EXAMINATION OF THE TRANSITIONING OF THE BOOK FROM PRINT TO DIGITAL:
INSPIRATION, POSSIBILITIES & APPLICATION

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ABSTRACT

My principal research questions are: what do we know today about the nature of the digital book? And, what future/s might there be for the book as it shifts away from paper volumes and into an ebook protocol, especially as regards deployment of marginal epistemologies, inclusivity, multiple authors, interdisciplinarity and alternative narratives? My research takes the form of both a thesis and a research-creation EPUB3 ebook. I chose the subject of bees as the content of the book. This subject offered me both an alternative narrative and a way to showcase the capabilities of the EPUB. Working with disciplines of Design, Film and Computer Science, I traced a trajectory through the history of the printed book to the present day finding a natural place for the self-published ebook. The thesis speculates on the genesis of the ebook as a recuperative medium in the evolution of the knowledge commons. It navigates a path toward progressive accessibility standards coexisting with a visual design paradigm.

DEDICATION

This work is dedicated to the voices of the many environmental and social justice activists on the

front line who, like an assortment of 'Cassandras', are more often fated to be disregarded, but

who nevertheless, continue to clamour.

ACKNOWLEDGEMENTS

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INTRODUCTION

This thesis had its genesis in a number of ways. One of these, as I explain at the beginning of

Chapter 1, was the work I did helping my mother self-publish her second book. Another way,

was the work I myself have done over the years producing zines and comics that spoke to issues

I felt were important to me. In a way, these zines led me through the door marked 'self-

published'—to examine whether this was actually the mark of a 'failed' author or a decision that

had a logic of its own and was the right thing at the time, within the knowledge dissemination

ecosystem. Writing is a little like the 'light' that Leonard Cohen sings about—it wants the cracks

in order to seep into the world. When a publisher says 'no' to a work whose fashioning was years

in the making, is that the end—or is it a beginning to something different? There are, I believe,

many books that a publisher cannot publish but which can still be consumed by the community at

large. Often these are books that have a different trajectory: that are extremely local in scope, are

issue-based and remote to a large general appreciation. Or maybe the author doesn't feel the need

to talk to a publisher, for whatever reason.

There are also books that are just 'different' or experimental. I think that *The Honeyed

Tale: An Interrogative Poetic on Bees*—the book that accompanies this thesis is one such book

(details for accessing this book are in Appendix C: Online Links to Research Creation Project).

In it, I decided to work with a number of ideas that are unconventional. For example, I call

myself a designer-editor and the members of the team, contributing authors. The theme of 'bees'

as a subject matter reflected not only my concerns at a particular aspect of environmental degradation in the world but helps point, metaphorically, to a kind of cooperative example that might help divert our human-centric energies toward a more equitable, Nature-centred consciousness. These ideas underlie both the 'poetic' and the 'interrogation' of the book title. In asking the team members to become part of my 'experiment', I was deliberate in my choice of 'authors'. I wanted to work with colleagues who I felt were actively living with a world-view that I shared and which I thought would benefit from being shared widely by dissemination through a Creative Commons, free ebook. These are hard-working, authentic and ethical people whose efforts are, I hope, reflected in the book in which we collaborated. There are many such people that I know and care about. Often, the voices that are the least noisy have the most to say. And, as I used to tell my family in times of crisis, I feel 'love' works better as 'doing' word.

CHAPTER 1

Characteristics of the ebook as distinct (diverting) from the print book & issues of accessibility which includes also reference to marginal groups and the digital divide, especially with reference to self-publishing.

A case for self-publishing

As intimated in my Introduction, the earliest ideas for the research scheme of my thesis came

from the experience I had of assisting my mother to self-publish her second book as an ebook. It

was through this work that I found myself considering, and, ultimately questioning, beliefs,

myths and acceptable practices that go into delivering a text to a public audience. Essentially,

through the mediation of digital technology I was able to help my mother side-step the traditional

course of submitting a manuscript to a long list of publishers, wait for the response and, if

'regrets', repeat. Following a successful first book, published by McGilligan Press, my mother's

second book might have followed on its heels without difficulty, had not her publisher ceased

operations in the interim. Instead, my mother found herself submitting her second manuscript as

a new writer to several remote publishers for consideration (Tait, 2005, 2012). When this was not

successful, she faced a decision. Should she put the book away into a bottom drawer or, try an

alternative strategy—the self-published digital format? With my assistance, she was able to

deliver the book to an audience that proved happy to consume the work as an ebook. My work in

assisting her in this process gave me the impetus to query commercial systems of publishing. I

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wanted to take a closer look at the model of self-publishing, in conjunction with the use of digital format technologies to publish texts which arise out of specific, localized contexts and, generally, serve small target groups, as a sustainable alternative (Laquintano, 2010:469, Taylor:2013, PG:2013, Douglas:2015). The question of the legitimacy of this approach as a function of the critical review process inherent in the commercial publishing industry is currently in the throes of debate. Carla Douglas, a self-described "writer and editor at *BeyondPaperEditing.com*, helping writers – unpublished, self-published and traditionally published – produce the best books they can", points out that we need to, "do away with these distinctions and let writers be writers [b]ecause in many ways the lines have blurred already" (web). My mother, a published author, worked forty months on her manuscript, employed an assiduous workflow, which included engaging an editor's services and submitting the manuscript to a large selection of publishers. It is interesting to note that the recent 2015 Booker prize winner, Marlon James submitted his first manuscript eighty times to publishers without success and subsequently destroyed the manuscript (Weaver: 2015). To quote lawyer and blogger, who goes by the initials PG, on a similar tact:

> "The Adventures of Huckleberry Finn is not literature, but a vile, inferior, self-published product. It was published by the author, the reprobate Samuel Clemens […] and as such, lacked the processes that we count on to ensure a minimal level of quality, both of content and style […] On the other hand, Huckleberry Finn was published in the United Kingdom by Chatto & Windus, a perfectly reputable publisher and a respected part of the Industry. This proves that Finn is a real book — in England — and Clemens a real author — in England again; but not in America, where his name is forever besmirched by his descent into the mephitic sewer of self-publishing." (2013, web).

It is known that many authors self-publish for all sorts of reasons. A list of such authorships is available online which, although its curator has been criticized because of his expanded definition of the term 'self-published', still impressively demonstrates the extent of this creative

ecosystem (Kremer, web). If a writer cannot get through the print industry establishment front door, why not try the self-publishing window as a legitimate alternative?

One of the important considerations in self-publishing is not only initial author investment in terms of creative effort but also of monetary outlay. Publishers have large resources with which to disseminate printed copies: print shops, distributors and public relation networks. A self-publisher is reliant on a local network, limiting constraints in distribution and a much smaller production infrastructure. The Internet has made these considerations somewhat less onerous. The development of ebook technologies provides a structure for self-publishers to work productively to a realistic end-point: the dissemination of a text within a digital realm. Given that these are possible (if not probable) scenarios for many types of texts today, what are the practical, optimal strategies for working within these spaces? I am writing about the use of the ebook as a considered alternative not merely to a print publishing industry – large publishers do publish ebooks – but as an independent entity similar to publishing independently on a website. The question at the heart of this inquiry is to what extent does an alternative self-published title sit comfortably alongside its "mainstream" companion in any online emporium? Do they stand apart or together? How are they distinguished? This is a problem that the major publishers are currently having to address, often with extreme reservation. The publishing industry euphemistically refers to the practice of self-publishing as "bottom-up innovation" (Wilson, web). Why is it important to have an alternative print culture? What are the contributions that can be made within a structure that allows for, and even nurtures such texts (Stephenson-Abetz: 2012, Vivienne: 2012)? Drawing from my mother's experience as well as my own, as a long-time comic zine producer, I endeavour to pull apart some of the accepted facts

about publishing, authors, writing and the book, in its many forms and possibilities in this discourse.

Differences/Distinctions between mediums

To begin this investigation, I want to look at how the ebook differs from a print book. This is a point of contention because preconceptions exist and drift toward the subjective. For many people today, "book" conjures a material object – a physical block of paper sandwiched inside a cover, inscribed with a linear-direction text and designed according to time-honoured parameters, containing: colophon, page numbers, table of contents, index, footnotes and so on, along with the principal text (and possible image) content. What is clear is that this is an analogue technology: as a concrete object it is unalterable (although, in longer time-frames, edition-ed). Similarly, the text that resides on its pages is immutable (Hayles:100). This is the context of the printed word.

The printed book, having these characteristics, has proved useful in post-modern analyses de-constructing historical political agendas within texts. As Edward Said demonstrated in his book *Culture and Imperialism*, for example, looking at narratives from the Colonial cultural era revealed the predominance of social and political attitudes that lead or mirrored myopic, racist implementations of policy whose residues persist in the current era (Said: 1994). He quotes Salmon Rushdie on this point, "the writer is obliged to accept that he (or she) is part of the crowd, part of the ocean, part of the storm, so that objectivity becomes a great dream, like perfection, an unattainable goal for which one must struggle in spite of the impossibility of success" (27).

When it comes to digital texts, much that might once have been concrete has taken on the characteristic of the ephemeral. This is an aspect of the digital and of the code that "interpenetrates" a disseminated text (Hayles, 2010:59). But the perception of the sanctioned immutability of published texts (and of their authors) can persist even into the ebook's hemisphere. These attitudes have resulted in the struggles for the imposition of copyright regulation and digital rights management (DRM) (Hayles, 31, Wilson: 2015). While the subject of DRM is large enough to be looked at in a separate chapter, it is here cited as one of the aspects of the ebook that complicates its existence in relation to the print book. It also points to another barrier imposed upon readers who might otherwise more fully engage with what should be a relatively accessible reading technology. Marshall McLuhan states "new media do not replace each other, they complicate each other" (McLuhan, 2011:xii). It is this "complicating" aspect of ebook that merits review.

In her comprehensive analysis of computational texts and contexts, Elizabeth Hayles states:

> "code is not the enemy, any more than it is the savior [sic]. Rather, code is increasingly positioned as language's pervasive partner. Implicit in the juxtaposition is the intermediation of human thought and machine intelligence, with all the dangers, possibilities, liberations and complexities this implies." (61)

By realizing this, an author is positioned to act as an autonomous agent in activating the meaning of a text in relation to both its impermanence and its currency. As many authors have demonstrated, "meaning is always indeterminate and deferred" (Hayles, 46). If the book is to persist in the digital realm, it must be enabled through a structure that best advances the text's meaning. A human agent acts as the intermediary that is part of that process. We can think of this

agent (or user) as positioned along a continuum of apprehension in terms of being able to access text.

Accessibility

Approximately ten percent of the population has a print disability (Garrish, 2012:4). The website for the Centre for Equitable Library Access (CELA) defines a print disability as "a learning, physical or visual disability that prevents a person from reading conventional print" (CELA, web). The enhanced digital ebook can be developed such that this gap can be reduced, through techniques that support screen readers, highlighting, and user options for larger fonts as well as other choices. Matt Garrish states:

> "Your data matters, not just its presentation […] It's a common misconception […] that any kind of data is accessible data, and that assistive technologies like screen readers work magic and absolve you of paying attention to what's going on "under the hood," so to speak […] It's unfortunately too easy when moving from a visual medium like print to treat digital content as nothing more than yet another display medium" (2012:1)

Yet, as Garrish points out, "a commonly cited statistic in accessibility circles is that only about 5 percent of the ebooks produced in any year are ever made available in a semantically-marked-up accessible format" (2012:1). If the difference between viable accessibility and none is merely a matter of consistent, formal, semantic tagging of text, then it is a development that is worth pursuing. The task, here is to advance print text to a realm where its visual primacy is guided toward a more user-inclusive multi-modal sphere. Much of the work being done at the moment in the EPUB 3 (see 'Appendix A: Glossary') specification accessibility features, references the Web Accessibility Initiative (WAI) and its Web Content Accessibility Guidelines (WCAG) – see 'Appendix A: Glossary' – as working models. These resources are vast and

contributed to on a daily basis by a world-wide network of vested-interest users and professionals. The EPUB 3 specification utilizes the markup of HTML5, CSS3, SVG and Javascript (see 'Appendix A: Glossary') as a semantic and design base for book content (where a book acts like a small website, using Web 2.0 technologies) and also to make use of web accessibility semantic mark-up, include PLS (Phonetic Lexicon System) and SMIL (Synchronized Multimedia Integration Language) with its own respective Guidelines (IDPF, web). The last, vital element is the requirement that accessibility mark-up is supported by the various reading devices that are presently in existence, which, currently is still far from ideal.

The accessibility to print publications initiatives tend to evoke the context of minorities with a print disability and the concept of 'digital famine' (Garrish, 2012:24). However, the move from the print world of information dissemination into the computational realm has consequences for any who are currently part of another digital famine – those whose incomes preclude the use of computers, reading systems or access to the Internet. As Hayles points out: "[computational] text exists in dispersed fashion […] [t]here are data files, programs that call and process the files, hardware functionalities that interpret or compile the programs and so on. It takes all of these together to produce the electronic text. Omit any one of them, and the text literally cannot be produced" (2010:101). This positions an ebook as an entity that depends on a support system made possible by socio-economic conditions existing in the First World or, possibly a system that works to facilitate inclusiveness. In what way would the EPUB be accessible in economies where the means to "read" their contents is limited? It is useful to remember that a principal solution is to simplify these enabling systems, such that they can be exported from device to device, despite fundamental hardware differences, with ease. Efforts that are contained within the Open Web initiatives will come into play in substantiating this kind of

dialogue – provided that they are successful. For an intensive conversation occurring as I write, please see link in 'Works Consulted' and discussion on WC3 latest proposal, an imposition of 'Digital Rights Management (DRM)' (DRM, web).

