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While there had been previous attempts at monetizing the ebook, the launch of Amazon's Kindle in 2007 marked the arrival of the commercial ebook.¹ The mature ebook differs from other emergent genres of digital text, although this distinction needs to be delineated within scholarly discourse, which often conflates the ebook with other representations of the book in digital culture. The popular understanding of ebooks is porous, emerging from the formulation of electronic plus book. (Piper 2012, 14) This article proposes a shift towards an ontological understanding of ebooks, as they are parasitically entwined with the history of the print, yet in the last decade the two material forms have diverged. This article interrogates the ontology of ebooks through the lens of material culture and tests this against examples of ebooks published since 2007, including J.J. Abrams and Doug Dorst's *S.* and Lawrence Sterne's *Tristram Shandy*, two novels that test the concept of bookness and through their digitization, ebookness.

The material construction of the book and its digitalization complicate debates around ebooks. Digitization and digitalization refer to two different phenomena: digitization is the *medial* shift of material from analogue formats to digital representations, while digitalization is the equivalent *cultural* shift. In terms of books, digitization represents the conversion of books to a digital format, while digitalization encompasses a shift to digital workflows in the publication, distribution and reception of books, both digital and physical. This distinction is core to the ontology of the ebook as both processes

and product are important, although many definitions do not consider this. The *Oxford English Dictionary* offers a tripartite definition: (1) specialized hardware; (2) a digital book; and (3) a digital-*only* book. The three definitions run from most to least concrete, as the limits of what constitutes a digital book is more diffuse than its manifestation as specialized hardware. Ebooks cannot rely on the physical aura of the object that helps to define books. Print's physical manifestation is more straightforward to identify than the assemblage of technology, format and content that constitutes the ebook, although this belies the complex processes involved in the composition of a book. The ebook cannot encompass all genres of digital text, but instead functions as a simulacrum of the physical codex with its associated processes of composition and reception. Ebooks are often traditional in their form as they adhere to the expectations of the book trade.

J.J. Abrams and Doug Dorst's *S.* and Lawrence Sterne's *Tristram Shandy* are two examples of contemporary ebook publishing that reveal the complex ontology of ebooks. Both texts feature elements that resist digitization. Abrams and Dorst present *S.* as a used library book complete with extensive annotations marking a conversation between two readers. These conversations spill across pages, requiring arrows to denote reading order. Postcards, annotated napkins and other ephemera supplement the on-page annotations, which increases the complexity of the work, particularly when striving to digitize the book, as these features are inserted in folds, but can be

moved by the reader. Lawrence Sterne's *Tristram Shandy* precedes the digital age by two centuries but reveals the convergence of tensions about the emergence of the novel as a print artefact in the late eighteenth century, and the current transition towards ebooks. Sterne's playful exploration of the book's materiality presents several challenges to publishers who wish to create the experience digitally, particularly since some aspects are copy-specific. Due to the innovative features of both novels, their ebook versions require new workflows to create accurate remediations.

A brief history of the Ebook

The ebook was inevitable despite the physical book's endurance as the last stalwart of mass analogue consumption. Television shows such as *Star Trek*, where crewmembers read on single-use devices similar to contemporary ebook readers primed contemporary culture for the arrival of ebooks. (Maxwell 2013, 32) Outside of *Star Trek*, Michael Hart's Project Gutenberg—founded in 1971—was the most pervasive example of ebook culture prior to the rise of physical ebook readers in the mid-to-late-2000s. Hart aimed to create a massive library of public domain texts for wide distribution. Project Gutenberg rejected the unit of the page and recast these classic works as plain text. This early foray into digital books remediated the page as a container for text that could be replaced by the wrapper of the screen or a further containing format. This move was logical, since slow Internet connections rendered

high quality scans impractical for transmission. Project Gutenberg's progress was slow, starting with the Declaration of Independence in 1971, reaching 1,000 titles twenty-five years later, followed by rapid growth from 2002 to a current total of 30,000 titles. It did not change the timeframe of arrival for ebooks, as it did not make the important step of viewing the book as a commodity. Beyond Hart, it is possible to trace the experimental era of ebooks back to Sony's release of the Data Discman in the early 1990s, if not the *longue durée* of early prototypes of dedicated ebook readers, although such a project is beyond the scale of the current article. These were unsuccessful, as the conditions to compete with print were unobtainable without a more sophisticated marketplace and more importantly, *infrastructure*. The ebook required several solutions to problems that hampered traditional books to overcome the stigma of reading on the screen. The infrastructure for wireless, computer-free distribution made purchasing a digital surrogate for a book more convenient than visiting a bookstore enabled post-Kindle devices to gain greater market traction. Infrastructure has become a commercial service for readers as different ebook providers vie for customers through providing additional features for users including dictionaries, social networks and shared reading.

