Multimodality and trans-semiotics

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The field of research and theorisation known as multimodality, or multimodality studies, starts from the position that communication encompasses a variety of semiotic resources besides language, if language is understood as constituted by speech and writing. The multimodal perspective on communication identifies a bias in linguistics towards a restricted and limited focus on language which does not recognise the wider range of semiotic resources in communication. The multimodal orientation offers a distinctive set of methods for collecting, analyzing and interpreting data, where attention is paid to other resources in communication, besides and along with language (narrowly understood), that include visual resources, bodily engagements such as gesture, facial expression, movement and posture, spatial orientation, music and other sounds, along with a wider array of signifying resources and artefacts.

Multimodality as a research direction draws strongly on the shaping work of Gunther Kress, along with a number of colleagues with whom he worked at different phases of his larger project. Kress drew on Halliday's *Language as Social Semiotic* (1978), as well as a selection of his papers edited by Kress (Halliday, 1976), taking from him the idea that language is a sign-based communicative activity, a semiotic resource, and is shaped by people realizing their social purposes in its use (Hodge and Kress, 1988). Kress and Van Leeuwen (1996) identified three communicational elements or meta-functions of meaning-making which function simultaneously to make meaning and identify these, following Halliday, as the ideational, the interpersonal and the textual. The ideational or presentational element is roughly that part of the meaning regarding what the focus of the communication is about, its semantic component or what it is saying about the world, what it is presenting; the interpersonal element is to do with who the listener/reader is taken to be and how the making of meaning responds to that relationship, what the orientation of the meaning-making activity is towards the listener/reader; and the textual refers to the shape of the communication, how it is organized, its grammar, realised through patterned representation, and involving aspects such as thematic structure and cohesion. The grammar is what makes any representation or text comprehensible to participants who share at least some common background with the producer of the sign or text, while the other two elements give it its particularity. Halliday's move to a semiotic focus on languaging activity encouraged Kress to turn his focus to other resources and elements of meaning-making besides language narrowly understood, to look at the meaning potentials and enactments with regard to image, colour, sound, movement, spatial organisation and various combinations and juxtapositions thereof:

> Multimodality is based on the assumption that meaning is made through the many means (we call these modes) that a culture has shaped for that purpose. (Kress et al, 2005, p. 21)

As Jewitt and Kress (2010, p. 342) described it, their approach

> built on the semiotic aspects of Halliday's theory and extended them to a range of 'resources for representation' and their uses in communication. It views them as socially organized sets of resources that contribute to the construction of meaning. This brings the modes of image, sound, dynamic representation, gesture, gaze, body posture, spatial orientation and movement into the analytical domain

In the semiotic approach in multimodality studies, signs are of many varieties of kind and size and are always fused joinings of meaning and form, linked in relationship with each other as

resources for making (different kinds of) meaning-as-signs with communicative intent, where sign makers choose from a range of resources which they draw on and combine to reflect what they wish to communicate. Kress insists on both the individually productive nature as well as the socially shaped nature of this sign-making process: "Signs are *made*—not used—by a sign-*maker* who brings meaning into an *apt* conjunction with a form, a selection/choice shaped by the sign maker's interest." (Kress, 2010, p. 62). Such signifying resources are usable because they are socially available and can be thought of as grouped into different kinds, or modes, such as speech, gesture, image, writing, and so on. The outcome is "a *multimodal semiotic entity* in two, three or four dimensions" and is "the result of the semiotic work of *design*, and of processes of *composition and production"* that produce *"ensembles* composed of different *modes*, resting on the agentive semiotic work of the maker of such texts" (Kress, 2012, p. 36, emphases in original). To paraphrase, meaning-makers are constrained and enabled by their social location and their positioning, in terms of what is available to them and how they understand those resources, but their communicative productions are their own, shaped by their interests, their intent and their individualised deployment of the chosen resources. The modal resources that they draw on - visual, gestural, actional, audible, tangible and so on - have been shaped in their situated use into semiotic resources and are further shaped by instances of interested use. From this vantage point, language-as-speech and language-as-writing are also always multimodal and meshed with the meanings made with other modes, where spoken language is not just meaning communicated through sound but is most often accompanied by bodily engagements, including stance, facial movements, gesture or other movements and where texts are not just products of language written down, but also get their meanings through other modes of semiosis, including effects of writing surface, framing, layout design and script. The choices made within these networks of meaning by a sign-maker offer what Kress calls *traces* of a sign maker's decision-making about the expression of the meaning that she or he wishes to make in a given context and these traces can be followed by the multimodal researcher as they provide means of 'reading' the interests, purposes and also the shaping background experiences of those involved (Kress, 2012, p. 37).

