Chapter 3. A Social Semiotic Perspective on Learning: Transformative Engagement in a Changing World

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Introduction

This chapter, like the rest of the book, focuses on learning and learners, first and foremost. We look at the environments in which learning takes place, the environments of learning, and at some others who participate in the processes of learning: teachers of course, colleagues, friends, parents, who are involved as well. We consider the range of means and resources through which the environments of learning are constructed and the characteristics of their constitution.

A learner-centred theory of learning

Our aim is to develop a learner-centred theory of learning. We are aware that this phrase has a history of more than two decades' use, so that it may seem like yet another re-invention of this wheel. However, while the phrase has been in constant use, the essential elements which might constitute such a theory have not as yet been elaborated and put into coherent relation with each other. Being concerned with learners and learning is not the same as developing a theory which places learners at its centre.

In doing this we use some terms which are not (yet) part of the taken-for-granted vocabulary of learning: one example is *signs of learning*. We proceed, by and large, through descriptions and analyses of what are for us criterial examples, drawn from research in various settings –formal and informal– that we have been engaged in over a considerable time. We start with two assumptions. The first is that teaching and learning are *social* practices; the second is that teaching and learning are instances of *communication*. The first entails that our theory is a social theory; it is concerned with relations between people at school, at work, at home, in public spaces such as a hospital, wherever and whenever learning is at issue and in focus. The second assumption entails that a theory of learning and teaching is part of, and set within the frame of an apt theory of communication. Together the two delineate our domain of interest here, namely that of pedagogic actions, interactions, practices. We do not assume that this encompasses all that can be and needs to be understood

about learning, and do not, in any way, rule out the significance of other approaches and their insights. It does however define both our point of departure and the domain of description and analysis.

Our theory of communication –and by implication, therefore, of learning– is a social semiotic one (Bezemer & Kress, 2016). That is, its focus is *semiosis*, the process of *making* meaning: 'How do we make meaning of what we ourselves say and do, to make things happen?' 'How do we make sense of what others say, do, make?' It asks how meaning is made in all human engagement with the socially shaped cultural world. In a social semiotic theory (Böck & Pachler, 2013; Kress, 2010; Jewitt, 2009; Hodge & Kress, 1988; drawing from Halliday's work of language as social semiotic, 1978) power is treated as always present and as a major factor in shaping the relations of members of social groups with each other as well as shaping their engagement with the social world. As a first brief suggestion of the relation of communication and learning, we say that communication happens, or has happened, when there is or has been interpretation (Kress, 2010). Translated to learning (as an instance of communication) this means that learning 'happens' or has happened when a learner has interpreted. That approach turns the still largely taken-for-granted relations in communication, as much as those about learning, on its head: it is the recipient's interpretation which guarantees that there is or has been communication; and it is the learner's interpretation which guarantees that there has been learning. In each case the interpreter's action decides what that communication and learning has been about. In the chapter we provide examples of this approach in different settings and occasions of learning. The surrounding (often institutional) environments and the power exerted in and by them tend to disguise this basic fact about both communication and learning more or less successfully and effectively.

In developing our approach, we have analysed social actions and interactions in audio and video recordings; as much as in observations of more or less formal kinds: in schools, museums, hospitals, in all manner of social places and sites. We have collected some of the artefacts which were produced, such as drawings and written documents, physical objects, as well as making records of our observations. Quite deliberately we have selected examples from the sites in which we have worked such that different kinds of social environments come into focus –institutional and not institutional– invoking different social relations. For us these relations can always be seen, at least in part, as kinds of pedagogic relations: of teacher and student, of curator and visitor, of parent and child, of expert and novice, of friend with friend, to name a few and different framings and relations.

In the school, what is to be learned is provided by a formal curriculum, set out as a prescribed syllabus, which is shaped chronologically, temporally, and spatially. Success in school, the indicators of 'successful learning', are framed as 'metrics of proximity' to the curriculum. In a teaching hospital, learning is framed first and foremost by the environment of clinical work in which experts and novices engage. In a museum, learning is framed by political, social / civic agendas, set, increasingly, by requirements of accountability by the museum to a wider segment of society and the state.

The focus of our analyses of learning and teaching is twofold. On the one hand we look at the existing *distributions of agency* in learning and teaching. We ask: who acts, where, when, how, with what means? Whose actions are accorded *recognition* and *value* by whom? We attend to learners in their different guises and social positions: as visitors, apprentices, students; and we attend to 'teachers' as curators, professional experts, trainers, in their attempts to shape both what learners learn as well as the environments in which they might learn, in how they guide the learners' engagement with aspects of the world framed for them. We focus on how 'teachers' attempt to draw the learners' attention to what is to be learned; we attend to the choices that learners actually make: what they choose to engage with; and whether the focus of their attention and their choices match –or do not match– the expectations and selections of those (seen as) responsible for the learning environments.

Our main means for doing so is by identifying, describing and analysing *signs of learning*. The range of signs of learning that we might analyse is wide, evident in any mode and ensembles of modes: drawings for instance, whether by primary school students or by museum visitors or by clinicians; texts of all kinds. In many cases the signs of learning are in embodied: ensembles of (body) movements, positioning, speech, gaze, objects. We analyse these, aware how the environment was *designed for learning*, by a teacher, curator, professional or other participants, such as colleagues or friends, who shaped what could be taken as and serve as environments for learning.

On the other hand, we look at learning by documenting individual change in an environment of constant *social change*. That is, we see existing distributions of agency in constant, ongoing, transformations, usually slow, subtle, nearly imperceptible; at times with great rapidity, producing large scale changes. Social and individual change is inextricably connected with and reflected in changes in the representational and communicational landscape. Many modes of representation and communication which were formerly treated as marginal or irrelevant –image, gaze, layout, typography– are now recognized as significant and central even, in any site of learning, changing both what and how learners learn. The

distribution of what is (taken as) central and what is (taken as) marginal in modal ensembles has changed and is constantly changing. In many of our sites of research – formal no less than informal– new technologies have created different potentials and constraints to those that had previously characterized and defined such sites. The screen is now a central medium of display and dissemination in many classrooms; in museums; in work places, in the home, and ubiquitous in personal use. That has profound effects on social relations, and on learning and teaching therefore. We illustrate all this with our examples from different sites of learning.

Methodologically, our choice of objects and phenomena for description and analysis is in part a reflection of the sites (formal or informal) in which we have undertaken research; in part it is a strategic choice for the purposes of this chapter. Social semiotic analysis potentially takes all action and interaction as instances of engagement and learning. We do not provide a full methodological account account of our approach in this chapter. Nevertheless, in the course of descriptions and analyses we do make points about our analytical procedures. We highlight analysis of artefacts and interactional phenomena as semiotic objects: drawings produced by teachers, learners or professional practitioners; responses to designed learning environments. Our discussion of these phenomena and objects is sensitive to (hypotheses about) the environments in which they were produced and about the purposes of participants or by observers.

Communication and learning are always tied to a social place. We take *sites of learning* to be a description from a social perspective –material/physical, formal or informal, immaterial and 'virtual'– of spaces in which learning happens. In considering sites of learning our focus is on their social organization: Who are the participants; what are their relations; what power is at issue; what social purposes have been assigned to the site; in what ways are they exercised? This notion of site, in conjunction with the notion of *learning environment*, allows us to refer to the 'look' of a site, its material characteristics on a particular occasion: how meaning-makers arrange the resources made available on a site for learning purposes. The notion of the learning environment foregrounds the situatedness of learning, whereas the notion of the site of learning foregrounds the more stable institutional and material structures that shape learning at any time.

The multimodal design of learning environments

In all communication, in all domains of the social world, meanings are made as ensembles which draw on different *modes*: gesture, speech, 3D objects, image, writing, gaze, music, posture and positioning, actions of many kinds. At all times, several of these modes are selected and 'orchestrated' as arrangements which are taken to be apt for the materialization of meanings. Each mode offers specific *affordances*, that is, potentials for representation and communication. The affordances of modes are an effect of both material characteristics ('what can be done with 'sound') and the social shaping of such characteristics ('what has been done with sound'), by members of a community with these material characteristics (Kress & Van Leeuwen, 2001). As a quite usual example, consider Figure 3.1.