Modelling the ebook

In order to understand how the ebook is distinct from both print and other digital media, it is important to uncover the various agents and protocols that collectively

produce ebooks. To this end, the current article leverages platform studies, a media historical methodology that approaches digital objects holistically. Montfort and Bogost (2009, 2) suggest that “a platform in its purest form is an abstraction, a particular standard or specification before any particular implementation of it. To be used by people and to take part in our culture directly, a platform must take material form.” This may be a hardware configuration such as a games console or mobile device, or a software package that emulates hardware, or even a physical medium such as the book. Kirschenbaum and Werner (2014, 434) argue “platform studies, like the history of the book, is characterized by close, some might even say obsessive and unseemly, attention to detail out of the fundamental conviction that such material particulars are ineluctably part of the history of communicative objects, artifacts, and our human interaction with them.” Platform studies provides a materiality driven approach to media studies that reveals how the generative platform can be manipulated to create works of art unique to that particular hardware and software configuration through its affordances and constraints. The book can also be viewed as a range of platforms from the early incunabula to cheap paperback reprints. Platform studies can be transposed to book historical inquiry as researchers attempt to account for the disparate aspects of composition and reception as well as the object’s materiality, which requires amalgamated evidence from different sources to account for the single platform of the book. The crossover between book history and platform

studies is enhanced when considering ebooks within the wider framework of computational culture: “what would it mean to think of the Kindle as a platform, for example, to critically examine the constraints and affordances of the device (both its physical incarnation as well as its architecture and protocols)?” (Kirschenbaum and Werner 2014, 434) The following argument attempts to answer that question from the perspective of ebook culture in general. In order to achieve this, it is necessary to reconceptualise platform studies as a model of the book. In this new model, there are three platform layers of ebooks: (1) technology, (2) text and (3) service infrastructure. These layers in turn bifurcate (figure 1). This can be visualized as an onionskin, since each outer layer requires the stable construction of the previous elements to function.

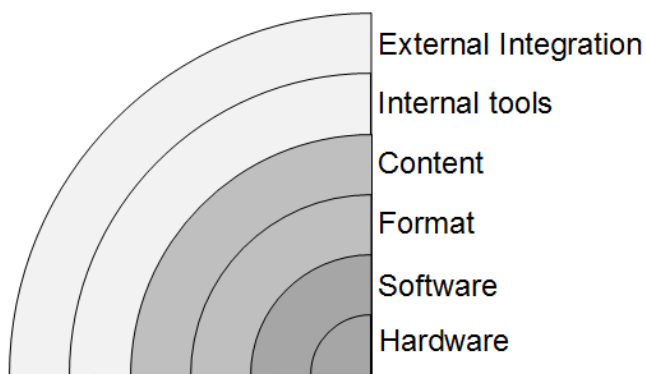


Figure 1 The generalized ebook platform model

Hardware

The technological layers of the ebook platform studies model offer explicit traces for analysis. The relationship between hardware, software and ebooks is not simple,

however, as in order to facilitate wider acceptance of the technology, media companies were required to ensure that ebooks worked across a range of hardware and software configurations. Hardware provides the most visceral form of ebookness to analyse. Dedicated ebook readers currently feature large screens with a minimalist interface, mimicking a tablet rather than a book. This was not always the case, as earlier devices—from Sony’s Data Discman in 1990 to the first-generation Kindle in 2007—bore explicit traces of their liminal status between computers and books (figure 2). These incunabula offered a playful rethinking of the book-as-object, making use of wedges and recto-verso openings, accompanied with QWERTY keyboards, simultaneously upholding and challenging the book’s history. Early ebook readers’ designs reflected their awkward mix of book-as-object and the desktop computing paradigm. The appearance of ebook hardware since 2007 has become homogenous to reflect the popularity of tablets, which focus on the interplay between screenness and pageness, rather than hardwareness and bookness. In other words, the ebook’s simulation has shifted from the complete object to a flat representation of a page. While dedicated ebook readers are emblematic of ebookness, the widespread success of digital reading can also be attributed to the rise of the tablet since the development of wireless communication infrastructures and high-resolution screens that are portable and small enough to be used and held singlehandedly describes both ebook readers and tablets. This set size has stayed similar across the development of

the ebook reader (figure 3), as most brands have convergence on an average screen size of six inches. The few devices that have attempted to expand to greater dimensions, and replicate an A4 page (including the Kindle DX) were not as successful as those that attempted to replicate the experience of reading a paperback or hardback. On the level of hardware, improvements in screen resolution quality as well as the development of haptic interfaces and cloud-based storage have been instrumental in providing the right cultural conditions for the ebook. These factors are the result of wider shifts in computational culture although dedicated ebook readers have helped to develop the current paradigm of digital reading.



Figure 2 The road to homogeneous ebook device design. L-R: Sony Data Discman (1990), Rocket eBook (1998), Softbook (1998), Franklin eBook (1999), Hanlin V8 (2004), Sony Librie (2006), Kindle 1 (2007), Nook 1 (2009), Kobo 1 (2010), Nook Simple Touch (2011), Kindle 4 (2011), Kobo Aura (2013) & Kindle Paperwhite 2 (2013).

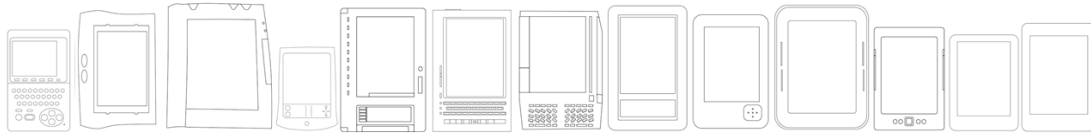


Figure 3 The change in size of the devices featured in figure 2

Due to the relatively small size and slow refresh rate of ebook reader screens, the hardware was not amenable to traditional book surrogate formats like the PDF as the user would need to either zoom in or otherwise navigate around the screen, deteriorating reading optimization. Ebook providers instead focused on displaying text in a readable form. The variety of screen sizes and font configurations emphasized *reflowability* over traditional pride in visual fidelity and ability to translate directly back to print media—consequentially, there is no easy way to print a document structured as an ebook.

