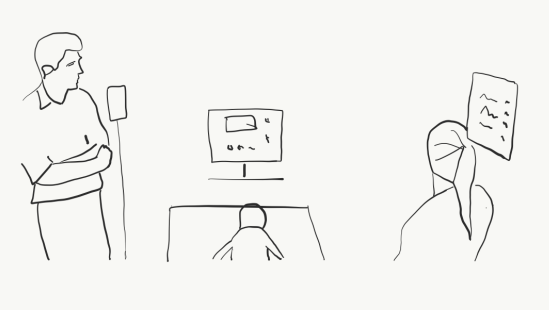


Figure 1: Medical Fellow (left) with Foundation Doctor (right)

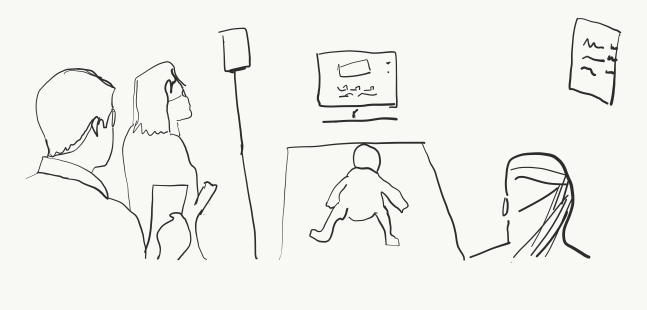


Figure 2: Medical Fellow (left), Consultant (middle) and Foundation Doctor (right)

These patterns have been explored in more detail using eye tracking technology. For example, Law et al. (2018) found that members of resuscitation teams direct 35 per cent of their fixations on the patient, and 26 per cent on peripheral displays. In another study, inexperienced anaesthetists were found to focus more on the patient monitor when a critical incident happened during induction, while spending less time engaging with manual tasks; the experienced anaesthetist's time spent looking at the monitor did not change, and they spent more time on manual tasks (Schulz et al. 2011).

Expression

Modes

Some of the artefactual and corporeal forms produced for communicative purposes are modal. Modes are conventionalised means of communicating meaning that are organised around a particular set of material resources (artefactual or corporeal) and means of and tools for manipulating these resources. Speech, writing, gesture and image are examples of modes. Modes serve as semiotic resources for sign makers who, with each communicative act, transform them; it is the sign maker that 'fixes' meaning, not the modes.

Modes typically co-occur. For instance, in the ICU, when staff call in colleagues, as in Figures 1-2, much of what is communicated involves speech. Writing is used by the scribe to record how the event unfolds. The patient monitor translates vital signs in several different modes of communication: numbers, diagrams, writing, and sound tunes. Gesture also plays a role, as in the case depicted in Figure 3.

Figure 3: Gesture in the ICU

The figure shows the Foundation Doctor making a 'squeezing' hand movement, thus simulating the movements involved in 'bagging' for ventilation, a common manual operation in this setting. The gesture indexes the object that the operation is typically performed on: the breathing apparatus. And the gesture stands for a command. By reaching out her left arm, she 'places' the gesture in the direction of the nurse: she addresses her. Timing–the gesture is made just after the crash call–and the proximity of the nurse relative to the object to be pulled out, provide further contextual grounding for the interpretation of the gesture.

Modes are typically combined to make signs with simultaneously produced forms. For instance, a surgical educator might identify a specific object in a field through pointing, while describing it to a medical student in medical terms (e.g., "That's the liver"). In this case, a gesture is combined with a spoken utterance; they are co-produced, and semiotically inter-related. Without either one or the other, the joint identification of a relevant form in a complex, 'messy' field would have been difficult to achieve.

A choice of modes is generally motivated by an assessment of the distinct semiotic potential of modes. For example, the Foundation Doctor's choice of gesture, as opposed to speech, might be explained by a combination of the following factors: (1) talk was already going on between the Consultant and the Medical Fellow; (2) what had to be communicated was expressible in gesture; (3) given their relative position, the gesture could be performed within sight of the nurse.

