RASK 55
SPRING 2022

Dematerialization

THEO VAN LEEUWEN

Centre for Multimodal Communication, University of Southern Denmark

ABSTRACT
There is an increasing interest in multisensorial communication and the potential of materiality for meaning-making, both in semiotic practice and in semiotic theory. At the same time digital technology and synthesization reduce the multisensoriality and material diversity of semiotic artefacts. The paper explores this tension between materialization and dematerialization in a range of historical and contemporary contexts, with particular attention to its crucial importance in organizational communication.

KEYWORDS
Dematerialization, materialization, organization studies, semiotics, colour, plastic, digital technology

1 Materiality and meaning

For several centuries, both practitioners and theorists believed that the meaning of semiotic artefacts and performances stems, not from their materiality, but from their design, their immaterial, underlying form, especially in the most highly valued domains of culture. The meaning of a play was thought to have been fully formed by the playwright's script, not also by the way it was performed by actors, the meaning of a piece of music by the score, not also by the way it was performed by musicians. Actors and musicians had to stick to the text and bring it to audiences with skill and conviction, but without changing the meanings enshrined in the scripts or scores.

Artists, too, did not use materiality as a means of expression. Painters, however different their styles, all used canvas and oil paint, sculptors bronze and marble, composers the same standard combinations of musical instruments, such as the string quartet or the symphony orchestra. As a result, different materializations of artistic, literary, and musical works could be regarded as the same – reproductions of well-known paintings, miniature versions of famous sculptures, piano versions of orchestral works, and so on.

Although such practices still continue, for instance in classical music, there has, for more than a century now, been a counter-movement. Already in 1912, a Futurist manifesto urged a return to materiality in sculpture (Boccioni, quoted in Apollonio 2009: 65):

leeuwen@sdu.dk

> Destroy the literary and traditional 'dignity' of marble and bronze statues. Refuse to accept the exclusive nature of a single material in the construction of a sculptural whole, insist that even twenty different types of materials can be used in a single work of art in order to achieve plastic movement. To mention a few examples: glass, wood, cardboard, iron, cement, hair, leather, cloth, mirrors, electric lights etc.

Many artists began to put this into practice. The collages of the German Dada artist and writer Kurt Schwitters (1887-1948), for instance, used a wide range of materials. In *Opened by Customs* (1937) he daubed oil paint and crayon marks on a collage of wrapping paper, a fragment from a German newspaper containing travel-related words such as "boarding pass", "baggage insurance", and "sleeper car", a scrap of paper with the word "Norway" on it, a blue label for Spanish oranges, a label with the words "Opened by customs", and German postage stamps, all this to tell the story of his life as a refugee from Nazi Germany. At the same time, composers began to use everyday sounds as instruments, in a way that would soon become commonplace in film soundtracks. The French composer Erik Satie (1866-1925) added a typewriter to the orchestra, the American avant-garde composer George Antheil (1900-1959) a propellor, and George Gershwin (1898-1937) a taxi horn. The Futurist composer Russolo (1885-1947) even created a noise orchestra with instruments such as buzzers, bursters, a thunderer, whistlers, rustlers, gurglers, a shatterer, a shriller and a snorter, and the Dada poets of the 1920s created "concrete poetry", working with the expressivity of the sounds of speech, rather than the meaning of words. Students of the Bauhaus, in the early 1920s, had to explore a wide range of materials before they were allowed to enrol in specific workshops such as furniture making, ceramics, graphic design, and weaving. As documented by their teacher Johannes Itten (quoted in Fiedler 2006: 365):

> As an introduction, long lists of different materials such as wood, glass, textiles, bark, pellets, metal and stone were recorded. Then I had the optical and tactile qualities of these materials assessed. It was not enough simply to recognize the qualities. The characteristics of the materials had to be experienced and described. Contrasts such as smooth-rough, hard-soft, and light-heavy not only had to be seen but also felt.

Materiality also began to play a role in education. Friedrich Fröbel, who, in 1837, had opened the first 'Kindergarten', gave young children blocks in the shape of spheres, cubes and cylinders, so they would become "sensitive, inquisitive children with uninhibited curiosity" (quoted in Elkind, 1997) and at the same time master the first principles of mathematics. Today, early childhood educators still encourage children to use recycled materials such as egg cartons, cardboard boxes, and bottle tops, to play with water and sand and to mess with finger paints. Here, too, as in the Bauhaus, the physical experience of materiality is seen as the foundation of meaning-making. Ormerod and Ivanic (2002: 69-72) gave many examples of children's creative use of material resources in their study of the school projects of year 4-6 primary school children in a small town in northwest England (the children were free to choose the subject of their project work):

> [I]n her project on birds, Denise attached feathers and broken eggshells to the pages [...], on one of his pages in his project on aggressive blading, Robbie carefully smeared some [...] rollerblade wax [...], and Ray includes some thick card tickets in his railway project. [...] Kyrah's butterfly collage contains wood shavings created from sharpening coloured pencils [... and] Lucy created her beautiful embroidered picture of an owl out of silk fabric and thread, using the different stitching devices on her mother's electric sewing machine to create the impression of the delicate intricacy of the bird's feathers.