In the earlier stages of the multimodalities project, Kress worked with van Leeuwen on developing a grammar of visual design (Kress and van Leeuwen, 1996). Their starting point was that, like written and spoken texts, visual images draw on meaning-making systems. Whereas language and sound are governed by sequence and time, visual images are governed by space, display and simultaneity. Drawing on Halliday again, they argued that the visual, like other modes of communication has to serve several communicational requirements: It has to be about something; it has to relate to who is reading the image, or for whom it is intended; and it has to say something in some kind of recognisable way, because differing compositional arrangements allow the realisation of different textual meanings. They recognised that, unlike language, the grammatical study of visual and other modalities was undeveloped and their efforts were initiatory and tentative, also that they were drawing on a primarily Western repertoire of visual design features and so were not working on a universal visual grammar. They identified intertextuality as a key resource in images just as in language texts, where previously read images or texts are used to make sense of new images and texts, and are invoked by image-makers and text-makers in their designs; and that other modalities besides language invoke rhetorical templates to make meaning. They analysed how meaning was constructed in visual examples through the tracing of meaning across horizontal and vertical structures, that invite the reader/viewer to

track meaning from ‘given’ to ‘new’ information, and from ‘ideal’/’emotive’ to ‘real’/’informative’ effects. They identified how action was realized in two dimensional images by vectors that create a diagonal line of action in images, and that in classical Western art as well as in contemporary advertising, the direct gaze of the subject in the image constituted a demand of some sort, while an indirect look was not a demand but could be an offer, and so on.

Kress drew on his observations of his own young children’s creative multimodal play to make the argument that children happily combine various semiotic systems, such as talk, drawing, gesture, dramatic play and writing. He described multimodality as “an absolute fact of children's semiotic practices” (Kress, 1997, p. 137). He emphasised that he saw reading as “a transformative action, in which the reader makes sense of the signs provided to her or to him within a frame of reference of their own experience, and guided by their interest at the point of reading” and that “what is taken as a sign to be read is also largely under the control of the readers, guided by their interest”. (Kress, 1997, p. 52). The reading of signs is also a process of sign-making rather than simply meaning-taking. As Kress (1997, p. 58) described it, “reading is the making of signs, internally”. The reader takes the form of the text (including highly complex texts such as films) as guides to the meanings of the maker of the sign; form mirrors meaning, form and meaning are entirely connected, one as the expression of the other. The transformative action of reading includes the processes of abstraction and condensation. And the question of what is taken as a sign to be read is also largely under the control of the readers, guided by their interest (see also Kress, 2000).

Research in multimodalities aims to undermine the ‘verbal-nonverbal’ dichotomy which positions the verbal as necessarily the unmarked resource in communication and such elements as ‘body language’ as the marked and supplementary resource. Going beyond this dichotomous view of language/other forms of semiosis, the multimodal approach to meaning-making encourages researchers to attend to all modes that are active in an instant of communication, as well as to what the *affordances* are of the various modalities in that case. As Bezemer and Blommaert (2012, p. 3) describe it, writing, for instance, besides its syntactic, grammatical and lexical resources, uses graphic resources such as font type and size, layout resources including paragraphing, headings, punctuation, juxtaposition of different kinds of texts, as well as colour, sound and images (both static and moving) in contemporary screen-based writing; while speech has degrees of loudness and pitch, intonation, length, pause and silence; and image has elements of framing, size, colour, shapes, iconic forms and other forms of spatial relations that can include juxtaposition, contrast, foregrounding and backgrounding, and movement in the case of moving images in film, and so on. Thus modes have different affordances, which shape representation but these affordances are culturally-shaped resources which can diversify across contexts. Resources of meaning are seen to be dynamic, fluid or variable because of their socially constructed dimensions and as transformed by their users in response to their communicative needs in particular settings, where modes can undergo development and change. In this way, multimodality studies is similar to Halliday’s focus on how people exchange meanings by languaging and also anticipates the more recent focus on ‘translanguaging’ and ‘transsemiotization’, as discussed later, where the focus is not on language as pre-given form or code but on languaging as something that is done and that is part of the action.