Hardware also marked a transitional moment in the acceptance of ebooks. The launch of the first Kindle in 2007 marked the “iPod moment” of ebooks. Although MP3s had circulated prior to the launch of the iPod, they were a small-scale market with little benefits for the average consumer. The iPod allowed users to carry and listen to their full library of music on the move and turned MP3s from a niche for pirates to a widely used format. The cultural shift required an emblematic piece of hardware to mark the difference from a niche format. In a similar manner, while ebooks were not widely circulated prior to the launch of the Kindle, the release of hardware was a legitimizing force that boosted the form into the mainstream.

Software

Ebooks are ontologically distinct from other digital text forms at the level of software, as the text is reflowable—that is, it is not fixed to the concept of a page, but can rather be changed to fit the reader’s preferences and exact screen size—and presentational aspects, beyond typographic formatting, are largely left to the software to interpret.²

As seen above, this focus derives from the demands of dedicated hardware. In contrast to printed books, the ebook is defined by the reader’s ability to alter the typography to their personal preferences, although this denigrates the reading experience of complexly formatted files. The uniformity of software regardless of hardware has resulted in a wider acceptance of ebooks. As a corollary of this cross compatibility across hardware configurations, coupled with the use of cloud-based storage, users can read a single ebook across devices without losing their location. Hardware and software integrate in other ways, such as Apple’s use of the Siri system to offer Text-to-Speech options on iOS devices, turning the eBook into an *ad hoc* audiobook. This is possible since the ebook-as-content is embedded within a software package, which by definition is executable. The reader is encouraged to execute aspects of the software to manipulate the text, offering new possibilities rather than sticking to a strict archival standard. Ebook software packages use the executable functions of the software to differentiate the formats compared to the static standard of PDF and plain text files. Since most ebook packages use cloud storage, facilitating

remote access to ebooks across devices, readers can access their books across software packages rather than relying on a single piece of hardware. The market leader, Amazon, offers Kindle software for smartphones, tablets, operating systems, and more recently, web browsers. The software interprets a combination of the publisher's instructions and user's options to display the ebook according to their reading preferences. The reader's understanding of the same ebook will differ between different software packages—iBooks or Kobo, for example—as the packages have different logical and structural properties. The reader is likely to be unaware of such discrepancies unless they view the ebook through multiple software packages. These different experiences come from the fact that software simulates another environment or medium, in this case: a simulation of the book. Johanna Drucker argues ebooks emerge from “a too-literal misapprehension of what constitutes the distinctive features of a material form.” (2009, 165) The specious rhetoric of ebook readers ‘improving’ the book through the addition of new features is coupled with a gap in the presentation of function, such as turning the page, and its utility, in the recto-verso format. (Drucker 2009, 166–7) This emulates the aesthetics of a book without its associated uses. In many cases, this offers visual effects without the associated semantic value, such as the addition of a visualization of extra pages at the limits of the screen, without the ability to judge how many pages are left in the ebook

as it is a fixed template. This reduces thickness to an aesthetic flourish rather than a part of the ebook's appearance that can aid navigation.

The wrappers of any physical book shape the reading experience. This is clear from *S.*'s format, for example, which depends on engaging with the book on a physical level, which cannot be warped into a traditional ebook, as the software cannot adequately deal with the rich dimensions of textuality represented on a single page.

Abrams and Dorst (2013a) acknowledge this in the preface:

A fundamental part of the experience for the characters in *S.* is that of holding, reading and sharing a physical book. Their experience of reading books—of reading *this* book—is a tactile one, one where they jot notes in the margin and can begin to communicate, back and forth, upon the pages themselves. There is a world of found items, clues, pieces of ephemera, and the intimacy of handwriting on paper. The physical edition of *S.* offers its readers all of this in precisely the way that the characters offer it to each other.

Abrams and Dorst can only provide a two-dimensional simulation of the three-dimensional object, losing endearing aspects of the original, such as its inserted ephemera and ample marginalia across page spreads (unless the view includes the verso-recto split).

Format

The ebook's textual layer bifurcates between format and content. The format indicates the structure of all documents in a particular type at its logical level, while content denotes how a specific ebook functions when mediated through the rules produced in the format. Jonathan Sterne states that "*format* denotes a whole range of decisions that affect the look, feel, experience, and workings of a medium. It is also names a set of rules according to which a technology can operate." (2012, 7) Formats are recognizable through familiar acronyms including TXT (plain text file), RTF (rich text file), and PDF (portable document file). Ebook formats include less familiar forms such as mobi, AZW and EPUB. These formats do similar things—display documents—but their underlying logic delineates the wrapping of the ebook's content. Ebooks are equivalent to the logic of a webpage-style document in a wrapper. (Maxwell 2013, 39)

