Chapter 15
Hands, Fingers and iPads

Guy Merchant

Introduction

Tablets buried in alluvial silt beneath the City of London attest to the long history of human entanglement with literacy and its technologies of production and consumption, indeed, recent archaeology pushes back the history of literacy in Roman Britain to the first century CE with the discovery of over four hundred such tablets, many traced with messages hinting at the personal lives of Londoners with their European connections. These tablets are described as being 'roughly the size of the modern iPad' (Smith 2016) portable enough to be a popular writing technology, and add to a catalogue that chronicles facets of everyday life—birthday party invitations, slave exchanges, family correspondence, business transactions and much more (see for example: CSAD 2003). The resurgence of tablets, roughly two thousand years later, is of course the result of many different influences including, amongst other things, the development of the silicon chip, glass with 'projected capacitance' for touchscreens, the availability of lightweight aluminium, small rechargeable battery cells and so on—not to mention the sophisticated transnational supply and distribution networks of companies like Apple—that, and our seemingly insatiable appetite for new gadgets.

Contemporary tablets are a far cry from those thought to be fashioned from recycled barrel staves filled with soot-stained beeswax. Technology has moved on; but yet there is still something striking in this very brief backward glance at the tablets of antiquity. It is this: tablets are made to be held, to be carried, to be transported from a to b. And not only this, they are designed to carry messages so that their users can create and display them; in short the generic description, mobile communication device, is quite fitting. Take the iPad Mini 4—only fractionally

G. Merchant (✉)
Sheffield Hallam University, Sheffield, UK
e-mail: g.h.merchant@shu.ac.uk

C. Burnett et al. (eds.), *The Case of the iPad*,
DOI 10.1007/978-981-10-4364-2_15

larger than the Roman tablet so carefully described by Tomlin (2004), although it is probably a little lighter; according to the manufacturer it puts 'uncompromising performance and potential in your hand' (Apple 2016), making it a handy device to own.

It is this notion of *handiness* that forms the initial focus of the current chapter; the handiness that connects the use of tablets new and old with the day-to-day business of literacy. I start, therefore, with an exploration of current literature on the significance of the human hand as a way of beginning to think about handiness, before turning to the subject of early literacy and what happens—or what might happen, when young children get hold of tablets in their early encounters with touchscreen technology. In doing this I attempt to come to an understanding of how handling tablets is part of the dense weave of growing up in social contexts that are now infused with new technology—technology with a reach and significance far wider than the manual dexterity required to operate them.

Handy Devices

They slide into your pocket, or disappear into the dark recesses of your bag, today's tablets may be slippery objects, but one thing that remains fairly constant in studies of mobile literacies is the 'new' work of hands and fingers. For example, Rowsell (2014) draws attention to gesture and touch; physical actions have been described (Crescenzi et al. 2014), holding and tapping have been examined (Merchant 2014); and Potter and Bryer (2017) develop the idea of 'finger flowment'. These studies sit alongside a growing interest in socio-materialism, the relationship between material and discursive practices (Lenz-Taguchi 2010; Kuby et al. 2015) and the ways in which they are imbricated in literacy in general, and early literacy learning in particular. From this perspective the co-mingling of things, bodies and semiotic resources might constitute a way of telling the history of literacy and, notwithstanding the fact that this privileges the able-bodied, it would be a history dominated by the work of the hands. As a basis for reflecting on what this might look like in the study of touchscreen tablets in early literacy, I turn now to two landmark studies of the hand, as a way of grounding this notion of handiness.

First, in the work of the neurologist Wilson (1998), we have a thorough exploration of what the hand does, the bone structure and muscular attachments that enable rotation, different intensities of gripping, holding, throwing and all the rest. Wilson shows that in precision movement, the eye works alongside the hand, and in a section that is surely of interest to literacy scholars, he focuses on the precision grips used in the manipulation of small tools—what he calls the 'writing/drawing cluster' (p. 158). Referencing the French psychologist Guiard, he notes how we use *both* hands in print literacy practices:

> Guiard showed that the nondominant hand plays a complementary, though largely covert, role by continuously repositioning the paper in anticipation of pen movement.
>
> (Wilson 1998: 159)

Of course a similar coordination of hands is also important in book reading, typing and text messaging. Although Wilson's central thesis about the hand-thought-language nexus and its origins in evolutionary biology are by nature speculative, he provides us with important insights into the anatomy of handiness and the role of hands in our experience of the body in context. Literacies, whether they involve the action of a stylus on wax, keyboard strokes, or the turning of a page all privilege manual dexterity.