Organizations are increasingly aware of the potential of materiality, especially for branding. Aiello and Dickinson (2014) have described the central role of materiality in a major re-branding project of Starbucks. In 2009, architect Arthur Rubinfeld designed a "Kit of Parts" store design model for the company, specifying the kinds of colour, furniture, light fixtures, murals, and artwork local designers were to use in "creating seemingly distinctive looks" to express key Starbucks values – environmental sustainability by using local recycled materials, community-orientation by using large community tables, and authenticity by using "purposefully grainy, rough, uneven" materials. Abstract meanings and values were expressed by the physical qualities of the materials used in the re-design of the company's coffeeshops (ibid: 308), which should be "filled with knotty and discoloured wood panelling, live-edge granite countertops, scratched slate boards, cracked leather armchairs, clotty concrete ceilings, unpolished metal fixtures, stools and sinks, and rustic canvas ropes and wall tapestry".

In this essay I will trace the role of materiality in meaning-making in diverse historical and contemporary situations and spheres of meaning-making, but, in line with the theme of this special issue, pay special attention to organizations. As many scholars in the field of organization studies have come to realize, "matter matters" (Carlile et al. 2013). A special issue of the journal *Organization Studies* titled "The Material and Visual Turn in Organizational Studies" (Boxenbaum et al., eds, 2018) sees 'the material turn' as a turn to *sociomateriality*. "All materiality", the journal's editorial argues, "is social in that it was created through social processes and is interpreted and used in social contexts and all social action is possible because of some materiality" (ibid: 601). The task is now, the editorial says, to "detail how the social realm and the material realm become intertwined and what effect these processes have on organizational practice" (ibid). To do so, organization studies and social semiotics have recently linked up in a number of publications (e.g. Meyer et al. 2013, Höllerer et al. 2018, Höllerer et al. 2019, Ravelli et al. forthcoming).

But while social semiotics is indeed well placed to use materiality as explicit evidence for claims about the social, it, too has only recently had its own 'material turn', as I will discuss in the next section.

2 Modes and media

In the Western tradition of semiotics, materiality has long been regarded as not-yet-meaningful, 'pre-semiotic'. Saussure (1974: 12) described the materiality of speech, its 'phonic substance', as "a vague plane of sounds", and Hjelmslev (1961), while recognizing that signs have substance, did not see this as playing a role in the process of meaning-making. To talk about language was to talk about form, not substance, about the shape of the mould, not about the stuff that is being moulded by it. And while Halliday wrote extensively about the differences between speech and writing, he did so on the basis of lexical and grammatical criteria, not on the basis of their different materiality (e.g. Halliday 1985). But from the 1990s onwards, social semioticians gradually began to realize that "signifier materials" such as "the surfaces of production (paper, rock, plastic, textile, wood, etc), the substances of production (ink, gold paint, light, etc.) and the tools of production (chisel, pen, brush, pencils, stylus, etc)" (Kress & van Leeuwen 2006: 216) are also involved in meaning-making, that "the material production of a design is not just the execution of something already complete", but a source of meaning itself (ibid: 215).

Kress and van Leeuwen (2001) addressed this issue by distinguishing between 'modes' and 'media'. Despite its central importance in multimodality studies, the term 'mode' has been somewhat elusive (see Holsting & van Leeuwen 2016). Often it is simply defined through examples ("image, writing, gesture, speech, posture"; Jewitt 2014: 1). Other definitions implicitly or explicitly use linguistics as a model and do not refer to the material differences between speech and writing, image and sound, and so on, as in this definition by Lemke (quoted in Andersen et al. 2015: 126), who defines mode as "a system of meaningful contrasts between forms in a community that has conventions for the interpretation of those forms and contrasts as paradigms and syntagms".

Yet other definitions do include materiality. Bateman et al. (2017) introduce the term "canvas" for the materials in and through which meanings are inscribed, and defined modes as semiotic systems which have distinct material realizations and organize which kinds of material forms can stand for which kinds of meaning. Media they then define as specific *combinations* of modes, together with their canvases, for instance, books, films, websites, etc. By contrast, Kress and van Leeuwen (2001) define 'modes' as resources for the design, rather than the production of semiotic artefacts and performances, as *abstract* ways of organizing meaning which can be realized in materially *different* media. Thus language is a mode in this sense because it can be materialized as speech or as writing. The compositional structures Kress and van Leeuwen describe in their book *Reading Images* (Kress & van Leeuwen 2021) also constitute modes because they can be realized in materially different ways — as drawings, photographs, paintings, and the like. 'Media', or more precisely 'production media', they then define as the material resources that not only realize these structures but also produce meaning in their own right: In the case of speech, for instance, this occurs through qualities of voice such as being smooth or rough, high- or low-pitched, and so on, in the case of writing through graphic qualities such as that letter forms may be round or angular, regular or irregular, and so on. Such qualities are physical qualities, but they can come to stand for more abstract meanings, in the way that the discolourations of wood panelling or the roughness of metal fixtures can come to stand for 'authenticity' in the context of the re-branded Starbucks coffeeshops described by Aiello and Dickinson (2014). Van

Leeuwen (e.g. 2021), following Jakobson and Halle (1956) has called such qualities "distinctive features". "Distribution media" are then similar to what Bateman et al. call 'media', resources for recording and/or distributing semiotic products or performances. But such distribution media are not neutral containers. They come with cultural values. Social media, for instance, embody values such as participation and judgment on the basis of affect ('likes'). Nor is the distinction between production media and distribution media watertight – technical distribution media often become involved in the creative process.