FIGURE 3.1. EXCERPT FROM A SCIENCE TEXTBOOK (SCIENCE EDUCATION GROUP 2002, P. 90)

Figure 1 shows the left hand page of a double page spread from a Science textbook for 13-14 year olds. The modes involved in making meaning here are writing and image; though we might ask whether layout and colour also qualify as modes. Given the topic of our book and chapter, two useful questions in this respect are: Do layout and colour contribute to meaning? Do they affect how a learner might engage with this semiotic entity? Depending on our answers we might then say that here, layout and colour are or are not acting as modes.

The two columns which make up the page –one of writing and one of image– provide an account of processes and entities involved in digestion: molecules, energy, enzymes, taking in, eating, breaking down, et cetera. Writing and image are, however, used differently: image depicts the shape, size, spatial relations and placement of the organs involved in digestion. Writing describes the processes, the agents and affected entities: "…*taking in* large *complex molecules*" which "can be *absorbed* through *the gut wall,*" and so on. Without the use of writing, the information provided by the image alone would be too limited; without the use of image, it would be difficult to visualize what the organs are like and how they are arranged and connected. In fact, each of the modes seems ontologically specialized: writing deals with processes and the entities involved in them; image deals with entities and their spatial arrangement and connection. One account is about dynamic, temporal processes; the other

about static, spatial relations. Each does a specific task, for which it seems best suited: apt. The curricular content is divided between the two modes, in line with their affordances.

This is a highly abbreviated description of a curricular entity in a learning environment. To get a sense of what had been learned we would need to know how a specific learner had interpreted this entity, given what (pedagogic and other) conditions characterized that environment (Kress et al 2001). The evidence we would use to get that sense, would be signs of learning produced by the learner.

The division of semiotic labour of modes shown in this example is specific to a particular culture, and to a specific period, (broadly within Western Europe, somewhere toward the end of the 20th Century). Fifty years earlier, the division of semiotic labour would have been much more heavily weighted toward writing. The social and pedagogic conditions would have been distinctly different (Bezemer & Kress, 2010). In a contemporary Japanese textbook for the same age group, the topic 'digestion' is handled differently: there, processes are represented through the use of image. The histories and the social semiotic practices –and affordances– of European and Japanese script-cultures differ profoundly.

In meaning–*making*, the agency of meaning-makers is central: they are actors in a social and semiotic world. They make meaning in interaction with others, imagined or real, always based on their *interest* (Kress, 2010) using the resources for making meaning that are available to them in a particular culture and on a particular occasion. In the example above, the meanings made, as signs in the textbook, were most likely made by a design-team. Its members will have had a collective interest which, at the least, is likely to have been pedagogic, professional (as designers and as pedagogues), and financial (needing to make a profit from the enterprise), to oversimplify massively. They would have considered the characteristics of their 'difficult' audience: young men and women, 13-14 year olds, with their interests; and so on. Specific circumstances play their part in how an ensemble is constituted. In a clinical setting, for instance, an anaesthetist who is talking to the patient about to be anaesthetised, cannot use *speech* to get their colleague to pass them the instrument they need, and so they have to use gesture and gaze as part of the communicational ensemble.

From the consideration of the multimodal ensemble in a textbook, we turn to the much larger, three (and four) dimensional ensemble of signs constituting an exhibition in a museum. Our example is an exhibition called 'London Before London' at the Museum of London (Figure 2). The exhibition consists of artefacts, drawings, diaramas, fossils, reconstructions in 3D and on screens, all assembled to construct a sense of the prehistory of

the site of present-day London. The exhibition occupies a large single space, filled with display-cases arranged in the space, allowing visitors to make their own path in among the exhibits. The left-hand side of the exhibition space is taken up with a large, continuous, floor to ceiling glass vitrine containing prehistoric objects –flint scrapers, knifes; bronze age spearheads, swords, lances– each with a small caption attached, displayed against a plain background; the whole flooded in a blue light. Many of the objects were found in the Thames, and the choice of blue lighting may be suggesting a relation of the objects to the river. The manner of display, in the large glass vitrines, as well as the lighting, lean heavily on or reproduce an aesthetic much more familiar from an art gallery or the display of high-end jewellery. This may indicate a wish to endow the objects with the status of works of high aesthetic value. In an exhibition held at the same time in the Museum of National Antiquities in Stockholm –'Prehistoric Sweden'– dealing with the same period and displaying the same kinds of materials, the objects were very differently displayed (Insulander, 2010). There the setting was suggestive of airport departure lounges and it straightforwardly emulated a pragmatic, scientific stance: a display in wooden drawers, in wooden cases, as well as in its plain lighting.

FIGURE 3.2. IMPRESSION OF THE 'LONDON BEFORE LONDON' EXHIBITION

Here lighting and colour are major means of making meaning; we might be inclined to see the two –singly or together– as instances of mode. (In Fig 1 colour was used to distinguish the organs, to suggest their function –blue for the air in the lungs– and to set them off from the overall pinkish body). The ensemble here is composed of colour and lighting, of glass used for display. The forms of arrangement indicate a careful attention to the features of each object discretely; inviting careful study and appreciation; as against the treatment of their counterparts in the exhibition in Stockholm, where they seemed to be displayed as tools, work-a-day objects; their distinguishing feature being that they were the work-a-day objects of distant era.

The sketchy comparison of the two exhibitions suggests that modes are means of aptly materializing meaning; and that they are also more than that. The manner and the means of display in London and in Stockholm –lighting, forms of arrangement, display materials,

relations of visitor and exhibits– point to ontological, epistemological and discursive differences, to distinct ideologies. These *position* a visitor: am I here to be reverentially admiring of the skills and the aesthetics of my pre-historic ancestors? or am I invited to see myself linked to them in a shared pragmatic attitude to the world? Modes bring with them ontological, epistemological as well as affective meaning-potentials, and these enter into the making of signs of particular kinds. Once used, modal choices position both what is represented –as work of art or as a work of everyday use– and position me as visitor in relation to the objects, their makers, and the era in which they were made. Whether visitors come to be entertained or to learn, they are addressed in specific ways. If, as we suggested, communication happens when there is interpretation, then whether as curators, as teachers or as researchers, we need to understand what interpretations have been made. Positioning, in the ways suggested here –ontological, epistemological, affective– certainly will have effects on potentials for learning, differently for different learners.

The right-hand side of the exhibition space in the Museum of London has vertical wooden panels alongside some display cases. These are dominated by writing with environmental, spiritual and poetic undertones; here too, there is an interest to ground information on a scientific basis. This information is realised in graphs, as scientific evidence derived from various disciplines, which provides a framing of scientific discourse. The rhetors' and designers' choice of overarching discourses –aesthetic, poetic, scientific (and mixtures of these)– affects the choice of modes, and, through that, shapes the possibilities of design. The choices may well be reflecting the interests and epistemological positions of individuals in the design team; or those agreed by the team as a whole; as well as larger level policies adopted by the museum. These choices, at the same time, also project possible subject positions for visitors as learners in their potential engagement with the exhibition.

As with texts of more conventional kinds (on pages, for example) the spatial disposition and ordering of the multimodal ensembles in the exhibition create what might be called, metaphorically, 'reading paths' for the visitors, through organising principles in the various modes for constructing salience. Criterial aspects of the representations, such as colour, size, angle of view, position, proximity to the visitor, have an effect on the choices the visitors are encouraged to make in navigating the space. They suggest how visitors might accommodate their interests through what is made available. (Diamantopoulou, forthcoming)

Signs of learning in drawings

So far we have focused less on learners than on aspects of environments of learning. Yet our rudimentary theory of communication and of learning demands that interpretation is foregrounded. As researchers, how can we come near to understanding the processes of attention, of selection and of interpretation in which the visitors are engaged? In trying to make sense of all this sign-material, how do we engage with this designed environment, whether as researchers or as visitors? We mentioned that our heuristic strategy was to focus on signs of learning. This was in an attempt to get away from the ubiquitous mainstream tools used to measure the learner's understanding, through testing 'facts' and 'rating' 'procedural skills'. As our hypothesis suggests that learning has happened when there has been interpretation, we need therefore to look for evidence of *transformation*.

