

Posthuman texts: nonhuman actors, *mediators* and technologies of inscription.

Abstract

The study of academic reading and writing has moved away from a predominantly cognitive focus towards one which views academic meaning-making as a complex set of socially-situated practices, (in work associated with the research fields of new literacy studies and multimodality). These fields of study acknowledge that literacy practices enrol social actors in (reflexive) processes of meaning-making and constitution of subjectivities via a range of semiotic resources, also recognising that these practices take place in increasingly multimodal contexts, additionally involving (complex processes concerning communication across the digital and the analogue). However, the agentive role of nonhuman actors and artefacts in these processes has received less attention in the literature. In particular, little research has been conducted into the embodied and material practices of meaning-making in contexts characterised by the presence of complex combinations of digital and print texts and artefacts. This paper will argue that within the contemporary university, meaning-making and textual practices have become saturated by digital mediation; raising research questions around the resultant role of nonhuman actors in the form of objects such as laptops, notebooks, mobile phones and books in the formation of texts, and also in the construction of student subjectivities. Drawing on posthuman and actor-network theories, this paper will report on a funded project investigating the day-to-day embodied and textual practices of 12 adult postgraduate students over a six month period, using multimodal journalling and in-depth case study interviews. The analysis will focus specifically on the ways in which mobile devices, screens and print literacy

artefacts were variously enrolled in a complex set of posthuman semiotic practices. I will argue for the utility of Hayle's (1999) notion of the posthuman and Latour's (2005) concept of nonhuman actor as *mediator* in the analysis. Particular attention will be paid to the agentive roles these nonhuman actors play in the constitution /reconstitution of texts in settings where semiotic practices are distributed across multiple domains of practice such as university, public transport and home, and also across multiple networked devices and technologies of inscription. Illustrating these points with textual data, images and drawings, it will explore in particular the transcontextual boundary of digital / print and how objects act not only to create new assemblages – complex and evolving networks of human and nonhuman actors - but also to enable transitions across contextual boundaries, leading to blurring of binaries around authorship, presence and persistence of text.

Introduction

'The Age of Print is passing, and the assumptions, presuppositions, and practices associated with it are now becoming visible as media-specific practices rather than the largely invisible status quo' (Hayles 2012:2)

In the last 15 or so years, there has been a move in the study of academic reading and writing away from a predominantly cognitive view of 'literacy' as a binary focusing on cognitive capacities in the individual, with an emphasis on defining the individual as 'literate' or 'illiterate', and towards one which regards literacy as meaning-making around texts as a complex set of socially-situated practices. This paper will report on a funded project investigating the day-to-day material and textual practices of 12 adult postgraduate students, using multimodal journalling and in-depth case study interviews. The analysis will focus on the ways in which mobile devices, screens and print literacy artefacts work together as actors in semiotic practice, drawing on Hayle's

(1999) notion of the *posthuman*. Attention will be paid to the roles these nonhuman actors play in the textual practices where processes are distributed across multiple domains, and across networked devices and technologies of inscription. It will explore in particular the transcontextual boundary of the digital / print and how objects are mobilised to create new assemblages of meaning, leading to a questioning of binaries around authorship and 'tools'. Illustrating these points with multimodal data, it will argue that material objects play a central role in meaning-making practice, co-constituting texts and authorial subjectivities.

Conceptions of literacy and meaning-making

This section will discuss some of the main ideas surrounding conceptions of what will broadly be termed 'literacy', drawing on theory from the fields of social anthropology, applied linguistics, semiotics and media studies. In doing so, it will focus on how these fields have sought to research, theorise and account for technological changes surrounding reading and writing in society and education. It will conclude by arguing that although our understanding of these practices has been greatly advanced by a focus on literacy as situated social practice, this conceptual framing has fallen short in adequately theorising the role of material objects and how they relate to language, in particular the material artefacts of literacy such as paper, pens, keyboards and mobile devices (Gourlay, Hamilton & Lea 2013). Drawing on actor-network theory as elaborated by Latour (2005), posthuman theory (Hayles 1999, 2006) and new work in media studies (Hayles 2012) I will go on to argue that our understanding of the enactment of literacy practices can be enhanced by drawing on these alternative

theoretical frames. The subsequent section will seek to illustrate this with data from a current research study into student digital literacy practices.

Seminal work in Social Anthropology in the 1980s (e.g. Brice-Heath 1983, Street 1985) presented a radical challenge to contemporary understandings of literacy, moving away from the notion of a cognitive phenomenon residing primarily in the individual. Instead, these ethnographic studies argued for literacy as situated social practice involving multiple participants in a wide range of informal settings, in addition to recognised formal contexts of education. These insights, combined with a new focus on the social and the critical in Applied Linguistics (e.g. Gee 1990) led to the emergence of new literacy studies (e.g. Barton 1998, Barton & Hamilton 1998), which focused on literacy in a range of social contexts, often foregrounding issues of power, social class and how literacy practices may serve to reproduce privilege and also constitute identities (e.g. Ivanic 1998, Lillis 2001).

The associated subfield of academic literacies arose from this strand in an explicit reframing of established conceptions of student writing in the university. In their influential paper, Lea & Street (1998) rejected the notion of student writing as consisting of generic, 'transferable skills'. Instead, they emphasised the situated and discipline-specific nature of textual practices, and the intertwined nature of disciplinary knowledge and associated practices of meaning-making. Crucially, this critique was founded on a radical repositioning of the role of text and language, moving away from the notion of language as a transparent medium, instead reframing textual practice as a site of situated knowledge construction. This conceptual shift is of strong relevance for this paper, as it marks an important staging post in a process of 're-embodiment' in

terms of how we view textual practice, reminding us that all reading and writing is particular rather than abstract, and involves human subjects engaged in material processes which are socially, politically, temporally and physically situated.