One of the valuable contributions to the development of content in the digital realm has been the open source (OS) hacker culture movement (Raymond, 2001). EPUB is an open source standard built with structural languages that are available to any developer who might wish to create a book and are also used in standard websites. There are browser apps which provide support for the display of EPUBs, although support for displays of 'rich' media vary. The crucial condition is that the EPUB standard is the one that becomes supported broadly, as is currently not consistent – because it is open source and, because, as Matt Garrish describes:

> "It's designed to enable reading systems to easily and reliably know, up front, what's contained in a given publication, where to find each thing, what to do with it, how the parts relate to each other. And it enables publishers to provide that information in one clear, consistent form that all reading systems should understand, rather than in different, proprietary ways for each recipient system." (36)

If the standard by which books are constructed is built along open source principles, the hope is that the implementation of fair use conditions on the dissemination of the contents of these books will become a tenet of the standard. This desire is reflected in numerous reports and discussions emanating from online forums. See, for example, this summation from "The ebooks research project", funded by Vetenskapsrådet – the Swedish Research Council: *"One single, user-friendly platform for all accessed ebooks, with an easy account management for end-users. And DRM-free, of course, with guaranteed long time preservation"* [italics: original text]; quickly followed-up by the reality-check: "[g]iven that different suppliers assume that they have commercial advantage from having their own platforms and different conditions, one must

assume that this situation is unlikely to be resolved in the near future" (Wilson, web). In an

endless series of revolving doors, reader systems and author frameworks existing on the market

continue to sell limited access to texts in order to secure user loyalty. Amazon™ mobi file format

is a prominent example – playable only inside of the Amazon Kindle®[1]. A further example, in

terms of a book/magazine authoring tool, is the Baker® framework,[2] providing a sophisticated

book creation package, using open-source HTML5 and CSS, but restricting user access to an IOS

app on Apple™ ipad or iphone exclusively.

One prominent fact in this discussion is the relationship of wealth distribution in the

world and that of communication devices. The assumption that there is a direct relationship

between First World wealth and access to digital communication is not borne by evidence.

> "Estimates of wealth distribution reveal that the richest […] 1 per cent […] account […]
> for 40 per cent of global assets. In contrast, the bottom half of the population together
> hold approximately 1 per cent of global wealth […] The world has however experienced
> a technological revolution that has allowed boundaries defined by wealth to be crossed.
> Currently, more people have access to a mobile phone worldwide than clean running
> water. Although this is an alarming fact, it also indicates the value individuals place on
> communication." (Bastawrous, web)

This information is supported by an article appearing in the Wall Street Journal recently

on the rise of cell-phone reading: "what has captured publishers' attention is the increase in the

number of people reading their phones. In a Nielsen survey of 2,000 people this past December,

about 54% of ebook buyers said they used smartphones to read their books […the] number of

people who read primarily on phones has risen to 14% in the first quarter of 2015" (Maloney,

web). There is an even greater adoption by millennials. In the presentation given by Noah

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[1] Amazon Kindle Fire provides for the ingestion of reader apps that support EPUB3
[2] http://www.bakerframework.com/

Genner for Booknet Canada (BNC) a 98% sector of the study group owned phone devices. In the study, twenty-eight percent agreed to using their phone for reading books (Genner, web).

Homogeneity

A final thought, in terms of the effort to reach for universal standards is the reality of homogenization of mark-up and object-oriented code to an "English-only" keyword coding system. The complexity and use of the Internet today is far greater than was envisioned in its earliest manifestation. Its genesis was an effort by a small selection of universities and the US Defense Advanced Research Projects Agency (DARPA), an agency responsible for the development of emerging technologies for use by the military, to enable the sharing of technological and science research texts during the Cold War era. The very first Internet, called Advanced Research Projects Agency Network (ARPANET) linked four universities: University of Utah, Stanford Research Centre, University of California, Los Angeles, and University of California, Santa Barbara. A vast number of technological breakthroughs came about as a result of these early efforts—too numerous to list here. One innovation is important to note: the software developed by Tim Berners-Lee, working at the time in the high-energy physics lab at the Centre Européene pour la Recherche Nucleaires (CERN) in Switzerland, that he called the World Wide Web. What distinguished this innovation was hypertext, which enable the linking of documents and resources external to the document on screen. Berners-Lee states:

> "*[s]uppose all the information stored on computers everywhere were linked*, I thought. *Suppose I could program my computer to create a space in which anything could be linked to anything* [italics, Berners-Lee] This would be a single, global information space. Once a bit of information in that space was labelled with an address, I could tell my computer to get it […] A web of information would form" (4).

What this brief look-back at the Internet shows, is that the vast majority of its developers came from English-speaking countries and backgrounds. The chances were pretty high that code that operated above the level of machine code, which would be parsed by a machine, would be English-based.

The World Wide Web has achieved its goal of weaving a network of constituents that encircle the world yet retains in its construction, a built-in disquieting inequity. As pointed out by Nitesh (2012): "[c]urrently, the Internet is a decidedly western[sic] system. While, over 50% of the World Wide Web is written in English, only 27% of Internet users speak English as a first language." (149). Another study showed,

> "students found the topics of 'understanding coding standards' and 'following coding standards' difficult. One of the reasons for this could be that most programming languages and the documentation on coding standards are in English […] different strategies may be required for native and non-native English speakers but this is open to further research."(Li, 2005:239)

This observation by the author is one which any developer will invariably discover. Digital communication in the public sphere is a world-wide reality and much of the structure that under-pins it uses the historical-instituted English key-worded code. In the synthesis that is beginning to happen with these code languages, they have taken on less a true English and more a 'proto-English' lexicography – code that exists as a human-language a level above machine language, and whose meanings are connected to a machine logic. Higher than this 'proto-level', at the tier of generated content, cultural differences, languages, and nuances abound. As a reflection of this reality, the most recent version of Drupal® (version 8), released in February 2016 – an open source content management web building tool – allows for the seamless translation of content into any one of 94 languages (Acquia, web).

The EPUB, utilizing the markup languages infrastructure of the World Wide Web has a potential to reach into any number of spaces that can present text using XHTML and CSS. That is pretty well anyone who has access to a browser or a dedicated reader, whether on a phone or a computer or a tablet. There is no need to be online. Once opened, an EPUB performs as a book, offering up pages, illustrations, as well as rich media, as the design and narrative dictates. And that content will unfold as any story, from any cultural tradition, might, should the 'book' usability allow. EPUB standards offer the best hope for the 'book' to have viability and vitality in the digital arena. To paraphrase Ursula Le Guin: a book "is a journey. It is a journey into the subconscious mind […] and *it will change you* [italics, Le Guin]" (Le Guin, 1973:6).

CHAPTER 2

What is a book?

In any transitional nexus, there is a 'Janus-like' perspective: a self-conscious inculcation of past

traditions as well as a venturing outside of those traditions toward the exploration of new

territory. There is a point where I, as scholar, need to ask: if the book is to transition from a

paper-and-print medium to that of a digital one, from what model will it be configured? What is

a book? It is the answer to this question that I speculate on at this time.

Leslie Howsam states:

"[t]he history of the book is a way of thinking about how people have given material
form to knowledge and stories. Knowledge and stories are intangible; it is their material
forms that make them accessible across the barriers created by time and space" (2015:1)

Thus a book embodies a conceptual as well as a material complexity that elides a quick

answer. In essence, the examination that follows will trace aspects of the book from a variety of

perspectives: referencing historical, material and social or philosophical circumstances that

revolve around the book object. While the subject of the book is a vast territory, my interest is in

situating the future digital book within a documented cultural context and my explorations will

tend to align to that framework.

Early Development

The invention, and rapid uptake by printing houses, of moveable type in Europe in the mid-fifteenth century created, what is interpreted by Elizabeth Eisenstein, as a "revolution" (1997:13). While in 1400 C.E., a moveable type print technology did not exist, by 1500, "printers workshops would be found in every important municipal centre [in Europe]"(14). From a data pool of a just few hundred manuscripts prior to 1450, the 'Commonwealth of Knowledge' increased to eight million printed books by end of century (15, 335). So rapid was the rise of printing that for many institutions, the production of hand-scripted manuscripts and printed volumes continued alongside one another. When Johan Fust first brought a collection of Gutenberg's printed bibles to the Paris Sorbonne university, the reception was adverse: "with some spectators associating the multiple copies as an act of the devil, or a suggestion of 'supernatural intervention'" (22). At first, printers followed the framework of the hand-scripted manuscript, using cast fonts (Gothic faces) that resembled hand-lettered scripts: "[i]f one holds a late manuscript copy of a given text next to an early printed one, one is likely to doubt that any change had taken place, let alone an abrupt or revolutionary one" (23). Lacking a model other than that of the scribal culture, printers gravitated to a known frame of reference. The early printed texts (or incunabula) used manuscripts as models for the presentation of texts, even while developing the books in a workflow demonstrably alien to that of the scribe. The "temporary resemblance between handwork and press work seems to support the thesis of a very gradual evolutionary change" but, as Eisenstein also states "new features […] began to appear before the fifteenth century had come to an end" (24). As is apparent from the historical data, the shift in cultural emphasis from the exclusive control of the scribe to that of the convenience of the reader grew out of the medium's ability to incorporate such a shift. Printers were able to add, within

texts, structures and artifacts that had not been possible within scribal book cultures. These included, to paraphrase Eisenstein, the use of graduated types, footnotes, tables of contents, superior figures, cross-references—as well as the gradual standardization of bibliographic content and colophons (24). The use of these enhancements, their placement and organization has come to be known as a book's 'paratext'.

In addition to text, image content was incorporated, by the use of the wood-block print. The development of printed images arose out of an earlier cultural transaction in which cheaply made paper printed images were sold to the medieval populace for the purposes of religious instruction or the invocation of saintly protection. Incorporated into the image were short text glosses either carved into the block or added by hand. These images might accompany the sale of an Indulgence (Martin, 1976:47). For Eisenstein, the use of the image as an enhancement in the production of a printed volume, is crucial: when the transfer of information in medieval societies, had largely belonged to an oral sphere, it was not possible to share image data across a widely displaced audience. As she states, "more-easily duplicated woodcuts and engravings–an innovation which eventually helped to revolutionize technical literature [including the printing of guidebooks and maps] by introducing exactly repeatable pictorial statements" increased the knowledge realm (1997:24). While "block prints and letterpress originated as separate innovations […] the two techniques soon became intertwined" (26).

Work specialization Cross-Pollination

Johannes Gutenberg, made famous as the printer of the Gutenberg Bible, the world's first movable-type printed book[3], had been a goldsmith. His knowledge of metallurgy was key in the invention of a technique of foundering individual pieces of type. Many other specializations, however, soon became crucial contributors to the development of the printing of books and other texts (pamphlets, maps, government statutes). Some of these innovations pre-dated the invention of movable type but, as might be surmised, formed a part of what might be labelled 'a perfect storm' of collaborations that fed the printing trade. The printed book, as well as other texts, required the use of paper. Although paper had appeared in Europe in the thirteenth century, it was considered vastly inferior to vellum and unstable. This changed with the introduction of rag-based papers. It is perhaps useful here to give a short account of paper-making in the period abounding the development of moveable type printing. This is a description from Martin:

> "[raw material of old rags] was obtained from specialised dealers, who collected it and brought it to the mill where it was sorted […] After the sorting came the steeping of the rags, which were chopped into small pieces and left […] to ferment. In this process the fatty substances were forced out and the cellulose gradually separated. The raw stuff was then brought to the mill […] In the milling machine the main shaft had little levers [that transferred the circular action of a mill wheel into a reciprocal action] which brought the small wooden mallets into operation, pounding up and down in the beating troughs which contained the treated rags […] The rags were finally reduced in water containing a carefully measured quantity of soap, to produce a paste of determinate thickness which ended as pulp. This was fed into a vat of warm water […] where there was then inserted a form—a wooden frame encasing a lattice of brass wires which allowed the water to drip away while retaining a layer of pulp […] [When] they had begun to dry, they were pulled away […] spread […] on felt […] repeatedly squeezed under a tight press [Finally they were hung out to dry and sized, dried again and textured and finished]. The paper was gathered into reams of 25 sheets and into bundles of 20 reams [and delivered] to market" (33-34)

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[3] The claim that Gutenberg's bible was the world's first moveable type printed book in Europe has recently been called into question by many scholars.

Paper mills established themselves alongside printers in a mutual understanding of fiduciary interest, with mill owners sometimes bank-rolling a printing enterprise (41). A widening circle of trade resulted in "fruitful forms of collaboration [bringing] together [u]niversity professors […] with metal workers and mechanics […] astronomers and engravers, physicians and painters" (Eisenstein, 27). Use of printing capabilities were not limited to books. "[N]ew tools available to printers helped to bring more order and method into a significant body of public law [e.g.] the *Great boke of Statutes* 1530-1533 […] offer[ed] a systematic review of Parliamentary history– the first many readers had ever seen" (80). Thomas Jefferson stressed "the democratizing aspect of the preservation powers of print which secured previous documents not by putting them under lock and key but by removing them from chests [and] duplicating them for all to see" (90). Further, the notion that "valuable data could be best preserved by being made public […] ran counter to tradition [but] was central both to early modern science and to Enlightenment thought" (90). Very quickly, the idea of information dissemination as having both an ethical as well as a practical role to play in social and political formation was unfolding.

I segue briefly to mention that the controversial resonances of this reasoning continue, to this day. Consider many current debates as to whether the Internet is best understood as a knowledge resource, which embraces peer-to-peer sharing, or a marketplace, which locks out many users. I refer the curious reader to a discussion currently taking place between the WC3 and the Electronic Frontier Foundation (EFF) (Doctorow, web). I attempt to address this thorny issue in a later chapter.