This leads us to ask a different set of questions: How do visitors (*re)make* the meaning of the exhibition for themselves? What do they select, and how do they frame the selections? Where do they direct their attention? How do they transform a complex set of signs, the 'text', of the exhibition? In the research project 'The Museum, the Exhibition and the Visitors: Meaning making in a new arena for learning and communication' this was the question that led to part of the methodology (Selander & Kress, 2012; Diamantopoulou et al., 2012). To get materials that might be turned into data for forming hypotheses about this, all visitor-participants (always invited to participate as pairs: grandparent and grandchild, two friends, husband and wife, et cetera) were asked to draw 'a map' at the end of their visit. It was suggested that they should not take much more than 15-20 minutes to do that. Here are two maps as instances of meanings made, i.e. as signs of learning by two visitors.

Figure 3.3 shows the map of an eleven-year-old boy who had come as a visitor to the museum, somewhat reluctantly, with his mother. He chose to make a map showing an aeroplane, a tree, a spear, a tool and a mask. These elements 'stand for' aspects of and objects in the environment that were particularly salient for this visitor. His attention had been drawn –among other things– by a small model of an aeroplane within a diorama, which was there to explain that the contemporary site of Heathrow airport was a site of archaeological importance. His map shows that interest; his experience of the exhibition was shaped, in a significant way, around the model of the aeroplane and what it evoked for him; as well as the other elements, in the environment of that exhibition.

Another map of the same exhibition, made by an eighteen-year-old woman (Fig 3.4), shows the skull of a bull at the top left of the map The rest of her map represents a composition of elements drawn from a range of scenes from everyday life in a prehistoric settlement shown in the exhibition. Her map does not draw on any one such scene. The large skull on the top left of the map marks the entrance to the exhibition, so that its selection as a key feature is well motivated in several ways. Her map is the result of a quite far-reaching selection and re-composition aligned with the map-maker's sense of everyday life in such a community in that era, as made possible by the exhibition. The transformations involved in the young woman's interpretation are: selection, re-framing and assembling-composing. Overall, the map expresses a coherence which she abstracted from the exhibition. In part her account also serves to explain the skull; or conversely, the presence of the skull suggested the need for a larger account that would explain its presence. The map is a complex sign which shows what she had learned about the people, the tools they used for hunting and cutting, how they made pots for cooking and prepared their food.

FIGURE 3.4. AN EIGHTEEN-YEAR-OLD WOMAN'S MAP OF THE 'LONDON BEFORE LONDON' EXHIBITION

Both visitors selected, re-framed and transformed, in more or less far-reaching (re-)designs, some of the resources that were made available by the exhibition. The maps show differing interests, differing degrees of commitment and orientation. The kinds of coherence evident in the two maps differ. In each case, the motivating force for the interpretation in this re-design is the interest of the visitor-as-learner. A constant in the production of both maps was the absence of overt power. The researchers could not say: 'This is not a map; could you please try again?' Nor did the researchers have any of the sanctions of teachers, such as grading. The visitors could not be failed, for instance. We are aware that the maps represent (the recording

of) a momentary interest: ten minutes later, or on the next day, the maps would have differed. Internal, ongoing semiosis would see to that.

In all the maps collected (both in London and in Stockholm) it was evident that there was a contrast between what (we, the researchers, assumed) had been designed (by the curator-designers) as salient in the exhibition and what was re-designed as salient in the visitors' maps as their interpretation of the exhibition. It was clear that the visitors' re-design of the exhibition accorded to their interests and agendas. We hypothesize that this showed, in part at least, what they had learned. Above all the maps showed something about the remaking of signs inwardly in the process of interpretation. For us, the maps were signs of learning (Kress, 2010; Selander & Kress, 2010; Diamantopoulou, forthcoming).

If we are attuned to this perspective on learning, then similar processes of engagement and redesign can be readily observed in any classroom, at any age, in any subject. Here is such an example (Mavers, 2011). A primary school teacher designs a learning environment around 'forces' for a class of students aged seven to eight years. This involves reading out the unit and lesson objectives from a screen, asking questions, enacting processes, making a mind map (copied by the class), and demonstrating different kinds of magnets and magnetic forces. The demonstration can be seen as the making of a complex (curricular) sign, using *placement* of 3D objects, *action* on the objects and *speech* (see Figure 5). A visualiser was used as a platform for the demonstration. With this complex sign the teacher established 'experimental conditions' and invited the class to predict what would happen 'if I move them [i.e. the magnets] closer together'.

FIG 3.5. IMPRESSION OF A SCIENCE DEMONSTRATION IN A PRIMARY SCHOOL

In response to the instruction to 'show what would happen', everyone in the class, without exception, drew ('re-designed') the bar magnets displayed on the screen as rectangles in a horizontal alignment (Figure 6) and in this way, demonstrated their learning about the experimental conditions that would be required in subsequent hands-on investigation. This had not been mentioned in the teacher's speech, so that this interpretation was construed from the teacher's positioning of the objects. At this point in the lesson, no reference had been made to the two poles of a bar magnet. The students had to decide whether or not the differently coloured ends were significant for the experiment. Positioning as separation and conjoining was a dominant means of showing predicted experimental outcomes.

FIG 3.6. DRAWINGS BY THREE STUDENTS FOLLOWING A DEMONSTRATION

In the context of the lesson, a *drawing* alone was not only an entirely valid response to the teacher's instruction, but it was perfectly adequate where everyone shared the knowledge that divided rectangles represent bar magnets and that their positioning could suffice as a hypothesis of the result of a forthcoming investigation. This 'situated obviousness' may not be sustained beyond what was 'the shared known' of this lesson. Some children added writing, either to lexicalize the drawn prediction or to distribute experimental conditions and outcomes between the modes of writing and drawing. Four students added wavy lines between their images as a means of signifying magnetic force.

Drawings such as these are both signs of engagement and constitute signs of learning. Firstly, the task demanded attention to the curricular subject matter of magnetic force within a particular pedagogic framing. Certain experimental conditions were stipulated, and prior experience and knowledge were brought to bear in the context of introductory activities and interactions. Imagining possibilities by showing or lexicalizing movement was sufficient for the time being. (81 per cent of the class predicted attraction, which is scientifically incorrect.) At this point 'getting it right' was not imperative; by the end of the lesson, it was. Secondly, the task entailed redesign of the teacher's prior design. In interviews, students talked about their experience of magnetic attraction in earlier experiences at school and at home (e.g. with games and fridge letters), but they had not made this sort of prediction before. In representing their hypotheses graphically, learning was evident as they selected the resources of drawing and writing for what was, for them, a new purpose. Thirdly, the task of hypothesizing was just one activity amongst others. The students also discussed and enacted the processes of attraction and repulsion, and, in a summative worksheet, arrows were stipulated as a resource for showing directionality of movement. As far as the lesson was concerned, these whiteboard predictions were incremental in the process of learning. In making signs inwardly, and, as here, outwardly as signs of learning, there is always an expansion in the semiotic capacity of the individual, however slight. Albeit seemingly inconspicuous and minute, this constitutes evidence of learning.

In research in secondary schools, some of us had looked at how a curriculum, in our case English and in Science (Kress et al 2005; Kress et al 2001), is produced in a classroom,

within and across modes and media: as the teacher's speech, gesture, enactment, as worksheets, as textbooks, in inscriptions on a board and as three-dimensional models (Kress et al. 2001). There, we had begun to see learning –as in the example of the magnets just above– as a process of *principled engagement* with a learning environment. The learners each brought their principles to the learning environment constructed by the teacher as the resource for engagement and then interpretation and transformation. The learners did not – 'simply', so speak– copy, or 'acquire', or straightforwardly 'internalize', 'absorb', the materials presented as stuff to be learned. Learning, we hypothesize, rests on the principled engagement with and transformation in line with such principles of aspects of the learning environment, however or by whomever constructed.

