The materiality of reading

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Introduction

Theresa Schilhab & Sue Walker

The phrase ‘materiality of reading’ may be interpreted in different ways, since there are numerous disciplinary perspectives on what constitutes materiality. This collection of essays is a result of discussions between members of the European research initiative E-READ (“Evolution of Reading in the Age of Digitisation” (2014–2019)), funded by European Cooperation in Science & Technology (COST), which brought together nearly 200 scholars and scientists studying numerous aspects of reading. Our anthology addresses the materiality of reading from novel perspectives influenced to some extent by the editors’ academic backgrounds in neurobiology and embodied reading, and typography and design for reading. We asked for ideas and work in progress (rather than final research studies) about materiality, so that we could capture some of the debate that occurred in the E-READ meetings – in Zadar, Vilnius, Reading and Stavanger.

The materiality of reading is about the interaction between a person and an object where the person uses different senses to know and understand the object and the object is a more or less considered manifestation of a content. This materiality can also involve the comfort experienced while reading, the space (where we read) and the act of reading (how we read). Materiality also plays a pivotal role in who is included or excluded as a reader. It influences our access to texts, as well as the ease of reading and kinds of user engagement that are possible. For typographers and book designers, the materiality
of reading is about making text and pictures accessible, legible, intriguing and enjoyable, recognising that different kinds of readers and circumstances of use should impact on the visual organisation of text and image (see, for example, Hochuli & Kinross 1996).

Psychologists use the term 'embodied reading', drawing on cognitive sciences and research. Accordingly:

We do not only read with our eyes (not even in the most rigorous experimental setting). Neither do we write, text or tweet exclusively with our fingers and hands. All acts of human communication, creative expression, meaning construction, and learning convey the fact that, as human beings of a biological nature, our actions and interactions are inevitably and intrinsically multisensory.

(Mangen & Schilhab 2012, 286)

However, embodied reading is not concerned merely with multisensory processes contained within the reader. The perspective takes inspiration from a recent shift in the cognitive sciences that goes under the name ‘embodied cognition’, an umbrella term used for the so-called ‘four Es’; the mind embodied, embedded, enacted and extended (for example Menary 2010). Hence, embodied cognition breaks with the ‘traditionalist’ view that attributing meaning to words spoken and written occurs irrespective of the physical substrate, that is the body of the cognizer.

Inherent to the embodiment paradigm is instead the notion that humans are engaged in continuous interaction with and are therefore strongly embedded in their environments and the material present in them (Wilson 2002). As part of being alive, we instantaneously adjust and adapt to circumstances, environments and people (Schilhab et al. 2018). As such, our cognitive modus operandi is essentially malleable and volatile, which limits instances of amodal, abstract and arbitrary knowledge processing to select occasions (Schilhab 2017). Thus, the embodied reading view is sensitive to the complexity that constitutes reading situations, including their cultural meanings as these are played out in different historical settings and their replacement of traditional subject–object relations for many-faceted multi-level interactions, as well as their material composition.

Typographers are aware that the difference in materiality between printed and digital texts affects the reading experience. Paul Luna (2018) notes that e-books present a window of decontextualized text to the reader, denying them the insight that handling a physical book gives about the scope and overall structure of the work. Physical texts encourage kinds of reading that include turning back, looking forward, annotating and skipping, and regarding these activities e-book readers and software still fall short of the printed book. Materiality is also expressed by the physical, dimensional presence of letters, words and text on a page, and consideration of the processes by which they were put there. As noted by Eric Kindel,1 this, in turn, brings about reading that blends material-sensory and cognitive aesthetics, and gives rise to reflections on the work of capturing thought and experience as language and (material) form.

We have organised the essays into three sections that represent the ways in which materiality was perceived in the COST workshops: where and how we read; the object of reading; and engaging with the text.