Meanwhile, throughout the 1990s, the use of digital technologies for communication became more widespread in developed economies, with computers more commonly used for writing in formal contexts of education, in particular in higher education, and in society more broadly. The field of semiotics responded with a greater recognition of the multimodal nature of contemporary semiotic practice, which this field of study has recognised as composed of a range of modes such as the visual, in addition to the textual (e.g. Kress & van Leeuwen 1996). This led to developments in the theorisation of multimodal communication, in particular the image-based semiotic practices of the screen (e.g. Kress 2003), also leading to a greater recognition of the features of digitally-mediated communication, and a concomitant broadening of the concept of literacy (e.g. Jewitt & Kress 2003). This field of study has expanded and enriched the notion of 'situated literacy', to acknowledge the changing nature of meaning-making (e.g. Steinkueler 2009).

These two related fields have generated a large body of research into meaning-making practices in a range of contexts, tending to draw on qualitative methodologies in order to explore the perspectives and experiences of social actors. Some studies have used fine-grained forms of enquiry with a linguistic focus, such as conversation analysis, while others have used video-based analysis of unfolding semiotic practice, such as work within Applied Linguistics (e.g. Goodwin 2007). Several important studies have also taken place within the ambit of new literacy studies, focused on digital practice and

writing (e.g. Lea & Jones 2011, Goodfellow 2011). These related research areas have immeasurably deepened our understandings of the processes of meaning-making in social contexts.

However, it might be argued that these forms of enquiry have also tended to elide the status of objects, even in detailed analyses of communication in complex scenes of embodied social action. Latour (2005) argues that in the standard paradigm of social science, objects are not seen as part of 'the social', which is conceptualised as exclusively human. Building on Latour's assertion, I would argue that objects in literacy and multimodality studies (despite the strong ethnographic leanings of the field) have tended to be conceptualised as 'tools' for communication, or part of the material 'context'. A central point is that a recognition of the agentive role of objects in processes of meaning-making would further 'embody' our conception of how we make meaning around texts, serving to anchor more firmly research and theory in the immediate, emergent and everyday process of material practice.

However, it is noteworthy that these fields of research do not make great use of media studies, although work in this field has long recognised the intimate relationship between semiotic practices and technologies of inscription such as the printing press, typewriter and computer, as McLuhan's pioneering work on print culture (1962) and the influence of media in society (1964) evinces. Although McLuhan's work has subsequently been critiqued as reductionist and technologically determinist (e.g. by Winston 1986), McLuhan's insight has been profoundly influential in foregrounding features of media which may otherwise have been regarded as transparent or neutral in terms of their contribution to meaning. Kittler, in his work on the history of media (e.g. 1990, 1999), reminds us that there have always been media technologies throughout

history, although unlike McLuhan he rejects of the notion of media as 'extensions' of the human, instead more radically conceptualising media technologies as developing in '...an autonomous media-technological evolution driven by an internal dynamic' (Winthrop-Young 2011: 65). The complexities of Kittler's analysis lie beyond the scope of this paper; however, his work (like McLuhan's and a host of more contemporary media theorists) underscores the notion of media technologies and associated objects as agentive, an idea which will be developed in the following section.

Actor-Network Theory and Posthuman Perspectives

As argued above, theoretical work on the nature of semiotic practice around texts has progressed towards an emphasis on literacy as social practice, and increasingly as multimodal and digitally-mediated practice. Elsewhere, media theoreticians such as McLuhan and Kittler have posited technologies of inscription as constitutive of epistemologies and social change - such as in Kittler's analysis of the role of media systems as constitutive of social roles in the university - or have even argued for these technologies as an autonomously developing set of nonhuman entities. Meanwhile, in Sociology an alternative conception of the social process and the role of objects has been developing since the early 80s in the form of actor-network theory or ANT (e.g. Callon 1986, Law & Hassard 1999, Latour 2005). This perspective may provide a means by which to relate some of these insights, both in terms of theory and research methodology.

ANT is not a unitary theory, but rather a collection of related perspectives which explicitly resist reductive definition. However, two broad features are salient to this paper. The first is ANT's rejection of *a priori* social categories (such as 'class') as underlying causes or drivers of social action- instead insisting that 'the social' is

constantly emergent and contingent, in a constant process of being created and maintained by social actors. Radically, Latour also mounts an explicit challenge to taken-for-granted notions in mainstream Sociology, such as that of 'social context', characterising ANT as follows:

'It claims there is nothing specific to social order; that there is not social dimension of any sort, no 'social context', no distinct domain of reality to which the label 'social' or 'society' could be attributed...' (2005:4)

Instead, in order to describe the social, we are urged to 'follow the actors themselves' (2005:12) to trace the associations between them.

Secondly, ANT explicitly sees material objects as agentive *nonhuman actors* in this process. In a compelling passage, Latour imagines a breaking free from a deceptive and limiting conception of objects, likening it to a spell:

'As if a damning curse had been cast unto things, they remain asleep like the servants of some enchanted castle. Yet, as soon as they are freed from the spell, they start shuddering, stretching and muttering. They begin to swarm in all directions, shaking the other human actors, waking them out of their dogmatic sleep.' (2005: 73)

Latour (2005) also makes a distinction between two potential conceptions of social actors –which he argues can be viewed as either *intermediaries* or *mediators*. An *intermediary* is '...what transports meaning or force without transformation: defining its inputs is enough to define its outputs' (2005: 39), while *mediators* 'transform, translate, distort, and modify the meaning of the elements they are supposed to carry' (2005: 39). He characterises ANT as viewing social actors (human and nonhuman) predominantly as *mediators*, as opposed to *intermediaries*:

'...the sociologists of the social believe in *one* type of social aggregates, *few* mediators and *many* intermediaries; for ANT, there is *no* preferable type of social aggregates, there exist *endless*

numbers of mediators, and when those are transformed into faithful intermediaries it is not the rule, but a *rare* exception that has to be accounted for by some extra work – usually by the mobilization of even more mediators!' (2005: 40)

Applying Latour's distinction to the social practices mediated by digital technologies, inscription devices and associated objects may be seen as nonhuman actors in the form of *mediators* which themselves carry meaning and influence social action, as opposed to being transparent and neutral intermediaries.