A part of making learning evident is understanding what resources are apt to bring to bear in a given context to make meanings and to express meanings: on one occasion a verbal response to the teacher is expected, on another, learners are expected to display their engagement through modes other than speech –through gaze and posture, for instance. On the parts of those whose task it is to shape conditions for learning, there is a reciprocal demand to *recognize* learning in all and any mode, even those which are not canonical, and to recognize the semiotic work of learners as agents of their own meaning making. This holds true for all meaning-makers, whether as teachers and learners in schools, or as experienced professionals teaching a relatively inexperienced member of a profession at work.

In a social (semiotic) theory, all meanings made can be taken as evidence of learning. At the same time, we are aware, as we have just implied, that not all meaning-making counts, officially, as learning. What counts as learning on a particular occasion is decided in terms of the power of those whose judgment enters at a particular point to decide what shall publicly count as learning; and above all how it shall be measured. In that context, our take is by no means part of a mainstream view of learning. For one, it is not usual to foreground the power relations that shape teaching, curriculum and learning and to ascribe agency to students as well as to teachers in their selecting from the 'stuff' that is presented to them to engage with. Present forms of assessment stand as guardians against such a view. In the dominant model of communication those in power (e.g., teacher, curator, surgeon) are taken to be the active cause or origin of communication or of learning (as enshrined in the contemporarily dominant phrase 'delivering learning'). In the 'delivery model' of learning it is the responsibility of the 'receiver' (e.g., student, novice, patient) to ensure that the message is appropriately received –to be 'decoded' accurately as identical with the message which had

been 'encoded'– as the process used to be expressed in the traditional model. The power of the teacher, expert, doctor, et cetera was not, and nearly everywhere still, is not in question.

By contrast, in the perspective put forward here, learners *make* (their) meaning from what is communicated, in their interpretations and transformations, on the basis of their interest. In that, they bring their principles to the processes of interpretation and transformation. That is, their interpretations are principled, even if those principles differ from those of their teachers and the interpretations depart from their expectations. This is in no way to diminish the authority of teachers. Rather it is to re-conceptualize the task of teachers and the necessary use of their expertise differently directed and focused. They are now seen as, (re-)designers who have the task of aptly shaping the environments of learning for learners in terms of 'what is to be engaged with' by learners. We will return to this issue further on in the chapter.

Here we pause and step back to consider an instance of learning in an environment framed without the presence of extraneous power. The example will enable us to draw out some general principles of sign-making and show how these underpin our conception of learning. A three-year-old, sitting on his father's lap, draws a series of circles, seven to be exact (see Figure 3.7). At the end he says: "this is a car".

Whether from the perspective of meaning-making or of learning, the question arises as to how this is or could be 'a car'. While drawing, he had said: "here's a wheel, here's another wheel, that's a funny wheel…. This is a car". In other words, in making the sign, for him the *criterial feature* of a car was its 'wheelness': it had (many) wheels. Wheels were represented by circles; and 'car' was represented by the arrangement of seven circles. To represent wheels by circles rests on a process of analogy: wheels are like circles. The result of this analogy is a metaphor: 'a wheel is (like) a circle'. Similarly with the representation of 'a car': 'a car is something with or that has many wheels'. The meaning made here is a sequence of two metaphors: wheels are (like) circles; many circles are (like) a car. For this sign-maker, the signifiers 'circle' and 'many wheels' are *apt* to be the carriers of the signifieds 'wheel' and 'car'.

We might ask further why and how, for this three-year-old, a circle could be the signifier for a wheel; and how wheels could be the criterial feature for 'car'. The first question seems

self-evident. As far as the second is concerned, if we imagined the eye-level view of a three-year-old, looking at the family car (in this case a 1982 VW Golf, with its prominently visible wheels, especially at the observer's height) we might conclude that his position in the world, literally, physically, but also cognitively and affectively, might well lead him to see cars –at least on occasions– in that way. His drawing, his sign, represents his position, his interest, arising out of his (physical, affective, cultural, social) position in the world at that moment, vis-à-vis the object to be represented. From the perspective of learning we can say that his interest shapes his attention to a part of the world and acts as the motivation for principles of selection.

The point is that it is the interest (in the sense just given) of the meaning-maker which shapes what is taken as criterial about an entity, at the moment of its representation. The child's drawing suggests and realizes of a view of a part of the world that is historically, socially and culturally shaped. What the meaning-maker takes as criterial then determines what (s)he will represent about that entity. In a sign, only what is criterial is represented; other features are left out or are back-grounded. Hence representation is always partial. The drawing is the result of the child's semiotic work in his *engagement* with a part of the world, embodying his distinct interests.

In taking a drawing as a sign of learning we suggest that as a result of the process of engagement with a part of the world, the child has made meanings for himself, first as a sign 'inwardly'; this would be based on a range of encounters with real cars and toy cars. Each time signs will have been made inwardly, without signs of cars being made outwardly. Here the sign has become visible, materially, 'outwardly'. It is the outcome of a process which had taken place in his engagement with the world, in interpretation-as-transformation. We hypothesize that processes of transformation of existing 'inner resources' have taken place; leading to a conceptualization of the world as shown here. It is a transformation of inner conceptual resources and shows a way of conceiving of a part of the world. In effect, the process leads to new concepts: we might say that the resources have been augmented. Learning has taken place. The effect of learning is a change to inner resources. The child has achieved an augmentation of his capacities for representation, through his making of meanings first inwardly, and then materialized outwardly. An augmentation of resources constitutes at the same time a change in potentials for action, and, in this, a change in identity.

In this approach to learning, every sign made is new, an innovation; its making an act of creativity. The ongoing, unceasing process of *transformative engagement*, integration and

inner transformation, with a constantly newly resultant state, constitutes learning. The processes are usually invisibly, unnoticeably minute. This is the case when the sign has been made inwardly, in the process of engagement, selection, interpretation and transformation. It has led to learning whether or not this learning and the inner sign have been materialized in a new sign made outwardly: as in the drawing or in something said or gestured. Whether in meaning-making or in learning, interest is decisive. It forms the basis of the principles of choice of what is taken as criterial about the entity for representation (wheels in the case of the 'car').

We take this 'childish' example as a guiding insight into the formation of all signs, made anywhere, and by anyone. To exemplify the use of that insight in a totally different environment, consider Figure 8. It is the sketch of a patient's body, made just before an operation by the two surgeons who will perform the operation. Their discussion of the issues likely to be encountered and to be dealt with, relies on to the choice of apt modes for representation. Speech alone not being sufficient, they resort to sketching while talking. Image as drawing is used to complement speech. The sketch –supported of course by the accompanying talk– is a sign of learning: a record of a hypothesis (based on much prior experience and learning) that can guide ensuing action.

In learning, the interest of the learner shapes attention to that which is to be learned, leading to selection from what is presented in the world; (the learner's) interest determining the focus on what is to be engaged with, selected and transformed, in learning. This is also evident in the drawing in Figure 3.8, made by a surgeon while talking to a colleague just before the start of an operation.

FIG 3.8. SKETCH BY A SURGEON BEFORE AN OPERATION

The drawing materializes a hypothesis about the patient's body; just as the drawings of the primary school children materialized their hypotheses about the effects of the force of magnetism. Both signs allow us to make inferences and hypotheses about the makers' understanding about their world; both are signs of learning.

Transformative engagement is a constant of all social interaction, anywhere. It can be observed in sites where a community of meaning makers has made an effort to design an

environment for others to engage with, such as the museum. It can also be observed where a site is turned into an environment of learning through the engagement of a learner. The semiotic work of differs from site to site, given varying social relations and social purposes.

Embodied signs of learning

So far we have identified and analysed signs of learning in drawings, which were produced in different sites and places and at different times in relation to the initial engagement. The museum visitors made their drawings up to an hour after their first engagement with the exhibition, in a room away from the exhibition. The school children made their drawings minutes after the teacher had demonstrated what might happen when two magnets are pushed together, whilst still in the same classroom. The surgeons made their drawing on the basis of much prior experience and as the expression of a hypothesis about what they might find once they start the operation.