Returning now to the topic at hand. From a practical perspective printing is "reduced to three essentials: moveable type cast in metal; a fatty based ink; and the press" (Martin, 50). But why go to the trouble of making books? What were the demands that catapulted the printed book

development into existence at this time? As Martin asks: "What role did it assume? What causes does it serve or fail?" In terms of another perspective, the book is deemed to consist of more than its material properties: "[w]hen we hold a book in our hands, all we hold is the paper: the *book* is elsewhere" (Howsam, ed.2015:54). In the age of scribes, book-making had been an activity of a centralized Catholic church whose monastic network extended throughout European Christendom—a propagation of biblical doctrine and classical wisdom through the continuous copying of texts. Gradually, some of the work of copying moved out of monasteries into universities. Original (exemplar) books were loaned out in quires for copying and stationers charged by the page or pecia. The invention of printing extended this system by "represent[ing] a handy means of multiplying indispensable texts even more rapidly and accurately than was possible under pecia system" (Martin, 21). In this way, some of the intellectual research of the fifteenth century had separated itself from the tight control of Church dominion. Printing provided for a more wide-ranging duplication of standard texts, thus freeing students from the obligation of "sitting at the feet of a given master in order to learn a language or academic skill" (Eisenstein, 37). An increased bookish knowledge "enabled many observers to check freshly recorded data against received rules" (45). Old texts were "duplicated more rapidly than new ones [and thereby, scrutinized] contributing to the formulation of new theories" (46).

In a spirit of increasing foment of ideas, it appears that science and religion set out along different dissemination paths. Science texts exploited the ability of printed books to demonstrate, as words alone could not, the physical world—by use of images, maps, tables, diagrams, charts, and mathematical equations. Meanwhile, religious texts increasingly moved away from image and became embroiled in an ever more intricate relationship with the precise meanings of words alone. Protestantism, the development of a vernacular (shifting away from

Latin) helped to "balkanize Christendom [and led to] an enhanced sense of spiritual dignity and individual worth, [an] 'inner light' kindled by the printed word" (307). The ability to consult a wide variety of texts "brought to the table of thought, contradictions, divergent traditions, difficult to reconcile" (48). Confidence in older theories weakened but "enriched reading matter also encouraged the development of new intellectual combinations and permutations" (49). In this enlightened age, sixteenth century map publishers "began to exclude 'Paradise' from this world as being too uncertain a location [while, succinctly] Galileo […] distinguished between [the Church's] 'how to go to Heaven'—a problem for the Holy Spirit—and 'how the heavens go'—a matter of practical demonstration and mathematical reasoning" (53). Author, editor and printer coordinated improved information flow by designing printed texts to reflect the content. This task was accomplished either as a rigorous exercise or haphazardly; and results reflected, either on creator, or intended audience.

Master and charlatan

The medieval Master printer "bridged many worlds" (Eisenstein, 28). He was "responsible for obtaining money, supplies and labor [sic], while developing complex production schedules" (28). But texts that issued from printing houses were not inviolable. Ages of copying of manuscripts had introduced errors and anomalies into exemplars which were often caught subsequent to coming off the press. As Eisenstein states: "[i]nsofar as the change from a sequence of corrupted copies to a sequence of improved editions encompassed all scholarly and scientific fields, it might be expected to have a fairly widespread effect [since] information had [had] to be conveyed by drifting texts and vanishing manuscripts [and] manual copying of manuscripts led to 'textual drift'" (86-8). Given this, it is hardly surprising that in some printing houses "books

underwent 'degradation' at the hands of ignorant printers trying to make quick profits" (82). Yet, it also makes the truly scholarly printed book even more remarkable. Consider, for example, *The London Polyglotte Bible'* of 1657 which "boasted texts in Hebrew, Samaritan, Septuagint Greek, Chaldee, Syriac, Arabic, Ethiopian, Persian and Vulgate Latin [and added] to the stack of fonts used by Western scholars for oriental studies" (76). Information from the ancient texts that was important to scholars was more easily emended as a result of printing and the wide distribution (across geographical frontiers) of duplicate copies (297). It was also the case that pseudo-science publications—such as those centring on alchemy or astrology—saw their way into the book market (299). The difficulty of determining what was truth and what fabrication had greater immediacy as volumes of texts increased.

This is not a condition that has diminished through time. There are similar problems of discerning truth from fiction on the Internet today. The wily twenty-first century reader is called upon to develop contextual awareness with the skills to filter out that which seems least credible.

Given that these were also turbulent times, politically, it was possible for political resistors to strategically 'disguise' subversive texts as unworthy, cheap pamphlets (Howsam, ed. 135). As the English government of the sixteenth century transferred rapidly from Protestant monarchy to Puritan to Catholic monarchy, many printed texts fell repeatedly, in and out of favour. Printing houses, requiring approval to produce a volume and were obliged to apply to both the Bishop of London and the Archbishop of Canterbury, found that, where one allowed, the other might deny, consent (131). In "1542, Pope Paul III instituted the Congregation of the Roman Inquisition [which] published [an] index of prohibited books [with] more than 1,000 prohibitions" (129). A vernacular translation movement was an important factor in the increased

need for books. Reading and understanding doctrine in the common tongue extended communication networks in Europe.

Printing in the vernacular allowed printers to "fix" linguistic variations in a language: "[p]rinters [fortified language walls], homogeniz[ing] what was within them, breaking down minor differences, standardizing idioms for millions of writers and readers, assigning a new peripheral role to provincial dialects" (91). In this way the "book created new habits of thought not only within the small circle of the learned, but far beyond, in the intellectual life of all who used their minds" (Martin, 10). Printing in Europe spread at a "phenomenal speed" in contrast to other parts of the world which had access to similar technologies (Eisentstein, 336). Conditions considered "ripe" for this spread are cited as the "absence of a powerful central authority, far-flung networks, sophisticated systems of financing developed by late medieval merchants engaged in a wholesale cloth trade" (textile manufacturing was closely linked to rag paper production) (338). It is perhaps apposite to note: there exists today a not-dissimilar situation in terms of neoliberal, global-networked communications infrastructure that facilitates the growth of the Internet. In medieval Europe, the ready desire for books existed for what they promised, "particularly among emergent social classes, the merchants and the bourgeoisie"—access to ancient and current wisdom (Martin, 28).

Authority and Transgression: A Post-colonial perspective

As repositories of particular information, books are perceived as possessing an element of authority. This authority, in the past, has been both acknowledged and feared. Political powers trying to maintain hegemonic control, conferred grants on publishers–for the purposes of duplicating important government documents–but also saw these same publishers as liable to

inspire subversion (Howsen, ed. 125). At the time and throughout history, the book's authority

has been in an uneasy contest with the authority of the state. In 1610, English ambassador to

Venice, Henry Wootton, discouraged the banning of a printed libel against the English Crown

"so as not to give it importance or cause it to be sought" (133).

During the colonial period, the book's authority has been further complicated by its

relationship to the parent state/s and its connection (in whatever form) to the colonized

population. Edward Said has explored this connection in his expansive book *Culture &*

Imperialism. He says:

> "The main battle in imperialism is over land […] these issues were reflected, contested,
> and even for a time decided in narrative […] nations themselves are narrations. The
> power to narrate, or to block other narratives from forming and emerging [constitutes
> one of the main connections between] culture and imperialism" (Said, 1993:xii-xiii)

Citing texts from British authors, Said expands his idea that the authority of the book (in

particular, the novel) reverberates with echoes of a presumed understanding on the part of the

British people of their right to rule the many other peoples of the world. Given this, what

authoritative weight do books possess that reflect back to those same colonial powers, the

historical effects of colonialist designs?

Some creators that take up this stance and have achieved recognition are writers such as

James Baldwin, Amiri Bakare, Nikki Giovannni, Ralph Ellison, bell hooks, Maya Angelou,

Chinua Achebe, Chimamanda Ngozi, Langston Hughes, Alice Walker, Michelle Cliff and

Jamaica Kincaid. Whether emerging writers of this calibre and sensibility will have similar

success, might be a question. While there is no doubt a significant diaspora market that would

consume, create and serve such texts as they are produced, the publishing industry is increasingly

consolidating:

"looking at the publishing industry from the perspective of the early twentieth century […] three levels […] are evident: relatively small to medium independent companies, often structured as sole traders or partnerships, serving local or regional needs; medium to large publishers at national level [and] that final level of conglomerate, evidence of both concentration of ownership [and] of publishing as a form of content management [with a] geographical concentration in Europe" (Howsen, ed. 162-163)

While the greater portion of a book market may be concentrated within an Euro-centric corporate domain, the need for contributions from the periphery has poignancy, especially when considering subject matter that engages with regional concerns. For example, which particular regions are likely to experience specific deteriorations (and to what degree) in climate and ecology due to Global Warming? Climate change may be a global issue, but discussion of specific regional impacts are likely to take place in much smaller rooms. In his essay entitled "The Book in the Twentieth Century", Alistair McCleery describes regional publishers at the smaller end of the publishing spectrum as independent companies, with a smaller domestic market which "serve that local market in terms of specific cultural and linguistic needs" (Howsen, ed. 163). Within the 'empires of print and the empires of the mind' a push to "displace the colonial binaries of metropole/periphery" and replace these concepts with a non-hierarchical web is in motion. The expectation is that anyone who wishes may contribute to the realm of knowledge (62).

This practice only gets complicated if a book ascends out of its regional dominion into world-wide fame: a situation which is discussed in detail in the essay "The Enkindling Reciter" by Alan Galey. What his narrative shows is that when an award-winning, small print-run book yields to its print limitations, ebook alternatives prove essential to a publication's continuity and availability. In a way, as documented by Galey, the ebook arrived exactly on time. Clearly, in material and in other ways, the ebook is not able to function as a facsimile of the print book.

There is much work that can be done to improve the presentation and usability of the ebook. Yet,

is it not possible, when I hold the tablet to engage with an ebook—that the book itself exists

elsewhere?

CHAPTER 3

What is an Author? What is a Text?

A closer examination of that part that exists within the enigmatic covers of a book is pertinent to the understanding of whole. While a book may be superficially judged by its cover, it owes its existence to its contents. An examination of the nature of these contents from inception to inscription forms the content of this chapter.

Consistent with other chapters, I will offer comparison/contrasting views of the categorizations and the ways they co-relate within paper and ebook paradigms.

What is an Author?

Pierre Bourdieu states: "The preliminary reflections on the definitions of the object and the boundaries of the population […] ignore the fact […] that the definition of the writer […] is an issue at stake in struggles in every literary […] field" (Finkelstein, 99). Bourdieu conceives the social position of the author is inside of an hierarchical equation that calculates relationships between producers (authors), products and audience. Each entity derives meaning in relation to the others' existence. Each entity belongs to a variable field of "consecration", whether there is innovation and experimentation or iteration of existing narratives (108). Bourdieu establishes a fixed point of reference as a vantage point from which the hierarchy is generated, with those

established, consecrated author/writing/audiences at one coordinate (examples might include such literary pillars as: Honoré de Balsac, William Shakespeare, Victor Hugo, Alexandre Dumas) and the more innovative eco-systems at the other (whose examples might include, writer groups such the spontaneous, complex Dadaists Tristan Tzara, Guillaume Apollinaire and André Breton). At the time of writing, this author feels that the metaphor of the hierarchical tree has less applicability in the world of Internet communication and the vast array of writing field arenas jostling for recognition. Authors and their texts occupy new frontiers that interweave in ways that blur and elide consistent consecration—although the older systems still activate and prepend the traditional enclave. Important to Bourdieu's analysis though, is the relational structure of "habitus" which can limit what is considered by Bourdieu as the "space of possibilities" (110).

For authors, Bourdieu declares,

"[t]he space of available positions does indeed help to determine the properties expected and even demanded of possible candidates, and therefore the categories of agents they can attract and above all, *retain*, but the perception of the space of possible positions and trajectories and the appreciation of the value of each of them derives from its location in the space depend on these dispositions." (111).

In Bourdieu's analysis the relationship between the author and the authored text is flattened, in that a single author generates and is responsible for his/her text. Regardless of the influence of habitus, the question of whether the meaning of a particular text corresponds accurately to the author's intentions is not taken into consideration in Bourdieu's discourse. The assumption, however, that the author and the texts that issue forth are irrevocably intertwined does illicit a lively debate amongst philosophical pundits.

In his provocative essay "The Death of the Author", Roland Barthes evokes the metaphor of author as medium performing texts, having "mastered the narrative code" but otherwise untethered to the story. The author, here, builds narrative (and meaning) from the wellspring of a "multi-dimensional space in which a variety of writings, none of them original, blend and clash. The text is a tissue of quotations drawn from the innumerable centres of culture" (Finkelstein, 279). Furthermore, as Barthes claims "[t]o give a text an Author is to impose a limit on that text, to furnish it with a final signified, to close the writing" (279). In this scenario, authors do not own their texts but, in some way, configure them from what already exists. It is easy to acknowledge Barthes ideas when considering the existence of the re-mix, hybrid and junk cultural phenomena that abound, as well as the instances of collaborative authorship and the discursive 'comments' section below a news story on the web. As an example of this sort of hybridity, consider filmmaker and York University professor John Greyson's "Gazonto - imagine Toronto bombed like Gaza", a hybrid fiction film posted to YouTube® and combining found Internet materials, such as maps, images from Google® earth, found aerial bomb footage, music and recorded voice—whose content combines to establish a contextual meaning (Greyson, web). This montage evokes the explosive emotional force of (virtual) armed missiles targeting our own (virtual) backyard.