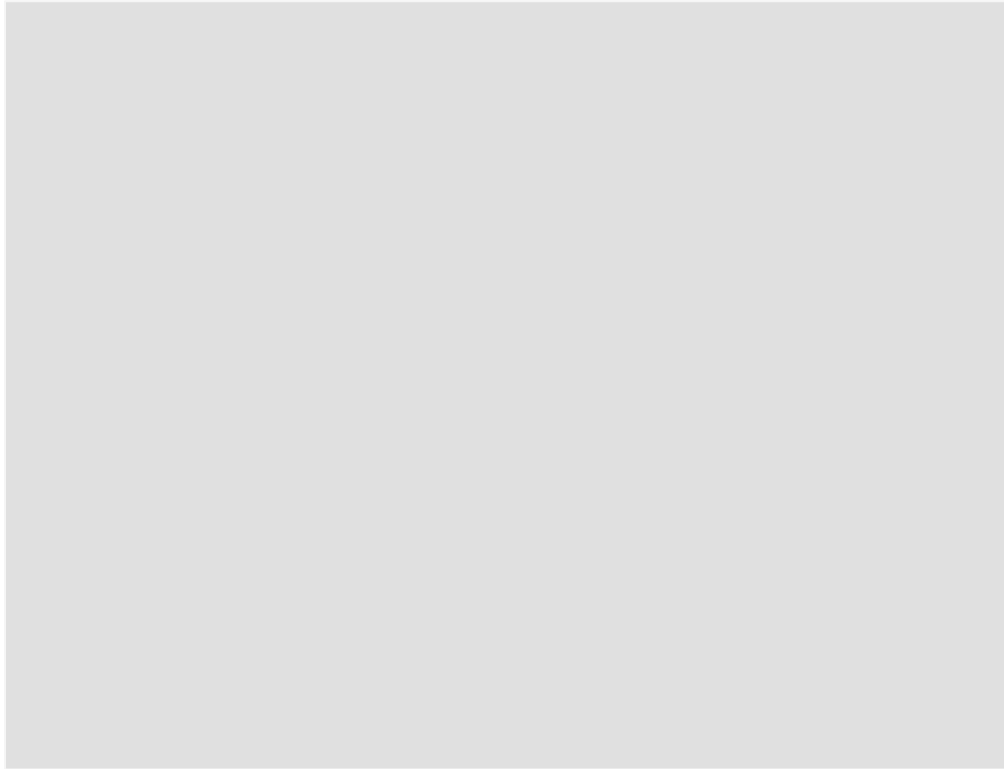


Figure 4 Comparison of the Kindle Fire and iBooks editions of J.J. Abram and Doug Dorst's *S*.

Maxwell argues that although this makes the ebook a simplistic web page, “the e-book privileges *content* where the web privileges *connection*. In doing so, the e-book adheres to an industry-era scarcity model where content experiences are relatively few and must be acquired at some cost, whereas the web assumes sheer abundance.”

(2013, 40) While ebooks do not offer the level of connectivity usually afforded to websites, the use of web-based standards such as HTML and CSS provide a malleable interface, as readers can change the screen configuration to meet their reading requirements.³ Ebook formats are designed to be robust and encompass a wide range of genres from biography to poetry. The format specification notes that EPUB is “a

means of representing, packaging, and encoding structured and semantically enhanced Web content—including HTML5, CSS, SVG and other resources—for distribution in a single-file format.” (IDPF 2014a, sec. 1.1) The single-file format uses technology similar to the ZIP file, allowing readers to unpack the ebook into its constituent files. Both *S.* and *Tristram Shandy* challenge representational ebook formatting. This is clear from the preface to *S.*, in which Abrams and Dorst voice their frustrations at the Amazon ecosystem, since the EPUB version states “the ebook version attempts to replicate [the] experience,” while the “Kindle Fire version attempts to work with platform limitations to replicate the experience of the physical book.” (2013a; 2013b) EPUB3’s ability to offer skippability—a function to remove layers of the text such as footnotes, images, page numbers, or in the case of *S.*, layered ephemera—cannot be replicated through the Kindle infrastructure, making it difficult to duplicate the layered and interactive formatting of the original text. Given the haptic elements of the ephemera inserted into the first edition, the iBook’s implementation of CSS offers a more flexible form of layering, while the limitations of the Kindle’s implementation requires the layers to be displayed as separate pages (figure 4). The iBooks edition represents this through using two layers to simulate the printed page and marginalia with ephemera as separate. Any annotations are linked to the ephemera on top of it, which can be toggled on or off. This is difficult to manage, however, as if a page features copious annotations and a piece of ephemera on top of the text, both must be

turned off, making it frustrating to strip back the layers. The ephemera are less flexible than the print version, as they are hard bound to the page in which they initially appear.⁴ *Tristram Shandy*'s formatting provides several challenges for publishers, as the novel includes a completely black page, a marbled page, a couple of missing chapters and a skip in the page numbers. Fortunately, as the text is in the public domain, there are several versions available. Six have been chosen for analysis to demonstrate how various publishers and formats resolve formatting challenges. While *Tristram Shandy*'s formatting plays with many print conventions, the following analysis focuses on typographic, visual and structural exemplars. As table 1 demonstrates, cheap or free editions of *Tristram Shandy* often overlook the novel's material forms, since they are difficult to replicate within ebook logic. Where necessary, a brief note explains the novel's peculiarity, but the feature is not replicated, as it would require a greater degree of formatting. More worrisome, the chapter structure has been eradicated by several of the edition, as the automatic number of chapters and volumes has marked several subchapters as chapters, misnumbering many of the later chapters.