Second, there is Tallis's philosophical anthropology of the hand (2003). Tallis sees the hand as the principal way in which consciousness extends out into the world, choosing what to grasp hold of, and of course what to manipulate or control. It is thus depicted as the leading edge of human agency. The pithy claim that 'the hand is an organ of cognition' (p. 28) is key to Tallis's thinking and one he uses to advance a unidirectional model. Human consciousness is central, and the hand, as its willing servant, operates at the interface between consciousness and the world. Tallis's study is something of a celebration of human exceptionalism—yet, however much this may be out of step with the current mood of posthumanism, his exploration of our dexterity is pertinent because it concerns the relationship between the brain and the hand. Although notions of feedback are hinted at by Tallis, this model is far-removed from the complex world of agential realism (Barad 2007) in which material and discursive, human and non-human forces act alongside natural and cultural phenomena. Still the fact remains, that this is another account that draws our attention to the precision and skill that is at our fingertips, that constitutes *handiness*—the sort of handiness that is crucial in holding a text, more or less at arm's length, navigating one's way through it, or indeed writing it oneself.

It should be fairly clear from this, that although the study of literacies is a wide and diverse enterprise, there is something central about the sort of *engaged material consciousness* (Sennett 2009) that involves, or arises from, careful co-ordination of hand and eye movement. Mackey (2016a) vividly illustrates this when she writes about the ways in which the hands connected literacy objects with the environment in her own literacy learning (for a fuller account see Mackey 2016b). This is not about any old hand–eye movement, however—precision matters—and of course that precision has to relate to what we might call an *inscription device*.[1] Herein lies an important difference between writing with pen and paper, or using a stylus and tablet, between reading a paperback or from a Kindle: that is the difference between the material affordances of the inscription device in question.

[1]In his exploration of the development of writing Harris argues that the 'presentation of writing most commonly depends on an artefact deliberately prepared for that purpose.' (2001, p. 86). Here, I use the term inscription device rather than artefact because it offers a little more specificity, but the basic definition still holds.

There is a subtle interplay, then, between materiality and literacy. It is not that literacy is anterior to technologies of inscription, that literacy is somehow waiting for the 'appearance of a suitable technology' (Harris 2001: 87); they develop together.[2] The popularity of the hashtag and its use on Twitter is a good contemporary example of this—it was handy to use a keyboard symbol to cross-reference tweets although it was not built into the design, but the hashtag was rapidly adopted by users, and it is now an established tweeting convention. A slightly different example is the use of the emoji. It would simply be impractical to use such a range of symbols alongside alphabetic writing on a wax tablet, or even with pencil and paper, but the menu-based selection which many of us are now accustomed to, makes it possible, with a quick swipe and a tap, to include our chosen emojis in rapid message exchange. Again, new work for the hands and fingers is required.

Thinking about handiness raises further questions, too. For instance, from an experiential point of view, ideas may emerge, whole sentences seem to write themselves as they move through our hands and fingers. Dexterity and touch recede into the background of consciousness. Rather like the example of the blind man's cane which 'has ceased to be an object for him' (Merleau-Ponty 2014: 144) we are in these moments, directly connected with meaning. Of course more unfamiliar or less-practised operations, like those required for a screenshot, interrupt this experience since they demand more focused attention on the hands. Perhaps this is why one may imagine that text is 'stuck' on the fingers when cut-and-pasting on a touchscreen. Fleeting impressions like these alert us to the often hidden work of the hands in everyday literacy.