Michel Foucault's complex essay "What is an Author?" is a response to Barthes (Finkelstein, 281). To clarify his position, Foucault developed the notion of the "author-function". The author-function is a field inside of the system of ownership of texts, with rules concerning the enactment of "author's rights, author-publisher relations, rights of reproduction, and related matters" (285). Foucault states, the "author's name manifests the appearance of a certain discursive set and indicates the status of this discourse within a society and a culture"

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(284). Some discourses are endowed with the author-function attribute, others are not. As Foucault describes, a "private letter may well have a signer – it does not have an author; a contract may well have a guarantor – it does not have an author. An anonymous text posted on a wall probably has an editor – but not an author" (Foucault, web). In Foucault's interpretation, the instance of an author's name performs "a certain role with regard to narrative discourse, assuring a classificatory function" (web). Foucault speaks about the signs existing inside of a text that point to the author—for example, were I to lay out for the reader here:

> "If we Shadows have offended,
> Think but this, and all is mended –
> That you have but slumbered here
> While these visions did appear.
> And this weak and idle theme,
> No more yielding but a dream,
> Gentles, do not reprehend.
> If you pardon, we will mend…"

an author (Shakespeare) will immediately spring to mind, signified by an association of memory, rhythm and language that has inured a reader to the author. Foucault argues that the existence of signs that identify this author as the initiator of these texts suggest the fusion of one with the other. As he points out, the "name seems always to be present, marking off the edges of the text, revealing, or at least characterizing, its mode of being" (web). How are these signs manifest? Foucault paraphrases St. Jerome on the subject of authentication of the author who is: "1) defined as a constant level of value […] 2) a field of conceptual or theoretical coherence […] 3) conceived as a stylistic unity […] 4) seen as a historical figure at the crossroads of a certain number of events" (web). The author function is therefore characteristic of the mode of existence, circulation, and functioning of certain discourses within a society.

What is clear is that the author-function has burgeoned since the time of Shakespeare to deliver an expanding repertoire of texts whose signified authors may be less in evidence at the level of a pulled quotation. And how do we incorporate the authors of other cultures whose works are translated into various languages outside of the original one and are, in terms of the initial sign, blurred?

Another aspect of the Foucault schema is the concept of authors as "founders of discursivity" (Finkelstein, 288). Foucault cites as his examples, Sigmund Freud and Karl Marx who, as individual authors, spawned a transformative "discourse" in the outgrowth of many branches of authors and textual "modes of existence" (290).

Foucault calls the author "the ideological figure by which one marks the manner in which we fear the proliferation of meaning" (290). This seems to correlate to a fearsome proliferation of meaning, were the author-function to transform or fade altogether. Enigmatically, Foucault finishes his essay in a prophetic vein with his musing that at some point "all discourses [may] develop in the anonymity of a murmur" (291).

How do these disparate views of authorship inform the constituency of the digital narrative? Important aspects of the realm of print and the way in which it relates to the function of authorship are being rewritten by the nature of the digital technology inscription ecosystem. Technologies inform the creation of the textual universe today in ways that are still resolving. This is an ongoing discourse, touching on the questions of: who is author…? what is text…? where and as what personas are readers…? and, what is narrative…?

One area where the identified authorship of a text becomes problematic, as Foucault points out, is in the area of transgression and punishment. In these instances, there is the possibility, as recent history demonstrates, for an author to be implicitly associated with both a

text initiated at his/her hands and with the society from which it springs, and for that circumstance to endanger him/her. Consider, for example, the story, "Journalist Ruqia Hassan murdered by Isis after writing on life in Raqqa" published by the Guardian in January, 2016, a statistic that adds to the growing list of murdered journalists around the world. As the author of this article states, "Islamic State militants murdered a journalist who wrote about daily life in occupied Raqqa" (Gani, web). Daesh terrorists have used the ubiquity of texts on the open Internet to target and assign the role of author of transgressive texts to journalists (in particular) as a mark of culpability and retribution. This is perhaps an extreme example of the unhappy consequence of an author-text binary.

What is a Text?

Cultural theorists such as Stuart Hall, have taught the necessity of understanding texts as possessing meaning that emanates not merely from an autonomous single author but out of the milieu of larger social contexts. This idea is the "McLuhan-esque" realization of the fish, which, suddenly coming into the air, discovers the meaning of water (Representation, Film transcript). As Hall states, "Late-modern culture is the saturating medium, the saturating idiom, of communication worldwide […] Culture is a way in which we make sense of or give meaning to things of one sort or another" (1997: Film transcript). Texts have both an external existence and a human internalized interpretation, which can vary to a greater or lesser degree and be subject to indeterminate levels of modification. Hall emphasizes that meaning-making in relation to the cultural ocean is on-going. Cultures, texts and languages all intersect.

> "Cultures consist of the maps of meaning, the frameworks of intelligibility, the things
> which allow us to make sense of a world which exists, but is ambiguous as to its meaning
> until we've made sense of it. […] First of all, there's the shared conceptual maps or

cultures that we inhabit. But very closely associated with that are the ways in which different languages […] the language that we speak and the language that we write […] digital languages, languages communicated by musical instrument, languages communicated by facial gesture, languages communicated by facial expression, the use of the body to communicate meaning, the use of clothes to express meaning—anything in the sense in which I'm talking about can be a language. By that I mean it gives sign to the meaning that we have in a form which can be communicated to other people. Language externalizes—it makes available and accessible as a social fact, a social process—the meanings that we are making of the world and of events." (transcript).

The interplay between text and its variable meanings gives rise to discourse. In one of Hall's lectures, he refers to the meaning of 'race' as the 'floating signifier'. This concept of 'floating signifier' is important when a discussion on the abstract interpretation of 'author' and 'text' is in play. The recognition that defining author or text might generate not a single meaning but several—and, not within a hierarchical structure but inside of a complex network of meanings—elicits a slippery foothold for concrete ideas.

What Author? Whose Text? Blurring the Lines

Regardless of these several distinctions, what seems to be at stake in the era of digital textuality is this very question of authority – and "authorship". Simon Carolan and Chrisine Evain point out, in their essay on the topic, that the words "authority" and "author" both derive from the Latin "autor", meaning originator (Carolan, 54). Traditional publishers, facing new modes of integrating authority in radically different spheres of text deliveries, are battening down the hatches: struggling for ways to completely control the market. The authoritative structures of the publisher spheres are being challenged by numerous constituents. The new ebook (which can potentially be authored, edited and published by a single individual) versus the older print book (which invokes a host of Publisher actors) are weighed and debated by groups on all sides. At the

centre of the debate is the pull and apotheosis of the new technologies facilitating individual

creative choice set against the labyrinthine route of obtaining the "Publisher's Stamp [as] Gauge

of Quality" (61). There is, I think, a link to be made here between the expansion of modes of text

delivery and the expansion of the author-realm that participates in the creation of these texts.

Henry Jenkins writes that the "presum[ption] that new media would displace old media

[is given way to a] convergence paradigm […] that old and new media will interact in ever more

complex ways" (Jenkins, 6). Importantly, though, Jenkins claims, "[f]reedom is fostered when

the means of communication are dispersed, decentralized, and easily available […] Once a

medium establishes itself as satisfying some core human demand, it continues to function within

the larger system of communication options" (11). Jenkins' analyses are directed towards a

theme of recreational, creative play and innovation, where media, content (both new and

existing) all come together as a form of piquant, communal cultural feast. He is looking

primarily at a demographic of, as he puts it, "disproportionately white, male middle class, and

college educated" and exploring instances of fan fiction, gaming and re-mix amongst this group

(23). The book "Convergence Culture" was published in 2006 and the demographic of media

players has no doubt expanded. A recent article in the Guardian states: "52% of the gaming

audience is made up of women […] Women have always played games, and in recent years the

growth of the mobile games industry in particular has been driven by a female consumer base"

(Jayanth, web).

Harking back to Stuart Hall, however, I sense that, at the fault-line of this play, is a

deeper message, which comes succinctly, as a quote from Pierre Lévy in the last part of Jenkins'

book: "the power to participate within knowledge communities exists alongside the power the

nation-state exerts over its citizens and corporations within commodity capitalism exerts over its

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workers and consumers" (245). From this idea I draw a line, pointing to the cultural positioning of the new ebook—at a place of great tension and debate.

In an essay that explores many of these issues directly, Richard Nash states: "the universe of knowledge we have about books, literature, and publishing excludes that universe of books that were never published." (Nash, 19). Bob Stein, founder of Voyager multi-media publishing in the 1990s, who calls himself a publisher with a digital focus told Paul Kennedy of 'CBC Ideas' that books are, like life, not a static object but a river which flows; what is important is not closing the book at the end, but being able to enter the flow – maybe through an online conversation, in the margins (CBC Ideas, web).

As the knowledge universe shifts, so do the numbers of titles hitting the market: in the U.S. from 1980 to 2010, there was a four-fold increase in publications. This was an important period for the development of the literate populace in the U.S. As Nash elaborates, it was the period of the Civil Rights movement, the decolonization of Africa and Asia and, of feminism. All of these issues were discoursed within literature (20). Inevitably, a portion of this increased readership became writers down the road. As computer technologies become increasingly ubiquitous, they become the tool of choice that these writers will reach for. As Nash says, "[w]alk into the reading room of the New York Public Library and what do you see? Laptops." (20). This observation is the logical result of the computing age. While untold volumes of texts flow into the world within the space of a heartbeat, does it necessarily mean that they cannot speak volumes in the field of literature? Nash thinks that these texts have, potentially, the same power to cultivate and entertain. His endorsement of the ebook is full of optimism; and largely, because of the practicalities of developing a text. As he says, "[m]arginal cost is zero: It costs as little to produce the billionth copy as it costs to produce the second copy" (22). He calls on

publishers to recall the unique position they occupy and "what the business of literature is. It is not about making art; it is about making culture, which is a conversation about what is art, what is true, what is good" (25). The only issue going forward is to work out a sustainable business model for the making of culture. Nash reminds us that what was magical and profitable in, for example, "Harry Potter" was the text between the covers. For millions around the world that content was worth wanting, waiting and paying for. The implication is that if it had come a few years later, in the form of an ebook, it would still be good. Echoing Jenkins' examination of the culture of play, Nash compares that activity to the space a reader finds: "In games you get to wonder what door to walk through; in books you get to wonder what the character was thinking, walking through that door" (23).

At the Edge of the Publishing Universe

Carolan and Evain's essay is a comprehensive analysis of the difficulties of Publishers' positions in the digital text's realm. As they state, big publishers (who are accustomed to a status quo) are facing an "upheaval [which] is leading to a loss of faith in traditional best practices and consequently, people are increasingly questioning the role of the publisher in the industry and their maintained authority over the publishing process" (Carolan, 52). Part of the problem is that publishers consolidated by absorbing smaller companies, and have become more beholden to the shareholder investor quarter than to the readers and are prone to a dismissive stance at the cornucopia of the alternative choices that are appearing. As Nash points out, institutions "will try to preserve the problems to which they are a solution" (Nash, 24). The corporate model is a "Winner Takes it All" philosophy, where a handful of authors are consecrated and backed for the best-seller stamp of approval, providing the publishers the rationale for business as usual

(Carolan, 62). As Carolan and Evain sum up their work, they state that the "sun is currently setting on this philosophy as smaller, financially viable publishing ventures are appearing across the industry. As diverse workflows are being developed, a new age is being ushered in, where "Everyone's A Winner" (62).

Who is behind these new publishing ventures? Recently, a report came through on my Twitter page that the sale of ebooks had appeared to have 'plateaued'. This caused people in my circle, who are aware of my research, to proffer me with supercilious winks. Perhaps the subject of my thesis was dead in the water. Or was it? It turns out that, according to a report issued by a website called 'authorearnings.com', an overwhelming majority of ebook sales at Amazon in 2015 has come from authors that are self-published. In order to understand the discrepancy in the two conflicting pieces of information, it is important to understand the data presented. As the author of this report states, clearly those who believe that ebook sales have plateaued are not looking at the same dataset. These are the point-form statistics for this analysis:

- AuthorEarnings reports analyze detailed title-level data on 33% of all daily ebook sales in the U.S.
- 30% of the ebooks being purchased in the U.S. do not use ISBN numbers and are invisible to the industry's official market surveys and reports; all the ISBN-based estimates of market share reported by Bowker, AAP, BISG, and Nielsen are wildly wrong.
- 33% of all paid ebook unit sales on Amazon.com are indie self-published ebooks.
- 20% of all consumer dollars spent on ebooks on Amazon.com are being spent on indie self-published ebooks.
- 40% of all dollars earned by authors from ebooks on Amazon.com are earned by indie self-published ebooks.
- In mid-year 2014, indie-published authors as a cohort began taking home the lion's share (40%) of all ebook author earnings generated on Amazon.com while authors published by all of the Big Five publishers combined slipped into second place at 35%." (Howey, web)

Essentially, as this author points out, when "one makes the fatal mistake of relying on ISBNs to estimate the ebook market, only 10% of unit sales and 7% of gross consumer ebook dollars appear to be going to self-published books" (for a definition of ISBN, see Appendix A: Glossary) (DataGuy, web). Because the ISBN is an artifact of the print publishing industry, and because in the U.S. they are fairly costly, as well as time-consuming to obtain, the "shadow industry" book culture has deemed it an outmoded artifact for the purposes of their enterprise (which is to sell books). As the author of the report reminds the reader, "those 'shadow industry' books aren't invisible to consumers. Readers are buying them in vast numbers—purchasing between 240 and 260 million of them a year in the U.S. alone. Readers don't "care whether books have ISBN numbers or not… most don't even know what an ISBN is" (web). Now, the only hurdle that remains is to persuade Amazon to journey beyond that primitive system of the Kindle (the antithesis of Web 2.0 philosophy: 'software above the level of a single device' – see Glossary) and embrace the EPUB.

This sort of data result must have the Big Five publishers (Simon & Schuster, Penguin Random House, HarperCollins, Hachette and Macmillan) on tenter hooks. No doubt, in 1455 when the first bible rolled off of the Gutenberg press, there were some scribes who, rather than feel the fear of impending unemployment, thought: "At last, I have something other than a quill to create text!" At this point, in that library full of laptops, I hear a similar murmur.