I would like to add a final **strand of theoretical work**, before moving on to discuss and exemplify how **it** might be combined with an ANT perspective. Posthuman theory is a body of theory (like ANT) which questions the relationship between the 'human' and other taken-for-granted categories such as 'nature', 'animals' and 'technology'. Like ANT, it is a complex **field** with **several areas of concern**, but what loosely unites these is an (interrogation of binaries used to separate seemingly inviolate and unproblematic categories, often traced back to Donna Haraway's critique of essentialist notions) of gender, in the complex and iconoclastic 'Manifesto for Cyborgs' (1991). Haraway's critique of the categories of gender led to subsequent theoretical work which problematized assumptions around apparently 'commonsense' ontological categories such as the 'human' and the 'nonhuman', questioning the extent to which these categories should be seen as separate, and crucially also challenging the dominance of the human as the site of agency in social sciences and humanities (See Wolfe, 2010 for an overview of the field of posthumanism).

The relationship between the human and the technological was also questioned, and this particular area is associated with the work of Katherine Hayles (1999, 2006).

Hayles proposes a posthuman understanding of the relationship between the human

and technological, a viewpoint which sees them as intermeshed, interdependent and merged at the level of social practice:

In the posthuman, there is no essential difference or absolute demarcation between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals. (Hayles 1999: 3)

The posthuman subject is seen as:

...an amalgam, a collection of heterogenous components, a material-informational entity whose boundaries undergo continuous construction and reconstruction (Hayles 1999:3)

The emphasis here is on the relationship between the human and the technological in terms of practices and subjectivities, as opposed to the notion of a literal cyborg in the form of a biological human with mechanical components. Hayles is seeking to investigate how the computer forms an integral part of day-to-day life, building on the work of theorists such as Turkle (e.g. 2005).

Applying Hayles' conception of the posthuman to literacy practices calls into question assumptions about the nature and identity of the author, who is traditionally seen a stable and singular human individual. In the context of the contemporary university where most reading and writing takes place via digital devices, it could be argued that authorship is distributed between the human, machine and the distributed agency of internet-based texts, in terms of the way that they act and actively contribute to the process of authorship. In her more recent work Hayles (2012) explores digital technologies and literacy in more depth, focusing explicitly on the effects of digital devices on student writing practices. She points out that screen reading is steadily increasing, while the prevalence of print reading is on the decline. However, as in her

earlier work, she insists on a recognition of the embodied and intermeshed nature of our relationship with digital media:

'...our interactions with digital media are embodied, and they have bodily effects at the physical level. Similarly, the actions of computers are also embodied, although in a very different manner than with humans. The more one works with digital technologies, the more one comes to appreciate the capacity of networked and programmable machines to carry out sophisticated cognitive tasks, and the more the keyboard comes to seem an extension of one's thoughts rather than an external device on which one types. Embodiment then takes the form of extended cognition, in which human agency and thought are enmeshed within larger networks that extend beyond the desktop computer into the environment.' (Hayles 2012:3)

Her claims regarding cognition are beyond the scope of this paper, but again she makes the point here that in terms of practices, the device functions as a form of prosthesis, and larger networks are conceptualised as agentive. This conception is a long way from traditional notions of technologies of inscription (print-based or digital) as inactive 'tools' to be deployed by 'the user', and has the potential to fundamentally shift our conception of the material object as part of social process.

This type of analysis seems to have much to offer the study of student academic writing, potentially radically reframing our understandings of how meaning is made in conjunction with objects, and shedding light on (how communication take place across contexts, by revealing the networks of human and nonhuman actors involved in textual practices. The following section will seek to illustrate this with an analysis of students' accounts of their digitally mediated writing practices at a UK university.

Background to the study

The context of the study is a predominantly postgraduate Education Institute in a large UK city. The Institute has a large number of PhD students, a wide range of Masters

programmes and PGCE programmes. Most of the teaching is face-to-face, with a small number of distance courses. The rationale was to investigate student engagements with technologies in their studies, motivated by a desire to provide better support and develop student 'digital literacies' across the institution, but also in response to the relative lack of in-depth research of this type in the field.

The research took place over one year and consisted of two phases: focus groups and longitudinal multimodal journaling, the latter chosen as it offered insights into the students' day-to-day practices around technologies over time, based on the minutiae of day-to-day practice, as opposed to at a more abstracted level as often takes place in stand-alone interviews. It also allowed the participants to generate, select, order and also analyse their own data by assembling it and identifying themes, giving a more ethnographic orientation. Multimodal journalling was also chosen for its visual focus on objects and embodied material practices, as opposed to relying on textual mediation, which often leads to generalisations in participants' accounts of their practices, which may lose a sense of specificity and connection with the particular and the material. Multimodal journalling draws on visual methodologies originating in the 'new ethnography' of the 1980s and the related critique of positivism/realism (e.g. Pink 2007). As this form of data collection and analysis is intensive and time-consuming, a small group of 12 student volunteers were asked to take part. The focus was more on depth than breadth or generalisability, but implications for other contexts can be drawn from the findings.

In the focus groups participants were first asked to draw a map, picture or diagram to represent their relationships to technologies in their studies, which then formed part of the wider group discussion. The participants were then invited to take part in the

second phase, which consisted of a six-month period of loosely-guided journaling on the topic of their engagement with technologies, using hand-held iPod Touch devices to document and record their experiences and practices, using photos, videos, notes and any other formats. The participants consisted of six male and six female students, six British and six international, aged between early twenties and early forties. Three or four interviews were held with each participant on the basis of their images, videos, notes, and assemblages created using software such as Prezi or PowerPoint. Later interviews focused more specifically on texts, and the role of technologies and devices in their literacy practices.