Multimodal research in education and other settings

Multimodality became the focus for a number of research projects which Kress led in the later 1990s and 2000s. In one example, Kress et al (2001, pp. 44-59) give an example of a multimodal research study of a science classroom that shows a lesson on the circulation of the blood in the human body, with year nine students (age 13-14) in a London Community and Technical College. The researchers describe the methodological requirements for data collection in a multimodal study, where accurate recording of multimodal interactions are needed. This resulted in their using video-recording as their central data collection method, with two cameras in action simultaneously during the class activity, one focused on the teacher and the other one focused on the students, on the basis that learning is a collaborative sign-making process by both teacher and students. They describe how they built up a detailed description of the data through repeated viewing of the taped recordings, sometimes focusing on image only, on sound only, and also on both sound and image together. They identified sets of descriptive dimensions to focus on in their analysis. These included eye-movement; gaze and direction of gaze; facial expression; hand and arm movement/configurations; the use of the whole body to make gestures; body posture; the position of people in the room and their use of space; the location and context of the action (e.g. the semiotics of architecture); the semiotic objects of action (Kress et al, 2001, p. 64), along with talk, of course. They also closely examined action in the classroom, how specific action realized particular meanings and how it brought about interactions between teacher and students; and how action by itself and with other modes produced meaning (using Halliday's (1978) categories of functional elements as analytical categories: ideational meaning, interpersonal meaning and textual meaning, along with their focus on learning as a dynamic process of sign-making).

In one illustrative example of data transcription, the extracts below follow on from the science teacher's introductory account of how blood moves through the body, where he described the process, used gesture towards his own body to locate the processes he was describing and to indicate direction and movement in the flow of blood. His attention then moved to a model of the human body sitting on the table next to him, locating the key body parts involved in the process, and then to a diagram in a textbook. Using gesture, he linked the diagram to the model of the body and to his own body. Each shift offered a different view of the body and together they produced a perspective that included 'inside' and 'outside' the body, or a common sense view along with a scientifically-shaped view. The teacher then moved on to a more detailed examination of the circulation of blood, drawing on an image on the board that shows blood circulation as a simple circular motion:

Speech	**Action**
We can think about it as a circle of	points at heart, traces finger around circle
blood like this, going round, and at	returns hand to heart, draws on arrows
various points say, the lungs are	places opened hand at left of diagram
here, the small intestine here, and	places opened hand at bottom left of diagram
the cells are here, the kidneys	places opened hand bottom right of diagram

up here, okay so its going all the	places opened hand at top right of diagram
way around and what it needs	draws arrows on circle, points at heart
is something to start pumping it	bends elbows, arms at side, 'bellows' action
again to give it a bit more motion	makes 'bellows' action three times
to go around okay	puts pen lid on

(Kress et al, 2001, p. 47)

The teacher then described a more complex description of the cycle of blood as a 'double loop', with blood going to the lungs, and to the rest of the body. He added a second loop to the drawing on the white board, transforming the drawing. The teacher then handled the model heart from the model of the human body on the bench in front of him, while talking about blood movement through the heart:

Speech	Action
Now if we look at that on our	Places model on front desk
model you can actually see here	stands behind model, arms in front
the heart has four main blood	picks up heart, points at heart
vessels okay now...	puts heart back in model
and if we take the front off, you can	takes front panel off heart
see what's going on inside	lifts heart out of model to in front of him
basically blood is coming round	sticks out index finger, traces loop from
from the rest of the body into this	his head to heart, puts finger in chamber
first chamber here....okay it goes	moves finger about in chamber
from this chamber into this	moves finger to next chamber
bottom chamber on this	
side that's where the first	slowly contracts hand into a fist, twice
pump happens	

(Kress et al, 2001, p. 48)

The two-dimensionality of the drawing on the board and the diagram in the textbook enabled some amount of explanation of the circulation process, while the three dimensional model provided others but was limited by its surface and static nature. The teacher's actions, talk and pantomine helped to fill out a more complex, dynamic and multi-dimensional and multimodal account, with the teacher's body providing a bridge from the schematic to the real. While the modes of explanation all had limits on their own, together they produced an

account that appears highly accessible and that includes both 'inside' and 'outside', and "movement, parts and functions" (2001, p. 54).

