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A sense of physical books in our digital society

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A Sense of Physical Books in Our Digital Society

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Abstract

In spite of the encroaching tide of digitisation across all forms of communication, resistance to the ebook revolution has highlighted the enduring allure of a physical book. The ebook can only be attributed 10% of publishing house revenue and lags behind print book sales by 1:3. Investigations and speculation regarding this anomaly have credited the oft-overlooked role of haptics in the persistence of print. The ability to touch and smell a book has an innate power engaging readers in a way not yet possible through pure digitised versions of the same media, a circumstance that invites reassessment of the true value of phenomenology in a world becoming increasingly digitised. For the first time, the publishing industry must contend with physicalness and its role in imbuing books with greater meaning than sum of its words embedded behind a screen. To understand the underlying principles at work in sensing more value in the physical world than the digital, this paper explores the emerging perspectives on ebooks and print books in terms of haptic interaction.

Introduction

An unwavering constant of technological innovation is a corresponding change in society. In few places has this been more evident than in the evolution of the written word, conceived at the dawn of human civilisation as a vessel for sharing knowledge and ideas. Advancements in communication technology have progressively increased the range and effectiveness of their dissemination throughout history, and each advancement has changed not only how people consume text, but also how they perceive the medium, as was the case with Gutenberg's press (Dittmar 2011). The capability to manufacture a perfect replication had the effect of emphasising content while depreciating the value of the individual physical object and thus ushering in the development of copyright law (Cotter 2003). The printing press was but one development in an ongoing trend by which replication had emphasised the role of intellectual property in media at the expense of phenomenality.

Phenomenality is a term referring to the extent to which an event or circumstance is cognisable by the senses. In modern philosophy, the word is closely associated with the works of Immanuel Kant, who articulated in Critique of Pure Reason that the universe as experienced by humans consists of the phenomenological realm (Kant 1929). Phenomenality thus has great significance to human experience, shaping perception of not only the phenomenological, but of the noumenal; the realm of the transcendent and intangible. This line of thinking has particular relevance today, given the increasing prominence of digital information as a successor to analogue forms. Humans are less concerned with the immaterial than the physical and observable. One example of this is the effect of currency transparency on one's willingness to part with money, by which less transparent payment modes such as credit cards are spent more freely than traditional cash (Raghubir & Srivastava 2008).

The information age that began in the 20th century is considered the written word's most significant redefinition since the creation of Gutenberg's printing press (Rao 2003), marked by the transition from analogue to digital as enabled by computing devices. The affordances of electronic editions of information present notable advantages over their physical predecessors and have a significant effect on our relationship with media (Simons & Buller 2014). The electronic book (ebook) embodies this change as a book in digital form, defined informally as any digital object that is recognisably "book-like" (Gibson & Gibb 2011). It first emerged into the popular consciousness in 2007 on the back of Amazon's Kindle line of e-readers and closely followed by Apple's IPad in 2010 (McCraken 2013).

Since their inception, it has become clearer that ebooks will not cannibalise print sales in the foreseeable future (Velde & Ernst 2009). Traditional book publishers have nonetheless indulged this concern, contributing to a sense of trepidation regarding the ebook market although statistical evidence to the contrary has since been made available (Hu & Smith 2011). Having accelerated production rates by 52% from 2010 to 2011 (Hane 2011), ebook growth stalled considerably leading into 2013 correlating with stabilizing demand (Greenfield 2014). Today, ebooks comprise 10% of publishing house revenue and trail print books by 1:3. The reason for this growth decline, following the initial hype, could be in the lack of attention paid to the importance of materiality in reading (Walsh, Asha & Sprainger 2007). Kress (2003) suggests that human imagination is inseparable from materiality and the use of our senses.

> "Western thinking of mind and body into severe question, and therefore challenges the reification and consequent separation of cognition, affect and emotion" (Kress 2003, p.171).

Investigating the significance of tangibility in regard to the ebook and print book comparison has prompted new outlooks on how phenomenality contributes to the reading experience. Indeed, there is good reason to investigate this field in detail given its significance to the ebook industry and reader experience. Addressing the sensory deficiencies of ebooks begs consideration of how to compensate for them, particularly in the case of rich media enhanced ebooks.