We now turn to *embodied signs of learning (Bezemer & Kress,2016;).* The site is an operating theatre of a teaching hospital. We focus on the interaction between a surgeon and a medical student as they are performing a surgical procedure. The surgeon stands on the right side of the table, the medical student on the left side, closer to the leg-end of the patient; and in front of the instrument trolley stands the scrub nurse (see Figure 9).

FIG 3.9. AT THE OPERATING TABLE

The example focuses on *touch*. At the start of the operation the surgeon points to an area just below the navel of the patient, where a small lump had developed, which they need to remove. The lump is not visible when the patient lies flat. As she points to the (area of the) invisible lump the surgeon asks the medical student if he wants to have "a feel of that". The medical student replies "yeah", dipping at three different points around the focal area with the swab in his left hand. He then touches the area with his right hand. He holds his hand flat, putting gentle pressure on various points with the tip of his fingers, covering an area of about three inches below the navel. The surgeon then joins him in touching, using her left hand; yet she touches differently. Her hand is slightly tilted, she creates more pressure with the tip of her fingers and the pressure is focused on one point immediately below the navel. This is followed by a grasping action involving her middle finger and her thumb, which lasts for a couple of seconds. Her hand movements suggest that she feels the lump that she is about to

excise, while the medical student's hand movements suggest uncertainty as to what and where to feel.

Following the examination the surgeon opens the skin, providing a spoken commentary at the same time, explaining how to start an incision, where to put swabs, which setting on the diathermy device to use for which parts of the incision, et cetera. That is, she uses speech to draw the attention of the medical student to some of the actions she performs, whilst leaving out others. This selection is shaped by the surgeon's interest and her understanding of what the medical student might know and need to know now. Had his touching appeared more like her own, the surgeon would probably have drawn attention to something that she believed to be more 'apt' for a learner whose clinical experience is closer to hers. In that selection, she demonstrates her learning about this student. The student responds to her prompts. When she rests her hands on the patient while asking for items from the scrub nurse, he too rests his hands on the patient. When she picks up a swab, he does too. When she starts dipping, he does too. This demonstrates the *mimetic* character of learning (see Chapter 4, this volume). Mimesis takes us away from the notion of teaching and the agency firmly placed on the side of the teacher. It highlights the agency of learners in terms of what they choose to engage with, regardless of whether there are 'teachers' around to guide them.

The next stage of the operation required a different set of manual actions, a different set of instruments, and, consequently, a new division of labour. Now, retractors need to be placed and held in position so that surgeon and medical student can dissect around the lump. The first time round, the surgeon places the retractors and then hands them over to the medical student (without actually *saying* anything). If she needs the medical student to provide a slightly different kind of traction she holds on to his hand and adjusts its position (again without saying anything).

There are two points here: on the one hand, the surgical educator teaches by *action* where that is the better suited mode; on the other hand, this is a typical social organization of surgical work: a senior surgeon does the 'invasive' work, while assistants hold things up, pull things aside, et cetera. What is less typical, but what happened in our example, is that from instance to instance, increasingly the medical student placed and replaced the retractors himself, mimicking what he had seen the surgeon doing moments earlier. The surgeon soon responded to these signs of learning, by acknowledging his increased understanding, his new position, and with that his potential to take on a certain role, by *asking* him to place the retractors instead of placing them herself or by repositioning his hand. For instance, she pointed at the retractor held in his right hand and asked him to "slide that in laterally". This is

how power relations are negotiated, shifting the initial enactment of 'teacher' and 'student' to 'surgeon' and 'assistant surgeon' and redistributing the agency of the two actors involved in this clinical work.

The signs of learning here are not documented in some permanent form; these signs are made, they might be noticed (as they are here), and then pass; they are ephemeral. Even the video-record is only a very partial record of them. However, they may be fleeting and difficult to document, to the aware participant they are noticeable, prompting further action.

Moving beyond dominant means of assessment

We hope to have shown that a social semiotic theory not only widens but fundamentally alters our perspective on learning. It resets the frame for what we can and should attend to. Our premises are that meaning making and learning are a) ubiquitous; and b) multimodal. This has implications for recognition of what counts as learning, which we will discuss now.

Meaning-making – and learning therefore – happens everywhere and all the time, not only when someone is taught, instructed, or when some environment is organized, set up, designed, for learning, whether in a seminar room or when at work. The sites explored here show how a learning environment –variably framed as 'exhibition', 'science lesson', 'surgical operation', shaped by one social actor or by a team– becomes the 'ground' from which another social actor makes selections. Both actors act on the basis of their interest through transformative engagement with the world. While one social actor –whether as 'teacher', 'curator', 'expert'– exerts power through the design of a learning environment, the other – 'student', 'visitor', 'novice'– exerts power through their capacity for selective engagement with that environment.

Meanings are made in any mode, not just in speech or writing or other canonical modes (such as mathematical notation), and all meaning making constitutes signs of learning. Common sense views tend to think of teaching (and indeed many other social activities) as constituted in and dependent on talk. We suggest that teaching always takes place through multimodal designs. We are aware that meaning makers (teachers, curators, et cetera) design learning environments not only through speech, but also through gesture, gaze, body posture, image, writing, tangible objects and the materials of which they are made, and so forth. Our example from the museum, for instance, highlights the curators' use of objects, of lighting, of display-cases such as vitrines, et cetera, to shape the visitors' attention in specific ways. In the operating theatre, we saw the surgeon pointing at the area just below the navel before

inviting the medical student to "have a feel". This pointing is not only a precursor of the invitation, it also draws the student's attention to the area he ought to feel. In many other instances, speech was not involved at all.

As we have suggested here and there in our account, the belief that teaching is about talking often goes hand in hand with the notions of implicitness and explicitness of knowing and understanding. From such perspectives, teaching is seen as 'making explicit' – through speech, usually– that which is regarded as implicit in the work of those who are already full (and fully knowledgeable) members of the community that the learner wants to enter. Our use of the concept of affordance orients us to treat all embodied actions –not only speech– as 'explications' potentially. As the different modes and forms of representation and communication have distinctive potentials and constraints, clinicians can use them to make different kinds of phenomena explicit, rather than 'translating' into speech what is very well known and understood by an insider, and is actually 'explicitly there' in modes other than speech. Putting a phrase such as 'implicitly there' or 'explicitly there' in single quotes is our beginning attempt to reset the scales for recognition: for the clinician these things are not implicit: they are explicit even though they do not rely on the mode of speech. The pointing gesture of the registrar, for instance, is a precise explication of an area, which is left unspecified in the co-occurring question, "do you wanna have a feel?" At the same time, the pointing gesture alone does not constitute a complete invitation to the medical student to 'have a feel'.

From a social semiotic perspective, the notions of explicitness and implicitness are not intrinsic properties of forms of representation: they are social and cultural categories. In Western societies, so called, these notions have had far-reaching effects on mainstream and dominant conceptions of teaching, learning and assessment. What could be spoken, written, represented in numerical form or as formulae has been treated as explicit knowledge. Much other knowing –not being represented in these modes– was treated as implicit. It was felt to be beyond systematic, overt teaching or deliberate learning, beyond the rationality guaranteed by 'language'. As such it had a secondary, marginal value: with consequent widespread, far-reaching social effects. It had led to a naturalizing of many of the practices at issue in the social construction of trades and many of the professions: certain definitional things, it was assumed, could not be taught and that in turn led to the folksy common sense that, say, a 'real journalist, writer, surgeon is born not made'.

A multimodal social semiotic approach to knowing opens the door to giving recognition to unspoken knowing, even though it might not be audible or immediately visible. The

approach can bring us to an understanding of, and get close to *embodied* learning and teaching (Lim, 2021). With that, the frame around what can and what cannot be taught, and how, in any case, things might be learned, has been expanded enormously. Speech as much as writing assume a new place in the semiotic landscape: expressing certain things exceedingly well, and also quickly coming to clear limits of their capacity: for instance, when pushed to use writing or speech to, say, intubate a patient. Here the physical, manual guiding of the arms and hands of the learner by the experienced anaesthetist proves to be by far the superior route to knowing in embodied teaching and learning. In a social semiotic account of multimodality, the latter provides the possibility of establishing descriptions and accounts of all these forms of meaning and knowing. The former, social semiotics, focuses on and highlights the agency of individuals, expressed in the interest of meaning maker*s* in which their forms of engagement with the world are paramount.