| Feature | iBooks | | Kindle | | Kobo | |
|--------------------------------------|--------|---------------------|---------|--------|----------------|------------------|
| | Mau | Oxford Text Archive | Collins | Amazon | Start Classics | Harper Perennial |
| Black page (1.13) | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ |
| Marbled page (3.36) | T | ✗ | ✓ | T | T | ✗ |
| Missing chapter with 10 gap (4.24) | T | ✓ | ✗ | ✗ | ✗ | ✗ |
| Blank page (6.38) | T | ✗ | ✗ | ✗ | T | ✗ |
| Shifted chapters 18 & 19 (9.18-19) | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| Manicules (passim) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Interglossia (3.10) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Extended dashes (passim) | ✗ | ✓ | ✗ | ✗ | ✓ | ✗ |
| Narrative digression squiggle (6.40) | T | ✗ | ✓ | ✗ | T | ✓ |

Table 1 Comparison of formatting features across editions of *Tristram Shandy*

Ticks – Feature appears

Crosses – Feature is missing

T – Feature is mentioned in text

The EPUB specification states that the format depends on continuity and a predetermined order as opposed to the fluid structure of hypertext and other digital genres, denoting that the experience of reading an ebook primarily fits into the narrativistic use of books. (IDPF 2014a, sec. 2.2.1) The format also defines how the software can use the data packaged in the program, for which “EPUB strives to treat content *declaratively*—as data that can be manipulated, not programs to be executed.”

(IDPF 2014a, sec. 2.9) Support for additional content is limited and the focus of ebooks is primarily textual, as there is only limited support available for extending the purview of ebook formats and the addition of JavaScript and other executable scripts may generate suspicion among ebook users.

Content

An ebook's content is relatively straightforward to define, but it is in flux, as standards are still developing. (C.f. Johns 1998) These problems are apparent through comparing print to ebooks: inconsistent pagination, errors from the process of digitization, and missing paratext such as indexes and epigraphs. Kindle ebooks are often published without indexes as Amazon's X-Ray provides a cheaper simulacra of an index through automation and crowdsourcing for important concepts and names within the ebook with a lack of accuracy and insight. (Wright 2012) Several formats also open the book initially at the beginning of the first chapter, skipping any textual preamble.

Since *S.* is a born-digital novel that has been converted directly to ebook formats, it is not surprising that its contents remain relatively consistent between print and digital editions. By contrast, editions of *Tristram Shandy* display a greater variety in content, demonstrating issues within ebook culture. The Mau iBooks edition, for example, exacerbates the problem of skipping textual preamble by removing the novel's epigraph and dedication, while other editions, including Amazon's in-house

publication, note the presence of the epigraph, but do not include the actual Greek text. A further content distinction emerges from the digitization process, as textual errors may creep in. The iBook's Oxford Text Archive edition of *Tristram Shandy* reveals how content changes with ebook editions as the copy features erratic line breaks and several typographic glitches in the Latin and Greek transcriptions. Other content shifts will not be as brazen, but the processes of converting even digital texts to ebooks will introduce further content differences.

These *transmissions* (Clod 1991) ensure that ebooks remain distinct from books, although some paratexts have been inherited from the sophisticated form of the book. The singular materiality of the reading device is unbound from the prestige of the content consumed within it. A well-edited version of Shakespeare's collected works appears in the same material wrapping as dinosaur erotica. The rhetorical features of ebook branding are still forming. In order to help readers adjust, designers have incorporated skeuomorphs, or elements that refer back to the materiality of print culture, in the interface. The comfortable familiarity of skeuomorphism ensures ebooks are likely to remain parasitic of print rather than exploiting experimental features. This is apparent in the use of the "page" for ebooks compared to the scrolling paradigm that dominates other computing systems. Even though the elements on the page can be manipulated, these remain a stable unit, as the user must refresh the screen in order to deliver the reflowed content.

Service Infrastructure

Service infrastructure innovations such as the ability to buy books directly within the package, creating a frictionless service, define the new generation of ebooks. This is the central innovation of the current generation of ebook technology, as companies like Amazon and Barnes & Noble began to associate the ebook with a service infrastructure. Amazon CEO Jeff Bezos commented at the launch of the Kindle that his ebook reader is a service, not a device. (Naughton 2007) This service might include free books at the point of purchase or download. Apple also used to offer a free copy of A. A. Milne's *Winnie the Pooh* until this service was discontinued.⁵ This service change aptly demonstrates the problems inherent in a service-oriented product, as users may not get a uniform experience. Automatic updates to books and software come as a corollary of this, as readers will automatically receive content without recognition of the update. As with the other aspects of the onion skin model, the service infrastructure layer bifurcates between internal tools and social networks. Internal tools include any aspects of the ebook experience to augment reading. Ellen McCracken delineates these two services in terms of centrifugal and centripetal paratext. The centrifugal represents the aspects of reading that are outwards and sociable, such as the ability to “engage with blogs, other readers’ comments, or an author’s web page without putting aside the e-device,” while the “centripetal paratexts, in contrast, modify readers’ experience on inward vectors [... through this,]