The following section explores the importance the research participants place on materiality and physical surroundings and places in the data . This is structured around series of points made by Hayles about physical domains, also referring to Latour's notion of the *mediator*.) These two perspectives are deployed together here as they seem to offer important inroads into an analysis of this type of practice, where arguably the sociomaterial - particularly the role of material objects to transform meaning as opposed to merely conveying it - has tended to be elided in mainstream transcontextual analyses.

Material practices: dynamic processes across physical domains

'Materiality, like the object itself, is not a pre-given entity but rather a dynamic process that changes as the focus of attention shifts.' (Hayles 2012:14)

The first set of findings from the data is grouped around Hayles's point about 'dynamic process', and this analysis focuses on the importance placed by the research participants on materiality, the influence of physical surroundings and associated

objects on their practices, the meaning ascribed to nonhuman actors, and how they negotiated in embodied ways with the objects and spaces in order to engage in literacy practices.

The degree to which their practices were distributed across a range of domains can be seen in figure 1, which shows the 'map' drawn by Sally in the focus group:

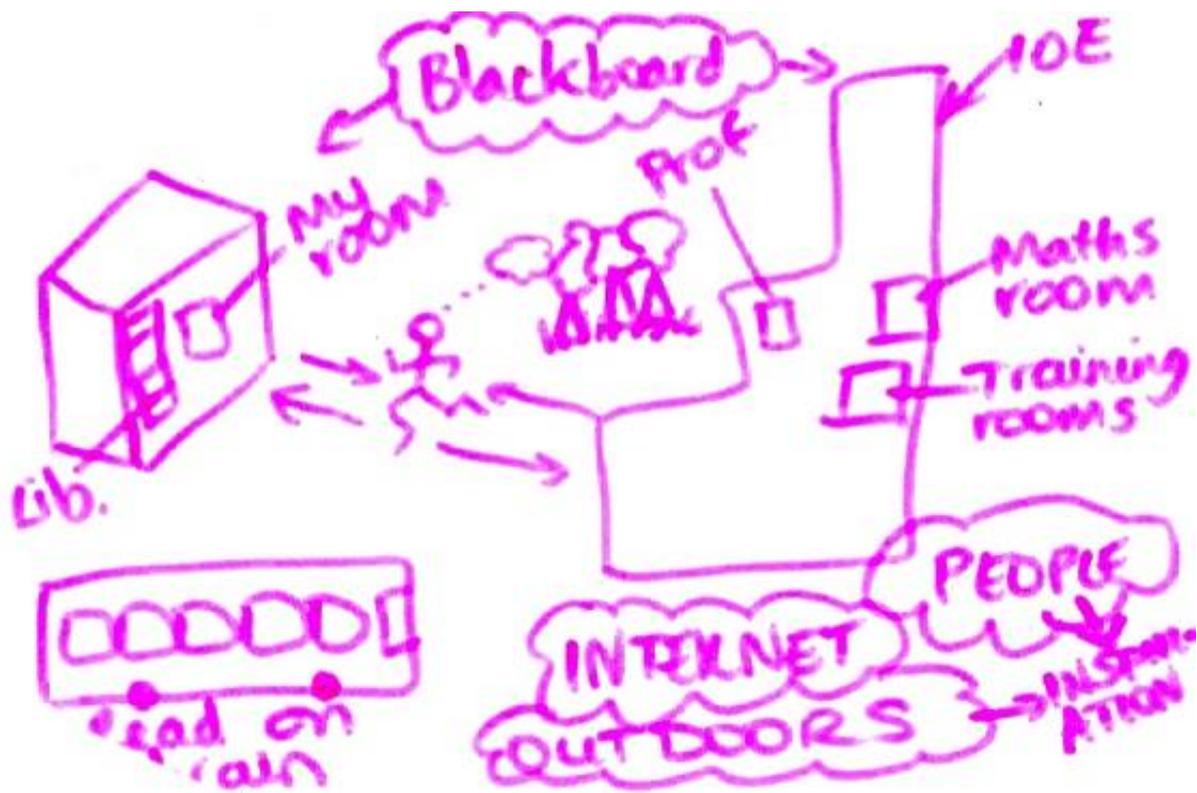


Figure 1: Sally's 'map' of practices

Sally depicts herself as a figure running between different university buildings, which also represent the two institutions to which she was affiliated. This sense of being spatially distributed was strongly apparent throughout Sally's data and can also be seen in her depictions of a train and 'the outdoors' which she cited in her interview as important sites of engagement with texts and technologies. The VLE 'Blackboard' and 'The Internet' are depicted as external to the buildings, with the 'cloud' design around

the words suggesting less concrete and more amorphous sites of practice. Overall this image depicts a complex set of interlocking material and digital domains of practice, a theme reported across the student data more generally.

Django (a PhD student studying art) also describes practices which are both highly physically distributed and permeated with digital mediation. She describes how she has been using the iPod Touch:

I tend to sort of work everywhere, but yet, the gallery quite a bit, in recording, just recording the journey that I've been around the gallery, you know, mapping the spaces and I found this very useful for doing that, so I recorded the time that it would take, I also left notes to myself on this, on what I could do, how I would get around and what I'd be doing. Also, obviously, gallery lectures as well, I use this to record a lecture, so I've used technology there. Obviously in the cafes, arts centre, all over the places really, I tend to do my work...(Django Interview 3)

Django's account reveals she has not simply used the digitally-mediating object (the iPod Touch) for study while passing through a range of physical domains, but has also used it to document features of those spaces and also to record and store face-to-face lectures. This seems to exemplify the notion of a 'dynamic process' of materiality, where Django uses the device as a *mediator* through which she creates new meanings in engagement with materiality of the gallery space, the lecture theatre and other embodied settings where she works.