Modes and media, according to Kress and van Leeuwen, not only make meaning in different ways, but they also make different kinds of meaning. Modes make ideational, interpersonal, and textual meanings through signifying systems and schemas, grammars and genres, that can be realized in different material forms. The grammar of language applies to speech as well as writing, the compositional structures described by Kress and van Leeuwen (2021) apply to drawings, paintings, sculptures, and so on, and narrative structures, as Barthes already noted (Barthes 1977: 79) can be "carried by articulated language, spoken or written, fixed or moving images, gestures, and the ordered mixture of all these substances".

Media, on the other hand, regardless of whether they are performance media such as the voice and gestures or media used in producing artefacts of one kind or another, make meaning on the basis of our physical experience of and with these media, and they do so in non-systematic, creative ways, always adjusting to the specific situations in which they are made. With regard to performance media, I often use the example of vocal tension. We have an embodied knowledge of how, as we tense the muscles of our throat, our voice becomes higher, sharper, and brighter, and we also know when this happens, when we are excited, for instance, or anxious, or when we feel anger welling up – many things can cause tension. Which of these meanings pertain in a given instance will depend on the situational or cultural context. Lomax, for instance (1968: 194), has noted the high degree of vocal tension (and nasality) in the voices of the most favoured women singers in cultures that have a high degree of repression of women (very early marriages, clitoridectomy, severe sanctions for adulterous women, etc.) – in those cultures such voices are then regarded as beautiful.

Irregularity in the shape of graphic signs, for instance letter forms, is another example (Johannessen & van Leeuwen 2018) – again, we all have experience of what can cause irregularity in writing, drawing and other forms of 'trace making': lacking the skills to produce regular writing, as for instance in the case of young children; a dislike of regularity, rebelling against it, perhaps; tools and materials that make it difficult to produce regular writing; intoxication or infirmity of the hand, and so on. We also know that handwriting, however carefully executed, is always more irregular than print. It is on the basis of such common experiences rather than on the basis of systems, and in relation to the contexts in which we encounter irregularity, that we can, for instance, recognize irregular handwriting in an advertisement for pain killers as expressing agony, on the cover of a punk rock CD as rebellion, on the cover of a children's book as playful and whimsical.

Features such as vocal tension and regularity are not binary, either/or choices (+ tense, + regular), they are graded, a matter of degree, and they combine with other features – vocal tension with pitch range, loudness, breathiness, roughness, and so on; regularity with curva-

ture, boldness, horizontal and vertical extension. These, in turn, combine with the features of other parameters of materiality – the features of voice quality with the features of facial expression and body movement; the features of shape with the features of colour and texture, and more. It is the combination of all these different features, in their different proportions, that creates the overall meaning.

Needless to say, endless combinations are possible, and this is precisely why this kind of meaning-making plays such an important role in contemporary communication generally and in corporate communication specifically, for instance in marketing and branding. In this context, innovation and constant change are expected, and meanings, like consumer goods, must be customized and individualized, yet also shared, so as to serve the needs of identity design and branding. Such forms of communication, ultimately stemming from the practice of advertising, start with something that needs to be expressed (a 'brief') and then choose apt signifiers, colour palettes, fonts, textures, and more, to express it, in a way that must always seem distinct and innovative. In short, it is the semiotic process which Gunther Kress came to call 'design' (Kress 2003: 49): "Design", he said, "asks what is needed now, in this one situation, with this configuration of purposes, aims, audience, and with these resources".

Configurations of features can of course also be recognizable on the basis of 'provenance', of 'where they come from', from which historical periods, cultures, or other contexts. Their meaning is then based on the ideas and associations that cling to these contexts. Designers constantly draw on such cultural and historical references, which does not mean that their audiences or users always know the exact provenance of the signifiers they may recognize as 'authentic', 'classy', 'exotic' and so on; John Berger (1972: 140) formulated this memorably: "They should not be understandable, they should merely be reminiscent of cultural lessons half-learnt".

3 Materialization and dematerialization: the case of colour

Over time, modes can become media, and media can become modes. In the former case, a process of materialization takes places, in the latter case a process of dematerialization. In his study of the history of stripes, Pastoureau (1991) shows how, in Medieval times, striped clothes were mandated for "outcasts and reprobates" and subject to precise regulations such as adherence to just two colours or equidistance between stripes. Although this may still play a role in certain uniforms or forms of ceremonial dress, in today's lifestyle fashions such rules have disappeared, and stripes make meaning – identity meaning – on the basis of provenance and experiential meaning potential. They can be wide or narrow, horizontal or vertical, closely or less closely spaced, black and white or multicoloured, and so on. van Leeuwen (2022: 69-70) in a discussion of typography, discussed the meaning potential of 'wide' and 'narrow' as based on our experience of space. Widely spaced elements or letter forms "spread themselves around [...] claiming large amounts of territory for themselves, narrowly spaced elements or letter forms are precise and economical in their use of space". Such meanings are then filled in differently - and valued differently – in different contexts (Pastoureau, 1991: 68): "Both the banker and the gangster wear striped suits and shirts, but it is absolutely not a matter of the same stripes: narrow and discrete in the first case, wide and garish in the second".