This opens up both a vast challenge for notions and practices of evaluation, and begins to focus on the need for a full awareness of the required means for recognition of learning. If learning is not recognized, it cannot be evaluated. If institutional authority is blind to many means for making meaning, especially those regarded as implicit, then those who use these means are placed outside the domain of recognition. If institutional authority is regarded as paramount, whether in the production of knowledge or in the engagement with it, then the principled transformative engagement of many learners is ruled out of court. Above all, the recognition of the many means of making meaning, and the abolition of the distinction of 'the implicit' and 'the explicit' (a kind of distinction of 'natural' versus 'rational') offers the possibility of avoiding distinctions, in theories of learning as elsewhere, of mind and body, of affect and cognition, which have be-devilled so much thinking and practice for so long in discussions of learning (see Introduction, this volume).

Socially, these are questions of politics and power, semiotically and pedagogically translated into ontologies and epistemologies. If education, whether in schools or work places, is to produce conformity and adherence to convention, then two things need to be maintained. First, the canonically recognized means of making meaning will need to be supported as canonical; others means will need to continue to be marginalized. Second, theories of learning (based on theories of communication) which privilege authority and its power will have to be defended. This will ensure that notions of 'correctness' and 'error' will prevail, and the transformative actions of learners denied or overlooked.

If, however, the aim is to understand the constantly transformative and innovative character of human meaning making, and of learning therefore, then all means for making

meaning will need to be recognized. Theories of meaning-making and therefore of learning, will need to be based on recognition of the agency of all participants in the making of meaning. The role of interest and the consequent exploration of the principles at work in transformation, interpretation, meaning-making, will need to be acknowledged and explored. A focus on evaluation of interest and the elucidation of principles in learning will lead to profoundly different conceptions –and metrics– of evaluation than those of conformity to power, which have hitherto been present both in the educational and in a more broadly common sense mainstream. That is the case whatever the environments of learning might be.

Environments of learning are undergoing changes of the most profound kind, largely socially produced and technologically amplified. Conceptions of learning, teaching and assessment will need to become adequate to the demands posed by current and future environments of learning. Making the currently inaudible audible, the invisible visible, making all means for making meaning recognizable, and giving recognition to all kinds of agency, everywhere, is essential.

A changing social and semiotic landscape

So far we have analysed learning and teaching without direct attention to the profound changes that are taking place in the social and the semiotic landscape. These do of course affect environments of learning in all ways; just as they shape the subjectivities and identities of learners. Meaning makers have always drawn on a range of different modes, writing and image foremost among them. Yet new technologies have given rise to changed and expanded possibilities for the use of modes than these in ensembles of modes. The displacement of the page –dominated for centuries by writing and its (linear, sequential) organization– by the screen –inherently a site for image and its spatial and modular organization– is one major factor. The screen offers far greater facility and ease for the use of image as for other modes, such as colour, moving image, sound, than does the page. The other factor may be due to the effects of two further, more potent underlying developments. One is the profound change in social (e.g. diversity) and economic change (e.g. the move of power from the state to the market in its various manifestations); the other is the effects of technological capacities on the management of information, in both pace and quantity. Images had featured in textbooks in earlier periods, yet not only do there seem to be more images now than before, they often seem to dominate the page and other sites of appearance. Multimodality is more than a mere change in semiotic fashion (Adami, 2017; Kress, 2010).

Focusing on media rather than modes for a moment, and returning to the school, the shift from the whiteboard to the Interactive Whiteboard (IWB) had led to an increase in the use of images for the presentation of science and other subjects. Concerns have been expressed about the changing semiotic landscape; for instance, about the increased use of images, and the implications for learning. To some commentators the trend threatens literacy; must lead to a general 'dumbing down' and is bound to have deleterious effects on economic performance. Less prominent, if equally firmly expressed, are beliefs in the empowering potential of such changes by their offering new routes into existing curriculum topics (Kaplan, 1995). In a social semiotic perspective, modes such as image, writing, colour, as well as other modes of communication, are treated as distinctly different yet in their semiotic potentials equally significant resources for representation. We know that societies recognize these resources differently, privileging one above another, or treating one as 'richer', 'better', 'fuller', or aesthetically more attractive than others. Social semiotics assumes that power relations are always manifest in the recognition and valuation of modes. However, its purpose is not to establish an alternative hierarchy of valuation, but rather to investigate the different potentials and affordances of modes, and to describe how they are used and continuously developed in response to social and cultural demands.

In our final example we explore the effects of social and technological changes on one site of learning in some detail. We return to the classroom, focusing on English in secondary school in the UK. We have materials that allow us to adopt a historical perspective, comparing video data from an earlier study of the school subject 'English', collected in 2000 with video data from a study of the use of IWBs collected in 2005 in which 'English' classrooms also featured (Kress et al, 2005). By good fortune, the data show secondary-school-English lessons on poetry taught by the same teacher in the same school and classroom, but with a gap. In the earlier lesson the teacher had used an Overhead Projector (Fig 10). Five years later, she was using an Interactive Whiteboard (Fig 11). The curricular categories at issue in both lessons were the same: Poetry and Persuasive language. There had, however, been significant changes in 'school English' in the intervening period. This affected, in particular, the pedagogic organisation of the classroom, in the performance of roles by the participants, in the display of texts, and in the process of textual analysis (Archer & Newfield, 2014; Yandell, 2013; Stein. 2008). These are described and discussed here.

The contrast in the display and function of student texts in the classroom overall suggests the emergence over this period of a discourse of participation. In the classroom in which the lesson from the year 2000 is set, canonical English texts and teacher-made texts were displayed on the front and sidewalls of the room, with some student texts displayed on the back wall. In 2005, student-made texts were incorporated into the active pedagogic space and processes of the classroom.

The teacher had scanned student responses to the poem, as well as students' own poems, and displayed these immediately on the IWB. The student texts displayed on the IWB became objects for discussion that both the teacher and fellow students could manipulate and annotate. A shared, fluidly malleable text was created through the use of the IWB. This opened up new pedagogic possibilities, which had the power to affect the configurations of authorship and authority in the classroom. The teacher's annotation and marking of the student texts on the IWB transformed what had previously been a usually semi-private activity into a public one. Among other things, it made both the criteria and the process of assessment explicit.

The activity engaged in by teacher and students could be understood as a *multimodal version* of the traditional, formerly always verbal, IRF sequence - Initiation, Response, and Feedback (Sinclair and Coulthard 1975). It is a process that foregrounds assessment and examination in the everyday practice of the classroom. In between 2000 and 2005, the sense of what could and what needed to be displayed in the lessons had changed, whether in terms of modes or in terms of the technologies of display. In 2000, writing and speech were in the foreground. By 2005 image, colour and layout had, alongside writing, become a normal part of the semiotic and pedagogic resources of the English classroom. The changing semiotic landscape of the classroom had reshaped both the pedagogic function of texts and the realization of the curriculum: what and whose texts are presented, how texts are presented, and what can be done with the texts. In the lesson from the year 2000, the use of the OHP supported the display of a (typed) copy of canonical written poem (with line numbers added),

a photocopy from a book. By 2005, the poem being discussed had become integrated with images downloaded from the internet, in slides of a teacher-made PowerPoint.

More generally, a comparison of the data and of observations of 'school English' from 2000 with that of 2005, suggests that changes in the relationship between image, speech and writing had become extensive and embedded in the English classroom. It had become common for English teachers (with likely 'generational' differences among teachers) to offer a route via the use of image into an important curricular concept in English. This could be done by showing a clip of a (by now digitally produced) video (often via U-tube), or to display an image downloaded from the Internet. In 2005, teachers frequently used PowerPoint to present their lesson materials; they annotated texts by means of images; or they connected –via the IWB– to a webpage. The use of image had by then become prevalent in students' work in English, through the use of clipart or digital photographs taken by students, or downloaded from the Internet. This project work was usually produced as PowerPoint presentations, done in class or out of school as homework.