This paper examines of the rise of the ebook from the first printed words of the Gutenberg press through to the introduction of Amazon's Kindle. It explains how physical sense plays an important role in the reading experience of an ebook and provides a comparison with our perception of physical books. The concept of phenomenality will be explored and a discussion of improving ebook tactility and value presented.

The Written Word

The written word is a concept as old as civilisation itself. It was invented independently at multiple locations in history, but the first of these was in Mesopotamia, the 'cradle of western civilisation', in circa 3000BCE (Bottéro 1992). Despite its earliest incarnations as pictographic logograms, subsequent writing systems ultimately became represented by an alphabet of letters. This represented the first repeatable commodity and, in fact, led to the first mass production (McLuhan 1962, p.124).

By the end of the renaissance, the invention of Gutenberg's printing press had demonstrated a tremendous impact on the way this information was distributed, serving as what can be referred to

today as one of the most significant events in human history (Roberts 1997). Gutenberg's invention experienced a significant rate of adoption across Europe within 50 years for its unprecedented level of efficiency. Marked by increased productivity and reduced cost-per-impression, the machine itself could produce an output of impressions far exceeding any traditional methods of printing (Dittmar 2011). This leap in communications technology brought about a massive dissemination of knowledge across Europe. Among other things, it manifested as a catalyst to the renaissance, reformation and democratisation of knowledge (Estep 1986, p96). The accuracy of each printed replica of an original work produced by the mechanical printing press diminished the perception of media as physical objects, instead emphasising the concept of authorship and the form of ownership that would become known as intellectual property (Cotter 2003). This transition was considered the earliest notion of a knowledge economy, a concept that would only become more prominent with each successive innovation in communications technology, culminating in the creation of the Internet circa. 500 years later (Cope & Freeman 2002, p3).

The electronic book

From the emergence of Project Gutenberg in the 1970s, digital literature, a new form of literary work pertaining to a digital environment, had established a small audience of early adopters dedicated to a few experimental artists (Gibson & Gibb 2011). Such innovators came to be the early adopters of e-readers - portable devices intended for the specific task of accessing digital texts (McCraken 2013). The first generation of these devices would not appear in the consumer electronics market until 1998, led by Softbook and NuovoMedia's Rocket eBook (Richardson Jr & Mahmood 2012). Although the proliferation of personal computers at this time ensured that readers had by this point become accustomed to consuming digital text, enthusiasm was tempered with scepticism (MacFadyen 2011). The cost and technological capabilities of mobile technology relegated epublishing to an unwieldy and unstable developing industry, and the burst of the dot com bubble in 2000 struck a significant blow to numerous startup ebook services which were unable to establish a sustainable business model (Machovec 2002). Commentators nevertheless maintained that the ebook had yet to be fully realised, recognising such factors hindering their diffusion as the poor quality of contemporary e-reading devices and a lack of adequate digital rights management (DRM) support (Hillesund 2001).

In subsequent years, attitudes towards ebooks in tech have fluctuated in optimism. Commentators have maintained digital books represent a significant cost-benefit advantage over their physical counterparts (Bunkell & Dyas-Correia 2009). One might compare ebooks and print books in the context of analogue and digital music, as, similar to the transformational effect of digital distribution on the record industry, ebooks are considered the successor to the printed word. Bolder predictions prophesied the eventual superseding of print books by ebooks, corresponding with the cannibalisation of market share. President of publishing house Simon & Schuster, Jack Romanos, stated "the ebook revolution will have an impact on the book industry as great as the paperback revolution of the 60s," (Kirkpatrick 2000). Commentators like Sheehan (2013) invoke the term in reference to an inevitable "cultural and technological shift" entailing the outmoding of print in favour of digital.

Ebooks found a significant foothold with the debut of Amazon's Kindle in 2007. Addressing many of the issues identified in earlier e-readers such as weight, battery life, and display clarity, Kindle's success marked the first in a new wave of e-reading devices more effective at mimicking the book metaphor (Gibson & Gibb 2011). In particular, with a service-oriented approach to e-reading hardware, the device-agnostic ebook model championed by Amazon much closer resembles the ownership of physical books (MacFadyen 2011). This second generation of e-readers has propelled ebooks to new heights of popularity. Between 2010 and 2011, trade publishers accelerated their ebook production rate from 50% to 76%. Despite its then-recent introduction in a long-standing industry, 1 in 10 publishers of ebooks received more than 10% of their revenue from ebook sales (Hane 2011). In a fashion similar to the Gutenberg press, the increased triviality of book publishing has resulted in greater productivity and accelerated dissemination of publications. By 2009, however, it had become apparent that the upward trajectory of ebooks would not adversely affect the readership of print (Velde & Ernst 2009). In hindsight, the early millennial optimism for ebooks induced rather than predicted the ebook revolution (Striphas 2006).