As well as communicative modes that are also used in everyday life, such as speech, gesture and image, clinicians have developed modes that are organized around certain operations on the patient body. To them, the patient body is more than an object on or in which forms are read. It is also a mouldable object through which they can communicate with others: through intervention they leave traces, which might be read by colleagues, trainees, and the patient. Learning to read these traces is a major part of the clinical experience. For example, a medical student learns to recognize the possibilities for manipulating stitching material and human tissue (using tools), while at the same time learning what the resulting forms stand for in the medical world. Some stitching may signify a 'rough and ready' job, other stitching signifies strength, care, insight in suturing material, and so on. Aesthetics come

into this, as evidenced by the frequent use of evaluative adjectives, such as 'nice'. Knowing that their work will be read, assessed even, gives communicative potential to the act of stitching: it becomes a means for the trainee to communicate with the assessor. Clinicians frequently encounter traces of interventional work from colleagues on and in the bodies of patients, which they subject to interpretation. In other areas, such as reconstructive and plastic surgery, the work is also visible to and judged by the patient.

As with all modes, the mouldable body can be classified in terms of the material 'stuff' it is made up of –different types of human tissue, prosthetic material- and their basic properties. These properties might include, for example, durability, elasticity, weight, and so on. They have an effect on possibilities for manipulation, and thus on possibilities for sign making: they put limits on the forms that can be obtained in a given materiality, *and* they provide dimensions for variation. Material variation produces potential for expression. As sign makers gain experience in fashioning new forms out of certain material resources they expand their possibilities for expression. Through interaction in social networks people working with the same material resources will develop understandings of variations in form, and of the ways in which other members of the network have exploited these possibilities for making meaning. In other words, the capacity to manipulate material resources comes with a recognition of certain regularities in meaning-form connections. It is for this reason that surgery is often described as an art and craft, and compared to, e.g., the work of tailors, potters, and so on (cf. Schlegel & Kneebone 2018).

Directing others

Each mode offers distinct possibilities to educators, team leaders, and others to guide engagement and interaction within the clinical environment. For instance, the attention of a clinician can be shaped through spatial arrangement of equipment, tools, technologies, and people in a room, and through the arrangement of graphic elements on a patient monitor, a page from a textbook, or packaging. What the designers want their addressees to differentiate between can be given different colours; what needs to be highlighted can be given a more central place or a bigger space than other elements, and so on. New 3D-image techniques and technologies projecting pre-designed visual maps onto patient bodies take guidance through graphics to a new level, helping interventional clinicians safely navigate anatomical structures.

In the absence of such advanced technologies gaze and gesture can be used to direct someone's attention. Figure 3 already showed how a Foundation Doctor guides through gaze. Pointing gestures are frequently made when clinicians jointly inspect parts of a patient's body, directly, or aided by optical technologies. Distinct possibilities for shaping engagement are also offered by *contiguous gesture*, which can be used by a supervisor to, e.g., position the hand of a trainee, as for example when a retractor needs re-placing (Mondada 2014). Speech, too, provides means to draw attention and provide guidance.

Each of these modes offers distinct possibilities for shaping engagement. Take the command in operating theatres. In speech, a surgeon can choose a (elliptic) imperative ("Scalpel!"), an interrogative ("Can I have the scalpel please?"), or a declarative ("I need a scalpel"). Each

grammatical form projects a different social relation, form of politeness, and/or sense of urgency. We might compare this to commands in gesture. How might a surgeon make a command by holding up their hand, and what might be the effects? A hand gesture always involves a stroke, its main movement. After the stroke the hand is sometimes held in position for some time before the hand is withdrawn again (Kendon 2004). The speed of the stroke, the place where it is held in position, subsequent 'grabbing' movements of the tips of fingers, and so on, all offer means of projecting social relations, forms of politeness, and a sense of urgency. By combining these forms with facial expressions, the possibilities for expression are multiplied: a hand held up while turning one's gaze in the direction of the addressee and displaying a smile means differently relative to the same gesture produced without a smile. We could extend this to the patient monitor interface: how do its graphics and sound tunes vary, and how has this variation been used to design different types of commands for action? That is another question for further semiotic research.