All this had begun to reshape the work of teachers and of students. By 2005, teachers had become involved –whether aware of this or not– in the *pedagogic design* of kinds of digitally produced multimodal texts that were rarely seen in 2000. They were designing multimodal environments of learning. Visuals had, of course, long been a significant category in subject English, and in the literary texts studied there (as in questions such as "Discuss the use of imagery in Marlowe's 'To his Coy Mistress'". However, in the literary texts of the English classroom, imagery had always been represented in images verbally represented, usually in writing, in social semiotic multimodal approaches seen as a transduction from image to writing. Now, however, imagery could readily be discussed by showing pictures. Where before image had appeared as a species of writing now the mode of image had suddenly become central in a subject that had hitherto been constituted in language, that is, in speech and in writing.

The students' analyses of poems are now often (re-)mediated by available technology and its capacities. Indeed, in the 2005 classroom the teacher began the discussion of various concepts by showing relevant images downloaded from the internet. 'What is to be learned' and 'how it is to be learned' had been reshaped by the multimodal potentials of digital technologies used by teacher and students. This prompts the question: What are the social and educational implications? What are the epistemological gains and losses of this process? In terms of the subject of this book and of this chapter, the question is: Has learning been changed, and if so how, by this change?

In this last example, we can identify two significant differences for textual analysis of 'now' compared to 'then'. One, as we have pointed out, is that the starting point for the introduction and the analysis of poems is different. In a text genre previously seen as constituted in writing alone, the starting point for reflection and analysis is image. This difference appears to be underpinned by changes in the use and function of writing, speech and image in the classroom. The starting point for textual analysis in the lesson from 2000 was a whole-class discussion of the poem's title and the students' use of a dictionary (the OED) present on all tables, to make it possible to look up words in the of the poem, ostensibly to establish 'the meaning' of the poem. The dictionary was the irrefutable, taken for granted reference point and authority. In 2005, the starting point for textual analysis was a whole-class discussion of the image accompanying the poem displayed on the IWB and a 'brainstorming' activity engaged in by the whole-class. The dictionary had disappeared. Where in 2000 there were two or three copies of the larger OED on every table, by 2005 there was not a single copy of any dictionary in the classroom. By 2005, the meaning of words was anchored and defined by images downloaded from the Internet (standing in for the real world). Practically, the routine was that students were asked to match words in the poem to images from the internet, e.g. the word 'congregation'.

The other difference between 2000 and 2005 lies in the kind of semiotic work done by students and teacher, the degree and kind of agency both apparent and accorded to teacher and students. Our comparison suggests a broad pedagogic move towards 'capturing' and displaying the work and opinions, the interpretations, of students: evident as a move from talk as ephemeral, transient, in its effect possible to pass over, to the display of talk, as concrete, material, substantial, in the transduction from speech to writing on the IWB. In 2000 there had been a firm boundary between the work of reading the poem and the work of analysing the poem; in 2005, the transformative and transductive, semiotic work of interpretation became materially evident on the IWB. Its constantly dynamic transformations in the dialogic (inter)actions of students with students and teacher shows both meaning making and learning as social and constantly dynamic semiosis.

In 2000, the poem was read aloud twice before analysis began. In 2005, analysis began with an engagement with the selected image. This is not so much an illustration than a fixing, a documentation, an anchoring of the meaning of a word to the world, before the written text of the poem is even introduced. We are less interested here in the ontological and epistemological status and effects of the process ('meaning' fixed by 'anchoring to 'the world') than by the differences in agency and consequent social relations. The potentials for

meaning making and learning made possible by changes in the socio-technological environment of the classroom raise quite new possibilities for teachers and students, with far-reaching implications for curriculum and pedagogy, and the formation by students of their identities.

Towards a culture of recognition

Against the backdrop we have provided, learning is, can be, and, we are certain, needs to be located differently to its present place in the officially, politically sanctioned mainstream. We opened the chapter with a quasi manifesto: "Our aim is to develop a learner-centred theory of learning…We start with two assumptions…that teaching and learning are *social* practices [and] that teaching and learning are instances of *communication*. The first entails that our theory is a social theory…The second…entails that a theory of learning and teaching is…set within the frame of an apt theory of communication." If we take this manifesto seriously, we can say that to speculate about the present and the future of learning, we need first to have a relatively firm sense of the present and the future of the social world. We could go one step further and make proposals of our own about this future, building on earlier work that enabled multimodality to come frontstage and operate as a perspective to make sense of the social (New London Group, 1996; Cope-Kalantzis, 2000).

Our account of an apt account of a learner-centred theory of learning starts from a social base. If in learning it is the interpretation of the learner which guarantees learning, then *recognition* of the learner's semiotic work of interpretation is the foundation of such an approach. Interpretation arises out of the learner's interest, itself the result of integration of experience in social environments and the semiotic work of ceaseless inner integration in processes of social semiosis. The principles brought to bear in interpretation are based on this constantly integrated inner resource. Recognition is crucial, equally, in relation to all the semiotic means evident in environments of learning, and all the semiotic means used in the outward production of signs of learning. As we have shown in our examples, modes other than speech and writing are no longer (if indeed they ever were) illustrative adjuncts to 'word'.

This, among other things, speaks of the need to make curriculum knowledge relevant by connecting it with students' out-of-school experience. In that respect the practices of the English classroom of 2005 can be seen as a move in an essential direction if the desire to

increase student engagement through ('inter')activity' is to be taken seriously. The profound effects on English –as on other school subjects, or in the social, economic and semiotic world at large– have barely begun to be recognized. To use one slogan: the world shown is not the same as the world told (Kress, 2003).

All this has far-reaching effects for learning at specific levels: through the texts that come into the classroom, how they are mobilized, how they circulate and are inserted into social interactions. This changes the place, the functions and uses of image, writing and speech. The boundaries between canonical texts and the texts of the everyday, of the aesthetically and historically valued, of the mundane and the canonical are changed, changes which mark social and political boundaries of 'English' as well as of all school subjects shaped by teachers, schools, Local Education Authorities, determined seemingly by policy and by diverse social interests. These boundaries are tightly guarded and regulated by a highly prescriptive policy context. Drawing texts from the Internet (for example, from image banks or YouTube) connects 'English' with the experiences and technologies of the 'out-of-school' in ways that question the boundaries of canonical knowledge and what counts as socially valued. This changes the semiotic landscape of the English classroom, even though these changes vary across an uneven social terrain.

The changing semiotic landscape also poses questions about what ought to be taught. Where up to two decades ago maybe, competence in relation to one mode, writing, was seen as sufficient for the task of composition of text, we now need to understand the semiotic potentials of all modes involved in the design and making of multimodal text. Now, when text consists of image and writing say, specific forms of textual cohesion and coherence emerge and theoretical means are needed for making sense of these. Where previously grooved routines of convention could serve as reliable guides in composition, in a multimodal world there is a need to assess on each occasion of communication what the social relations with an audience are, what resources there are for communication, what media are going to be used, and how these fit with what is to be communicated and with a clear understanding of the characteristics of the audience. Hence a rhetorical approach to communication is essential.

The shift from *composition* using one mode, *writing* usually, to *design* of *multimodal ensembles*, points to current changes in power and in principles and agencies of control which are, among others, about a shift from 'vertical' to 'horizontal' social structures, from hierarchical to (what are at least at some levels) more open, participatory relations. The disintegration of former social frames, lead to changes in genres, in access, and to changes in

notions of authorship and canonicity. Wholesale change in social relations means that participation in semiotic production –as it was sketchily evident in the classroom of 2005– now describes (certain of) the characteristics of communication more accurately. With former structures of power, the characterization of the relation of 'audience' to 'author' had been that of 'consumption'. With new distributions of power, production and participation are the more normal dispositions of those who had previously been seen as 'audience'. YouTube can stand as a metaphor for the changed social relations by many to contemporary media: producing for an unknown and potentially vast group, distribution via existing, new or yet to be created 'sites': production for the new media, new sites, seemingly in more democratic participation.