In many cultures, colours have been, and still are, defined in material terms.[1] In Gu-jingarliya, an Australian Aboriginal language, for instance, red is co-classified with a range of very light colours. Here 'red' refers to qualities such as shiny, glistening, reflective, bright, rather than to hue – the best example of 'red' is reflective foil (Wierzbicka 1996: 318). Tzotzil-speaking Mayan weavers in Mexico distinguish colours, not only on the basis of hue and value, but also on the basis of material qualities such as texture and opacity (MacKeigan & Muth 2006: 27). Such cultures "have difficulty accepting the parameters of colour as defined by Western culture (tone, value, saturation). For a given colour it is sometimes more important to know if it is dry or moist, soft or hard, smooth or rough, than to decide if it is part of a range or reds, blues or yellows" (Pastoureau 2019: 233). In the West, too, colours were defined on the basis of their materiality. In Ancient Rome, for instance, yellow was not just yellow. It had different meanings, values and uses, depending on whether it was made from the yellow flowers of the genista, a thorny scrub, from weld, another plant, which required a more complex production process, or from saffron, the pistils of crocuses with yellow flowers, which was the most expensive yellow dye, as it required a large quantity of pistils to produce a small amount of dye (Pastoureau 2019: 48). Such colours were valuable for their materiality. In the Middle Ages, art patrons would commission the use of specific blues or reds or yellows, and expensive colours were reserved for highly valued subjects. Ultramarine, for instance, was used for the mantle of the Virgin Mary, as it was made from lapis lazuli, a semi-precious stone that had to be imported from 'across the sea' (*ultra marine*).

But from the 12th century onwards, colour, "which had long been defined as matter, became a concept, an abstraction, a thing in and of itself, distinct from its materiality and its medium" (Pastoureau 2019: 76). This transformation applied only to certain colours, colours which were socially *recognized* as colours, as "categories established by society and conceived in an almost abstract way" (ibid: 14), and it played a fundamental role in developing the Medieval symbolism of colour in liturgy and in heraldry. Symbolism, Pastoureau concluded (ibid: 86), "only truly and effectively comes into play once colours have become dematerialized and retain their meanings regardless of the technique used to produce them, or the medium in which they appear." Yellow, for instance could be "light, bright, saturated, diluted [but] this had no importance or meaning. What counted was the idea of yellow, not its material expression" (ibid). And in heraldry, too, colours were thought of as "absolute, conceptual, almost immaterial: the tones do not matter". *Gules* ('red'), for example, could be "vermilion, cerise, carmine, garnet red, etc. What counts is the idea of red and not the material and chromatic representation of that tincture" (ibid: 46). All this was reflected in the way colour was talked about: "Colour terms, which had long remained adjectives, now became standard nouns" (ibid: 76).

1 Materiality invokes the issue of sustainability. Colour dyeing, for instance, is a major source of water pollution, turning lakes and rivers black and killing aquatic plants and animals in countries like China and Bangladesh. The production of a single pair of jeans takes 7500 litres of water, and every time a new colour is introduced, so are new chemicals, dye stuffs, and catalysts (Regan 2020). Digitalization is often seen as a remedy – and does of course contribute to the dematerialization of colour. But digitalization brings its own sustainability issues. Apple, Google, Dell, Microsoft and Tesla all rely on cobalt mined in the Democratic Republic of the Congo, often using child labour, which has led to the death and serious injury of many children (Kelly 2019). Data storage in remote servers, the so-called 'clouds', requires huge amounts of electricity to cool the heat these servers generate. Information about this is difficult to come by, as data are not being compiled (Energy Innovation 2020).