Recently, an initiative at Black Caucus of the American Library Association (BCALA), was launched. Called the "SELF-e Award Literary award", it will honour self-published ebooks. According to the article, librarians "have long sought more guidance on self-published books as well as books by authors of color [sic]. Aiming to answer both needs is a new award [for] the top self-published fiction and poetry ebooks by African American authors born in the United States,

with the winners receiving $500, formal recognition at the BCALA Literary Awards, and a

BCALA Literary Award Seal to use on their books." (Verma, 19). This announcement goes on to

state that the "2016 award will honor [sic] Cynthia Hurd, an American library manager who was

murdered in the AME Church shootings in Charleston, SC". Further, "Kelvin Watson, current

BCALA president, welcomes the initiative, too, particularly noting its importance in meeting the

goals outlined by the We Need Diverse Books (WNDB) initiative, which include getting more

books into readers' hands that represent a change from what's currently widely available, such as

small press books and works by authors of color" (19). The Twitter handle is

#weneediversebooks.

       This is the very initiative that inspires me, in my own work here. What matters, I

believe, is that we celebrate the proliferation of texts by diverse authors who are in the business

of rehabilitating that "universe of books" which up to now, has never been published.

CHAPTER 4

Designing the ebook

In developing this chapter, I hold before me an idea of what I imagine a book to be, drawing

from my research thus far described. In beginning a chapter on design, I also ponder some

intangibles. These qualities might be illustrated in the words of Gregory Maguire, a reviewer for

the New York Times Book Review magazine, "Stories change shape as one reads them.

Understandings are loaded in, revised, discarded. Then when the book is closed, a kind of spirit

image remains in the mind, a revenant. Sometimes a reader knows that a lasting connection has

been made only by the intensity of the effect, the memory and aftershock, after the book is back

on the shelf." (Maguire, 2016:2)

      Design's purpose is, amongst other things, to best support the function of this imagined

book. Where ebooks and print books diverge in material characteristics – so must each design

follow, to the extent that the format dictates (see also Glossary: Appendix A for 'design').

Implementation of this design philosophy should serve to provide a cohesive usability protocol.

At best, the sensibilities, training and mission of the designer is aligned to those of an optimal

book.

On the Shoulders of Giants, but without the Fanfare

It is perhaps useful here, to briefly look at a core foundation of design theory, which provenance

belongs in the Western design canon. Modern book design harkens to the teachings of the Bauhaus, one of whose students and instructors, Jan Tschichold went on to standardize designs for Penguin House. The philosophy of "form follows function" (a phrase coined by American architect Louis Sullivan in his article *The Tall Office Building Artistically Considered* published in 1896) pointed artists and designers in a direction of responding to functional aspects of an object or two-dimensional visual field, using a formal language consisting of "repeated geometric components" as "re-combinable modular elements" to develop dynamic, asymmetric and abstract representations (Bergdoll, 202, 18). The concept was to simplify both the surface qualities of a discrete object or field and to encapsulate comprehensibility (hence functionality). In order to set in motion this rationale, the Bauhaus teachers set about teaching students to "unlearn" their assumptions, and work with empirical "experience not knowledge" (17). For example, Herbert Bayer designed a new typeface which "sought a letter stripped of national signifiers, a truly international alphabet [the principle typeface in use at the time in Germany being 'Fraktur', a contemporary Blackletter (Gothic) face]" (22). However, the dictum "form follows function" has become over time, associated with an inflexible, ultra-modernist, formal language. A Google search on the Web inserting the phrase brought up many essays and commentaries voicing contrarian views on this paradigm. To build on my description here, I sample a small segment of this discussion:

> "As the modernist designer's claims to authority increased, the user's status became more and more precarious. Direct references to users, or clients, when they appear in the functionalist texts, are almost invariably of an edifying bent, suggesting that the modernist architect is in possession of authority to decide what is best for them, both in the functional and in the aesthetic sense" (Jiri, web).

Similarly, on another site, that of architect, Jan Michl:

"the same three words, historically instrumental in fostering a formalist vision of the allegedly 'pre-ordained' and 'historically necessary' modern forms, are employed today to resist the very formalism the three words introduced, encouraged, and defended. That only further compounds, rather than dispels, the confusion around the meaning of the phrase.

I suggest therefore that it would be a great service to the design community to avoid the three F-words altogether" (Michl, web)

And, in a similar vein:

"'Form follows function' was the war cry of people who wanted to build big boxes and boring typefaces […] around 1970 the International Style, as it was called (this being code for Big Boring Boxes), was predicted to last for a thousand years. Just like the Third Reich […] You can't justify your design for a building or anything else with the phrase 'form follows function' unless you have a situation where something has only one function. Nothing in this universe has only one […] on it goes, function after function, and each one gives you different answers" (Price, web).

These discussions support the development of a multi-dimensional, sensitive approach to design for ebooks, especially as regards meeting accessibility standards. One commenter spoke about adopting a 'success criteria' concept, as opposed to that of 'form-follows-function' – build to the best use case for the user/s of the object (Bradley, web). This might be best summed up by the comment of another contributor on the Web: "What we face in the consumer age is not the destruction of 'function' as the foundation for good design but rather a re-definition of what function is or can be" (Dickson, web).

We may be hoping to 'experience' the full power and promise of the ebook as a designed object in concert with a re-awakened, understanding of flexible design in the New Age. We will soon find, however, that what we had thought was workable, is, after all, not quite there. Designing the ebook may be frustrated by a host of issues. There are inevitably surprises, of the unanticipated kind. The technologies are new, an understanding of them nascent and both

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hardware and software support for the expanding specification, still incomplete. The work of learning how this technology best serves producer and consumer is still in its infancy.

In this way, the examination that follows will, occasionally, present as conditional. Nevertheless, it is useful to articulate here, functions and affordances that an ebook may currently or, at some point down the road, contain.

What is reading?

In 1948 scientist C.E. Shannon produced a paper in which he stated that the fundamental problem of communication was faithfully reproducing at one point, a message emitted at another point (1948:1). While this understanding served the development of information technologies, by consolidating, integrating and rationalizing information systems to work better inside of the human-machine interface, the model does not specifically address how the sent signal is processed by the reader.

Reading, as Maryanne Wolf will tell you, is a complicated process. She describes a reading experiment thus:

> "you engaged an array of mental or cognitive processes: attention; memory; and visual, auditory, and linguistic processes. Promptly, your brain's attentional and executive systems began to plan how to read […] and understand it. Next, your visual system raced into action, swooping quickly across the page, forwarding its gleaning about letter shapes, word forms, and common phrases to linguistic systems awaiting the information. These systems rapidly connected subtly differentiated visual symbols with essential information about the sounds contained in words. Without a single moment of conscious awareness, you applied highly automatic rules about the sounds of letters in the English writing system, and used a great many linguistic processes to do so. This is the essence of what is called the alphabetic principle, and it depends on your brain's uncanny ability to learn to connect and integrate at rapid-fire speeds what it sees and what it hears to what it knows." (Wolf, 8)

Given that we, as readers, have developed these sets of skills primarily in a print world, how are they used in digital environment and how, possibly, are they compromised?

How we read text is a function of the nature of the text as much as it might be an idiosyncrasy of reading style. "Traditionally, readers have almost always encountered text in the context of a document: an object with borders, with a declared aim, with a defined authorship, and within a recognized genre – with all the conventions, rules, authority, and audience expectations that are implied by that. Text (language string) has usually been situated in a text (document)" (Waller, 236). Different situations inflect different reading styles. As Waller points out: reading a novel – reading from beginning to end with little variation in pace – is a condition well-suited to the ebook. Less conducive is the style that requires problem solving or a "responsive reading […] and active engagement with the arguments in the text, with frequent changes in pace, pauses, and rereading" (239). This is a kind of reading that appears within an academic environment: "[s]tudents often mark up texts, seek out and assess references, multitask while reading, and generally do more than just read the words on the page or screen […] work [that] involves a variety of navigation techniques, such as cross-referencing information within a text and across multiple texts" (238). To simplify the argument, Waller states that when "we read a novel we engage in a style of reading that is […] 'receptive', 'linear', or 'close' reading, [while the activity of studying] in contrast, is an example of […] selective or strategic reading" (238). Waller states that this second form of reading is at the heart of document literacy, which he also calls "functional literacy" (241). This is important information to bring forward when considering the potential of an ebook in terms of its overall design function. While the goal of the above-defined functional literacy environment within an ebook framework does not currently exist, there is no reason to believe that it is unattainable.

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The issue of functional literacy is complicated when a producer faces the issue of what can be understood as "situational literacies". As Waller explains,

> "literacy only has meaning within its particular context of social practice and does not transfer unproblematically across contexts; there are different literacy practices in different domains of social life, such as education, religion, workplaces, public services, families, community activities; they change over time and these different literacies are supported and shaped by the different institutions and social relationships. [Situational] literacy describes our understanding, either as creators or users of communication channels, of how a particular communication is shaped by its […] context" (247).

In what way does design succeed or fail in the digital environment? Design of ebooks will fall short of connecting with a reader's situational literacy if it fails to develop a set of functions as comprehensive as – or even, in certain cases, exceeding – those inherent in print production. Peter Meyers' comparative analysis of this issue highlights the problem and points to a rationale for dealing with it. Designing the ebook for the reader needs to develop as an autonomous process, keeping the print-reader-habituated-mind in mind. Meyers states, "[are] printed books […] better than ebook editions? No. It's a lesson in the limits of replica designs. Arrangements composed for a print book lose much of their value when copied onto an electronic device" (35). Rather than produce a replica of the print book, the designer needs to consider the particular characteristics of the digital environment and accommodate a design to both the constraints and the enhanced capabilities of that space.

Where both reading styles and objectives are multi-forked, so ebook design should ultimately find a place in these different spaces. As Waller explains:

> "Conceptual thinking is about manipulating ideas. For example, with paper documents we might:
> - Focus on an idea, integrating representations of it from different sources – for example, a set of different documents, viewed together, open at relevant pages.
> - Compare more than one document, point for point. People often do this by annotating documents or transcribing concepts into tables or diagrams.

- Park an idea, so that it is in view but not in play, to remember the fact of its existence. People typically write notes for this, or leave books open on a desk.
- Connect a number of concepts, from inside and outside of the document to […] documents in piles, use color-coded bookmarks, or make lists and sketch diagrams.
- Prioritize among a set of possible directions for our thinking. People may transcribe ideas into numbered lists, or sort documents into piles.
- Annotate a text element, to capture a thought before it escapes." (244-5)

These kinds of user tasks are either well beyond the current capabilities of ebook reader system softwares or delivered poorly – and ebook designers are constrained to work within the space allocated by these different reader system applications.

As the EPUB3 specification continues to develop, a discussion that relates to some of these reading/working functions will hopefully find an airing. Like the design of the web, EPUB continues to evolve (EPUB3.1 is slated for release in October 2016 and represents a radical change from the current EPUB3.0.1 specification). Given the reality, there are still many ways that design can improve the reader's experience of the ebook.

One of the problems that takes some getting used to is the idea that the ebook canvas is essentially limitless. While a reader system software such as iBooks® will impose a book-like page framework, with margins, page numbers and illustration insets—this is an illusion. In a print book, the design functions as an active region arranged in a dynamic relationship with the edges and aspect ratio of the page. Typographer and book designer, Jan Tschichold's declaration that "white space is to be regarded as an active element, not a passive background" loses meaning in the digital book, as that same white space would present as a failure of the page to load properly (web). Since fixed page edges cannot be replicated within an indeterminately-proportioned screen environment, such design rationales will not work. Instead of building with the concept of concrete edges, the ebook designer works with flows. The reader's eye is directed

progressively (and may even scroll) through a text in a way that is reflective of the content. Typographic and other graphic cues – such as font-size changes, borders, graphics – provide a semantic arrangement (see sample EPUB accompanying this thesis).

Remembering that readers can elect to consume a publication by selecting from a choice of reader system fonts, designers may elect not to embed a font family within the publication. This is one of the aspects in which both designers and readers will learn to accommodate to the new ebook reading environment in a way that, to paraphrase Maryanne Wolf, we are best able to become "what we read" (Wolf, 5).

Unpacking ebook design criteria

The work of this chapter is to pull together and untangle the various entities that contribute to the ebook design. This is the interdisciplinary approach to design in the digital realm. Waller calls for a need to "evolve a common basis for a digital literacy – an agreed set of tools and techniques that enable us to study, understand, and retrace our steps through information, as well as to find it and connect it (both of which the digital age does supremely well)" (Waller, 244). The need to establish a functional reading toolbox increases exponentially every day. In 2010, Pew Research Centre reported "that hardly anyone in the US had an e-reader or tablet. Now half of the population does. The proportion of the US population who has read an ebook in the past year increased from 17 % in 2011 to 28 % just 3 years later" (Danet, 276). As was noted in Chapter 1 of this thesis, a study group report at the Tech Forum 2016 conference showed an astounding cell-phone adoption amongst millennials of 98%, with a significant percentage using this tool for reading books (Genner, web). The work that is ongoing at the IDPF to build a usable book protocol with the EPUB specification (see Glossary: Appendix A), using current Web languages,

cannot be resolved too soon. Paul LaFarge, quoting Maryanne Wolf notes: "The reading brain

circuit reflects the affordances of what it reads […] It's not a question of making peace. We have

to be discerning, vigilant, developmentally savvy […] We have to enjoy ourselves. If we can do

that, digital reading will expand the already vast interior space of our humanity" (LaFarge, web).

Waller calls for a "graphic literacy as a component of functional literacy" to be incorporated into

the ebook realm such that anyone along the development chain has some kind of inherent

understanding of what will work in the total graphic presentation of a publication (Waller, 236).