Theresa Schilhab and Anežka Kuzmičová explore how digital reading has transformed how and where people read, and relate this to grounded cognition. The late Paul Stiff’s short paper (published in Eye magazine in 1993) questions the postmodern notion of the passivity of reading and the unconventional use of typography to make readers work to engage with

1 Informal correspondence with the editors in 2019.
a text, and that typography can affect how people read by addressing the needs of different kinds of reader and genres of text. Ana Vogrnič Čepič, Patricia Dias, Anežka Kuzmičová and Skans Kerst Nilsson discuss how the reading device, type of text and purpose of reading relate to different bodily postures and physical environments, and the material advantages of the single-purpose nature of print books. Adrian Netedu reports on an empirical study about the role and place of reading in student daily activities in the context of student perspectives on the switch from printed books to digital resources.

Pasqualina Sorrentino, Massimo Salgaro, Teresa Sylvester, Jana Lüdtke, Arthur Jacobs and Gerhard Lauer address the dichotomy of digital native/digital immigrant, investigating the reading preferences and reading habits of younger and older people in relation to literary reading on paper vs. on screen.

Immersive reading presents an opportunity for reader–text interaction, shifting ideas about what is meant by the object of reading. Alice in Wonderland is used in Federico Pianzola and Wayne de Fremery's exploration of how a virtual reality reading (VR) environment might be designed to immerse the reader in the experience of the story, including sound and interpretations of landscape. In their visual essay, Chloé Aubry and Claire Gauzente propose a framework for studying the different material processes used in artists' books and their potential impact on the readers/users of such books.

The section on 'engaging with the text' is concerned with the ways different kinds of readers access content in printed and digital texts. Valeria Levatto discusses how accessing information in a text (conventionally done through indexes and contents pages in the case of a book, for example, which are produced by editors) has changed with digital formats, where readers are able to control routes through a text, and their individual interpretations of its content through tagging. A different perspective is given by Ann Marcus-Quinn and Triona Hourigan, who explain how they encourage informal 'book making' to stimulate reluctant readers.

Based on their study with eye-trackers, Arūnas Gudinavičius and Andrius Šuminas discuss selecting strategies and browsing patterns among readers searching for books and query their accepted relation to age and gender. The anthology closes with an exemplary essay by Alenka Kepić Mohar, who reflects upon the shift in materiality of textbooks for education by examining several examples of primarily Slovenian textbooks from various periods, ending with digital versions.

References


Does age determine whether we read e-books?

Questioning the dichotomy of digital natives vs. digital immigrants

Pasqualina Sorrentino, Massimo Salgaro, Teresa Sylvester, Jana Lüdtke, Arthur Jacobs & Gerhard Lauer

The dichotomy ‘digital native/digital immigrants’ was introduced in 2001 by Mark Prensky with the aim of describing the digital divide existing between young people and the elderly. The metaphor has had enduring influence on how the educational system perceives students and technology. Most scholars do not like it, for various reasons. Among other problems, the term implies that technological abilities are innate rather than taught and learned. The purpose of this study is to examine whether there is any empirical evidence to support the use of the metaphor. We looked at the reading preferences and habits of younger and older people in relation to literary reading on paper vs. on screen. We tested subjects (n = 59)
of different ages and socio-cultural backgrounds. Our results clearly distinguish between two attitudes towards literary reading on screen, represented by readers who have been using a digital device for longer than three years, and readers who have used one for no longer than two years or who have never handled one.

Introduction

It is often stated that we are living in an era of a great cultural transformation: the third “reading revolution” (Darnton 1991, 148). After the invention of writing 6,000 years ago and of the Gutenberg printing press in the 15th century, the introduction of digital texts and reading devices such as the Kindle in 2007 has changed our reading minds again (Wolf 2007). Along with the embodiment and diffusion of digital technologies into every part of our society and economy, a whole new generation of young people was born: the so-called digital natives.

Marc Prensky (2001), working in the field of education, introduced the dichotomy of digital natives/digital immigrants in order to describe a generational divide. According to Prensky’s classification, the first group are the ‘native speakers’ of the digital language of computers, the Internet and video games – the generations who were born into the digital world. The so-called ‘digital immigrants’, on the other hand, are represented by those who started to use the language of new technologies at a later stage in life, and “like all immigrants, some learn] better than others – to adapt to their environment, they always retain, to some degree, their ‘accent’, that is, their foot in the past” (Prensky 2001).