It follows from all this that *part* of learning to be literate must be concerned with handling inscription devices, whether this is achieved through explicit instruction or informal interaction. And it is equally true for practices of the page and practices of the screen. It was as true for shorthand and typing as it is for computer-based graphic design. Literacy as a kind of engaged material consciousness is nothing short of a handy skill, and at this particular juncture, when such a wide range of inscription devices are available, there is of course plenty of learning to be done.

New Tablets in Young Hands

Public and professional reactions to the rapid advance of digital technology are nothing if not diverse, oscillating between unbridled enthusiasm and a persistent suspicion of their possible negative effects. It is perhaps only natural then, that such reactions are heightened when we think about the young children we care for, and what is right for them. In the face of this, touchscreen tablets have evoked a

[2]A fascinating historical example of this is provided by Lamarre's (2002) study of Japanese Heian calligraphy in which the text and the texture of the paper become part of the same poetic expression: 'papers of various colour are pieced together like a crazy-quilt […] trails of dark ink run over lavenders, yellows, and reds that pool and stream…' (p. 150).

surprisingly favourable response from many parents and early childhood educators (Marsh et al. 2015). Ease of use and portability have no doubt contributed to this. Research, for its part, has tended to focus on the educational use of tablets (Lynch and Redpath 2012) and particularly on the use of story apps (Kucirkova et al. 2013; Merchant 2014, 2015).

As an inscription device, the iPad has quite specific operational features. Features that would, of course, be completely alien to the tablet users referred to in the introduction, but more or less unproblematic for the under-twos in the study reported on below. It might help to rehearse these operational features. First, assuming of course that the device is turned on, it must be held in focus, more or less at arm's length with at least one hand free to work at the touchscreen interface. Right away there are some challenges: how and where to place the tablet so that the screen is visible, how to keep it still, how to avoid too much glare on the screen and so on. Second, and assuming that the previous conditions have been met, you need it to display something you can interact with—an app. This of course requires the tap of a finger, contact of sufficient weight, accuracy and duration to open the app (it is easy to overlook how often we have to make minor readjustments, for instance, to tap again when the first attempt fails), and then those gestures and movements that are necessary to work with the app. I will not detail these, but they may include the preset touchscreen gestures (tapping, pinching and swiping), movement of the iPad (as registered by its accelerometer), and its audio-visual features (the use of microphone and camera). On the face of it, that is quite a lot for young children to work with, but then, they are quick to learn.

In previous work I looked at how under-twos responded to story apps on touchscreen tablets (Merchant 2014, 2015). Focusing on a number of story-sharing episodes that took place in an early years setting using an analysis of video-recordings,[3] I developed a simple typology of hand movements used by the children, all of whom were under 2 years of age at the time (see Table 15.1). Rather than starting from the operational features of the iPad-as-inscription-device, as outlined above, the typology derived from what was actually observable in these episodes. It is important to note, at this point, that these story-sharing episodes emerged out of the ongoing free flow of the setting, which included the movement of children and adults, the distribution of toys and games, nursery furniture, print texts and so on.

The typology took into account many of the ways in which the young children handled tablets, their largely successful attempts to hold them steady within sight in order to view the screens, or to use their folding cases on tabletops, categorizing these as *stabilizing movements.* It also enabled me to focus on the *controlling movements*—the taps and swipes that are part of the gestural economy of working at the interface of these particular inscription devices. Also noticeable within the story-sharing episodes was the work of arms, hands and fingers in pointing at the screen. These *deictic movements* are of course fundamental to shared meaning

[3]The video data was gathered by my colleague and co-researcher Karen Daniels.

Table 15.1 A provisional functional typology of hand movements used with the iPad (adapted from Merchant 2014)

1. Stablilizing movements
Holding—*using one or both hands to support the tablet as one might hold a tray*
Holding and resting—*as above but using the knees for additional support*
2. Control movements
General tapping—*using three or four fingers in a slapping motion*
Precision tapping—*using the forefinger (like the pointing gesture) or with the hand palm downwards slightly lowering one of the first three fingers so that it activates the screen*
Swiping—*hand palm downward using one or more fingers to drag across the screen*
Thumb pressing—*using the thumb to tap, swipe or operate the home button*
3. Deictic movements
Pointing, nodding and other gestures—*directing attention to the screen or visual items framed by the screen*

making, and they were woven into the choreographic texture of story-sharing as a multimodal ensemble. All this reveals so much about story work in general, and also about the specific nature of this sort of activity when it is mediated by a tablet —but, as we shall see, these episodes were also embedded within the ongoing life of the setting.