readers engage with new paratextual elements such as formats, font changes, word searching, and other enhancements.” (2013, 107) The ability to purchase ebooks from within the software package was instrumental in the design of contemporary ebook brands along the centrifugal axis. This shift towards infrastructure-as-service in ebook brands is reflected by the rise of integrating services such as retail, preservation and social functions directly within the ebook software package. If, as William Kuskin argues, “texts are simultaneously marked by time and are transcendent of it; scarred into being by their very manufacture” (2008, 5), the ebook is scarred by a simulation of the book trade and print culture. The ebook can never duplicate the print book, but pays homage to the book trade through simulating its processes through digitalization. Ebook brands have developed complex service infrastructures in the competition to become the market leader. Since a reader may be investing in a particular brand of hardware due to its unique services—Kobo’s Reading Life or Kindle’s Shelfari—it is important that providers ensure their services are competitive. It is no surprise that the technology companies with the most sophisticated media infrastructure, Amazon and Apple, dominate the ebook marketplace, since both made a transition from selling products to developing service infrastructure embedded in those products. This shift can be seen through comparison of Apple’s Newton and its successor, the iPad. The iPad’s success derives from a combination of its powerful technology and Apple’s infrastructure including the App Store and iCloud. The coming of the ebook marked a

move away from selling books to offering services around the book. Apple's iBooks, although not the market leader, has a particular advantage in developing complex internal tools as it is available exclusively for Mac OS and iOS devices. This limits the potential audience, but the ubiquitous penetration of iPads and iPhones ensures a wide potential user base, while narrowing the focus stops potential formatting errors from cropping up. Ebook providers demonstrate their reliance on services through their aggressive policies to purchase start-ups that have developed tools for discussing or cataloguing books. In recent years, Amazon have purchased Shelfari, a book annotation tool, and GoodReads, a review site, to strengthen their marketing to convince users to buy into their proprietary ebook brand.

One of the most important services for the ebook trade was the digitization of print. The processes of digitizing books still lags behind other stalwarts of digital culture such as films and music, as text is more laborious to digitize, since humans often have to intervene in the process through either manually keying in the whole text or correcting the results of the automated extraction of text from an image in the Optical Character Recognition (OCR) process. Due to its supposed simplicity but actual complexity, "paradoxically, text is both the first and the last of the medial modes that is to go digital." (Van der Weel 2011, 1) As stalwarts of resistance, including J.K. Rowling and Thomas Pynchon, allow their works to be published as ebooks, digitized and born-digital ebooks have colonized much of the territory previously occupied by

print culture. When contemporary authors have resisted the widespread availability of their books on ebook formats, enterprising readers created samizdat ebooks and other digital editions of the missing texts. Despite these gaps in the market, the piracy of ebook has not become as pervasive as films, television shows and music, where users have almost limitless supplies of obscure works. Books present a greater problem for digitization than other media, due to their long history and the decentralization of the book trade over 500 years as catalogues and archives are distributed over vast regions. Furthermore, textual fidelity degrades through printing copies, particularly when dealing with older editions, rejecting the single copy represents all copies approach to digitize other media. In order to compete with print, the integration of additional features is vital to the continual development of ebooks, as brands can develop sophisticated services as marketing tools to attract a great user base. Ebook stores required a critical mass of available titles based upon rights agreements with publishers, as users were unlikely to switch to ebooks without the assurance that a range of titles would be available digitally.

The services offered by ebook providers have met resistance. Several artists have exploited the procedural rhetoric (Bogost 2010) of ebook service infrastructure to demonstrate the problematic poetics of the emerging form. There is an aesthetic of ebookness that has transferred to print culture, which mediate on the aspects of service discussed above. Johannes Osternoff created *Dear Jeff Bezos* as a response to

the surveillance culture that has emerged from the cloud computing options that readers cannot turn off. Osterhoff reverse engineered the automated Whispernet syncing system on his Kindle to alert Jeff Bezos of his progress. (Osterhoff 2013) Osterhoff turns the surveillance culture of the “always-on” ebook readers against those who perpetrate the surveillance. (Fino-Radin 2013) Tom Scott’s *Shakespeare.txt.jpg* (2013) takes on a different aspect of ebook pre-processing: the difficulty of accurate OCR. Scott took photographs of *Romeo & Juliet*, changed the JPEG compression and ran the images through OCR, resulting in a variety of interpretations of Shakespeare’s works, although Scott notes that to the naked eye, all but the lowest quality image is still readable by humans, while its post-OCR equivalent is difficult to decipher. Others have created physical surrogates for the lack of local backup afforded for Kindle users. Peter Purgatholer’s ebook scanner (2013) reflects on the problem of reselling books, which Jeff Bezos advocated in 2002 when used books fuelled the development of Amazon’s retail offerings, but made it difficult through the Kindle. Instead, Purgatholer’s book scanner automates the process of taking photographs of the ebook and then “turning the page” through pressing a button. Jesse England focuses on the output of scanning a Kindle through publishing his version of George Orwell’s *1984* as seen on his Kindle. The choice of text reflects the tension of reading a novel which has previously been recalled from user’s Kindles. (Striphas 2010, 308) England (2013) argues that since the Kindle screen can

easily be photocopied, readers can be create a physical copy that will not be recalled. England acknowledges a communal discomfort that has yet to dissipate about ebooks.