An additional problem when it comes to research on literary reading on screen versus on paper (Dillon 1992; Ziefe 1998; Mayes et al. 2001; Wästlund et al. 2005; Noyes & Garland 2008; Magen & Kuiken 2014; Magen, Walgermo & Brunick 2013) is that the subjects of investigations usually students – who are, according to Prensky, digital natives. It is therefore questionable whether the results of such studies could be generalized.

Theoretical background

Before 2007, when Amazon launched the first Kindle, the word ‘book’ was always associated with something physical – with specific paratextual information (Genette 1997) given by typography, cover, size and colour. Due to the long Christian tradition of book production and the close ties between bourgeois society and printing culture since the 18th and 19th century, in the 20th century the culture of books in the Western world turned into a new cult of books: dictators’ publications became the ‘sacred’ core of state propaganda and a tool for the manipulation of the people (Koschorke 2016).

For historical and biographical reasons, different readers developed various attitudes towards books and screens. Especially for the older generation, the book was something ‘sacred’; it had its own ‘materiality’ and ‘originality’. Already the concept of ‘original’ has been severely compromised by the
invention of printing. "Yet the digital media has marginalized the notion of the original even further... After all digital copies cannot be distinguished from the original" (van der Weel 2011, 181–182). All digital texts, regardless of provenance or quality, look identical.

Literary reading is a human–technology interaction that involves our bodies and our brains engaging with a device of certain ergonomic and audio-visual affordances. In addition, the book has a user interface (i.e. cover, paper, titles, page numbers) according to van der Weel (2011, 187), but we are so used to it that we do not notice it anymore. Digitalization can implicate haptic changes, such as the way we interact with different media with our hands. When we read on an e-reader, we click and scroll through the pages, while in paper reading we are literally in touch with the text itself (Mangen 2008, 405). In a recent study of iPad apps in kindergarten, Merchant (2015) found that the body and in particular the hands are fundamental when using iPad apps for story-reading with young children. The haptics of the iPad interface makes a crucial difference for meaning-making, for the experience of stories, for navigation through the text and for how the texts are shared overall (Merchant 2015). These haptic differences were also tested in previous experiments. For example, Mangen and Kuiken (2014) wanted to examine the effects of reading medium (iPad vs. booklet) and a paratext manipulation (fiction vs. nonfiction) on aspects of narrative engagement. Their results indicated that subjects using the iPad reported uncertainty about location within text (dislocation) and a poorer grasp of its length.

This finding replicates evidence from other studies indicating that readers lose their sense of where they are in the text when reading on screen (Piolat et al. 1997; Wästlund et al. 2003; Mangen et al. 2011; Walgermo & Brennick 2013). The most interesting main effect was for the measure of medium awkwardness, in that subjects reading non-fiction on the iPad reported feeling that the holding and manipulation of the medium was more awkward during reading than readers in the booklet condition (sample items: "I felt awkward manipulating the booklet/iPad during reading"; "I felt awkward holding the booklet/iPad during reading").

Starting from Prensky's dichotomy, the aim of the current study is to investigate whether the categories of digital natives, namely the younger generations born into the digital world, and digital immigrants, those who started to use new technologies at a later point in their life, exist in relation to reading habits associated with literary reading on paper vs. on screen. Furthermore, it explores possible differences between the two groups. We want to see whether there is any empirical evidence to support the use of Prensky's metaphor of digital natives vs. immigrants in the first place, questioning its usefulness in characterizing particular generations of people.

**Methods**

Fifty-nine participants (37 women, 22 men) aged between 18 and 70 years old (M age = 40.0, SD age = 18.8) were recruited in the area around Göttingen and Berlin through printed and online advertisements, and social networking websites (i.e. Facebook). Forty-nine participated for free; the remaining ten were volunteers who participated for compensation. All of them were from different backgrounds: there were workers, pensioners, and people with and without academic educations.