Lemke (1998), also drawing on Halliday's social semiotics, made a complementary case that scientific concepts are inherently multimodal, involving linguistic, mathematical, graphical, and operational (actional) semiotic aspects. He made the case for the effective science teachers' role as being to show students how science 'is done', involving the activities of talking, writing, using diagrams, calculating, planning, observing, recording, presenting and analysing data, formulating hypotheses and conclusions, connecting theories, models and data, relating their work and results to those of other researchers. Lemke saw the social semiotic practices, activities and resources of visual representation, mathematical symbolism and experimental operations as key to 'doing science', along with speaking and writing of language:

> Every scientific concept is simultaneously a sign in a verbal semantics of discourse, and in an operational system of actional meanings, and usually also in a visual representational system, and frequently in a mathematical semiotic system as well. And its meaning does not arise simply from each of these added to, or in parallel with, the others: it arises from the combination of each of these integrated with and multiplied by each of the others. From this multiplication of meaning comes the great power of scientific concepts and of scientific reasoning: in scientific reasoning we can freely and self-consistently move back and forth between verbal reasoning, visual reasoning, quantitative reasoning, mathematical symbolic logic, and operational situated sense-making. (Lemke, 1998, p. 8).

Multiple modes in language education

The case for multimodality in science and in science education would seem to be an easier case to make than for multimodality in language education, where the lesson focus might be thought to be on language, narrowly understood, thus side-lining or backgrounding the other modes. But multimodality researchers made the case for the productive modal research of the language class. And the increasingly multimedia nature (including Interactive Whiteboards) of the contemporary classroom has enhanced the argument for a multimodal approach in language and education studies, along with all the other subjects, since Kress and colleagues' first study of the English classroom, as described below.

A multi-researcher project directed by Kress studied 'The Production of School English' and ran from 2001 to 2003 (Kress et al, 2005). By 'School English' the researchers meant English as a school subject, taught, in their case studies, in three 'state' secondary inner-London schools, each with an ethnically diverse student population that included students from refugee and low-income families. Their research account starts from a pointed contrast between school Science and school English (2005, p. 3), where Science is primarily seen to be about knowledge and where the entities of the science curriculum (such as 'magnetic field', 'blood circulation', 'plant cell') are recognisably stable across schools, classrooms and teachers (see also Jewitt et al, 2001). In contrast, they see the English class as primarily about meaning, and meaning-making but that what counts as appropriate meaning-making in classroom English is both varied and contested, as well as more personalised by way of the commitments, interests and classroom actions of individual teachers along with how they respond to diversity amongst their students, as regards backgrounds and school success. These variations and contests relate to the complicated history and disputes around English

as a school subject that is both about language and about literature, resulting in different views around what is important in English, as to engaging with the literature canon of 'great works', or focusing on sensibilities, morality, reader identity and student self-development through engagement with reading and values. They recognise that their dichotomy between Science as "a world of 'fact'" and English as a "world of value" is, in their words "not completely tenable" (2005, p. 5) - the dichotomy had already been challenged in Latour and Woolgar's (1986) study of "Laboratory Life", later in Mol (2002), and has more recently been discounted in new materialist studies, such as in Barad (2007), which all show science as a world of value as well, constructed through socio-material practices - but what they were most likely responding to here was the extent of a broad consensus that was then in operation and is still dominant, as to what constitutes school science, whereas school English was then and now a more riven, contested entity, informed by cultural/political purposes of various kinds. These included Government efforts to standardise the English curriculum, along with the residues of earlier strategies around 'teacher autonomy' in the UK that were far less prescriptive. A further division was around whether the purpose was to learn how to study literature as an art form or to encourage self-development in the students by their engaging with literature that was about people 'like them'; whether they should focus on the 'great' works of literature or on contemporary writing that "engaged with the experiences and cultural meanings of subordinate social groups" (Kress et al 2005, p. 16).