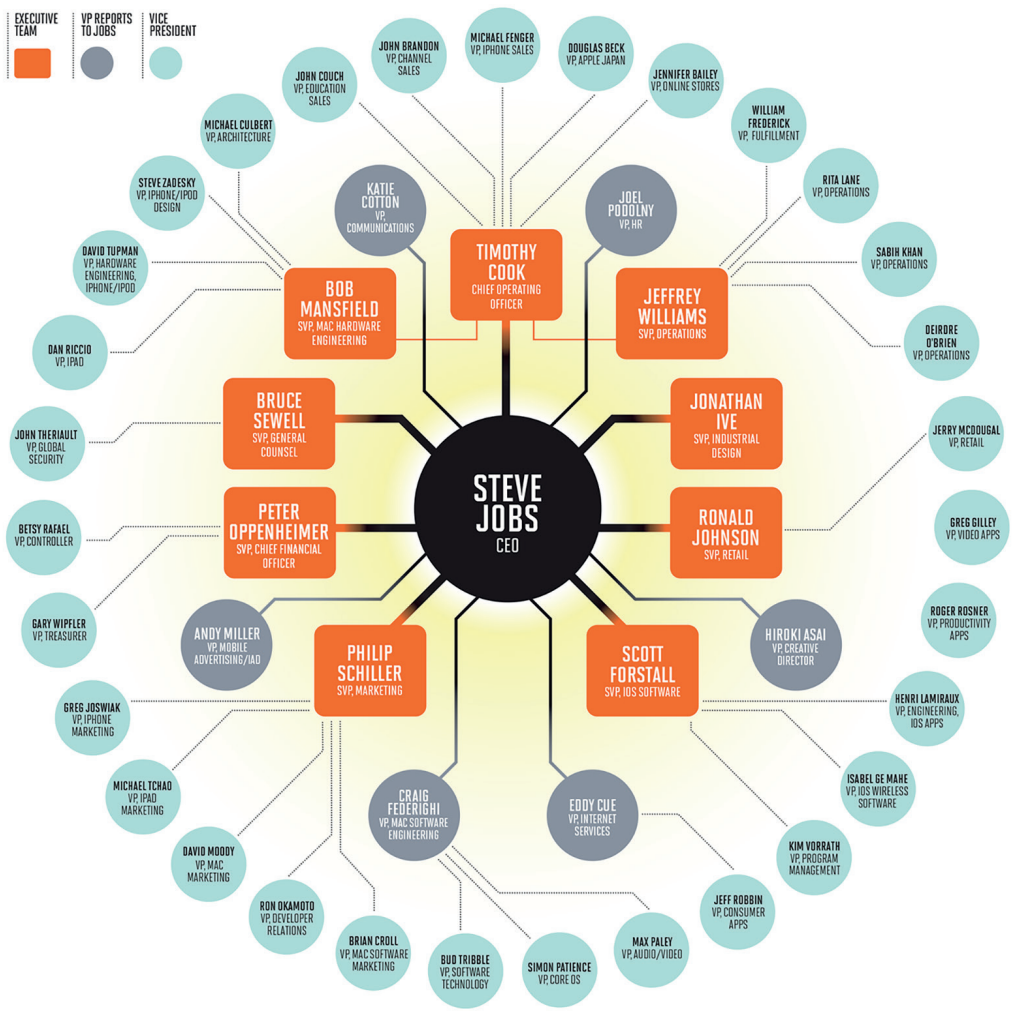
Technological developments accelerated the dematerialization of colour. Around 1600, in Dutch painting, a new technique allowed each particle of pigment to be coated in a film of oil which insulated it against chemical reaction with other pigments that were also present in the medium in which they were suspended. This allowed differently coloured particles to retain their own colour in a mixture and made mixing much easier and much more effective. Instead of a vast collection of materially distinct colours, colour now became a semiotic *system* with just five elementary colours (black, white, yellow, red, and blue) from which all other colours could be mixed. Once this abstract system existed it could be realized in materially different forms - not only in the form of paints and dyes, but also in the form of photographic emulsions, the phosphor dots on our computer screens, and so on. Colour changed from being understood and used as a 'medium' to being understood and used as a 'mode'. It dematerialized. We should therefore not ask for a definitive, definitional answer to the question: "Is colour a mode or a medium?" Colour can be either, and which it is, depends on historical circumstances and the reactions to these circumstances by historical agents. It can be understood and used as a mode in some contexts, as a medium in others. It is even possible, as Pastoureau has shown, for some colours to be understood and used as a mode and others as a medium in the same context. In first century Rome, for instance, red, black, white and yellow, were recognized as colours, and even had specific guilds of dyers devoted to them – green and blue were not (Pastoureau 2019: 62-63): "It is society that 'makes' colour, that gives it its definitions and meanings, that organizes its fields and modes of operation, that articulates it into multiple codes and value systems" (ibid: 8).

However, despite its dematerialization, colour is, today, in many ways used as though it is a medium – to express identity, whether personal or corporate, and it plays a key role in many organizational practices. In figure 1, an Apple organization chart, the colour blue represents vice-presidents (the circles in the outer ring), the colour orange the executive team (the rectangles in the inner ring) and the colour grey vice-presidents reporting to the CEO (the circles in the inner ring). The black circle in the centre represents Steve Jobs, the CEO, and has a white aura that shades into an intense yellow which desaturates as it gets closer to the outer ring, perhaps representing the radiance of Jobs' charisma. The lines that connect him to his reports gradually shade from the black of the central circle to the orange of the executive team and the grey of the vice-presidents. According to Kress and van Leeuwen (2021: 201), circular compositions of this kind present the centre "as the core element with which all the other elements are associated, to which all the other elements in a sense belong and from which they draw meaning and coherence". Here, colour, in conjunction with the shapes of the circles and rectangles, adds a message about the intensity, the affective depth of that 'belonging' and that identification with the corporate culture which Jobs personified.

Many organizations use specific colours to denote their unique identities. Car manufacturers ensure that the dark blue of the BMW differs from that of a Volkswagen or a Ford and legally protect 'their' colours, so that others will not be able to use them, using the Pantone Matching System (PMS) with its thousands of colour specifications. Even Universities do this. The U.K's Open University, for instance, stipulates: "Two colours, for formal applications such high-quality stationery and degree certificates – blue (reference PMS 300) for the shield and lettering, and yellow (PNMS 123) for the circular inset. Single colour stationery should be blue (PMS 300) if possible" (Goodman & Gradol 1996: 119).

Often such colours combine in colour schemes. The logo, the lettering on aircrafts and the cabin crew uniforms of THAI airlines, for instance, use gold, magenta and purple. These colours were chosen for their provenance as they reflect "the culture and the country" and "recall the gold of temples, the intensity of Thailand's famous shimmering silks and the brilliant hues

Figure 1. Apple organizational diagram



of the orchids" (THAI, 2010). Such colour schemes, even though they are no longer bound to a specific materiality, are chosen on the basis of experiential meaning potential and/or provenance and closely tied up with specific contexts, making the kind of meanings that are characteristic of 'media' rather than 'modes', and allowing for ever different and ever (to at least some degree) new designs.

Semiotic software such as Word and PowerPoint provide for this kind of meaning making by offering a plethora of pre-set colour schemes with names that suggest the kind of meanings they are meant to make: "Urban monochrome", "Metropolitan", "Future Forward, "Office", "Dividend", "Boardroom", as well as "Feathered", "Earthy Inspiration", "Floral Flourish", "Droplet", to give just some examples. These meanings accord with the key values of contemporary corporate cultures, in which, as Machin has put it (2004: 330-31), "connotations of serenity, escape and freedom bring a sense of 'philosophy' or even morality to the corporate world of branding and consumerism" and in which "positive thinking is a crucial moral value." Digital semiotic resources of this kind therefore on the one hand seek to bring back the multisensory meaning potential of materiality, to re-materialize what has become virtual and dematerialized, yet at the same time fail to do so.