The first part of the study enabled all participants to experience the reading of different pieces of literature in paper books and on an electronic device (Kindle reader). All participants read two short stories and two poems, one each in a paper book and on the Kindle reader, in a counterbalanced order. After reading each text, participants filled out some memory tests and rated their agreement with a list of statements regarding their
reading experience on a 5-point scale. At the end of the study participants filled out an additional questionnaire. Besides the questions related to their age, gender and educational achievement, they responded to the items presented below concerning their reading habits:

1. How many years have you been reading digitally in your free time?
   Answers on a 5-point scale: 1 (for more than 5 years) – 5 (never)
2. How many books did you read last year in your free time?
   Answers on a 5-point scale: 1 (more than 20) – 5 (none)

The first two questions regarding the subjects’ familiarity were used to split the sample into two groups independently of their age and focusing on their digital reading experience. To explore group differences due to familiarity with digital texts further, we also presented an adapted form of the haptic dissonance scale (Gerlach & Buxmann 2011). Participants indicated their agreement with the following statements on a 5-point rating scale (from 1, I strongly disagree, to 5, I strongly agree):

3. For me it makes no difference whether I read a printed book or an e-book.
4. I find reading in digital formats cold.
5. An e-book is more technical and reminds me of work.
6. Reading an e-book feels more technically distant and not natural in my hands, thus I cannot establish a close relationship with the book.
7. Paper books for me have a kind of ’fragrance’.
8. I set a high value on the paper quality of printed books.

To test whether both groups corresponded to the assumed Prenskyian dichotomy of digital natives/digital immigrants, we compared the answers of both groups to all other questions about their reading habits and their usage of digital vs. paper texts for leisure reading (described below):

9. Do you prefer to read digital or printed books in your free time?
   Answers on a 5-point scale: 1 (only digital books) – 5 (only printed books)
10. Which medium supports deep reading (better)?
    Answers on a 5-point scale: 1 (only digital) – 5 (only printed)

Results

As a first step, we used item 1, concerning familiarity with the digital medium, to split the participants into two groups. Thirty-three participants (66.7% female) reported a high familiarity, indicating the usage of digital media for reading for more than three years. The remaining 26 participants (53.3% female) reported low familiarity, indicated by no usage of digital devices (or usage for less than 2 years).

Comparing both groups with respect to age indicated no significant differences: t(57) = 1.7, p = 0.10. As shown in Figure 1, we could identify young participants below 40 reporting less familiarity (measured in time spent reading digitally in their free time), as well as older participants reporting high familiarity.

This outcome is interesting because it suggests that neither young nor elderly people are homogeneous in terms of their use of technologies for reading. In accordance with other studies (Helsper & Enyon 2008; Herring 2008; Cheong 2008), our findings seem to reject this idea of digital expertise and technological savviness based on date of birth. Furthermore, we did not register any differences between the groups in term of reading frequency, since our subjects reported the same amount of
leisure reading in response to item 2 (χ² = 1.4, p = 0.8). For the remainder of this chapter, we therefore use the labels low vs. high familiarity to refer to both groups.

To explore the two familiarity groups further, we compared whether they see any differences in reading paper books compared to reading e-books (item 3). The high familiarity group agree more strongly with the statement that reading paper books does not differ from reading e-books than the low familiarity group, shown in the t-test: t(57) = -2.7, p = 0.009.

The results presented in Figures 2–4 show that familiarity with the medium determines whether digital reading was perceived as ‘cold’, ‘distant’ and/or associated with work (items 4–6). Compared with the high familiarity group, members of the low familiarity group perceived e-books as ‘cold’, t(57) = 4.2, p = 0.0001, as associated with work (t-test: t(57) = 3.9, p < 0.001) and as distant (t-test: t(57) = 4.5, p < 0.0001). Readers from the low familiarity group were not able to establish an emotional close connection with texts in an e-book format. For literary reading, this is an important gap as it seems emotional bonding with the fictional characters is impeded by the digital medium. Gerlach and Buxmann (2011) described this lack of (warm) haptic feeling as "haptic dissonance".
Moreover, subjects with a low e-reading familiarity also perceived the e-book as more technically distant and not natural in their hands. It seems that they struggle to establish a close relation with e-books. This is in line with the assumption that texts presented in paper books are often described as tangible, whereas texts presented on screen are described as intangible and detached or mediated (Mangen 2008). Our data show that people who are unfamiliar with digital devices in particular differ in their perceived materiality of text on paper and of text on a screen. It is important to highlight the exact phrasing of the description of these embodied sensations, as digital texts are described as “distant” and “not natural”, which refer to precise bodily sensations.