Expanding on this, he states: "the way in which we frame our thoughts for the communication

and preservation of knowledge has a profound effect on how we think" (237). Where the print

publication over many years, put into place a set of principles that helped in the delivery of

information to the reader, these same ideas are important guides to reconfiguring texts for the

ebook. In Appendix D of this thesis are tables which record the qualitative tests I conducted on e-

reader systems for selected usability and accessibility affordances that I consider important

criteria for ebook functionality.

Analogue Affordances and the Digital Assignment

As a presenter at the recent ebookcraft conference in Toronto declared, "Let's face it, when it

comes to ebooks there's only Apple iBooks!" (Kleinfeld, conference). This elicited a groan from

the audience (and, it must be added, a rebuttal by a Kobo® representative who claimed much of

the same capability exists in their readers and OS extensions). But the remark was instructive in

the context of this research because, in an effort to establish a lead position, the iBooks app has

included a number of usability protocols that are either non-existent or poorly implemented in

other apps or browser extensions (see Appendix D). These protocols must continue to be

expanded and developed to increase ebook usability in ways that correspond more consistently with the affordances of print books, as described above. Using Waller's concept of "functional literacy" as a bearing, how do iBooks assist or confuse the reader? (Waller, 241). As I demonstrate both in the thesis Chapter 5 'Designing the ebook as EPUB3 format: Applied Method' – a case study of building an EPUB3 – and in my qualitative tests (Appendix D), iBooks, as a proprietary reading system, does not conform to IDPF EPUB3 standards in all cases and has added its own discrete interpretations of the standard (as, for example, in the use of pop-ups for footnotes), which make it more difficult to create a universal document which works similarly across all platforms and reading systems.

I have myself, created two EPUB3s to accommodate this issue – one, for iBooks and one for Chrome Readium, with smaller adjustments in markup. In terms of my tests, it is important to note here that results of user tests are limited: I am the only user; I work with an Apple Mac operating system (OS 10.10.5, also known as Yosemite). The test object is my own EPUB book which I test on my system using iBooks app (on iPad mini and desktop) and two browser extensions – Readium® on Google Chrome and ePub extension on Firefox. I have some feedback on usability from my co-supervisory thesis advisors, who are viewing the book in their own systems. I built a test EPUB3-compliant book to test in these environments for various design and user adaptations, including general CSS support, font delivery, superscript and subscript, footnotes, the ability to copy text for purposes of research, note-taking (marginalia), multi-media which included audio and video and accessibility supports. I did not test, nor try to deliver MathML, complex interactivity or SMIL functionality; these were beyond my time frame and system capabilities.

Whereas many of these adaptations are currently only available in iBooks, there continue to be problems. Some of these problems have to do with the lack of choice for designers in designing for iBooks. This lack of choice runs the gamut from merely irritating (there may be workarounds) to egregious – it can affect not only aesthetics but also readability and usability. I contend that design for the ebook realm must incorporate a comprehension on the part of the designer of both the spheres of code (XML, XHTML and CSS principally) and the sphere of presentation (graphic design within the ebook using the same markup languages). In this, I am not in disagreement with many designers currently working in the field. A Twitter *#eprdctn* group is a frequent meeting place for discussions, albeit concise, on these issues. There are also GitHub repositories, such as the one begun by Derrick Schultz that he calls *99 problems* that explores current inconsistencies in ebook delivery systems. In addition, epubtest.org (a service of the IDPF) provides various test results for reader systems, to check where supports for particular reading systems exist. It is not an easy list to parse, as it applies percentages to tests, which is somewhat ambiguous.

Optimal design choices are not currently available to designers working for ebook deliveries. Most designers are working essentially in a 'front-end' (see 'Appendix A: Glossary') work-flow; they are unlikely to break or re-configure the programming language of a reader system. Early Internet web technologies hamstrung designers in similar ways, forcing non-semantic hacks, such as the complex and difficult to maintain HTML table layouts of the 1990s, to display pages[4]. But non-semantic mark-up is an unacceptable choice today, as it does not

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[4] For truly comprehensive discussion on 'semantic markup', see Eric Meyer's blog post entitled, 'Markup Missive' posted 23 Aug 2004, as well as the extensive chat that fine-tunes the issue. http://meyerweb.com/eric/thoughts/2004/08/23/markup-missive/

conform to accessibility protocols. In an email discussion that I held with Matt Garrish, who is the authority on accessible EPUB delivery, I was assured that to mark-up a text semantically was the best future-proofing method for EPUB3-compliant ebook delivery. With the many minds converging on the problems at hand, things for the designer as well as the reader will no doubt improve over time. As I discussed with another attendee at the recent 'Digital Book World Conference' in New York, a lot of program hand-shaking must transpire in order for the EPUB to work inside of the Web 2.0 ideal. I return to some of these considerations in my last chapter.

Lessons from the Open Web

Given that these problems exist, how must designers proceed? A feature of the Open Source ecosystem is the individual who engages with a peer-group discussion, similar to that described by Eric Raymond in his book *The Cathedral and the Bazaar*. As Raymond explains, there are different roles within the hacker kingdom, the least assertive being the: "'need-driven consumer' [who] is using the product solely because it fulfills a need or goal […] uninterested or incapable of locating code responsible for defective behavior [sic]" right through to the "'The core developer', [a] participant who is actively supporting and advancing the product […] willing to work on development because it is necessary, even if it is hard, unpleasant, and/or has little personal utility […] helping new users, etc." (Cavalier III, web) The major message here is: there is no set work-flow or pattern. There are processes (as will be demonstrated in Chapter 5) that are to some degree, optimal but inevitably, there will be a lot of 'Google searches' for alternatives and answers. The prime resource is the community of ebook developers, whose shared experience percolates down through various channels (some highlighted above), adding to the individual developer's expertise.

While a knowledge of the book as a package of affordances inculcates both the user-cum-reader and the reading system developers in a mutual exchange, the publisher-cum-designer, as in the case of a self-publishing entity, operates, at present, as go-between on the frontier. Everyone interested in the development of the ebook should be involved in the discussion and some voices on the net are making the point. At present, large publishers, the WC3, and the IDPF (whose membership is a group of publisher-stakeholders with funds to pay the large membership fee) are the only official affiliates. Designers, by and large, who generally work on contract, are side-lined. This is the reason that accessibility design in ebooks is often considered an optional add-on, despite the advances in software support to date.

Put simply, this means that while many useful capabilities exist, others are currently not available (as demonstrated in Appendix D of this thesis). As I have noted previously, designing for the EPUB is not a fixed set of conditions. Given all of this, I will proceed to discuss specific aspects around EPUB design that I feel are important elements to the overall impact of this technology as it relates to an apprehension of the book and its use as a cultural object. The discussion that follows will include not only practical, applied tactics but also rationales for coming to an understanding of working inside of the digital. It should also be understood that the design strategies that a sole designer-publisher might deploy will not necessarily be the same as those inside a larger industry model. There are, in fact, many solutions out there: some, in-house and specific to a particular publisher and others, out-sourced independently. In some cases, what I discuss is essentially very general and optional and in others, reflects specific recommendations of the IDPF and the WC3.

It follows though, that no matter what strategies are used to support the usability and readability of a book, its design will preferably remain 'invisible' to the reader. Before I move

into this more specialized design segment, however, I want to take a step back and reflect more generally on our relationship to the digital reading universe itself.

Cultural Theory and Reading the Digital

In his book, *Information, Please!* Mark Poster makes an extensive survey of cultural theory as it relates to the self and culture, arguing for the need to consider "the implications of the new media" (15). His larger goal is in "the cultural significance of the migration of information from humans to machines, the change in the nature of information and the way it mediates relationships and creates bonds between humans and machines" (4). He recognizes that, "[c]ulture can […] no longer be understood as separate from technology" (20).

While many people acknowledge a "multi-" prefix to our cultural world, Poster claims that "the degree of autonomy of each culture is significantly reduced as a consequence of the global information network, and at the same time, the task of constructing a planetary culture is posed […] local becomes relative, and the global becomes universal [a state which] will be differential [and] consist of heterogeneous glocal fragments" (20). Along with this reality is the possibility that "postcoloniality is now folding into globalizing movements and trends" posing a problem for how postcolonial theory can critique a set of concerns that "subsist under the sign of globalization" (27).

Poster interrogates cultural theorists such as Homi Bhabha and Frantz Fanon to understand the relationship between their theories and the realities of digital communications. He states,

> "postcolonial theory of the 1980s presumes a proximate relation of colonizer and colonized that obscures the transculture of new media, communications that inscribe types of hybridity in electronic spaces very different from that envisaged by Bhabha and

other theorists […] networked computer 'conjures forth an identity no longer split between First and Third World, between metropole and native home, but rather, a body so fragmented that its morphology is a diaspora' [qt. Emily Apter]" (31).

These considerations are important because the machine communication systems belong to an already existing set of affordances that inform both ebook delivery and apperception. Poster comments that, "[i]n their content, cultural objects, flowing within the newer media, increasingly cross national, linguistic, geographic and cultural boundaries" (35). Poster evaluates these changes in our information world thus: "[i]n the media unconscious, the tool of the information machine insinuates itself within the processes of culture, reconfiguring what had been the subject and the object into a new construct that I will call the humachine" (36). He then further extends the metaphor, "[i]ndividuals are 'relays' […] nodes in a network", becoming, essentially more like a "broadcaster than like an individual speaker at a meeting" (41). In order to characterize the whole, he elaborates, "discursive subject positions today are contingency and paradox, heterogeneity and multiplicity, the frank recognition that we are within something that is huge and perplexing, something that engulfs all cultures and standpoints, providing perches of epistemological privilege to no one" (48).

To come to an understanding of the phenomenon of human integrated with machine is also to begin to formulate a set of rights and obligations such that the "conditions of globalization […] include [a political configuration of] the coupling of human and machine. New democratizing principles must take into account the cultural construction of the human-machine interface […]. What is required […] is a doctrine of the rights of human-machine interface" (72). Poster names a citizen constituted in cyberspace, a "netizen" and ascribes to her/him a number of

unique characteristics: a member of a decentralized, deterritorialized space, part of a collective intelligence, difficult if not impossible to control by the nation-state (78, 84).

Poster's analysis of McLuhan's media theories are useful here. McLuhan saw media as "extensions of man" – books as memory devices, radio as amplified voices across space, film and TV extending eyes' reach throughout the globe. As Poster describes it, media "was thus anthropomorphized […] theorized as human senses and little more" (123). Given this, "the Internet would be understood […] as extensions of the nervous system and the brain combined" (123). Poster concludes that, despite "the extraordinary prescience of his understanding of media, McLuhan cannot be our guide in questioning the relation of aesthetics to politics in the era of networked computing" (123).

Meanings for cultural objects change over time. In much of the work of this writing I have allocated a space to a range of actors but as Poster acknowledges, this is not the true picture of past cultural exchanges. He says, "only some individuals are designated as free or self-narrating. The following groups at different times in the modern era and in different nations were disqualified from the position of narrator: the poor, the insane, women, children, nonwhites, non heterosexuals, and others" (129). If I were to add to the list, I think I might include, as Chief Oren Lyons, Oneida, in an address to the Non-Governmental Organizations of the United Nations, Geneva, Switzerland, 1977 did, "[a metaphorical] seat for the Eagles" (Chief, web). Even as McLuhan sees media as message, Poster speculates whether, "the medium in which the narrative appears affect[s] the nature of the narrative?" To eschew the traces of ineffectual cultural inscriptions, is to seek newer narrative(s) and structures that propose alternatives. Poster offers this scene: "[i]n Herculean struggle with herself, the free spirit experiments with 'living dangerously', risking her beliefs, deliberately placing herself amid the unfamiliar and the

strange" (Poster, 158) thereby "[unhinging] preexisting patterns of culture" (160). As a cultural object, the ebook acts as an intermediary between the stable linearity of print and the hyper-linked fragmentary nature of the Internet, taking on traces of both but re-configuring the experience within a discrete space.

Success Criteria for the EPUB: Making the Design Work

The introduction to *EPUB 3 Best Practices* states, "The EPUB format is specifically designed to be free and open […] basic text editing tools can be used to create publications" (Garrish, 2013:44). Jeffrey Zeldman, in his book *Designing With Web Standards* states, "[w]hen authored correctly (containing no errors, and no illegal tags or attributes), standards-compliant XHTML or HMTL is completely portable. It works in web browsers, screen readers, text browsers, wireless devices – you name it" (46). Zeldman qualifies this statement with his definition of "semantic markup" which is "[choosing] tags […] according to what they mean; [it is important to note that] a web page can be valid and not semantic" (46). Eric Meyer, a well-revered pundit in the area of CSS development goes further: "empathy is a core development skill […] fully imagine being a person who doesn't know how this shit works […] if you make things simpler and easier, you are helping everybody" (Meyer, 2014:film). From these texts, I have devised my own simple formula for working with ebooks: use the invisibility of design to help transform people's reading experience by giving them the information they most need in the least painful and evasive way possible.

Remember, also, that you are dealing with specific reader system design abilities that may or may not be respond to CSS in predictable ways. So, inasmuch as possible, test, test, test.

The efforts being made by the IDPF is to develop a full-supported programmatic standards scaffold for the ebook such that any manner of book, whether it be novel or educational text book can be built around that standard. Currently, this scaffold is defined using four specification documents which define: 1) the XML used in the package document (a single file containing the metadata which defines the content and bibliographic characteristics of book); 2) EPUB3 Content – defines the profiles of XHTML, SVG and CSS for use in authoring content (note: not everything recommended in the spec is currently supported across reading systems); 3) EPUB Media Overlays – how to use SMIL, so words can be highlighted as they are narrated; 4) EPUB Open Container Format (OCF) defines how to bundle resources together in a single file. The EPUB itself is a particular type of zipped folder with an '.epub' extension that organizes content files, metadata information and mimetype. On the Apple Mac a specific script is used to zip and unzip the folder. More information on the EPUB structure will be described in Chapter 5 of this thesis. The rationale of the IDPF's EPUB3 specification is that many of the current web accessibility support structures already in place can also be used with the ebook. TTS works by navigating web pages or ebooks using the semantic markup taxonomy in such a way that it can announce to the blind user, not only the content, but also its function in the document – is it a table of contents, a list of items, an image, a footnote, a link, or a chapter? In addition, another level of accessibility mark-up, called ARIA roles provides a further taxonomy for screen readers to map descriptions of content. For example, an image can be described using the HTML <… alt="[some text]"… /> attribute, but a video will need to use the <…aria-describedby="[id reference to some text]" …/> followed by a separate text description. Screen readers will normally announce the keyword 'image' or 'button' (for video) and the content of the description.