When David Hockney began to use digital 'paint brush' technologies to create landscape paintings on a tablet, some critics praised the way he extended the representational potential of digital media, others, such as Adrian Searle, the art critic of *The Guardian* (January 16, 2012) saw only failure: "What he actually lacks is touch itself [...] the [landscapes] can never hide their electronic origin, no matter how painterly they appear. There is something inescapably dead and bland and gutless about them".

Hockney himself disagreed: "It is thought that new technology is taking away the hand. I'm not so sure. If you look around, a lot is opening up" (quoted in van Leeuwen & Johannessen 2022: 30). Perhaps he is right. Print has "taken away the hand" a long time ago, but that has not destroyed poetry, and while the synthesized sounds of today's electronic instruments are no longer made directly with the mouth or the hand, musicians still have melody, harmony, and rhythm to work with and can do so in uniquely personal ways.

In the next section I will deal more fully with digital resources and their impact on dematerialization.

4 Materialization and dematerialization and digital technology

Digital semiotic resources may make communication more multimodal, but they cannot make it more *multimaterial*, and that shows in all the domains in which the 20th century had begun to re-introduce materiality. Although David Hockney exhibits his tablet art both on actual tablets and in the form of large prints, they do not have the multimateriality of art works such as those of Schwitters. Manufacturers of digital semiotic resources try to compensate for this by providing the same devices with different covers in faux leather, marble, silk, and more, yet while they look like the materials they simulate, they do not feel like them. In education, the monomateri-

ality of the screens of tablets and mobile phones does not allow the tactile learning early childhood educators propagated — from the point of view of a semiotics of materiality, the 'touch screen' is a very unresponsive surface as the different gestures it allows us to make (tapping, pinching, dragging and so on) can ever only produce a visual and not a tactile response. Yes, the screen can be touched, but there is only one thing to touch – glass. No wonder that some educationalists worry, for instance Armstrong (2006: 78): "Television and computer screens are not the sensory-rich environment that young children need in order to exercise their multimodal brains [...] young children need hands on interaction with the content of the real world".

In other ways, too, tactile (and olfactory engagement) with the material world is flattening out. The book is no longer an object with distinct physical qualities, no longer offers "the multisensorial experiences ignited through smelling the paper, ink, and the glue used to make paper books, the grassy notes and the tang of acids or a hint of vanilla over an underlying mustiness" (Strlič et al. 2009: 8618). When buying clothes online, we cannot touch the fabrics or fit the clothes; when buying groceries online we cannot test the ripeness of a peach or an avocado; when skyping or zooming we cannot sense the bodily presence of others, touch, share food and drink. In all these cases we get only text and image, rather than a full multi-sensorial engagement.

Materials themselves also dematerialize, paradoxical as that may sound. This began with plastic, which originally developed as a surrogate for scarce luxury materials such as ivory, shellac, and mother-of-pearl, but soon became a mode, a material able to represent almost all configurations of material qualities without having any of its own. It can be made available as sheets, fibres, foams, pellets and more. It can be hard or soft, heavy or light, thin or thick, red or green and so on. In short, it is a system to *signify* material qualities, a material that "adapts itself to the syntax of the design in the same way that the words of a language adapt themselves to the syntax of a text" (Manzini 1990: 138). As Baudrillard (1996: 112) put it: "The manufacture of synthetics signifies for materials a stepping back from their natural symbolism towards a polymorphism, towards a superior level of abstraction which enables a game of universal associations to take place".

3D printing takes this a step further still – and until recently could only produce plastic objects, though it can now also use metals and ceramics. It can make aeroplane parts, prosthetics, firearms, Nike shoes, and even entire cars – but always with the same procedure of building the objects by layering very thin cross-sections, and always with a single material – multimaterial printing is not (not yet?) possible.

Perhaps as a result of all this, there is a renewed hankering for touch, in art as well as in many other practices, for instance in interior design, as seen in the redesign of Starbucks coffeeshops. Paint manufacturers such as Dulux try to regain the materiality of colour, presenting a wide range of paints defined in terms of material qualities and provenances (Completecraft 2020):

> Popularity in texture continues to grow [...] *Metallic* creates the subtle polished sheen or precious metals on your walls, doors, trim or furniture, *River Rock* [is] a subtle texture inspired by weathered rock from nature's riverbeds that adds a

> natural ambience to your room and *Pearlustre* is an intriguing and luxurious lustre which adds vibrancy and radiance to your home.

Semiotic software such as PowerPoint offers textured backgrounds such as 'recycled paper', 'marble', 'tissue paper', 'canvas', 'cork' and 'oak', and even allows users to manipulate these textures, to make the weave of fabrics or the grain of wood more or less dense, more or less pronounced, more or less regular (Djonov & van Leeuwen 2011). But it can ever only show those aspects of texture that throw shadows – relief, density, and roughness, together with their (in) consistencies and (ir)regularities. Qualities such as liquidity, viscosity, rigidity, and in some cases temperature, cannot be rendered visually other than by showing objects they are qualities of - dryness by showing images of cracked soil or old wood, wetness by showing droplets on a bunch of grapes or sparkling water in a glass, the softness of velvet by showing velvet dresses or theatre curtains. There remains an element of dematerialization, even in these attempts to bring materiality back.