Reading on paper seems to be related to a kind of emotional state of mind that leads readers with low digital familiarity to perceive mechanical devices as an obstacle to building a close relation with a book.

Furthermore, the results related to the acceptance of the medium showed that e-reading, far from being a leisure activity, was perceived by the low familiarity group as technical and associated with work. Again, the familiarity with the medium compromises the perception that the subjects have of the reading experience as a moment of relaxation and enjoyment. It seems that subjects naturally distinguish between reading for leisure on paper and reading for work digitally, where literary reading belongs to the first activity.

Additional analysis indicated that the familiarity groups differ especially in their perceptions and evaluations of e-books. As shown in Figure 5, the groups do not differ significantly (both t<1) in their evaluations of the materiality of reading paper books (items 7–8). Both groups agreed equally strongly with the statement that paper books have a kind of ‘fragrance’ and that paper quality is important.

The findings presented in this study suggest that the dichotomy of digital natives/digital immigrants when related to reading behaviour (paper vs. screen) is misleading. The inconsistency of the Prenskyian dichotomy with respect to literary reading in free time is further revealed by the findings represented in the following graph in respect to the preferred medium for leisure reading. According to our results, not only the low familiarity group, but also the high familiarity one showed a stronger inclination for reading printed books rather than digital ones in their free time (item 9, Figure 6).

The paper book is preferred by subjects in both groups as the medium allowing an active process of thoughtful and deliberate reading, or “deep reading” (Wolf 2009), which supports comprehension including critical analysis, reflection and insight (item 10, Figure 7). These results evidence the social prestige associated with the printed book in Western culture, a culture described by Adriaan van der Weel as based on the “Order of the Book” (van der Weel 2011), and shed light on a prejudice against digital media which is not empirically based, since in our study we did not register any difference in comprehension and memory across reading media.2

2 See Saigaro et al. (2018) for further results.
between the familiarity of the reader with the medium and the medium itself.

**Conclusion**

Our findings reject popular generational stereotypes according to which young is equivalent to digitally or technologically adept, and the existence of a “digital divide” (Compaine 2001), or a gap between people with effective access to digital technology for leisure reading and those with very limited or no access at all. In line with other studies, our results reinforce the critique of the age-associated notions of “digital natives” and “digital immigrants” (Bennet et al. 2008).

At least for our subjects, it was not age, but preference and familiarity with the digital medium that were the discriminating factors. This supports previous findings (Chen et al. 2014; Margolin et al. 2013; Noyes & Garland, 2003) on the correlation between subjects' reading performance on screen vs. on paper and their familiarity with the reading medium.

The value of the physicality of reading – the importance of touch – seems to be a key aspect in explaining the different reading preferences of the two groups. Finally, both the printed book and the e-reader are objects that offer specific affordances and therefore haptic interactions.

The study's outcome contributes to the discussion on literary reading on screen vs. on paper. Along the same lines as other similar studies, our results seem to indicate that the paper book still has an important position in our society and that e-books are not taking over.²

Unlike some previous studies, however, it allows generalization of the results to various kinds of literary readers, since the interviewed sample included different ages and varied

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² See Delgado et al. 2018.
backgrounds. The experiment was focused on personal experience and comprehension but did not distinguish between learning and remembering. A further limitation of this study is the limited number of participants. To make more general statements about the dichotomy of digital immigrants/digital natives a test including more subjects is needed.

References


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