External integration

Internal services are supplemented by wider integration into social networks, either dedicated to both reading and more general interests. The user can share their reading experience outside of the ebook's interface, offering a degree of agency over the ebook ecosystem. Different ebook providers have integrated a variety of social networks to varying degrees of success. iBooks allows readers to share selected highlights to Twitter and Facebook, while Kobo promotes their "Reading Life" application, which promises to integrate personalisation, reading statistics and sharing features. The Kindle infrastructure is the most complex, with features similar to Kobo and iBooks, as well as core acquisitions of start-ups such as Shelfari and GoodReads that offer extensive social networks dedicated to annotating and reviewing books. Kindle data about reading location can also be transmitted to social networks, gamifying the reading process by encouraging users to share their current location in the book and therefore competing to finish the book.⁶ While different ebook providers offer varying levels of support for social networks, they all understand the importance of controlled integration to external content. While their business models do not allow for large scale sharing of ebooks, these snippets encourage readers to provide word-of-mouth advertising for the brand. Moreover, the ability for publishers and other

model, whereby books are units that do not really interact. Retail giants such as Amazon ensure scarcity remains the dominant paradigm for the foreseeable future. Although the early book trade and the ebook marketplace share similarities, Ray Murray and Squires introduce new aspects such as the device, media content producers and crowd funders. Their model focuses on people rather than things, including the book. This performs a useful function in situating the ebook historically within the book trade, but one must not ignore the automated processes that run alongside or above the human processes. This approach reveals the nuanced mediation between device and reader, which represents the core ontological distinction of ebookness. Unlike the book's relatively fixed form, ebooks, with associated services, change to reflect the reader's preference, thus offering optimal personalization. The device integrates more of the services that would traditionally be outsourced to pre-composition processes, and in turn allows the reader greater agency over the text.

These automated techniques occur at several levels in the ebook trade. Whitney Trettien (2013) uncovers the digitally mediated distortions of John Milton's *Areopagitica* that are sold as physical Print-on-Demand (POD) books through the Amazon store, and similar problems plague ebook editions too. The problem stems from the centrality of Project Gutenberg in providing free public-domain texts, but many of these texts can also be purchased as facsimiles of the original. Some ebooks,

such as the ones that Trettien identifies, can be conceived as pure service as the process is entirely automated and an object does not exist until the reader calls it into existence. Since ebook publishing is still in the incunabular stage, automated workflows have yet to stabilize, and emerging efforts such as Project GITenberg, an attempt to convert Project Gutenberg texts to the transparent workflows of GitHub, posit potential long-term solutions to the digital workflow of books. This demonstrates the importance of automation. The project's leader, Seth Woodworth, makes the revision and reuse processes of the Project Gutenberg corpus visible. The Git infrastructure allows the process of revision and adaptation to become explicit, as well as the easy reuse of materials for executable functions. Through offering the corpus on a manipulable format, Project GITenberg potentially offers a range of new possibilities for ebook creativity. (Woodworth 2014) Through digitalization, Woodworth suggests that Project GITenberg can automate aspects of the book trade that can enable users to create sophisticated ebooks automatically.

Liminal texts

The preceding examples of ebookness reveal an emergent understanding of the ebook as a performative simulation of aspects of the book trade. Although non-book forms of digital text may challenge this, the definition can be refined through comparing ebooks to similar digital genres. Liminal examples demonstrate the strength of the new definition of ebooks. A plain text copy of *Bleak House*, such as Project

Gutenberg's base version, may be described as an ebook, but only because of its direct lineage with an actual physical book. It is unlikely that a plain text file outside of a container format such as EPUB could be marketed as an ebook as it only replicates the contents of a book rather than the form. Text length alone cannot determine the status of the ebook. Therefore, the designation is partially dependent on the rhetorical structure of the original's bookness and its integration into a larger service, such as Project Gutenberg. This case is the trickiest to dismiss as it features many of the criteria other than the wrapping. Services are central for distinguishing ebooks from other book-like formats, as they rely on a user's ability to share, purchase and otherwise manipulate books, although many of these aspects may also be locked down.

The PDF, and to a certain extent, fixed layout ebooks, represents a further challenge to the stable ontology of the ebook, as it harks back to print culture with its use of facsimile. In this form—which can be subverted through embedding interactive elements—its bookness is presented in a two dimensional replica of the book, while elements of the ebook's malleability create a 2.5 dimensional representation of bookness. This deference to print ensures the prestige of the format “by emulating the limitations of the old format” rather than creating something innovative, yet alien. (Westin 2013, 137) The facsimile attempts to represent both simultaneously, although it ignores pertinent aspects of the computational relativity of ebooks such as

searching, random access and other advantageous aspects. Nonetheless, “unlike facsimile transmissions of the early 1990s, PDFs aren’t ‘dumb’ – they contain so-called content streams that can be searched.” (Gitelman 2014, 125) This does not offer the flexibility of the full ebook, however. The PDF extends beyond the book towards a wider range of document types. PDFs purport to be lossless and “an archival standard.” (Gitelman 2014, 125) Since there is a lack of services embedded within the PDF, the PDF cannot be called an ebook. Not all digital books are ebooks but all ebooks are digital. The difference resides in an emphasis on reflowability over facsimile. This reinforces the concept of the ebook-as-service, as the ebook focuses on service infrastructure over the fidelity of the book as traditionally understood. The last few years have been accompanied by the rise of the Literary App. These take many discrete forms since the reader is presented with a package dedicated to the exploration a classic work of literature including Edgar Allen Poe’s *oeuvre*, T. S. Eliot’s *The Waste Land*, Shakespeare’s Sonnets, Mary Shelley’s *Frankenstein*, and Jack Keuroac’s *On the Road*. (Poe 2012; Eliot 2013; Shakespeare 2013; Shelley 2012; Kerouac 2013) Although all share similar features, these Apps are heterogeneous and approach their source texts from a variety of angles. The iPoe Apps offer Poe’s short stories with additional animations and soundtracks to increase the ambiance of the work. Instead of simulating aspects of print and the book trade, Apps instead focus on audiovisual immersion. *The Waste Land* App overloads the reader with extra features