It is no wonder that the technology companies seek to make up for this sensory deficit by attempting to make their products more multisensorial – virtual reality platforms with immersive 3D stereoscopic vision, scent diffusors, touch screen gloves, motion simulators in chairs, back and leg ticklers, and even experiments with the simulation of taste, through electric current applied to the tongue (Ranasinghe & Do 2016). But these technologies all focus on multisensoriality rather than multimateriality, on sensation, or perception, rather than on the interaction between our bodies and the qualities of material objects, on multisensoriality rather than on multimateriality.

5 Coda

The contemporary tension between (re)materialization and dematerialization exists also in social semiotics itself. On the one hand there is a 'material turn', a renewed interest in the way materiality makes meaning. On the other hand, this has led us, paradoxically, to frameworks for identifying *abstract* parameters such as shape, colour, texture, and *abstract* qualities such as regular/irregular, wide/narrow, tense/lax and so on ("qualisigns", as Peirce called them; 1965: 243-246), parameters and qualities which can be applied to different materials, and which can therefore readily be incorporated into digital technologies.

Poststructuralism sought to rescue the pure embodiment, the pure sensation, the *jouissance* that can come from engagement with materiality — Barthes "grain of the voice" (Barthes 1977), for instance, and Julia Kristeva's writings on colour, which she saw as on the one hand "situated within the formal system of painting" (1980: 216) but on the other hand as "an instinctual pressure" which can "destroy normativity" and allow "the subject to escape its alienation within a code" (ibid: 221). But they were fighting a rear-guard action as marketers now enlist affect and *jouissance* for their own purposes, in a new kind of normativity which constitutes a relation between the material realm and the social realm (Boxenbaum et al., eds, 2018).

Perhaps this kind of tension is not new. The Greek philosopher Parmenides, born between 520 and 515 BC, wrote a book in two parts, *The Way of Being* and *The Way of Seeming. The Way of Being* was about logical reasoning. Reasoning, said Parmenides, seeks for what is true and starts from the premise 'either it is, or it is not'. Accepting one of these oppositions means rejecting the other. Once this is done, only being remains — impenetrable, singular, indivisible, a mystery. *The Way of Seeming* is about perception. In perception, said Parmenides, the acceptance of one thing involves the acceptance of its opposite. Light calls forth dark, rare calls forth dense. Perception may be unreasonable, misguided, yet we cannot think without it (see Kirk & Raven 1957).

We can put materiality on a pedestal, as the post-structuralists did, venerate it as *jouissance*, as affect-laden embodiment, or we can explore what we can see, hear, feel, smell, taste, in all its diversity and all its richness, and try to understand how it has been, and continues to be, used to make meaning. And that, for better or worse, is *The Way of Semiotics*.

Some of the ideas in this article have been presented and elaborated in *Multimodality and Identity* (van Leeuwen 2022).

References

Aiello, Georgia and Greg Dickinson. 2013. Beyond authenticity: A visual-material analysis of locality in the global redesign of Starbucks stores. *Visual communication* 13(3). 303-22.

Andersen, Thomas H., Morten Boeriis, Eva Maagerø, and Elise Seip Tønnessen. 2015. *Social semiotics – key figures, new directions*. London: Routledge.

Apollonio, Umbro (ed.). 2009. *Futurist manifestos*. London: Tate Publishing.

Armstrong, Thomas. 2006. *The best schools - How human development research should inform educational practice*. Alexandria, VA: ASCD Books.

Barthes, Roland. 1977. *Image, music, text*. London: Fontana.

Bateman, John, Janine Wildfeuer, and Tuomo Hiippala. 2017. *Multimodality – foundations, research and analysis – A problem-oriented introduction*. Berlin: De Gruyter Mouton.

Baudrillard, Jean. 1996. *The system of objects.* London: Verso.

Berger, John 1972. *Ways of seeing*. Harmondsworth: Penguin.

Boxenbaum, Eva, Candace Jones, Renata Meyer, and Silviya Svejenova. 2018. Towards an articulation of the material and visual turn in organization studies. *Organization studies* 39(5-6). 597-616.

Carlile, Paul R, Davide Nicolini, Ann Langley, and Haridimos Tsoukas (eds.). 2013. *How matter matters: Objects, artifacts and materiality in organization studies*. Oxford: Oxford University Press.

Completecraft. 2010. Completecraft. https://www.completecraft.com.au.articles.

Djonov, Emilia and Theo van Leeuwen. 2011. The semiotics of texture: From tactile to visual. *Visual communication* 10(4). 541-64.

Elkind, David. 1997. Play's the thing. *New York Times*. 7 September 1997.

Energy Innovation. 2020. How Much Energy Do Data Centers Really Use? https://energyinnovation.org/2020/03/17/how-much-energy-do-data-centers-really-use/

Fiedler, Jeannine (ed.). 2006. *Bauhaus*. Königswinter: Tandem Verlag.

Goodman, Sharon and David Graddol. 1996. Redesigning English: new texts, new identites. London: Routledge.

Halliday, M.A.K. 1985. *Spoken and written language*. Geelong: Deakin University Press.

Hjelmslev, Louis. 1961. *Prolegomena to a theory of language*. Madison: University of Wisconsin Press.