In general, the story-sharing was focused around adults, appearing like a brief *coalescence* of bodies, feelings, materials (particularly tablets themselves) accompanied by verbal exchanges. The stabilizing, control and deictic movement described how the hands worked in concert with other modes during story-sharing, often providing vivid instances of what Norris refers to as 'fluctuating modal hierarchies' (Norris 2012) in which one mode, such as a screen image, might briefly come to the fore only to give way to another, such as a gestural cue from a child. But even these movements were not always easy to isolate from ongoing action and interaction. Often it was a challenge to make clear-cut distinctions between categories—for example—when simple deictic finger-pointing gestures became control movements (taps) midway through their execution. Nevertheless, the iPads would come to rest, bodies would assume the proxemics of story-sharing, and adults would enact pedagogies. These typified moments of *coalescence.* But of course, there were also periods of *non-coalescence*, periods during which children wandered off, iPads displayed the wrong thing, adults were called upon for other duties and so on. Like other inscription devices—books, crayons, paper and all the rest, and like other bodies and things in the room they had a life of their own. This life is precisely what is hidden from view in an archaeology of literacy, and it is also what we miss with an exclusive focus on handiness.

A Different Story[4]

Focusing on story-sharing episodes was instructive in itself, but inevitably they were generated by a particular method assemblage (Law 2004) in which certain ways of seeing and certain ways of knowing are enacted. It seems important to acknowledge that one way of looking does not show the whole story, and remaining with material engagement is in itself insufficient. Despite the obvious limitations of video (see Maclure et al. 2010)—the disappearance of anything that is beyond the frame, things that are not captured, seen or heard, or even the semblance of a reality that is produced—there were other points of interest, too. For example, it was possible to notice where a particular child was recruited into the routine of story-sharing, moving close to an adult, perhaps pulling a screen into view, little fingers jabbing at the tablet, the physical contact between adult and child and so on. But something else was going on too, engulfing these episodes, swirling in and out of them, something that refuses the rather trite label 'context'. Something about the place, the setting with its cacophony of voices and things, the two segments of nearly-the-same-colour blue flooring, the children, unruly and unpredictable, and the adults performing various organizing or pedagogical moves.

I returned to the video data that had been discarded in the search for episodes of story-sharing in a mood of enchantment (Bennett 2001; Burnett and Merchant 2016), looking for alternative perspectives on how bodies, hands, fingers and iPads became part of the lively and emergent atmosphere of the setting. I located ten nodes that spoke to me, that evoked some strong affect—and took screen shots of them in order to think differently with them (Fig. 15.1). In summary part of what these ten nodes show includes:

1. An iPad on the blue carpet. Three children staring at the screen. Amie's bare foot dangling down (she has removed her sock).
2. A finger jabbing at an error message. Emma (the teacher) has Amie's pink sock bundled in her hand as she points at the screen.
3. Amie—her shoe is on the edge of the screen, making gentle contact. Emma rolls the sock on to her other foot, whilst a boy looks at the copyright page of an app.
4. Iona holding the iPad like a book. Her shoelaces are untied.
5. Iona walks away—crossing the threshold of the two blue sections of flooring. She is going away.
6. In the foreground: iPad action. In the background: Iona looks in a cupboard. She has taken off her shoe and holds it in her left hand.
7. Iona returns—there is a moment of physical intimacy with Emma (her teacher).

[4]I am indebted to my colleague Cathy Burnett for the idea of revealing multiplicity through generating different stories. We develop the notion of 'stacking stories' more thoroughly in Burnett and Merchant (2014, 2016).