Kress and his colleagues questioned the consensus that the study of classroom English is the study of 'talk' in the classroom, around the texts that are studied and around the background experiences that students and teachers brought to this activity. They acknowledge that "English is that school subject which seems to be founded absolutely on the rock of language, spoken or written" (Kress et al 2005, p. 168). In contrast, their starting research orientation is that classroom English is produced multimodally and attention to other modes besides talk, reading and writing would give a fuller sense of what the activity of school English was about, where the meaning in English might reside in how the furniture in the classroom was arranged and how students and teacher interacted in that space, in the teacher's 'bearing' and dress, what gestures were used, as much as in talk and writing. They see the ensemble of classroom English as a bricolage of plural methods, purposes and objectives, and they look for their traces in the semiotics of the classroom and the participants' activities. They draw, again, on Halliday's social theory of the sign, where meaning and form are brought together in a single unit and examine the environment and the signmakers in their agency as they produce English. They find that what is produced is "unusually diverse" (2005, p. 23) across classrooms and they describe this diverse complexity across a number of foci across several chapters. In looking comparatively at pedagogy in the classroom the research's multimodal research frame analysed the teaching activity in terms of the following categories: *The layout of the classroom, the movement of the teacher in the classroom; visual display; speech; gaze, gesture and embodiment, voice quality, and student posture.* They see these as a set of signs which, all read together produce the complex meanings of school English. They describe the contrasting 'look' of various class rooms and how the layout and furniture contributes to the construction of a particular version of English, in tandem with posters and images on the walls, teachers' and students' gestures and movements, as close accompaniments to talk, reading and writing. In this way, they show how pedagogy is accomplished as a multimodal activity.

In one classroom, with a cohort of students who do not have strong educational backgrounds, the researchers describe the pedagogic focus to be on 'English as competence in language communication' and this is seen in how the teacher had organised the classroom and conducted her pedagogy, with desks organised for group work and a strong focus on the content of the prescribed curriculum. As Jewitt (2005, p. 315) summarised it in a separately published paper: " The teacher represents English as a series of competencies that the students are to learn—the classroom display reminds them why they are there, why they must work." There are only a few images on display, and most of the display material is written or typed, focused on language and language-learning and originating from or relating to the National Curriculum. The classroom reflects the general ethos of the school, which conveys that students are the sort of people who need assistance on the basics to cope with assessment demands.

In contrast, in a classroom at another school, where classrooms are much more clearly the products of the individual teachers, the organisation of desks and images and writing on the wall, along with the teacher's style of addressing the class in a lesson, all suggest that while there is a focus on the curriculum, the teacher and the official curriculum have different voices: "they remain distinct and the teacher's voice remains the most dominant" (Kress et al, 2005, p. 51). The texts produced by the students mostly have little prominence, compared to the prolific material of the teacher on the walls, are smaller in size and have no teacher commentary. Compared to the previously described classroom, there is a far smaller sense of connection and focus in the layout, suggesting "English as and through 'bricolage'" (Kress et al, 2005, p. 54). The official curriculum is overlaid in the classroom by the teacher's sense that English in the classroom is both about but more than the official curriculum, it is also about 'how to move forward in life', about the potential of English to empower students. This concern with empowering students is accompanied by a strong strategy of teacher authority and control.

Across multiple classrooms, the researchers found that pedagogical activity was markedly diverse from one classroom to the next, while each lesson remained clearly identifiable as an English lesson. The combinations of internal and external pressure, along with the effects of real agency recognisable in teachers' activity all shaped the classroom pedagogy, where "the teacher in each classroom has orchestrated a range of modes to construct a set of social relations, a pedagogy" (Kress et al 2005, p. 35).

New media in the classroom and changing semiosis

In a later, related study, Kress and Jewitt (2010) noted the way the semiotic landscape had changed in a relatively short period of time, from the early to middle 1990s, into the new millennium, as a result of the proliferation of online and screen-based multimedia technologies. One result was that the multimodal dynamics of reading and writing with digitalised software had come to the fore. The English classroom, as one example was now unmistakably multimodal.