Developing shared understandings

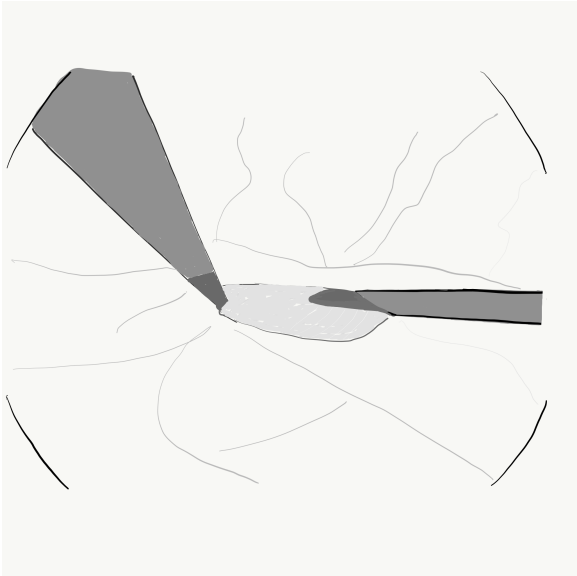
Crucially, in a clinical environment, modes provide means for *expressing* understandings of the patient's condition. This includes possibilities for communicating sensory experiences. As clinicians inspect, palpate, auscultate, they make meaning, they attach meaning to corporeal forms. Speech, writing, drawing, and other modes of communication are available to articulate the meanings made, enabling them to develop joint accounts of the patient and *calibrate* (Goodwin 2018) their understandings.

A number of different factors prompt deliberate efforts at developing shared understandings through communication. First, asymmetries in knowledge about a patient. For example, when the consultant in Figure 2 arrived on the scene, the Medical Fellow told her that the patient has just come back a few hours ago from having had TGA (Transposition of the Great Arteries) surgery. The Foundation Doctor then adds that she's lost saturation. The Consultant, looking at the patient monitor then remarked that she is hypotensive and started a recount of their joint observations ("So she's two hours post-op…"). Second, clinicians experiencing semiotic challenges in, e.g., interpreting corporeal forms. For example, in one laparoscopic cholecystectomy, the operating surgeon started the following dialogue with two experienced colleagues who were co-present:

SURG1: Look at that
SURG2: It's, it's weird. I would go into that space
SURG1: That might be the artery and that might be the duct. Can you see this anatomy.
SURG2: Just twisted
SURG3: Yeah, it's really weird, it's twisting round each other
SURG1: Yeah. and what that's doing is it's, torting the Hartmann's pouch over

Speech, along with gesture, is used here to express uncertainty and hypotheses about what-is-what in this patient and how it compares to 'normal' anatomy; and about what might be the best next action.

Third, asymmetries in experience prompt calibration efforts. The example in Figure 4 features a surgical trainee is operating under the supervision of a consultant. The trainee is separating tissue that attaches the colon to the abdominal wall. The consultant explains that "this bit is best done with your left hand closed […] So that left hand kind of closed into the space and then like sweeping movements leftwards." A few minutes later, he takes over and demonstrates that movement. This is where the teaching episode in Figure 4 begins.



"So once we get into that position this is the movement that I was saying. […] Now can I just get a bit of more traction higher up there. So Simon what I need is counter-traction. This is something Dave that you must get me to do when I'm giving back to you in a minute. To actually just get me moving upwards and opposite you the entire time. So you can hold that one there. You can see that that little flat bit of tissue now becomes a cul-de-sac. And that cul-de-sac is kind of what I'm always aiming to do. Because then I can put that left hand instrument in closed. And with the right hand just kind of thin it out."

Figure 4: Surgical demonstration

The supervisor, now operating, demonstrates a movement, drawing attention to it by making the movement seamlessly yet slowly. He uses speech to connect the movement to the description he had provided of it a little earlier; and to instruct the assistant what he needs to do to ensure that the movement produces the desired effect; and to instruct the trainee to mimic those instructions when he is back in the operating role. At one point, the supervisor also repositions the instrument held by the assistant. He then draws attention to what he describes as "that little flat bit of tissue" and to the shape it is adopting as a result of their concerted action – a shape he describes metaphorically as a 'cul-de-sac'. He then describes the movements he subsequently makes with his two instruments. The line drawing in Figure 4 captures the point at which these are described as "thin[ning] it out".