on top of the primary text including celebrity readers and a facsimile of the original manuscript. This distinguishes Apps from ebooks, as the use of multimodal features and adaptation overwrite the App's print palimpsest. The Literary App offers a multimodal approximation of the original work rather than a reading text. Often Literary Apps contain bonus feature similar to DVDs, such as celebrity readings, annotations, videos and other multimodal appropriations of the original content. (Benzon 2013) While ebooks can provide similar bonus features, their primary mode is the original text while the Literary App is more diffuse. The Literary App recalls the earlier expanded book Voyager CD-ROMs that provided enhanced versions of works such as Art Spiegelman's *Maus*, William Gibson's *Sprawl* trilogy and Michael Crichton's *Jurassic Park*. There is no clear direct link between Voyager Expanded Books to Literary Apps, although the aesthetics and content are very similar. Google Books presents the greatest challenge to defining ebooks. While books are a major part of the brand, Google's indiscriminate digitization program extends far beyond books. (Lernout 2010, 247) The project can instead be conceptualized in terms of service. Google focus on machine readability in their digitization project—despite the recent ability to purchase public domain books from Google Play—stems from a philosophy of creating books appropriate for searching rather than aiming for a publishable and clean copy of the books. Google's interests lie beyond the human-readable book towards leveraging the data with the corpus to expand their algorithmic

and advertising potential, offering a service, unrecognisable within traditional models of the book trade. The Google Books corpus is less accessible for humans than Project Gutenberg or Amazon's digitization efforts, as if a text is protected by copyright, users may only be able to access chunks of text, and search terms might not produce accurate results. This runs counter to other commercial ebook endeavours, which work to create widespread availability of digital texts for profit. Google Books' remediation of books as data rather than human readable artefacts ensures that the ebook remains a distant secondary element of the project.

These liminal examples strengthen the current definition of ebooks, as they reinforce the two core aspects of ebookness: (1) simulation of print culture through replicating its form and traditions; and (2) replicating the tradition of the book trade. PDFs emphasize the unity of the page to high fidelity to the denigration of simulating the book-as-unit and accessibility. PDFs come from the tradition of microfilm rather than books. Literary Apps extend beyond reading towards a multimedia experience.

Google Books focuses on proprietary machine-readability, making interoperability and human reading difficult. The service focuses on the algorithm over content. From this evidence, it is important to acknowledge the distinction between digital books and ebooks. While digital books include many of the forms discussed above, including the PDF and Literary Apps, the ebook represents a subset of digital books that focus on

the manipulation of reading preferences and cross-device compatibility. Furthermore, ebooks are primarily read, while other formats may focus on multimodality.

The future

The mid-2010s mark a further period of transition in the development of eBook design. Dedicated hardware has popularized the form, but the latest generation of format standards and devices suggest a shift towards multimodal ebooks and potentially the demise of the dedicated device. Formats such as EPUB3 and KF8 suggest a shift from a focus on reading to exploring multimodality and interactivity. EPUB in particular has taken great strides towards integrating open formats of video, image and sound directly into the ebook. These software and hardware innovations are linked to the shift to multi-use tablets, including the Kindle brand's diversification into tablets, television set-top boxes and phones. The ebook as currently understood is unlikely to remain the dominant paradigm, but the next shift will likely continue to feature aspects of print culture with some additional digital features. The development of ebooks has extended beyond the horizon of electronic paper and the all-inclusive and device agnostic form of ebooks exemplified by the early Kindle towards something transmedial.⁷ A rise in multimodality can only be accompanied by restriction in the freedom of the reader's typographic preferences. Nonetheless, Bezos's comment that the ebook is a service, and not a product, will define the continuity between contemporary ebooks and what lies ahead.

Notes

¹ While the spate of ebook readers launched in the late 1990s, including the SoftBook and Rocket eBook, the earliest attempt to create a commercial ebook reader came in the form of Sony's Data Discman in 1992.

² The Web is also built to be reflowable, but its dependence on CSS for aesthetics means that in practice, webpages tend to be less reconfigurable without distorting formatting elements.

³ All technical information in the following section comes from the EPUB 3 specifications. (IDPF 2014a; IDPF 2014b; IDPF 2014c)

⁴ I am grateful to Matthew La Schneider for providing me with this fascinating and problematic example.

⁵ <https://discussions.apple.com/message/15484637>

⁶ *Gamification* encapsulates “the idea of using game design elements in non-game contexts to motivate and increase user activity.” (Deterding et al. 2011)

⁷ It is no coincidence that the majority of **ebook** reader brands have supplemented, and arguably surpassed, their **ebook** brands with diffuse and cheap tablets.

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