The Print Comparison

The prevailing sentiment of a book as a mere vessel for intellectual property contributed to the climate of optimism that anticipated the proliferation of ebooks leading into the 21st century. Proponents of the ebook had overlooked the aesthetic qualities of books in their printed forms and how their materiality contributed to their ownership (Mangen 2008). A book's aesthetic qualities are a product of more than just its literary form and a reader's expressed preference for such sensations as the feel of paper against their fingertips represent an aesthetic argument for how texts are meant to be read and experienced (Jung 2012). Scent and feel are but two components of physical books that ebooks may never duplicate (Young 2001).

From a utilitarian respect, it may have been clear to see why ebooks would serve as a successor to print: inheriting the qualities of digital goods as compressible, portable and easily replicable, presenting a significant cost-benefit advantage over print (Bunkell & Dyas-Correia 2009). Like digital objects, however, ebooks are as intangible as pure information. They exist solely as intellectual property and their usage is only possible insofar as copyright license will allow. In this regard, they are similar to other digitally distributed media like music or intangible tender such as stocks and electronic money.
There have been various efforts to investigate consumer preferences between ebooks and print books.

Research suggests there is no imminent concern for an ebook takeover, although there is reason to believe the innovation diffusion rate of ebook adoption has yet to peak. Moreover, the general traits of ebook readers are unsurprising; young, highly educated Internet users, and their reasons for situational preference of ebooks are utilitarian in nature (Zhang & Kudva 2014). Such readers may prefer ebooks for a multitude of practical reasons, such as ease of transportation, price, and purchasing convenience, although they are considered not as easy to read (Chao, Fuxman & Elifoglu 2013). This correlates with the comparatively mentally taxing experience of reading from an electronic screen (Wästlund et al. 2005). As a consequence, reading text from a computer screen tends to be slower (Muter et al. 1982;

Creed, Dennis & Newstead 1987; Gould et al. 1987; Gould & Grischkowsky 1984; Heppner et al. 1985; Kruk & Muter 1984; Liu 2005) as well as shallower in comprehension (Eshet-Alkali & Amichai-Hamburger 2004; Coiro & Dobler 2007; DeStefano & LeFevre 2007; Eveland & Dunwoody 2002). A significant factor to this is the role of spatial memory in the navigation of print books, and its absence in a digital environment (MacFadyen 2011).

One notable observation from the current literature on ebook preferences is the lack of significant correlation between age or generation and ebook inclinations. Despite being their largest demographic, millennials have been shown to have mixed feelings towards ebooks, preferring print for elusive, hedonistic reasons while acknowledging the potent pragmatic benefits of digital text (Gregory 2008). Other research on undergraduate populations suggests print books represent the preferred method of book consumption by a margin of 3 to 1 for both hedonic and utilitarian reasons. Utilitarian content, in this context, refers to perceived usefulness. Hedonic content refers to perceived playfulness, a trait observed to be deficient in ebooks, corresponding to a decreased perception of value (Torres, Russell; Johnson, Vess; Imhonde, Benjamin 2014). Ebooks pale in comparison to print books in terms of control, lacking the "serendipitous freedom" afforded by physical pages (MacFadyen 2011). Another issue is an inability to loan titles in one's collection, owing to the concept of books that are licensed rather than owned (Richardson Jr & Mahmood 2012). Ebook providers offering solutions to such issues include Amazon, having launched an albeit regulated ebook lending service some years ago in spite of publisher concerns regarding unprofitability (Trachtenberg & Woo 2011).