Some participants made comments describing deliberate attempts to restrict their study practices to particular physical domains. MA student Juan's 'map' illustrates this urge to maintain this division:

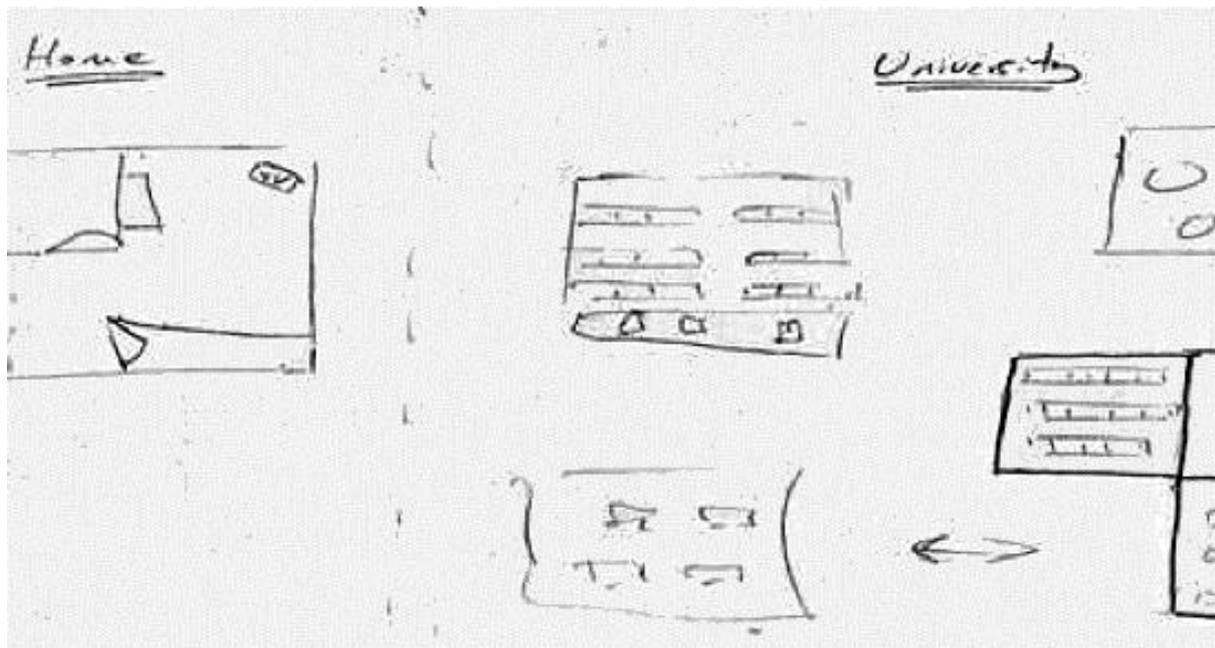


Figure 2: Juan's 'map' of practices

He depicts 'the university' on one side of the page, and his home on the other, with a line drawn down the middle representing a division between the two, and he remarked in his interview that he preferred to maintain this division in order to separate his private life from his studies.

Juan also made several comments about his preferences concerning the material spaces of the university, reporting that he deliberately physically positions himself away from computers except for at the final stage of writing. He refers to the physical library in positive terms, specifically mentioning features which seem to be symbolic of the 'traditional' library space, such as that the fact that it is 'dusty', with 'wooden shelving':

I don't work at home for example, home is, sort of, separate. I mean I can if necessary, but I much prefer not to, so I come and I work in a library and I'll work at a desk in the library away from computers, then I'll only work at the computer usually to actually do the final part of writing an essay. I enjoy... the image of being, sort of, in a dusty, you know, sort of, wooden shelved, kind of, old library, where it's, sort of, cosy and warm, that's, you know, I like that and that's a part of the experience of studying that I enjoy.
(Juan interview 1)

He also expresses his views about computer rooms in the Institute, commenting that the larger rooms with a lot of people 'feel like an office', which he perceives as less academic:

I really dislike the large rooms with, you know, sort of, banks of monitors, whereas the ones downstairs, it's a little bit... there's much more space between them, I much prefer working there; I really dislike the one upstairs...it feels like an office. It's not the place where you can imagine... or if there is any, sort of, academic element coming out there. (Juan Interview 1)

Juan's discussion of these physical spaces emphasises the meanings he ascribes to the features of the different material spaces and the objects within them. The library is prized as an 'academic' space which is described as 'dusty', 'wooden shelved' and 'old'; whereas the 'banks of monitors' in computer lab are avoided, as they are associated with the features of a modern office. The objects associated with literacy in these two different spaces appear to have a symbolic value which adds or detracts from his sense of them as legitimate and valued spaces, with the objects associated with print literacies appearing to symbolise the 'academic', while the objects of digitally-mediated literacies such as desktop computers do not. In this regard, these nonhuman actors may be seen in Latour's terms as *mediators* which carry meaning, as opposed to neutral 'tools'.

Frederick also describes how he makes deliberate choices to restrict his engagement with computers or screens:

When I'm in the library I can print at the computer and then turn off the computer for a bit, make a space, and go in a quiet reading corner and read then. If I do want to read and have access to the computer, I'll do that in my room, and then I'll just have my desk opposite me with my screen, and I'll, sort of, sit sideways with my legs on the bed, stretched out. (Frederick Interview 1)

He consciously restricts his material engagement with objects associated with digital mediation, and also orientates his body in a particular way to allow only a partial

engagement with the screen. This highly-considered embodied practice and engagement suggests that Frederick imbues the computer and the screen with powerful qualities, and the potential to distract him or engage him in ways which he would not find productive for his academic work. Again this viewpoint suggests that the student is imbuing the device with a form of agency.