An influential response by academics focused on language, literacy and education to these changes was made in the work of the New London Group (NLG) where Kress's work on multimodality formed a key part and where Kress participated (New London Group, 1996, 2000; Cope and Kalantzis, 2000; 2009). The NLG was a joint endeavour by a group of language and literacy studies academics, among whom were Joseph Lo Bianco, Courtney Cazden, Bill Cope, Norman Fairclough, James Gee, Mary Kalantzis, Gunther Kress, Allan Luke, Carmen Luke, Sarah Michaels, and Martin Nakata, and who met to discuss these new

directions and publish work together and independently. They called their work a *multiliteracies* project to identify a diversified and multiple dynamic in digital, screen-based reading and writing. A focus on multimodality was a key feature of the multiliteracies approach in recognition that these new screen-based forms of reading and writing drew on print and audio-visual modalities of interactive human communication, where graphic resources such as images and video were observed to have increasingly moved to front-stage, imparting information directly, rather than providing backup for knowledge that was located in print.

The NLG argued that the increasing multiplicity of such communication channels and media, along with increased cultural and linguistic diversity in classrooms that were produced by heightened migration flows across multiple settings since the 1980s, called for new pedagogy and curricula in schools. Along with multimodality, attention to multilingualism was the second strand of the multiteracies focus. As one example of initiatives that were developed in various regions, in South Africa the Wits Multiliteracies Project (Stein and Newfield 2004) in Johannesburg developed classroom-based pedagogies which aimed to be multimodal and multilingual and involve different kinds of "crossings" − across languages, discourses, popular youth cultural forms, indigenous knowledges, and performance arts. Archer's (2006) research showed how pedagogies which incorporated multimodality and indigenous knowledges could yield successful results for students from diverse language and cultural backgrounds, who were studying academic literacy in an engineering foundation course at university. Prinsloo (2004) studied children's creative, collective out-of-school play activity in a case study in Khayelitsha, Cape Town and described their play as a distinctive, localised, multimodal, multilingual and multi-sourced activity, merging influences from home, school, religious and popular cultural as well as traditional cultural resources. He contrasted this rich semiotic play activity with the same children's encounters with a highly circumscribed version of literacy in school, which was mostly drill-based learning of phonemes and coding, along with language drills, with very little attention to meaning-making, or to linguistic and semiotic diversity.

Digital literacies

Attention to the practices of screen-based, digital, on-line communication showed that there are key differences between networked, screen-based communicative activities as compared to pencil and paper-based textual practices. As Mills (2006, p. 26) summarised it, some of the features of the new multiliteracies included new screen-based genres, non-linear reading and navigation skills, increased interactivity between readers and writers, and changed means of distributing, accessing and juxtaposing texts from across multiple media and software sources. The impact of hypertext (that is, electronically networked images and text that carried embedded linkages to other images and text) produced a diversification of meaningful associations to a potentially unlimited degree and required new practices of reading, sense-making and semiotic responsiveness. The active process of interpreting virtual text was now an open-ended cycle of linkages. Online, popular media text is often full of cross-references to other events, images, quotes from songs and film. Readers of these multimodal texts organise their reading across a range of media, flexible constructs and typologies, producing a break from the old language grammar orthodoxies. Lemke (1997, p. 287) made the case that meanings in the new forms of on-screen multimedia were not fixed or additive, in the way word-meaning and picture-meanings were previously thought to relate to each other. Rather, they were multiplicative, where word-meaning was modified by image-context, and image-meaning in turn was modified by textual context.

Along with and consistent with the multiliteracies approach, studies of 'digital literacies' proliferated in the late 1990s and into the 2000s, including a focus on children's out-of-school, screen-based reading and writing on personal computers, cellphones and ipads, along with observations that electronic media were increasingly part of young children's home environments around the world. Studies from many diverse parts of the world showed children and youths playing video games, (Marsh, 2004; Gee, 2003; Walton and Pallitt, 2012); sending text messages, using emojis to express feelings and stance, along with photographs, to friends and family (Kasesniemi and Rautiainen, 2002; Snyder, Angus and Sutherland-Smith, 2002; Lankshear and Knobel, 2003; Hull and Schultz, 2002). Lewis and Fabos (2005, 493) described how successful, active young participants on chat sites used writing strategically and creatively to achieve a sense of spoken language through written forms and creative rule-breaking of grammar orthodoxies. For them to maintain satisfying exchanges required them to grow into a stance of the performative and multivoiced social subject. Lee (2007) examined young people's Instant Messaging practices in Hong Kong and found a complex social dimension to do with choices of language and scripts, that included Cantonese, Standard Written Chinese (based on the mandarin system) and English. Lee described how participants modified and styled linguistic and script resources in unconventional ways but with design intent and effect.