Fig. 15.1 Ten nodes

8. Fingers are repeatedly tapping the touchscreen of an iPad. Amie has removed her sock, again (is it the same one?).
9. Another child is on all fours on a table top. Why? No one seems to notice (is this *OK*?).
10. On camera: a boy is looking directly at the video camera. He appears to know that he is becoming an image…

From these one begins to get the sense of multiple flows of activity, the shifting of interest and attention and a complex of concerns in which socks and footwear are as significant as hands, fingers and iPads, in which emotional warmth, physical care and pedagogical intent entwine. In contrast to the story-sharing episodes, on these occasions the tablet is one thing amongst many as it becomes absorbed into the more general to-and-fro of the social space. iPads are handled and carried by the youngsters who from time to time look at their screens; sometimes they are slapped or tapped and occasionally a tug-of-war ensues as young bodies struggle to take hold of them, to wrestle them from each other, or from the hands of adults. In all the tablets seem to slip between being slabs of metal and glass to be carried around, texts that invite attention (sometimes quite actively with a tune or recorded voice on an app), and part of the array of things, resources and equipment that populate the setting, different, but not by much, from the other inscription devices at hand—books, pencils and paper and whiteboards.

Lessons in Handiness

We know very little about how Roman Britons were inculcated into the use of wax tablets, but on the other hand there is plenty of more recent practice and debate that we can bring to bear on learning to use touchscreen tablets. Thinking about hands

and tablets in the sort of ways explored in the early sections of this chapter could well lead one to suppose that young children should be trained, or should at least receive some sort of explicit instruction in the use of these devices. After all, if literacy as a socially prized form of engaged material consciousness is important, so is the specific work of the hands and fingers that are involved. But the observations referred to above showed that many of the young children concerned were already adept at handling tablets (Merchant 2014), and when this was not the case they were quick to learn through trial and error. In contrast, the ten episodes draw attention to the ways in which tablets, like the more traditional objects of literacy, are woven into the tapestry of classroom life, are handled in different ways and come in and out of focus in the unfolding of events.

Looking back over the recent history of literacy instruction shows how a lot of attention has been given to detailed and repetitive training in the use of inscription devices. 'Definite teaching of the right sequence of strokes' was the order of the day for writing instruction in the 1930s, and pupil progress from 'chalk to soft pencil, and thence to broad pen' was a matter of 'gradual training' (Board of Education 1937: 362). In a popular teachers' guide of the 1970s (Webb 1969) literacy learning depends upon 'systematic and quite formal instruction' (p. 40)—again practising handwriting is a focus of this work—although perhaps in keeping with the progressive ideas that were circulating at the time, it could 'be made interesting' (p. 48) through the use of a variety of different tools and surfaces. Shifts in educational priority in England continue of course, and as other aspects of literacy have come to the fore, such as phonics instruction and sentence grammar, less attention is now given to the work of the hand. Yet it remains the case that 'legible joined handwriting' is a prerequisite of performing at the expected standard at the end of primary schooling (Standards and Testing Agency 2016). Meanwhile, repeated calls for including keyboard skills, or instruction in touch-typing in writing curricula go unheeded.

Learning to be literate may well involve an education of the hand, and this is a central part of my argument, but this is by no means the whole story, and it certainly does not lead logically to the conclusion that touch and gesture should be the subject of direct instruction. Much has, in fact, been lost in successive attempts to identify specific skills that can then be placed in a learning sequence and used as a measure of progress. Education systems can end up reifying skills and routines, creating a reductive version of literacy—one in which bodies are schooled, and disciplined through literacy pedagogies. In the light of this, it is perhaps helpful to remember that 'school literacy is […] a discursive rather than a natural, practice' (Siegel 2016: 27).

Reflections on Touchscreens

Before the novelty begins to fade it may be time to reflect on what new technologies of literacy can teach us about older ones, and vice versa. Tablets, it turns out, are nothing new, and the evolution, design and use of inscription devices is always,

and inevitably, shaped by the human hand. Furthermore, hands and fingers play a key role in communication. In literacy, more often than not they operate at the interface between bodies and meaning making. Touchscreens simply shed new light on this. But old technologies of literacy can also help to put newer technologies in perspective. Roman tablets were constructed from available materials and used to convey messages which were part of the conduct of everyday life. It is also the case that they were bound up with the lives of a ruling elite. In contrast, contemporary tablet technology is part of a global flow of materials, and in an unequal and divided world we cannot assume that everyone can enjoy the 'uncompromising performance and potential' that the Apple Corporation celebrates (Apple 2016). Young children, however, engage with what is at hand—the 'culture' that seems 'natural' to them. And for the young children in the study referred to in this chapter, touchscreens are a given part of that world.