In contrast to Frederick, MA student Yuki places a great deal of emphasis on proactively engaging with mobile networked devices in all her domains of practice:

For me the most important thing is portability, because I use technologies, ICT, everywhere I go, anywhere I go. For example of course I use some technologies, PCs and laptops and my iPad in the university building, and in the university building I use PC, I use them in PC room, in library, and for searching some data or journals. In the lecture room I record my, record the lectures and taking memos by that. (Yuki Interview 1)

Yuki's extended range of physical domains for digitally-mediated practice can also be seen in her photo of her iPad, which she used to illustrate her account of reading it in the bath, having put it in a ziploc bag:

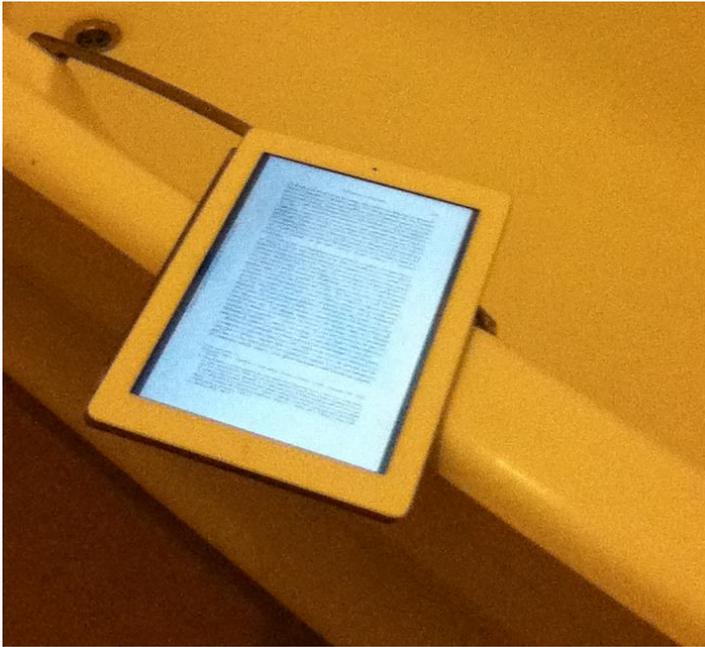


Figure 3: Yuki's image of her iPad on the bath

This image illustrates the permeation of digital devices throughout Yuki's day-to-day life, including during bathing - a practice which tends to be predominantly associated with privacy, solitude and the biological body. The juxtaposition of the networked device and the secluded, intimate setting of the bath is a striking one, and suggests that for Yuki the division between private embodied domains and connected digital ones is an indeterminate one. Her enrolment of the iPad as *mediator* in this way seems to be a striking example of Hayles' 'dynamic process' of materiality in play, and is an example of how the iPad as an object plays a crucial role in the movement and translation of texts across contexts. The iPad is acting as a *mediator* here in Latour's terms as opposed to *intermediary*, in that it changes the meaning of what it carries transcontextually. The texts read in the private space of the bath are transformed in their ontological status, becoming intimate and personalised, as opposed to public and imbued with associations of the material campus of the university. The following section will seek to develop and extend this analysis by returning to Hayles and her notion of the 'changing assemblage',

applying this concept to the relationship between print and digital literacy practices in the data.

Changing assemblages: tracing texts across the print-based and the digital

'Grasping the complex ways in which the time scales of human cognition interact with those of intelligent machines requires a theoretical framework in which objects are seen not as static entities that, once created, remain the same throughout time but rather are understood as constantly changing assemblages in which inequalities and inefficiencies in their operations drive them towards breakdown, disruption, innovation, and change. Objects in this view are more like technical individuals enmeshed in networks of social, economic and technological relations, some of which are human, some nonhuman.'
(Hayles 2012: 13)

Hayles' point here is that objects should also be seen as being part of processes of change; 'technical individuals enmeshed in networks'. The analysis of this set of findings is concerned with the notion of the 'constantly changing assemblage', in particular how it may be instantiated in the interplay between print-based and digital media in the literacy practices of the participants. Like the preferences concerning physical domains and objects, the students also reported decisions taken about the mediated format in which they preferred to work with texts.

Juan refers to a process of 'demarcation' between print or paper-based practice and the digitally-mediated, expressing a preference for working on paper by printing digital texts and marking them up, even specifying that the pen should be yellow:

My favourite way of studying something is sitting down with a book and...a pen and some yellow paper and taking notes.... And then I will use the technological side as well, because... Yes, I like combining the two, but I also like to be... the demarcation lines between them, you know, if I, if I have a reading to do then I can, then I almost, I invariably print it off and highlight and go through it and that kind of thing, then that's done, then I've got the notes, so then it's just the notes I've got. (Juan Interview 1)

He goes on describe why he prefers to work with paper, mentioning a 'personal connection' and 'simple comfort':

I've tried doing the thing of ... reading an article on a computer, but I just prefer it to be printed off, to be in my hand so that, you know, there is, there's a... maybe it's because of a personal connection to something like that, but I think it's more like simple comfort. (Juan Interview 1)

Juan's preferred practice seems to maximise the degree to which he can materially interact with the text as object, through the highlighter pen as *mediator*. Unlike Latour's *intermediary*, the pen transforms the meaning of the text as opposed to neutrally conveying a pre-established and stable set of meanings. Through this practice, the assemblage of computer / paper text / pen / Juan-as-author is brought into being.