Wohlwend's studies (2015; 2011) show children in peer-play settings manipulating virtual avatars and other digital resources and artefacts, along with actual toys. Wohlwend identifies children's play as rich and layered in the merging of digital and real-life resources, in on-screen along with off-screen action. Their play included singing and recited quotations of remembered dialogue, along with mimicry and the use of hand-made puppets. Rowe and colleagues (2015; 2014) as well as Rowsell (2017) studied children's e-book composing with digital tablets and iPads and observed how children traversed images and words in telling stories and drawing on information, expertise and languages from the domains of home and school. Flewitt and colleagues (2015; 2014) showed children making creative meanings on iPads using a varied repertoire of signs and symbols. Children's and youths' out-of-school online messaging exchanges were providing them with multimodal reading and writing experiences, including design and narrative skills and resources. Other studies found, however, that classroom reading and writing activities continued to be framed by teachers' commitments to older understandings of print literacy and how to teach it, ignoring the multimodal resources that children were acquiring out of school (Burnett, 2009). Merchant (2009) studied the effects of a virtual world created for students and teachers to engage in at a school in England. He found that teachers' lack of familiarity with gaming routines meant that the virtual world often mirrored the world of the classroom, rather than offering a stimulating alternative. Tensions were thus identified between 'top down' concepts of digital literacy in schooling and 'bottom-up' understandings of informal and popular cultural processes (Sefton-Green, Nixon and Erstadt, 2009). Other research described the contrast between digitally connected youth and unconnected teachers as symptomatic of a disconnect between schooling and the globalised and electronically connected social world (Luke and Luke, 2001). One suggestion from the research is that the education of pre-service teachers should include making them aware of the realities of children's out-of-school literacy lives, shaped as these are by popular culture, media, and new technologies (Marsh, 2006). Studies of children's in-school and out-of school engagements with digital media from particular sites in Africa (Prinsloo and Walton, 2008; Norton and Williams, 2012), in contrast, showed the particular challenges facing children who did not have easy access to

digital technologies out of school and teachers who had little experience of computer-based communicational activities, as well. Lemphane and Prinsloo (2014) showed in a case study that children of poor parents, living in a shack settlement on the outskirts of Cape Town, had intermittent access to the two digital phones of their parents but there was very little they could do with them, because of the constraints of their environment.

Transemiotics

One response to the increase in linguistic diversity in schools in various settings in recent decades has been the emergence of translanguaging as a theory of language and a research approach which focuses on fluid languaging practices that cross, merge or mesh resources from what have formerly been thought of as separate languages (See chapter ? in this volume, on Translanguaging). Li (2018, 26) took this perspective further, while drawing on Kress's work on multimodality, to make the case for translanguaging as a term for diverse multilingual and multimodal practices, as "a multilingual, multisemiotic, multisensory, and multimodal resource for meaning making that human beings use for thinking and for communicating thought" and he identified trans-semiosis as a more appropriate term for this perspective, because of the multimodal nature of communicative activity. As Li and Lin (2019) wrote:

> Translanguaging embraces the multimodal social semiotic view that linguistic signs are part of a wider repertoire of modal resources that sign makers have at their disposal and that carry particular socio-historical and political associations (pp. 211)

Baynham and Lee (2019, p. 107) similarly argue that the research focus in sociolinguistics should be extended to include not just languages, language modalities (spoken/written) and registers, but also a range of other semiotic possibilities (visual, gestural, etc.) "because virtually anything in our world can be enlisted to signify". Blackledge and Creese (2017, p. 251) agree that "rather than making decisions about which 'language' to use in a particular social setting, people have a semiotic repertoire from which they select resources to communicate". In the context of a study of communicative activity at a butcher's stall in a city market, Blackledge and Creese analyse multilingual/multimodal communicative interactions in a context where people share almost no common language resources and thus "translanguage through the deployment of wide-ranging semiotic repertoires" (Blackledge and Creese, 2017, p. 251) with gestures and body movements in particular. They find that gesture is often integrated with speech in such a way that it must be taken into account in any full understanding of communicative encounters under such conditions. As they suggest, such uses of repeated gestures are not arbitrary or singular in their use, but are learnt and 'taught' both in the specific encounters in a particular stall and are also developed as generic practices in markets elsewhere. "They are features of the brief relationships which come into being, are negotiated, and are concluded, in a service encounter" (2017, p. 253). Customers and sellers in such urban market settings do not share much in common in terms of linguistic history, and inventiveness under these conditions is described as being especially salient, and such interactions are not seamless. An elderly Chinese woman, in one instance, was mocked by the butchers in her attempts to communicate through gesture, leaving her feeling humiliated and angry, an indication that such interactions were not always successful.