Accessibility is a primary aspect of ebook delivery. Unfortunately, today's publishing industry does not appear to pay it much heed. The Digital Book World 2016 conference (DBW) had no presentations on accessibility. It is a mark in favour of a designer's work ethic to strive to include these assets in a book. Canadian ebook designer and typographer Laura Brady did include an accessibility presentation at the ebookcraft 2016 conference (Brady, web) and stated that including this work in her design is often at her own initiative.

What this amounts to is a somewhat long list of standards, specifications and mark-up language syntaxes and obligations that a designer should have a grasp of. While it may seem daunting at first, there is a good deal of information available online and, like anything, practice builds ability. And it puts the designer in the position of providing a best-possible accessible delivery of information – design elements which proceed from a core knowledge of front-end web semantic mark-up in order to build a flow-able structure.

HCI scientist, Alan Newell, who spent many years developing systems for improving IT inclusivity says, "If we consider human beings as points in a multi-dimensional space that describes their abilities, 'disabled' people do not sit in a discrete volume in that space [...] with time constants of years (e.g., growing older), hours (becoming tired), minutes (the effects of imbibing noxious substances) and seconds (an accident) [the categorization shifts]" (Newell, 110). It is important to consider ways in which current practices have served to disenfranchise users of IT: "Digital technology has made an enormous difference in the lives of a great many people, but significant numbers of people have been excluded, or have excluded themselves, from these benefits. These include many older and disabled people and other minority groups including people from certain cultures and […] poor educational achievements. This has been called the Digital Divide" (1). Newell is a believer in narrative to demystify digital technologies

and has used it extensively to coax the uncertain learner: "I have come to the conclusion that, although data is vital, the power of the message in the data can be greatly increased by presenting a story, if possible with a personal narrative. Such stories are often denigrated as 'simply anecdotes', but a good story – particularly one with some humour and/or conflict – which effectively illustrates the message behind the data, can be a very powerful tool" (11). He also assigned a broader definition to the so-called 'ordinary' user such that the "concept was that 'ordinary' people operating in an 'extra-ordinary' environment (high workload and stress, such as flying planes and warfare), provided similar HCI challenges to those of 'extra-ordinary' (disabled) people operating in an 'ordinary' environment (e.g., word processing)" (7). Newell recommends incorporating the term "sensitive" instead of "universal" design, believing that a fully-inclusive model is not achievable in all cases, across all systems, but that a designer "should develop an empathetic relationship with [users]" (120).

A very important aspect of design in books is that of the text. Designers are trained in the development of hierarchical typographical relationships to graphically guide the eye through dense textual content in a way that is easy for the reader to navigate. More often than not, this design training is with relationship to the static printed page. While it is essential in ebooks to maintain a pseudo-relationship to the print-book-page-schema for the purposes of enabling cross-referencing, it is not essential to replicate the typographic layout of the print version of the book. In fact, it is, as I hope to show, a grievous mistake to do so.

Screen Type

Type on a screen does not act in the same way as type on a page. A screen font, especially a black font against a white screen is more arduous to read, because of the difficulty of focusing on

a small point in space that has a high contrast and a backlit field. The eye does not hold a point of

a surface in a steady gaze but travels rapidly across surfaces in movements called 'saccades'

(Manguel, 37). Where the surface is pixellated-text on a bright screen, maintaining focus must

invariably be more difficult. This is compounded when looking at a serif font with incised 'thicks

and thins' (a serif font, such as the one used in this document, carries, at the extreme ends of the

letters, embellishments (serifs) that are structured to pull the eye horizontally along a line of

type, as well as a contour (or edge) that modulates within the letter-shape to enhance lightness

and readability on the printed page). The illusion of flicker that appears with serif fonts increases

the strain. This is also a case when the font is small and the line-height (leading) tight. To present

text on screen requires a different mind(font)-set entirely. In addition, web accessibility standards

recommend a limit to small (particularly fixed unit) font-sizes – preferring the use of a

responsive font-size unit (such as ems or percentage). A number of accessibility studies have

looked at fonts on screen to measure readability and comprehension. Some of these concern

issues around dyslexia – while this is a specific condition, there are overlaps in the way in which

readers respond to screen-text. I summarize results of some of these tests here.

- "Onscreen text is commonly perceived as being inferior to printed text. This inferiority is primarily due to screen (versus print) resolution. While most monitors present text at 72–120 dpi, laser printers can achieve resolutions of 300–2400 dpi. Low screen resolution causes curved and slanted letter segments to have a coarse appearance" (Chaparro, 2011:29).
- "significant main effect of size was found for font legibility in that 14-point fonts were more legible to read than 12-point fonts. A marginal interaction was also found for reading time in that participants read 12-point serif fonts significantly slower than 14-point serif or sans serif fonts" (Bernard, 1).
- "Results show that the legibility was higher for the ClearType typefaces Consolas and Cambria as well as the non-ClearType typeface Verdana than for Times New Roman, especially for digits and symbols" (Chaparro, 2010:36)
- "may play a role in safety. In a 2002 near-accident, an air traffic controller was reported to have misread letter designations identifying aircraft destinations on his monitor and

accidentally sent an aircraft to an incorrect airspace. Other controllers cited difficulties reading numbers corresponding to aircraft altitudes" (Chaparro, 2010:46)

- "For combinations of lower-case letters, digits, and symbols, practitioners should note the following: – Use Consolas, Verdana, or Cambria for letters and digits. – Avoid the use of Corbel, Candara, Constantia (oldstyle numbers) and Times New Roman when displaying alphanumeric text" (Chaparro, 2010:49).

- "This analysis showed that Franklin Gothic and Verdana had significantly higher proportions correct and Candara, Constantia, Corbel, and Garamond had significantly lower proportions correct. (Chaparro, 2011:34)

While many dedicated ebook reading systems provide a range of fonts that can be selected according to preference by a user, it is still necessary to provide a CSS font-family rule to establish the default. Generally, my choice to is to use sans serif font for the body, while a serif font makes an excellent contrast header font (the reverse of what is generally used in print). I also start with a larger base size (this can be made even larger by the user) than might be put in a printed text. My own experience and aesthetic sensibility guide my choices for font-size, style, colour, etc. but there is a recognition that the design in a reflowable ebook is partially an arms' length exercise.

Recognizing that books contain content other than text and that the designer is also developing a work flow that uses images, whether photo or illustration, chart or decorative elements, audio or film, what options are open? One can assume generally that the reading system window is small (it may even be tiny, as in the case of a phone) and that therefore any pixel-based image should display at the same width as the body content. In iBooks, this will entail adding an additional {margin: 0; max-width: 100%} CSS rule on the <figure> tag. Apple reader systems seem have difficulty with classic CSS inheritance behaviours and I've found it necessary to repeat margin and font-family rules targeting particular elements. While this seems redundant and not very DRY (see definitions), it has been the only thing that works thus far. The

'99 Problems' GitHub repository lists issues and workarounds for difficulties a prospective designer may encounter.

Adding Film: Just because You Can?

In considering whether or not to include film in a book, a designer will find a mix of opinion out there. Peter Meyers, for example gives the idea a thumbs down:

> "So, what is to be done with video and the digital book? To begin with: a rigorous audit of any clip under consideration. Does the text truly need its support? When prose alone has difficulty conveying concepts – how to make an omelet or roll sushi – moving images make sense. That cookbooks are consulted mainly in snatches helps; readers rarely seek an immersive state. The frequent shift between presentation styles – body text for introduction and background, bullet list for ingredients, numbered steps for cooking instructions – mirrors the frequent switch between mental modes, between review and action. Video feels right at home in this type of cognitively diverse environment. The same can't be said for long-form narrative." (71)

But, there is a flip-side argument. In my view, a film inserted into a textual narrative offers a 'pseudo-paragraph' inside the text. In the years that I have studied and worked with film, I have come to see it as another text, with its own syntactic narrative code. Bruce Kawin states that as "a medium of presentation and communication occurring in time, film is not less a 'language' (or system of signification) than literature" (Kawin, 5). Kawin speaks of the link between the film as "haunted by the eloquence of the novel […] continually return[ing] to the voice of the story-teller […] not because the imagery is unable to sustain interest or clarity, but because the film aspires, among other things, to some kinship with literature" (6). In addition, according to Kawin, "sound has become integral to the presentational field. Sound is […] a highly expressive aspect of the filmed world" (19).

In my proposal for this thesis, I turned my attention to text and the book and away from the practice of visual art because I became fascinated with the ability for the mind to generate its own imagery while participating in a story (to 'see' with the mind's eye). I also realized that the opportunity to present content that activated a full spectrum of senses – visual, hearing and text would offer me a robust challenge to render these fields of presentation into accessible formats. If the effort proved successful, it promised a single-format, accessible cultural object, in which a potentially larger group of individuals could participate and thereby experience it in community. Thus, I have not hesitated in including film in my sample book (my research creation project) that accompanies this thesis. Kawin writes about the camera eye and its ability to operate as a subjective voice for the author in several ways: "subjective camera (share my eyes); point of view (share my perspective, my emphases); mindscreen (share my mind's eye); self-consciousness (share my reflexive perspective) – [all of these can be expressed directly or indirectly, for example, with montage]" (190).

One thing that must invariably be considered with the parenthetical film within text, is that it has to be a short film. File-size increases with the film length and an ebook reading system restricts the publishing size of an ebook file (although different maximum file sizes exist for different systems).

DRM: don't touch that dial

The last section of my chapter on design takes a cursory look at the subject of Digital Rights Management (DRM) – or, as Richard Stallman calls it, "Digital Restrictions Management" (Stallman, web). There are hundreds of voices discussing this thorny issue as I write, and I am not going to make more than a brief (yet still, I venture to suggest, necessary) overview on the

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subject. The IDPF remains neutral: "EPUB is deliberately agnostic as to the issue of DRM" (Garrish, 2013:79).

Poster states, "[d]igital cultural objects do not fall under the laws of scarcity and the market because they require almost no cost to produce, copy and distribute, and like ideas they do not diminish when given away […] digital cultural objects *resist* market mechanisms" (Poster, 195). The law of digital copyright falls under the Digital Millennium Copyright Act (DMCA) and appears to be manifestly incapable of properly understanding the vicissitudes of peer-to-peer networking. The consequences for transgression are so far out of proportion to the activity as to become, for many, a clarion call to resist. Poster states, "[t]he system of copyright law is so far out of whack [it forces the conclusion] that, with regard to intellectual property, the legal structure no longer provides a semblance of justice"; and further, quoting Kembrew McLeod, "[i]ntellectual property law reinforces a condition whereby individuals and corporations with greater access to capital can maintain and increase unequal social relations" (198). Hence, he goes on to declare, "all citizens have an obligation to violate copyright law whenever they can. Since the legislative branch of the U.S. government is under the sway of the media industry, the only alternative available to foster democracy and promote creativity in the realm of culture is Henry David Thoreau's practice of civil disobedience" (198). It is apposite to consider that, for the United States, an influential signatory of the DMCA, "cultural objects are second only to defense [sic] in export value" (208).

Science fiction writer and computer programmer, Cory Doctorow has written an entire book on the subject of DRM and its widest implications. He states: "[i]ndustries that make widespread use of digital locks see market power shifting from creators and investors to

intermediaries. They don't reduce piracy. And customers who run into frustrations with digital

locks are given an incentive to learn how to rip off the whole supply chain" (Doctorow, 33).

A friend of Doctorow's and fellow activist, Aaron Swartz, under arrest and threatened

with 35 years imprisonment due to breach of copyright law (considered a felony in the U.S.),

took his own life in 2013 at age 26, to evade further prosecution[5]. His was an important voice in

the discourse. In a film that was made posthumously about his work, a colleague said of Swartz:

"Aaron wanted to have public access to the public domain [which] was the thing that got him

into so much trouble […] the public domain [is being] locked up […] it's like having a national

park but with a moat around it, and gun turrets" (Knappenberger, film).

In his *Guerilla Open Access Manifesto*, written when he was seventeen, Aaron declared:

"Information is power. But like all power, there are those who want to keep it for themselves.

The world's entire scientific and cultural heritage, published over centuries in books and

journals, is increasingly being digitized and locked up by a handful of private corporations […]

There is no justice in following unjust laws. It's time to come into the light and, in the grand

tradition of civil disobedience, declare our opposition to this private theft of public culture"

(Swartz, 2008).

While I am very much in sympathy with the publishing industry's need to have their

businesses thrive and produce, to have their initial investments duly compensated – the model

that is currently in place is unfit for business. A law which provides such severe legal recourse

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[5] Aaron Swartz was prosecuted under the U.S. copyright legislation (which carries a possible 35-year-minimum incarceration penalty), for illegally downloading documents from JSTOR to protest their paywalls. For more information about this story read 'The Guardian' February 2015 article *Aaron Swartz stood up for freedom and fairness – and was hounded to his death.* https://www.theguardian.com/commentisfree/2015/feb/07/aaron-swartz-suicide-internets-own-boy

and threatens users, without allowing for a reasonable defence, that locks-in cultural commodities almost indefinitely – needs serious re-invention. The question, here, is who will be invited to take part in these much-needed revisions? A content creator, caught in the struggle between the rights of the commons and the needs of the corporation, which is what is currently being played out, will have to make up his/her mind how to proceed. But, as Doctorow has pointed out, "if you are a creator who never got the time of day from one of the great imperial powers, this is your time. Where once you had no means of reaching an audience without the assistance of the industry-dominating mega companies, now you have hundreds of ways to do it without them" (44).