Frederick also comments that he prefers to work with paper and pens, explicitly rejecting a Kindle because it would not allow him to continue this practice:

When I read, it has to be a physical paper, and when I read I have my marker pen. So for me, a Kindle or something like that will not be an option for quite a long time, because I can't marker pen, or I could do it once but then it would be broken. (Frederick Interview 1)

He elaborates on this with a vignette about an occasion when he was unable to highlight a digital document. In this case, his inability to interact with it is also cited as the issue, as he was unable to convert it into a summary using the highlighter:

I had to do a pre-reading and it was like a very, very long document, and it was one of these PDFs that you weren't allowed to print and you had only had like a five day licence on it, and that was such a pain, having to read it on the screen, because it's, like, the thing is, when I read something, I want to learn it, and I want to summarise it, so for all that I need my marker pen, I mean, if it's a PDF, I can't, I mean, I can highlight it temporarily, but it doesn't, sort of, as soon as I click again, it's gone. (Frederick Interview 1)

MA student Naheed also mentions his desire to highlight text as the reason for his choice of print-based context of textual practice:

I used to read a lot on the screen when I was in my graduation years or doing my past Master's, but nowadays I don't feel that comfortable reading. And I do have to highlight a lot: highlight and then writing down somewhere. So that's why I print out most of the materials I'm studying, and I keep notes in digital form as well as in written form. It's a combination of both. (Naheed Interview 1)

These accounts imply that the materiality of the paper text as object is chosen in order allow for the deployment of *mediators* in the form of pens and highlighters, allowing for change to take place in the whole assemblage more readily through use of these artefacts, which allow for meanings to be transformed in a manner which is regarded as more difficult to achieve in a digital text.

When it comes to writing, PGCE student Louise comments that she prefers handwriting to typing, although in her case the reason is that digital mediation provides too much flexibility:

If I'm sitting at a computer typing, I find that really sort of blocks my thoughts because there's too much temptation to kind of delete and keep on changing. Whereas if you write by hand, you know, it just sort of flows more, I think. I mean, I guess like a lot of authors, I find it easier to write by hand than on a computer. (Louise Interview 1)

So Louise chooses handwriting here in order to restrict the authoring practices available to her, as she finds the ability to delete and change text digitally 'too much temptation'.

Yuki's strategy is rather different, as she prefers to minimise working with paper to maximise portability, although she also mentions the advantage of being able to intervene in the paper text by writing on it:

Paper materials, physical ones, are very easy to review, and I can write, I can jot my ideas into it, on it, but I have to bring so many papers if I go to the library, and from my house I have to take many papers. (Yuki Interview 1)

Django discusses what she sees as the differences between the digital and the print-based in her creative practice:

I mean the argument is that with Photoshop, yes, you know, you can make the image look like screen-printing...but the quality of actually doing it by hand is the fact that every single print can be different, if you choose it to be, you know, and that's more the fine art way of working. (Django Interview 1)

Interestingly, she comments that although digital technology can produce an image which appears to be hand-made, she prefers actually working by hand as each print will be intervened in to be different. This seems to be another example of choosing a particular material configuration in order to have more opportunity for change within it. She also describes how she digitally recorded her embodied practice, filming spaces and 'making them into something else':

I recorded my own hands actually constructing and making something, and it was, I mean it went on for ages, but that was the whole point of this kind of, quite laborious process that I was undertaking in making these things. And then it was, sort of, you know, editing them, using the software to develop some kind of, sort of, narrative that was going through this thing.... so filming spaces, taking kind of, freeze-frames of various parts of this journey, and then, you know, making them into something else. (Django Interview 1)

This is a compelling account of a very semiotically rich material assemblage, in which Django uses her hands to create an artefact and simultaneously films them in this process. She then edits the film using digital software in order not only to create a 'narrative' of the laborious creative work of her hands, but by doing so 'making them into something else'. The camera and editing software act as *mediators* in order to allow this change to take place, creating a new digital artefact.

In this section I have argued that 'constantly changing assemblages' (Hayles 2012:13) of literacy practices are brought into being through a complex interplay of print-based and

digitally-mediated artefacts. I have proposed that material objects such as digital devices and print literacy artefacts such as pens function as *mediators* in Latour's terms to transform the meaning and ontological status of texts transcontextually, illustrated with examples from the study.

The absence of apparently neutral *intermediaries* in Latour's terms is striking in the data - instead the devices and other artefacts as described by the students appear to exhibit the features of *mediators* – changing and transforming texts as they interact with them. This findings underscores Latour's contention that *intermediaries* are rare, fitting with his broader point that nonhuman actors are agentic in social process, as opposed to neutral 'tools' – in networks they do more than convey meaning, they change it and transform it in a broad range of ways. The next section will advance this analysis, arguing that these devices and objects can be analysed as 'nonhuman actors', which are imbued with features of agency by the students in the study.

Agentic: devices and objects as nonhuman actors

'Like humans, objects also have their embodiments, and their embodiments matter, no less than for humans. When objects acquire sensors and actuators, it is no exaggeration to say they have an *umwelt*, in the sense that they perceive the world, draw conclusions based on their perceptions, and act on those perceptions.' (Hayles 2012: 17)

A consideration of the degree to which objects have an *umwelt*, or a 'self-centred world,' (Deely 2001) is beyond the scope of this paper. However, some of the comments made by participants suggest a imbuing of objects with agency as Hayles describes.

One area where this was evident was in the way that participants describe their relationships to devices, often in terms that suggest a personal or emotional connection:

And then I had a boyfriend at the time, and he had one of the little Apple Macs as well, so I got quite into using the whole kind of cute little thing. So by the end of my college years I was quite in with the whole old-style Apple Mac. (Sally Interview 1)

Actually, when I, yes, except for the sleep, I'm sleeping, I usually always touching my laptop. (Yuki Interview 1)

I had to travel places far from my home or from the university, specially outside the capital in other parts of the country...I would still have my laptop with me so I could work on that. And later on it was a constant company for me. (Naheed Interview 1)

These comments suggest feelings of affection, with devices described in terms of companionship, also suggesting close physical intimacy with the device as object. The remarks indicate that the objects themselves are seen as having qualities well beyond their technological functionality, that they are in some sense imbued with an agentive, positive presence by their 'owners'.