Höllerer, Markus, Thibault Daudigeos, and Dennis Jancsary (eds.). 2018. *Multimodality, meaning and institutions*. Bingley: Emerald Publishing.

Höllerer, Markus, Theo van Leeuwen, Dennis Jancsary, Renata E. Meyer, Thomas H. Andersen, and Eero Vaara. 2019. *Visual and multimodal research in organization and management studies*. London: Routledge.

Holsting, Alexandra and Theo van Leeuwen. 2016. 'Mode'. *Key terms in multimodality: Definitions, issues, discussions*, ed. by Nina Nørgaard. https://multimodalkeyterms.wordpress.com

Jakobson, Roman and Morris Halle. 1956. *Fundamentals of language*. The Hague: Mouton.

Jewitt, Carey (ed.). 2014. *The Routledge handbook of multimodal analysis*. 2nd Ed. London: Routledge.

Johannessen, Christian M. and Theo van Leeuwen. 2018. (Ir)regularity. In Christian Mosbæk Johannessen and Theo van Leeuwen (eds.) *The materiality of writing – A trace-making perspective*. London: Routledge. 175-92.

Kelly, Annie. 2019. Apple and Google named in US lawsuit over Congolese child cobalt mining deaths. https://www.theguardian.com/global-development/2019/dec/16/apple-and-google-named-in-us-lawsuit-over-congolese-child-cobalt-mining-deaths

Kirk, G.S. and J.E. Raven. 1957. *The presocratic philosophers*. Cambridge: Cambridge University Press.

Kress, Gunther. 2003. *Literacy in the new media age*. London: Routledge.

Kress, Gunther. 2010. *Multimodality – A social semiotic approach to contemporary communication*. London: Routledge.

Kress, Gunther and Theo van Leeuwen. 2001. *Multimodal discourse – The modes and media of contemporary communication*. London: Arnold.

Kress, Gunther and Theo van Leeuwen. 2006. *Reading images – The grammar of visual design* (2nd Ed.). London: Routledge.

Kress, Gunther and Theo van Leeuwen. 2021. *Reading images – The grammar of visual design* (3rd Ed.). London: Routledge.

Kristeva, Julia. 1980. *Desire in language: A semiotic approach to language and art*. Oxford: Blackwell.

Lomax, Alan. 1968. *Folk song style and culture*. Brunswick NJ: Transaction Books.

Machin, David. 2004. Building the world's visual language: The increasing global importance of image banks in corporate media. *Visual communication* 3(3). 316-36.

Mackeigan, Terri and Stephen Muth. 2006. A grammatical network of Tzotzi-Mayan colour terms. In Carole P. Biggam and Christian J. Kay (eds.) *Progress in colour studies. Vol 1. Language and culture*. Amsterdam: John Benjamins. 25-36.

Manzini, Ezio. 1990. Objects and their skin. In Penny Sparke (ed.) *The plastics age: from modernity to post-modernity*. London: Victoria and Albert Museum. 132-43.

Meyer, Renata E, Markus Höllerer, Dennis Jancsary and Theo van Leeuwen. 2013. The visual dimension in organizing, organization and organization research: Core ideas, current developments and promising avenues. *Academy of management annals* 7. 489-555.

Ormerod, Fiona and Roz Ivanic. 2002. Materiality in children's meaning-making practices. *Visual communication* 1(1). 65-9.

Pastoureau, Michel. 1991. *The devil's cloth – a history of stripes and striped fabric*. New York: Columbia University Press.

Pastoureau, Michel. 1997. *Heraldry – Its origins and meanings*. London: Thames and Hudson.

Pastoureau, Michel. 2019. *Yellow – The history of a colour*. Princeton: Princeton University Press.

Peirce, Charles Sanders. 1965. *Collected papers*. Vol I. Cambridge, Mass: Harvard University Press.

Ranasinghe, Nimesha, Ryohei Nakatsu and Hideaki Nii. 2012. Tongue mounted interface for digitally activating the sense of taste. *Proceedings of the 16th international symposium on wearable computers*. 80-87.

Ravelli, Louise, Theo van Leeuwen and Markus Höllerer (eds.). Forthcoming. Organizational semiotics: Multimodal perspectives on organization studies. London & New York: Routledge.

Regan, Helen. 2020. Asian rivers are turning black. And our colorful closets are to blame. https://edition.cnn.com/style/article/dyeing-pollution-fashion-intl-hnk-dst-sept/index.html

Saussure, Ferdinand de. 1974 [1916]. *Course in general linguistics*. London: Peter Owen.

Strlič, Matija, Jacob Thomas, Tanja Trafela, Linda Cséfalvayová, Irena Kralj Cigić, Jana Kolar, and May Cassar. 2009. Material degradomics: On the smell of old books. *Analytical chemistry* 81. 8617-22.

THAI Airways. 2010. Public information centre: Thai logo. https://www.thaiaifr.infouips/h1013e.htm.

van Leeuwen, Theo. 2022. *Multimodality and identity.* London: Routledge.

van Leeuwen, Theo and Christian M. Johannessen. 2022. Art as research in semiotic technology: The case of David Hockney's digital art. In Ilaria Moschini and Maria Grazia Sindoni (eds.) *Mediation and multimodal meaning making in digital environments*. London: Routledge. 17-32.

Wierzbicka, Anna. 1996. *Semantics – Primes and universals.* Oxford: Oxford University Press.