Baynham and Lee (2019) draw directly on the notion of the material affordances of different modes that was developed earlier in Kress' and colleagues' work, and use this to make sense of multilingual and multimodal interactions in their research. To explain the construct, they use the example of asking someone to describe a spiral staircase. "Typically, the person asked

will respond not with words but by tracing a spiral in the air with their finger. Something about describing a spiral staircase encourages the respondent to lean towards the visual." (Baynham and Lee, 2019, p. 23). They find similar turns to visual communication and other forms of bodily, or embodied communication in their study of translanguaging during play on a basketball court and in their study of *capoeira* (Afro-Brazilian in origin, capoeira combines elements of dance and acrobatics along with call-and-response choral singing and percussive instrumental music). Baynham and Lee (2019, pp. 24-5) define translanguaging as follows:

> Translanguaging is the creative selection and combination of communication modes (verbal, visual, gestural, and embodied) available in a speaker's repertoire. Translanguaging practices are locally occasioned, thus influenced and shaped by context but also by the affordances of the particular communication modes or combinations thereof in context. Translanguaging practices are typically language from below and are liable to be seen as infringing purist monolingual or regulated bilingual language ideologies and hence can be understood as speaking back, explicitly or implicitly, to these ideologies.

Lin (2015, p. 23) coined the phrase "grassroots trans-semiotizing" to characterise the activities and creative productions of individuals and communities that she studied, linked trans-locally, such as hip-hop communities who draw on local and trans-local language, dance, visual art and other resources, as well as local and shared values, and share their work on the Internet, thus becoming part of larger trans-local groupings by way of shared creative collections of hip-hop recordings. She describes the work, as one example, of a Hong Kong-based hip-hop artist who drew on examples from the USA in producing anti-war music and street-art/graffiti with lyrics and messages that crossed the boundaries of oral and written language, of English, Chinese and Cantonese.

We can see from the above that the multimodal approach continues to find a compatible home in contemporary work on translanguaging and trans-semiotics and is increasingly relevant in the context of burgeoning new electronic and digital technologies and contemporary conditions of increasing language complexity in multilingual settings.

Theoretical linkages and departures

Multimodality research does not have a substantive social theoretical base of its own beyond Halliday's social semiotic emphasis on communication, where attention to the social, to interactional theories and to analysis of social hierarchies and power dynamics is relatively undeveloped. As a result, various multimodal studies have drawn on other social theories and research traditions to underpin some of their analyses. Jewitt (2005) drew on Vygotskian activity theory to help her fill out her account of the dynamics of the classrooms she studied. Bezemer and Kress (2008; 2016) in their examination of the changing nature of textbooks drew on Basil Bernstein's (1996) sociology of education, including his ideas on discursive structures, pedagogic discourse, contextualisation and recontextualisation. Several multimodality researchers have drawn on the situated ethnographic study of social practices from the New Literacy Studies approach to make sense of the semiotic activity that they observe (Mills, 2010; Pahl and Rowsell, 2012; Rowsell, Kress and Street, 2013). Most recently, some researchers who have previously worked on multimodality and the new literacies have become critics of the approach. Under the influence of more recent new materialist and post-humanist work, including a turn to Deleuze and Guattari (1987) and Barad (2007), researchers have come to question aspects of the social semiotics approach underpinning

multimodality studies, particularly the emphasis on sign-making and -taking as reflecting the design intentions of sign-makers and takers (Leander and Bolt, 2013; Kuby and Rowsell, 2017). They have come to question the representational and rational or purposeful elements implicit in the notions of sign-making and of design that are central to multimodality studies and the ‘new literacies’ studies of the NLG, and argued for a more embodied, physical or sensual, as well as fuzzy and less coherent and rationalised, in-the-moment, response to media and signs, on the part of children at play as well as youths and everyone else.

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