The crux of these issues relate to the notion of 'thingness', an elusive trait that highlights the ongoing resistance to ebooks that took root as growth in the market bottomed out prematurely (Staiger 2014). Compared to its digital counterpart the traditional print book is characterised as a multisensory experience. A book's smell, for instance, is one such aesthetic characteristic that has only come to be identified as significant to the reading experience since the emergence of digital texts (MacFadyen 2011). The 'indeterminate distance' from which digital texts are engaged with contrasts with the sense of being phenomenologically in contact with the text itself, often evocative of dexterity in their navigation by way of hands and fingers (Mangen 2008). The elements of such a book construct an impression that transcends the words printed on the page. Touching and holding enforce an innate sense of presence that may render electronic media as 'soulless' by comparison (Young 2001). This sensation is called haptic dissonance, characterised by an irritating internal discord that arises from inconsistency between cognition and haptic perception (Gerlach & Buxmann 2011). Dissonance, in this sense, refers to the theory of cognitive dissonance, describing the human compulsion to seek consistency between cognitions (Festinger 1962). The prevalence of haptic dissonance suggests that tactile feedback serves as a compelling factor in the experience and perceived value of a book.

Human perception of tangibility is denoted as object permanence, a term originally used to describe the developmental stage at which infants gain the mental capacity to understand objects outside observation (Murray et al. 1979). It has since been applied to the psychology of adults and animals. Subbotski and Trommsdorf (1992) describe it as "the 'capacity' of some entity, be it mental or physical, to conserve its stability in an individual's mind" (p. 63). Their study into cross-cultural notions of

permanence highlights the role of human senses in establishing tangibility; the clarity of such senses as seeing, touching and tasting are specified as a significant factor. In the operation of robotic surgical systems, for example, surgeons find that the presence of haptic feedback bolsters their awareness regarding their instruments (Koehn & Kuchenbecker 2014).

Although the research on ebook adoption has neglected the role of haptic perception in the reading experience (Gerlach & Buxmann 2011), touch and haptics has proved relevant in HCI and user interface design. Feedback, in the form of sight, sound and touch, has been utilised in user experience design to satisfy communication expectations that carry over from human-human interaction. In much the same way that a person might, during a conversation, anticipate a nod of the head as confirmation of understanding, a response from a computer upon receiving a command serves to alleviate the uncomfortable ambiguity as to whether the command has been received. This sensation is known as psychological closure (Pérez-Quiñones & Sibert 1996).

In the domain of consumer science, studies show that haptic perception also plays a large role in the valuation of items. Touching a product in a retail environment has the effect of elevated purchase intentions proportional to an individual's Need For Touch (NFT) disposition (Peck & Childers 2003). The same effect is prevalent when the act of physical contact provides no substantial information about the product itself (Peck & Wiggins 2006). In addition, mere touch has a potent effect in establishing a heightened perception of ownership, even in the absence of legal ownership. This impression results in a positive and significant effect on the valuation of that item (Peck & Shu 2009). Sensory input in general has a considerable influence on subjective value (Krishna 2010), as sensory stimuli tends to provoke heightened instinctive, subconscious responses when compared to learned information such as the recollection of a brand name (Balaji, Raghavan & Jha 2011). Touch is unique in this regard as a sense characterised by its proximal nature, being the only sense that is experienced by way of contact with the skin (Krishna 2010).

Although it is possible to touch an ebook the interactivity does not endow the same effect as it is not the actual book itself being touched but the device on which it resides. If ebooks are to find equal footing in the market as an alternative to the printed word, publishers need to learn from the issues investigated and resolved in HCI to impart the digital with the materiality of the physical.

Making the Virtual Real

As before mentioned, it is the physicalness of a printed book that gives it an edge over its digital counterpart. Utility and hedonism aside, haptic dissonance remains an issue that plagues ebooks and hampers their widespread acceptability with readers. Attempts to bridge the gap and bring the experience of reading ebooks in line with physical books are ongoing and efforts are focused on the senses of vision, hearing and touch; considered the most important senses to HCI (Dix et al. 2004). The effect of vision in particular is a well-documented element of the ebook reading experience. Visual engagement in general is a potent agent of immersion. A classic example of this power is Parker's (1971) study into motion sickness susceptibility, finding that an eight minute video from a car navigating a

mountain road is sufficient to induce motion sickness in its viewers. As mentioned previously, ebooks read slower and produce greater mental strain than print books, although the reason for this is unclear (Wästlund et al. 2005). A study by Noyes and Garland (2003) to address this effect demonstrates that closer parity to print books can be achieved when matching the visual characteristics of a printed page, in terms of typeface and display resolution, more closely. Contemporary dedicated e-readers have since adopted e-ink technology as a non-emissive, paper-like alternative to LCD screens that mimics the presentation of a print book. As observed by Siegenthaler et al. (2011), these interfaces are notable in that they alleviate the strain of ebook reading.