Frederick uses an intriguing way of referring to a particular search engine, again suggesting an intermeshing of himself and technologies in his thought processes:

My third half of my brain is Google scholar. (Frederick Interview 2)

Other comments also seem to position devices as agentive, but in a less positive way either in terms of controlling practice or as intrusive:

In a way I think they (the technologies) control me as well, because I can't really do anything without them, unless I want to have a boring lesson with my kids, I think yes, so in a word I think the technology is controlling me now. (Faith Interview 1)

Faith describes a situation in which she must use technologies in order to teach in an engaging way. However, instead of simply saying that technologies are necessary, she states that they 'control' her. This formulation imbues the technology with powerful agency in her practice.

Sally refers to the website iTunes and the perception that it can 'spy on you', with the website cast as an active and potentially intrusive presence:

Obviously I don't generally read all the terms and conditions, but somebody's read all the terms and conditions and said that they think that iTunes can then actually, kind of, spy on you basically. (Sally Interview 2)

This view of technologies as malevolent or threatening is apparent in other comments made by Sally, who also refers to her phone as 'the spy in my pocket'. She refers to the arrival at her flat of a magazine which she had not subscribed to, citing a possible breach of data protection:

I do think that there's something really quite fucked up going on with, like, data protection and stuff at the moment... I'm just not very happy about it... And then this week what do I get? The bloody alumni magazine comes to my flat and they must have been data-sharing with the colleges to update their database. (Sally Interview 2)

While the notion of the posthuman and the nonhuman actor is largely implicit in the student remarks, it is partially suggested by Django, who describes her embodied practices in conjunction with technologies as a 'circuit':

Obviously with this project, it's not necessarily the working with, sort of, the traditional practices, but much more about the, you know, our physical bodies in space, rather than... And thinking about online environments, or digital environments, I'd say, not online, but a digital environment as being, you know, perhaps, you know, the iPhone, or whatever it is, connected to a projector, or working then with the iPad, and connecting, so you've got this kind of circuit within a physical space. (Django Interview 1)

Her remark specifically describes how this 'circuit within a physical space' of the embodied and the digital is achieved through 'working with' *mediators* in the form of the iPhone and iPad, which can be seen as agentive co-workers in the creation of what could be termed a posthuman assemblage.

Conclusions

This paper began by arguing that New Literacy Studies, despite its strong ethnographic orientation, has fallen short in providing adequate theoretical purchase in terms of the materiality of literacy practices, particularly in contemporary digitally-mediated communication. It proposed that this perspective could be significantly enhanced by interweaving insights and theoretical constructs from actor network theory and posthuman theory, focusing in this paper on Latour's concept of the object as *mediator* as opposed to *intermediary*, and Hayles' recent discussions concerning the nature and ontological status of materiality and objects in reading and writing.

The analysis was structured around three claims made by Hayles (2012). Firstly, it looked at the notion of materiality as a 'dynamic process', arguing that the data shows the students engaged in ongoing emergent processes of negotiation and interaction with objects in the form of technologies and texts. In their accounts of practices within particular physical domains, the student comments suggest a highly interactive engagement with devices, in order to create and maintain the preferred conditions for engagement in literacy practices and for them to change. The student data suggests that cultural meanings and qualities were also attributed to objects and physical spaces associated with literacy practices, and that student decisions and preferences were influenced by the meanings attributed to these.

The next section argued that these processes instantiated Hayles' notion of 'constantly changing assemblages', with a particular emphasis on how these changes were achieved through movements of texts between digital and print formats. The student remarks reveal decisions taken with regard to materiality around print versus digital, and the

relationship between this and the ability to interact with the texts, for example via *mediators* such as highlighter pens.

The third section of the analysis focused on Hayles's claim for agency on the part of objects as nonhuman actors, arguing that the students imbue their devices with various qualities more conventionally associated with the human, both positive and negative. These perceived features of the device caused the students variously to avoid it, accept it or adapt their practices in order to progress, with comments indicating that they too see devices and technologies as in some sense agentic, powerful, emotionally significant, and at times even malevolent.

Throughout their accounts, these objects are not presented as 'tools' which simply carry previously formulated and stable meaning, as in Latour's notion of the *intermediary*. Instead, Latour's notion of object as *mediator* was deployed throughout the analysis to characterise the agentic, meaning-making and transformative nature of these objects as evidenced in the student accounts, and how they operate in the process of texts being transformed across contexts. My contention in this paper is that a recognition of objects as agentic *mediators* (as opposed to *intermediaries*) offers transcontextual analysis powerful new analytical purchase on the fine-grained micro-practices through which texts are transformed. The devices appear to be implicitly understood by the students in the data as social actors which are rich in social signification, and are capable of transforming and creating meaning – such as the digital document which does not allow for highlighting, the paper and pen which does, or the computer which allows for too much deleting. These do not therefore appear to be regarded as neutral and passive objects or *intermediaries*, but more as active agents - *mediators* - which must be

creatively enrolled and then worked with in the processes and struggles of text production and transcontextual processes.

This form of analysis presents a challenge to more conventional (implicit) notions of objects and devices as either part of background 'context', or as passive 'tools' under unproblematic control of the rational human 'user'. The reading of objects as agentic participants in processes of meaning-making arguably also serves to disrupt taken-for-granted binaries such as that of text and author and device and user. The implications of this shift in how we consider the status and role of objects in these terms is potentially far-reaching, as challenges to these apparently 'commonsense' understandings of how texts are produced and transformed offer a radically different analysis of how literacy practices are enacted. The focus is brought even more sharply to bear on the situated nature of practice - not as tools, context or backcloth to human agency, but as active and necessary components in emergent networks. This allows for potentially more detailed and nuanced insights in transcontextual analysis which may provide a more balanced and accurate account of how these movements and transformations take place across the print and the digital in textual practices. The challenge for the future research is to continue to develop and also operationalise these concepts in research methodology in order to allow a deeper understanding of what it means to author the 'posthuman text' in the contemporary university and beyond.

(8998words)

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