All aspects of communication are drawn into that, with far-reaching effects. In many contemporary social semiotic practices there seems little or no concern about what were, until the mid-eighties or so, central questions: questions, for instance, of 'authenticity' of authorship of certain kinds of texts. In downloading, mixing, cutting and pasting, questions such as 'Where did this come from? Who is the original/originating author?' seem no longer an issue. Much like the use, in former times, of a ruined castle or monastic building as a quarry, a source of building materials –a large chunk here as a lintel, another there as part of a wall– existing texts are taken as resources to be 'mined' for the making of new texts. There is an absolute need to understand the practices, aesthetics, ethics and epistemologies of contemporary forms of text production. At the moment these are discussed in terms of 19th century models, where terms such as 'plagiarism' or 'mere copying' are too often too readily to hand: that is, the invocation of models from an era where conceptions of authorship were clear and legally buttressed.

If we take signs of learning as essential means to understand processes of meaning-making and learning, it is essential to gain a profound understanding of contemporary principles of composition. Possibilities of the recognition of learning evaporate in the absence of such understanding. When we come to translate the comments over the last few paragraphs into all sites of learning we see a vast agenda of work opening up. We have pointed to some items in that agenda: serious questioning and possible erasure of distinctions such as implicit and explicit knowing; understanding the different means of learning and their potentials and affordances; questions represented by concepts such as 'mimesis'; an agenda of recognition of agency and kinds of semiotic work, as well as the need to recognize and understand the many resources, modal and other, involved in environments of learning and in the making of signs of learning; by a need to conceptualize aptly the semiotic work, the roles and relations of learners and teachers; with a full and serious acknowledgment of different tasks; the need

to develop means of representing that which is seen as implicit knowledge, where word, spoken or written, or other presently canonical resources for representation will not suffice.

The conception of learning that follows will need to serve fully the needs of a quite differently constituted social. And that indicates that in working towards such conceptions, having a real sense of the shape of that social will be a major requirement. Assessment and different metrics of assessment had been developed in close interaction with past conceptions of what learning was seen to be (and still largely is seen as). The metrics based on power as knowledge will need to be replaced by clearly articulated means of describing evaluations based on the recognition of principled engagement and recognition of the principles and their strengths and possible limitations.

Whatever a learner-centred pedagogy can and might be, it cannot be a pedagogy which encourages a dismissal of the seriousness of semiotic and intellectual work, whether of the present or that of past generations. This opens the vast and difficult issue of how we could have on the one hand, forms of assessment which recognize and value the work and principles of learners or meaning-makers, and which at the same time give those responsible to a community for the tasks of the school both the means and legitimacy to bring learners to an understanding of the community's understanding of a specific issue.

As one highly tentative suggestion at the moment we might say that the role of teachers will become that of experts in the design of learning environments, constructed as apt forms for engagement with a topic, and as successive re-designs taking into account the designer's understanding of the learners' principles, each so (re-) designed so as to guide the learner closer to the community's sense and understanding of the matter. Clearly this will differ from case to case: we might all wish that process to be more closely designed for surgeons than for poets.

However, the shift in the role of the teacher from the authoritative dispenser of knowledge backed by power, to the sensitive (re-)designer of learning environments would be anything but de-professionalization; quite to the contrary, would demand higher and different levels of understanding, sensitivity as well as 'subject knowledge'.

Epilogue

Having written the chapter in 2012-2013, drawing on research projects we had carried out in the preceding decade, we want to reflect briefly on what has changed in the preceding five years, in terms of the social and technological conditions of meaning making, learning and

communication. Our main message is that while much has changed in this relatively short period, the theories, methods and applications outlined in this chapter provide a robust basis to account for these changes. More and different questions have arisen, many of which can be adequately handled by social semiotics, provided that we acknowledge its limitations and continue to advance the framework, through new research, and engagement with ideas from 'adjacent' approaches, such as the ones presented in this book. What follows may thus be read as a brief, highly provisional sketch of a research agenda for semiotics and education.

In the chapter we discuss visual materials produced by learners and teachers, such as drawings and excerpts from textbooks. We comment on the *rise of the visual*, in schools and beyond; and reflect on the curricular and pedagogic implications of this trend. In the past five years that rise of the visual has continued. In everyday digital communication photographs and (live) videos are shared on a large scale through mobile technologies and social media platforms. In schools, workplaces and public spaces digital technologies have continued to replace pen and paper and created more opportunities for the digital production and dissemination of visual material. Photo- and video-editing have become widespread semiotic skills, without which participation in vast swathes of social activity is blocked. 'Infographics' and data-visualization are pervading journalism and academia. Video games (Gee, 2013) and visual records have become common means of prompting learning (Iedema 2019) and of documenting learning (Flewitt & Cowan 2019).

Yet the visual -which has for a while been key in learning and creativity (Jewitt, 2008), is also taking yet another turn which is not discussed in the chapter: it has gone *three-dimensional*. Augmented and virtual reality glasses can now be used to add visual layers onto the real world and generate holograms. At the moment, these glasses are still relatively expensive, and not yet widely used. But their potential for learning is already beginning to be noted, e.g. to support those learning to examine and manipulate complex physical objects -an engine, a human body- in vocational education, museums, and workplaces. The technology opens up possibilities of visually experiencing previously unknown and inaccessible places in entirely new ways. Think, for example, of the possibilities of a hologram of the human body showing how food is digested, and how this visual representation differs from the textbook excerpt from our opening example. For social semiotics, these developments prompt a return to 'old' questions about the design of and engagement with multimodal learning environments. What are the affordances? What do they draw attention to? How do they position the learner? (in the case of our example, a primary school student might find itself in a position that is closer to that of a medical professional).

Another trend that 'post-dates' the chapter is the rise in the automated *tracking* of learners' engagements with the world, and in the development of *algorithms* that can identify and visualize patterns in data thus collected. The chapter (and book) has outlined arguments against crude measurements of what someone has learnt. Yet the new tracking possibilities can be used in different ways. Traditionally, a guide (a parent, say) might observe a learner, make a judgement, and articulate this judgement (in multimodal ensembles), thus providing feedback and instruction. Now, this guidance can be augmented with, or even replaced by, 'intelligent feedback systems', which measure and make explicit proxies of engagement and learning. As well as tracking what learners attend to on (touch)screens, *body motions* of all kinds (whole-body, eyes, hands, heart) can now be monitored, analysed, and translated into signs for learners. Touch can now be digitally mediated (Jewitt et al. 2020).

Indeed, the capabilities of technologies for sensing, interpreting, communicating and learning are now such that they should be treated as *semiotic agents*. For social semioticians, and for everyone else interested in learning, one task will be to account for and critically review the redistribution of 'semiotic work', and with it, of agency and power, among learner, teacher, technology designer, and technology. We need to explore what learning is made evident by what semiotic agent. What signs of learning can teachers and learners recognize in drawings and video recordings of embodied interaction, and how do they relate to the signs of learning that might be recognized by 'intelligent feedback systems'? And crucially, who dictates what signs ought to be recognized, and for what purposes? When does 'a culture of recognition' become 'surveillance capitalism' (Zuboff 2019; also see Chapter 2 this volume)?

The question of shifts in the distribution of semiotic work reaches further still. In all domains of social life, technologies are emerging as semiotic agents that get involved in signification and communication where that was, until then, the exclusive domain of human sign makers. Technologies select and arrange the multimodal texts we read on online media platforms. They interpret the body, outperforming the diagnostic capabilities of, e.g., the radiologist. At home, they listen and respond to our spoken questions about the world and our instructions for action. They warn drivers, and intervene, when they approach objects too fast. And so on and so on. All of this has far reaching consequences for what we learn and how we learn. It also has significant implications for the theory outlined in the chapter, which was focused on human agency. Reconsidering that assumption in the light of ongoing technological and social change will be one, if not the, area for development in social semiotics.

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