Although hearing serves as another significant role in the human-computer relationship, the importance of mediated sound to virtual environments is somewhat undervalued (Kramer 1995). Much of the prevailing interest, instead, pertains to user interface design. One such study by Schuck (1994) explores the effect of audio feedback on touch screen typing performance. The experiment results confirmed that user typing speed is accelerated without a corresponding increase in error rates. The use of sound is discussed also in reference to embedded soundtracks. With the goal of testing the effect of dramatic soundtracks on reader engagement, Holenderski and Hu (2011) concluded that music tends to be more distracting than immersive when applied unilaterally. As noted therein, the results contrast with the Listen Reader experiment of Back, Cohen and Gold (2001) in which more ambient and interactive sound effects instead correlate to an enriched user experience.

Investigations regarding the influence of touch on ebook reading have been limited, tending to focus on touch screen applications. A study by Koskinen, Kaaresoja and Laitinen (2008) intended to examine the relationship between haptics and user experience in touchscreen applications determines that tactile feedback does in fact correspond with a more pleasant user experience. In the absence of physical buttons, various mobile device manufacturers compensate through incorporation of vibration motors that respond to user input, and this has shown to achieve near parity with the user experience of physical buttons. Such feedback patterns are preferred based their ability to replicate the tactile sensations of analogue input. A succinct pulse of vibration motors, for example, is reminiscent of typing upon a physical keyboard, while a sustained buzz might invoke a more alarming response (Shin et al. 2014). Furthermore, the work of Altinsoy and Merchel (2009) as well as Chang and O'Sullivan (2005) in researching audiotactile interface design concludes that the combination of auditory and tactile feedback induces a heightened sense of synergy and a richer, more satisfying user experience.

Conclusion

The discussion of how ebooks compare to their print counterparts tends to invoke the sentimentality of ebooks as successors to print. Much in the same way digitally distributed music has eclipsed its physical media, ebooks present a considerable cost-benefit advantage over their predecessor. Their multimedia and hypertext capabilities invite a rethinking of everything a book can be. Not only can they be distributed far cheaper, they inherit the fundamental advantages of digital data; compressible, portable, and for all intents and purposes, transcendent of time and space. As was the case with Gutenberg's

press, history shows that cheaper and faster forms of communication invariably supersede their competitors.

Although their utilitarian benefits can be easily demonstrated, ebooks nonetheless have struggled to usurp print as a preferred medium. Studies in ebook and print comparisons affirm a preference for the physical on the basis of readability, attributed in part to computer screens as mentally taxing. Other perspectives highlight the importance of tangibility in the reading experience and how a deficit in object permanence is bringing about a resistance to, as Staiger (2014) articulates, 'disembodied' books. Indicators suggest there may, in fact, be innate qualities to traditional books that elude digitization, and there is now good reason to believe ebooks aren't valued as highly as physical books because they do not offer the same sensory experience. Given the resilience of print in a climate of encroaching digitization, it is not unreasonable to interpret resistance to ebooks as an innate preference for the traditional paper bound book and the intimacy that its physical presence affords. The corresponding view is that ebooks function best as a complement to print books, as previous notions of cannibalisation have given way to a concept of electronic and physical books as co-existing in the same ecosystem.

"It is very clear that the eBook in one form or another is here to stay and it is relatively unimportant whether or not it eventually replaces the printed book." (Rao 2001)

In regards to visually guided motor tasks, Perreault and Cao (2006) note that tactile and kinesthetic feedback is indeed an underappreciated facility until it is no longer available. Time will tell whether ebooks are destined to supersede the traditional print book, but for now, there is reason to believe the phenomenology of print has an appeal more elusive than most might have predicted. As society faces increasing digitisation, an emerging generation of digital natives is offering additional insight into the true value of physical presence.

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