In this fragment, the forms that the supervisor makes serve both practical and communicative functions. His manual movements, mediated by the instruments, not only serve to proceed with the dissection, they are also gestures that represent, iconically, the hand movements that this trainee is required to learn. These manipulations are shown *and* described. Speech is also used to describe changes in the stuff that is being manipulated, highlighting the body as medium.

Achieving shared understandings is limited by the expressive potential of the modes of communication available. This is felt sharply by patients trying to articulate the pain they feel, for example. Yet even with the semiotic resources that clinicians have developed over time to suit their needs many challenges remain. Not all forms that surgeons want to draw attention to have generic names, and so the surgeon in Figure 4 relies heavily on pointing

gestures to identify what area he refers to when talking about “that little flat bit of tissue”. As well as limitations of naming parts of a human body, modes are limited in their potential to represent body movements and other kinds of processes, and individual sign makers have limited access to the specialist resources of surgeons. This has implications for what can be taught in what mode. It also highlights the need for educators to learn to be creative semiotically.

Reviewing clinical work

Clinical work is frequently reviewed by those who were party to that environment and external observers. Typically, this happens when reviewers are spatially and/or temporally detached from the clinical event under review. Different types of reviewing events can be characterized in terms of who reviews what for whom, how, and why. In the UK, examples of common types of reviewing events include the debriefing, work-place based assessment, and the Schwartz Round.

Like doing clinical work, reviewing it is mediated by modes of communication. For instance, a clinical event may be recorded in written notes or numbers representing judgements along pre-defined categories (‘rating’). It may also be automatically recorded, e.g. as video or digital data from equipment, sensors and so on; all these recordings can be subjected to interpretation. Reviewers express their interpretations and build joint accounts of (recollections or recordings of) events using speech, gesture, and so on; and may produce an official report, typically in writing. Reviewing, then, is an instance of ‘resemiotization’ (Iedema 2003), in which meanings are made and re-made (‘translated’) according to specific needs and semiotic structures and possibilities for expression. This comes with a shift in focus from developing (shared) understandings of the patient to developing (shared) understandings of the clinician.

For example, Pelletier (2016) shows what participants in simulation-based training courses in the UK selected for expression and evaluation in their debriefings, and how these accounts were then sampled and re-categorised by the course facilitators, e.g. as instances of strong ‘non-technical skills’ and other pre-defined categories derived from Human Factors. As they translated the participants’ accounts, the facilitators introduced hierarchical and causal relations between the actions and events described by the participants, replacing, e.g. cohesive devices such as ‘and’ with, e.g. ‘so’, thus reshaping the account to suit the institutional aims of the training course.

Iedema et al. (2015) explored how clinicians gave meaning to video recordings of their own practices in an Australian hospital ward. Prompted to reflect on infection control, one junior doctor in their study noticed that “I put the dirty crepe bandage on his clean bed” (nurse) and that “I scratch my face when I’m in there” (p. 158). Collaboratively teams noticed cross-contamination risks when transferring a patient from the ward to an isolation room, designed solutions to mitigate these risks. As in the case reported by Pelletier, these reviewing practices were framed as opportunities for learning through reflection. One important difference between the two examples is that the reviewing event described by Iedema et al. was not only retrospective, it also was also prospective in that the participants

jointly discussed how to re-design their own clinical environment to further minimize risk of infection control.

Schwartz Rounds are explicitly framed as a forum for reflection, rather than an improvement or problem solving exercise (Point of Care Foundation, n.d.). They have been introduced in the US, UK and elsewhere to create a space for health care staff to talk about the emotional impact of their work. Here, clinical experiences are retold as personal stories, rather than joint accounts. Originally aimed at staff, Schwartz Rounds are now being opened up to medical students (Gishen 2016). On top of these institutionally supported, structured forums, clinicians and students review their experiences in numerous other, as yet little researched discursive spaces, e.g. in mentor- and student-led, curricular and extra-curricular, regular and one-off meetings; and online and offline, local and global, open and closed, inclusive and exclusive spaces. Each of these will afford distinct types of modes of communication for reviewing (speech, writing, dance, painting) and possibilities for participation, reflection, expression, interaction and learning.