As inscription devices go today's tablets are well-matched to complex communicative practices. Their screens display pin-sharp multimodal texts, they enable rapid interaction and message exchange, and they can store more than their predecessors ever could. They therefore challenge us to redefine literacy so that it can describe the ways in which we can tap to find information about almost anything, write legibly with our fingers, and interact with others simply by 'following', 'liking' or 'sharing'. This is contemporary meaning making which is literally at our fingertips—and yet its reach is far wider than the manual dexterity it requires. Reflecting on the changing nature of literacy, Brandt suggests that:

> we are just now entering an era of *deep writing*,in which more and more people write for prolonged periods of time from inside deeply interactive networks and in immersive cognitive states, driven not merely by the orchestration of memory, muscle, language and task but by the effects that writing can have on others and the self (Brandt 2015: 160).

For researchers and practitioners, looking at tablets on their own is not enough. They are, from one point of view, last in a long line of inscription devices. But just as we need to know more to reach a fuller understanding of how tablets were used in Roman London, so we need to be alert to the liveliness of children's interactions with iPads, and how the specific and essential work of hands and fingers is part of the power of meaning making in everyday life.

References

Apple Inc. 2016. iPad mini 4. http://www.apple.com/uk/ipad-mini-4/. Accessed August, 8 2016.

Brandt, Deborah. 2015. *The rise of writing: Redefining mass literacy*. Cambridge: Cambridge University Press.

CSAD [Centre for the Study of Ancient Documents]. 2003. Vindolanda Tablets Online. http://vindolanda.csad.ox.ac.uk/. Accessed August, 8 2016.

Barad, Karen. 2007. *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. London: Duke University Press.

Bennett, Jane. 2001. *The enchantment of modern life: Attachments, crossings, and ethics*. New Jersey: Princeton University Press.