Other review types are embedded in a formal assessment structure. For example, in the UK workplace-based assessments are part of a framework set up by professional bodies responsible for postgraduate medical training. Junior doctors are required to organize for their involvement in different types of clinical events to be reviewed by their supervisors. They are then expected to jointly record the outcomes of the review in writing on a online pro-forma. For instance, the pro-forma used in surgery (ICSP 2018) asks the assessor to comment on 'strengths', 'development needs' and 'recommended actions'. The trainee is asked to address 'trainee reflections on this activity', 'what did I learn from this experience', 'what did I do well', 'what do I need to improve or change? How will I change it?' In practice, both sections are usually completed by the junior doctor and validated by the assessor some period of time after the event. The written comments found on these forms do not 'replicate' the reviewing event; they are translations of selected observations expressed during the reviewing event. The selections and translations are shaped by the pre-defined categories on the form and by what can be expressed in writing; and in anticipation of future use of the forms, which become part of a portfolio that is considered annually by an assessment panel. Research of this meaning making process, and the 'gains and losses' involved in this type of reviewing, is under way (Tahim et al. 2019).

Projecting clinical work

Another area of semiotic work for and by clinicians is the making of texts that *project* clinical work. They include guidelines, protocols, learning resources, and reference books, such as anatomy atlases. While the reviewing practices discussed in the previous section are (primarily) retrospective, these are prospective. As with doing and reviewing clinical work, projecting it involves efforts by one party to shape engagement and understandings of others using a range of different modes of communication.

Take, for example, current guidance for health professionals on communication (Royal College of Physicians 2017). Like so many guides, it describes and visually represents a model for handovers which is comprised of four discrete elements that have a fixed

ordering: Situation, Background, Assessment, and Recommendation. As with the categories that the facilitators imposed in Pelletier's study, and the rubrics on the WBA pro-forma, they are pre-defined and get re-produced through reviewing and projecting.

Elsewhere, clinicians produce their own texts to prepare for clinical work. For example, Figure 5 is a drawing by a peripheral nerve surgeon that was used in communication with a pelvic surgeon, highlighting the sciatic nerve in the pelvis he was planning to operate on.

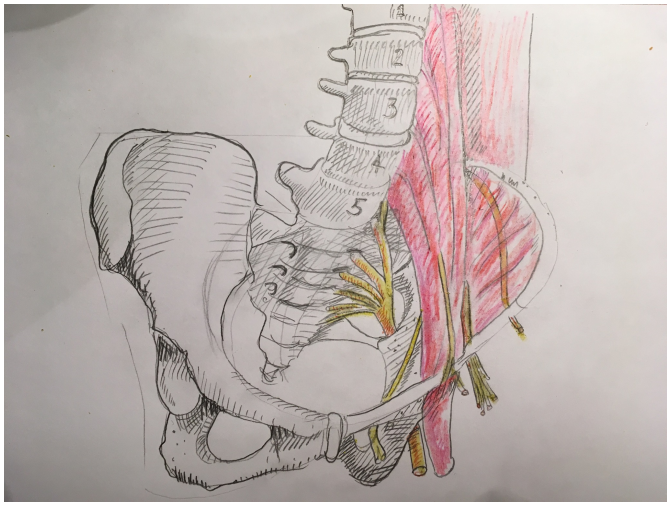


Figure 5: Drawing by surgeon (Copyright Tom Quick)

Questions that social semiotics raises in this area relate to, e.g., representational processes of selection (what is included and what is excluded?), arrangement (how do representational forms cohere?), foregrounding (what is highlighted, what is backgrounded?) and social positioning (what relation between drawer and reader does it project?) (Bezemer & Kress 2016). Consider, for instance, two learning resources designed for medical students preparing for the OSCE skin suturing station (discussed in Bezemer 2016). One is a set of revision notes; the other one is a short video published on YouTube (https://youtu.be/bE8SEOXjTpo). The 'notes' consist mainly of writing, with some still images. The video consists of a much wider range of means of representation, including speech, gesture and animation. (Note that the popularity of YouTube and other video sharing platforms among clinical learners is testimony to the potential of *video* for demonstration).