Board of Education. 1937. *Handbook of suggestions: For the consideration of teachers and others concerned in the work of public elementary schools*. London: HMSO.
Burnett, Cathy, and Guy Merchant. 2014. Points of view: Reconceptualising literacies through an exploration of adult and child interactions in a virtual world. *Journal of Research in Reading* 37 (1): 36–50.
Burnett, Cathy, and Guy Merchant. 2016. Boxes of poison: Baroque technique as antidote to simple views of literacy. *Journal of Literacy Research* 48 (3): 258–279.
Crescenzi, Lucrezia, Cary Jewitt, and Sarah Price. 2014. The role of touch in preschool children's learning using iPad versus paper interaction. *Australian Journal of Language and Literacy* 37 (2): 86–95.
Lenz-Taguchi, Hilevi. 2010. *Going beyond the theory/practice divide in early childhood education: Introducing an intra-active pedagogy*. Abingdon: Routledge.
Harris, Roy. 2001. *Rethinking writing*. London: Continuum.
Kuby, Candace, Tara Rucker, and Jessica Kirchhofer. 2015. 'Go Be a Writer': Intra-activity with materials, time and space in literacy learning. *Journal of Early Childhood Literacy* 15 (3): 394–419.
Kucirkova, Natalia, David Messer, and Denise Whitelock. 2013. Parents reading with their toddlers: The role of personalization in book engagement. *Journal of Early Childhood Literacy* 13 (4): 445–470.
Lamarre, Thomas. 2002. Diagram, Inscription, Sensation. In *A shock to thought: Expression after Deleuze and Guattari*, ed. Brian Massumi, 149–170. Abingdon: Routledge.
Law, John. 2004. *After method: Mess in social science research*. Abingdon: Routledge.
Lynch, Julianne, and Terri Redpath. 2012. 'Smart' technologies in early years literacy education: A meta-narrative of paradigmatic tensions in iPad use in an Australian preparatory classroom. *Journal of Early Childhood Literacy* 14 (2): 147–174.
Mackey, Margaret. 2016a. Literacy as material engagement; the abstract, tangible and mundane ingredients of childhood reading. *Literacy* 50 (3): 166–172.
Mackey, Margaret. 2016b. *One child reading: My auto-bibliography*. Edmonton: University of Alberta Press.
MacLure, Maggie, Rachael Holmes, Christina Macrae, and Liz Jones. 2010. Animating classroom ethnography: Overcoming video-fear. *International Journal of Qualitative Studies in Education* 23 (5): 543–556.
Marsh, Jackie, Lydia Plowman, Dylan Yamada-Rice, Julia Bishop, Jamal Lahmar, and Fiona, Scott. 2015. Exploring play and creativity in pre-schoolers' use of apps: Final project report. www.techandplay.org. Accessed August, 8 2016.
Merchant, Guy. 2014. Keep taking the tablets: iPads, story apps and early literacy. *Australian Journal of Language and Literacy* 38 (1): 3–11.
Merchant, Guy. 2015. Apps, adults and young children: Researching digital literacy practices in context. In *Discourse and digital practices: Doing discourse analysis in the digital age*, ed. Rodney Jones, Alice Chik, and Christof Hafner, 144–158. Oxford: Taylor and Francis.
Merleau-Ponty, Maurice. 2014. *Phenomenology of perception*. Trans. D. Landes Abingdon.: Routledge.
Norris, Sigrid. 2012. Three hierarchical positions of deictic gesture in relation to spoken language: A multimodal interaction analysis. *Visual Communication* 10 (2): 129–147.
Potter, John, and Theo Bryer. 2017. Finger flowment and moving image language; learning and filmmaking with tablet devices. In *Literacy, media, technology: Past, present and future,* ed. Rebecca Parry, and Cathy Burnett, 11–127. London: Bloomsbury.
Rowsell, Jennifer. 2014. Towards a phenomenology of contemporary reading. *Australian Journal of Language and Literacy* 37 (2): 117–127.
Sennett, Richard. 2009. *The Craftsman*. London: Penguin.
Siegel, Marjorie. 2016. Inscription, erasure, embodiment: Literacy research and bodies of knowledge. In *Literacies, learning and the body: Putting theory and practice into pedagogical practice*, ed. Grace Enriquez, Elisabeth Johnson, Stavroula Kontovourki, and Christine Mallozi, 20–35. Abingdon: Routledge.

Smith, Roff. 2016. Ancient IOUs found beneath Bloomberg's new London HQ. National Geographic June 1, 2016. http://news.nationalgeographic.com/2016/05/ancient-rome-London-Londinum-Bloomberg-archaeology-Boudicca-archaeology/. Accessed August, 8 2016.

Standards and Testing Agency. 2016. *2016 Teacher assessment exemplification end of key stage two: English writing, working at the expected standard*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/510832/STA-Ex2016-KS2-EW-MorganAnn_PDFA.pdf. Accessed August, 8 2016.

Tallis, Raymond. 2003. *The hand: A philosophical inquiry into human being*. Edinburgh: Edinburgh Press.

Webb, Lesley. 1969. *Modern practice in the infant school*. London: Blackwell.

Tomlin, Roger. 2004. The girl in question. *Centre for the Study of Ancient Documents Newsletter 11, Winter 2004–2005*: 1.

Wilson, Frank. 1998. *The hand: How its use shapes the brain, language and human culture*. New York: Pantheon.

Author Biography

Guy Merchant is Professor of Literacy in Education in the Sheffield Institute of Education at Sheffield Hallam University. He specialises in research into digital literacy and the inter-relations between children and young people, and new technologies of communication. He is widely published in international journals and is a founding editor of *Early Childhood Literacy*. The ground-breaking *Web 2.0 for Schools* was co-authored with Julia Davies, and he has since co-edited a number of collections including *Virtual Literacies* (2013), *New Literacies across the Globe* (2014) and *Literacy, Media, Technology: past, present, future* (2017). He is active in literacy education and professional work, including writing curriculum materials and professional publications.