The two multimodal configurations project skin suturing differently. The written notes offer generalised, abstract instructions – 'rules of thumb'– which students can apply in the actual, concrete situations they will be confronted with. For students who revised using the notes, the semiotic work involved is largely that of deduction: they are to follow a set of general rules to deal with the concrete, unique instance given in the OSCE. The video, unlike the notes, is organised around a concrete situation, showing an actual (simulated) body part (and, occasionally, patient), an actual suture and skin pad, et cetera, from which generalisations are sometimes inferred and articulated in writing superimposed and in animations added in the post production, edited stage. For students watching, the semiotic work demanded is largely that of induction: i.e. to analyse and infer from the concrete,

unique instance shown a set of general rules that they can follow. While in principle both writing and moving image can be used to design the two learning environments, the level of 'concreteness' achieved in the video would be difficult to match in the written notes; and the level of abstraction in the writing would be difficult to achieve in the video.

In each case, the modes used shape the representation of the suturing procedure. For instance, by default, the video shows all movements involved in suturing continuously. In writing, choices always need to be made about what movements to select and which ones to leave out. Movements that appear simultaneously on the video are to be presented sequentially, one after another, in writing. Each of these epistemological 'losses' may at the same time count as pedagogic gains: a 'reduced' account may be perfectly fitting to certain trainees, relative to their knowledge and skills.

Given the mediating effects of modes, no two learning resources or activities provide the same potential for learning, even if they were designed to 'cover' the 'same' body of knowledge. In the contemporary world, clinical trainees are rarely restricted to only one site. Instead they move between –and learn– across many different sites, each uniquely configured: work place, simulation centre, online platforms, et cetera. Social semiotics provides means for exploring what is 'unique' in each, and how they are used by educators and trainees to facilitate learning.

Experimental research is used to explore the effects that multimodality can have on learning. For instance, in one study, medical students were given learning materials on chest drains. One group was given a handout made up of traditional written text and diagrammatic representations, while another group was given a handout that included comical drawings (Junhasavasdikul et al. 2017). The latter appeared to have made greater progress in the two-week period between the pre- and post-test. Similar questions can be asked about the effect of relative new text genres, such as (serious) *games* (see Gorbanev et al. 2018 for a review); and the potential of new technologies, such as touch-screens and virtual reality, and AI, for creating multimodal, interactive, and personalized learning environments, which simultaneously project *and* review (simulated) clinical work.

Sign making in the clinical curriculum

At present, the domains for meaning making outlined above are not given equal recognition in curricula for clinical trainees. One area that *is* acknowledged in the medical curriculum as a matter of meaning making is diagnosis. Hence, clinical educators have taught medical students' principles of meaning making through the interpretation of art, on the assumption that the capacities for meaning making thus developed would be transferrable to diagnosis (Tredinnick-Rowe 2017).

The materials discussed in this chapter show that practices of meaning making pervade all clinical work, not only diagnosis. The quality and safety of clinical work is contingent on novice clinicians learning across all domains of sign making sketched above. This includes communication, an area that has been introduced into clinical curricula in recent decades in the Western world. Social semiotics draws attention to the multimodal character of

communication, whether in consultations with patients, handovers to colleagues, or in the context of complex, dynamic team work. Drawing and gesture are widely used modes of communication in clinical work and clinical education, but hardly ever taught or reviewed. The meaning potential of the mouldable patient body gets attention in some specialties, and is made explicit in some cases, e.g. in a textbook for plastic surgery; yet overall, remains 'under the radar'. Research is needed to further map and explicate these domains of meaning making in clinical work.

Doing clinical work, and indeed reviewing and projecting it, relies on semiosis. To advance practices in any and all of these domains, clinicians need to develop skills in signification and communication, i.e. they need to expand their semiotic repertoire. By expanding the expressive repertoires of clinical educators, possibilities for teaching increase. Effective clinical educators are effective, multimodal communicators. Under-developed semiotic repertoires can have real effects on what does and what does not get recognized and therefore becomes available for valuation, evaluation, and learning. Thus, there is a need for refinement and diversification of (meta-)semiotic resources, including specialist vocabulary and visual methods, to enable better communication about the semiotic work of clinicians. This how social semiotics can be put to practical use.

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