While it is true that monetary compensation is not as easy to obtain in an expanding space of voices – self-publishers will need to work as hard at marketing themselves as they did at creating content – the need to share a cultural object with the world seems to be part of today's digital covenant. It is a way to add to and alter the socio-political dynamics of the global human corpus.

Alberto Manguel writes, "the role of the reader is to render visible […] that which writing suggests in hints and shadows" (39). My thesis has explored ways in which writers, whose work more often prevails in shadows, may move more affirmatively, toward light.

CHAPTER 5

Case Study: Using the EPUB3 format to design
The Honeyed Tale: An Interrogative Poetic on Bees

Throughout my thesis discussion, I have been advancing a 'soup to nuts' perspective of a

digital writing project – the creation of a story that culminates in a complete and viable ebook

publication. My purpose has been to explore this concept through the lens of design, using the

term 'design' in a comprehensive sense: the design of a storyline, the design of the content, the

design of the book – with, where applicable, the incorporation of established practices and

industry standards for print and ebook publication. In Chapter 4, I wrote extensively on ebook

design as separate from that of books in print, yet nevertheless maintaining an affiliation to its

parent, so as to be recognizable as a book by a user. I have come to realize that, in its broadest

sense, design is a term that can embrace not only a relationship to a project but, philosophically,

a position of the self in the world. Design is both a noun (from which concepts and theories may

emanate) and a verb (from which applied experimentation and conclusions may derive). Given

this, a designer may operate along a continuum of design-mastery, from the generalist who

tackles every aspect of a complex project, to the specialist, who contributes to a larger

production workflow by concentrating on a single aspect of production. Wherever a designer

may find him/herself along this continuum, properly belongs to the practice of design. This

designer is never in stasis and learning is a prerequisite of the work. Fortunately, the open web offers a myriad of resources with which to develop a particular development tool kit.

This chapter offers a structured breakdown of the development of a single ebook project, starting with a sequential workflow section, Part A: 'stages' and following with a section Part B: 'Practical Considerations'.

A. Stage 1: Design Overall Strategy

I spent several months gathering content information which would be synthesized into the narrative of the story, *The Honeyed Tale: An Interrogative Poetic on Bees*. Being intimate with the subject matter of the book proved an advantage when it came to developing a design strategy. At the 2016 eBookCraft conference, type designer, Charles Nix stressed the need for a book designer to have a familiarity with the book content – to have read the book – prior to working with design and fonts (Nix, web). I might have organized the material that I collected over the past two years, in any number of ways. I realized, however, as I contemplated the topic, that a natural structural theme presented itself. While the subject of the book – the bee – is most visibly active in the Spring and Summer, the discussion of its fate at our hands is a year-round concern. In this way, I decided to develop chapters that followed the four seasons of the year, underlining the importance of the bee through time. Having established a theme and a structure for the narrative, my task was to work into the material a directional flow that would best enable a reader's understanding, interest and engagement with the narrative – one that suited the subject, its tone and message.

I decided to include in the book illustrative decorative elements that would serve as content separators. I also wanted to try working with SVG format, which is one of the core

formats for EPUB3 and has a number of advantages – not the least of which being, its' incredibly compact file size. Since the digital 'weight' of an EPUB is a consideration and other included file types made much larger size demands, this was an incentive. In addition, I developed a short film, as well as an audio file, which are included parenthetically. This type of content is also part of the EPUB3 spec. As stated by the authors of *EPUB3 Best Practices*, "One of the primary drivers of the EPUB 3 revision was the publishing community's desire to natively include audio and video content in publications, a key ingredient in breaking EPUB out of the static confines of the printed page." (Garrish, 2013:EPUB-289)

To best inform myself about the technical aspects of working with EPUB3, I read and took notes from, the book *EPUB3 Best Practices*. I also did the work of brushing up on HTML5, CSS3 and getting re-acquainted with Adobe Illustrator® in order to make several SVG images and a diagram. I continue to regularly follow discussions at the twitter EPUB address *#eprdctn*. I also worked through Anne Marie Concepcion's video training module that covers the export from InDesign® to EPUB on Lynda.com®. This module is useful in apprising a student of the many ways in which InDesign® is complicated in its export of a valid EPUB3 package. The training was useful, by pointing to scripts that are essential for working with EPUB, as well as explaining the logic and function of InDesign, which can be mystifying. Scripts are required to zip and unzip EPUB files when working on them in a Mac OS environment (see Appendix B: Resources). The IDPF also maintains a GitHub repository that helps a creator become familiar with issues arising from the latest implementation of EPUB3 specifications in browsers and reading systems. A valuable section of this repository is the selection of downloadable EPUB3 sample books, which include a test publication to use with reading systems. These are useful for comparison purposes, when working on validation of our own publications.

A. Stage 2: Applications and Workflows

As previously stated, every designer adopts a process that is unique to his/herself. My previous work in print and web design has familiarized me with the intricacies of Adobe software used for illustration and image processing (Illustrator®, Photoshop®), page layout (InDesign®), and web design (Dreamweaver®). These were tools that I used to create and process vector-based and continuous-tone still images, as well as markup texts (as per IDPF EPUB3 specifications) as part of my workflow. In addition, I used the film editing software, Apple's Final Cut Pro® to edit both audio and video and Apple Compressor® to optimize and compress the final video for deployment. It should also be noted that the operating system used was Mac OS 10.10.5 (Yosemite). Earlier Mac operating systems do not include iBooks® as part of the core applications. It is still possible to test EPUBs on a tablet connected to a desktop but that is an onerous task. Versions of Firefox and Chrome have their own reading system extensions, which are ePub® and Readium®, respectively. For some of the work, I was also able to test directly using the browsers themselves. All of these reading systems cache content, so a workaround is necessary to repeatedly test EPUB design changes (described below)–what one expert termed the 'rinse-review-revise-repeat' cycle.

Given the sequential nature of EPUB development, the first stage is to work within the print design environment (with specific adjustments for EPUB export). Print design has a workflow that diverges from that of the EPUB but there will be times when the two mediums must be deployed with specific equivalences in the dissemination of a text. Accessibility in educational texts, for example, calls on ebooks to mirror their print book counterparts, for the purposes of group access. Take for example, this IDPF forum comment: "[o]ne of the primary

reasons for including page breaks is accessibility […] so that non-visual readers can quickly access the corresponding print page location as their sighted peers (e.g., for classroom use)" (IDPF forum, web). A page in a printed book however, translates only nominally to a 'page' in an ebook. Since tablets/phones come in all sizes and aspect ratios (see B Section titled, 'Page Size and Aspect Ratio' below), the 'page' is a loose concept. In the printed version of a text, the edges of the page are locked. The choice of an ebook page size, when beginning work in InDesign, is, however, not definitive but more of a guideline. So, the initial decision in preparing a design is determining the deployment medium of the book. In this exercise, my only deployed format file was to be a reflowable EPUB package, which would be styled ultimately using XHTML5 and CSS. I did prepare, additionally, a PDF to give to the team contributors for editing and review.

A. Stage 3: Preparation of InDesign Document for Export to EPUB

I will describe some of the most important aspects of working in InDesign for export to EPUB. The first thing to note is that InDesign does not consider images as part of document flow. We must specifically assign them as such. To do this, we must anchor images, each preferably on its own line, into its own paragraph, with its own specific paragraph style. The recommendation is that the paragraph style has 1pt font-size with 'auto' leading (I think a larger point-size might work just as well, and would be easier to see in the original document). This will position images, when exported, as part of document flow and not, as is the case otherwise, extraneously at the end of the document.

The next thing to note is that our EPUB page-breaks must be specifically forced, using a paragraph style that includes a 'page-break' rule. This can be accessed through the paragraph

styles menu 'Paragraph Styles Options > Export Tagging Options' selection. In my case I used a right-aligned decorative (anchored) illustration which had its own paragraph style as my page-break style.

A similar operation is carried out for the marked-up division of each chapter. The chapter headings are assigned a unique paragraph style that is then targeted through the EPUB3 export protocol to generate the reader systems' standards-compliant defined table of contents (TOC).

These set-ups in InDesign serve as landing places within the EPUB but are only a bare skeletal structure from which to develop a serviceable book. InDesign serves as a rudimentary bridge between the print world and the ebook (XHTML) world.

On export to EPUB3, InDesign sets up each of the pages (XHTML documents) with the corresponding formatted 'doctype' and other <head> metadata. Having instantiated the TOC content generation in InDesign, a navigation document called the 'toc.xhtml' is placed in the EPUB folder that identifies (and provides links to) the XHTML documents (pages) of the book. This document generates the required standard navigation TOC in the reading system. The EPUB is powered by a 'package.otf' that manages all the assets of the publication. So, the workflow provides some hand holds for developing an EPUB[6].

Once the work of exporting from InDesign to EPUB3 is complete, it then falls to the next stage – to clean up the file of numerous export gremlins and problematic HTML tagging.

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[6] Oddly, InDesign CC 2015 adds a canonical fragment identifier (CFI) to each document filename inside the toc.XHTML whose presence caused the EPUB validation to fail when I put it through a validation rinse. I was not able to find any use for this CFI, so removed it, in order to enable validation. I could not find any sign of such an artifact on any of the IDPF sample files. There is currently discussion within IDPF to utilize CFIs as a way to navigate within the book to specific locations. Possibly, InDesign was future-proofing with this additional markup. In the end, the final EPUB did display a TOC inside the reading systems that support this feature, without the added markup.

A. Stage 4: Working Inside the EPUB

The EPUB exports to a zipped '[filename].epub' package, which is designed to work with standards-compliant reading systems. In order to access the various components of this package, this zipped folder must be cracked open (unzipped). In Mac OS X, this is achieved through a script. The one that I used is called eCanCrusher (see 'Appendix B: Resources') which both zips and unzips the package. The part of this package that contains the XHTML content for editing is the OEDPS folder. This makes up the 'working' folder with editable files. The other files that are part of an EPUB need not be touched (the folder called META-INF and the file named 'mimetype'). You can create a 'site' in Dreamweaver using this OEDPS folder as a site folder and thereby see all the pages in their logical cascade that are part of the EPUB. This will allow you to work directly with the XHTML and CSS in the code view option in Dreamweaver.

I removed almost all the paragraph and character style class names because I found them difficult to deal with – classes such as 'ParaOverride-5' or ids such as '_idContainer011', that describe nothing – and developed specific CSS styles to align with new, more worker-friendly 'class' and 'id' names. (Author's Note: the final EPUB3 package is submitted as a separate folder with this thesis and so, the styles, classes and mark-up are easily available for viewing.)

B. Practical Considerations: Page Size and Aspect Ratio

Where it came to deciding on a page size and aspect ratio inside of InDesign, I decided to develop my book using the aspect ratio and size of the iPad mini (my main testing device). These are: 1024px (Height) x 768px (Width). Other sources recommend an aspect ratio of around 1:1.5, which my dimensions approximate. Images displayed on the iPad permit a higher resolution then

websites (around 150dpi), which increases their file size. It is important to note there is a

relationship between the total pixel-width of an image and dots-per-inch (dpi). An image saved

to a smaller width than the page width will not render flush with text margin (where a CSS rule

of 'width: 100%; margin: 0;' privileges the inline IMG element and not the containing block). In

order to have images render across total content width, I saved them with a width of 1024px and

150 dpi size. For the purposes of my design, I set up a proportional crop preset in Photoshop and

cropped all my images to an aspect ratio that mirrored the 9:16 aspect ratio of the HD video, for

appearance purposes – which gave me a crop-size of 1024px x 576px x 150dpi.

However, a page size in InDesign does not correlate to a page in a reflowable EPUB. The

document (page/s) is responsive and relative to size of font and line-height and the EPUB

standards-compliant reading system's viewport. With a fully responsive ebook design, the

viewport size and aspect ratio of the device (whether computer monitor, tablet or phone screen)

which operates the reading system, does not cause the overall book appearance to break. The

document pages vary in response to the system, and are also affected by the users' choice of text-

size, as text reflows automatically into the viewport.

Knowing this, I put a CSS style max-width on the 'body' tag of 38em, to prevent the

horizontal line-width from extending too far beyond a serviceable page region on a larger screen.

This provided sufficient structure for an optimal line-length (between 50 and 75 characters per

line on a large monitor.

In terms of establishing a rational relationship between XHTML elements and InDesign

paragraph and character styles: choices are limited. It is possible to assign HTML tags to

paragraph styles but only <h1> through <h6> ('heading' levels markup) and <p> ('paragraph'

markup). InDesign makes extensive use of nested <div> ('division' markup) tags on export, as

well as <span> for character styles – neither of these are properly 'a11y' semantic and so must be re-configured in the HTML integrated development environment (IDE). I used both Dreamweaver (DW) and TextWrangler as IDE.

B. Organizing the Workspace

I would like to examine methods for organization of materials when developing to epub. The method that I came up with, which worked well, was to break down the work environment into a sequence of folders that contained various elements of the build project, organized in, for my purposes, a logical way. My upper-tier folders roughly housed: 1) *epub development files* (these included versioning – which I will discuss immediately below) 2) *epub research files* (which included samples for testing), as well as instructional books and notes 3) *epub asset files* (raw texts, video, images and audio) 4) *epub tech* (the scripts needed to zip and unzip epub, validate epub as well as notes on various tech aspects of building). Working with this top-level organization has proved effective in my own workflow. In terms of the development cycle, I also included a versioning folder, with several iterations of the development EPUB. I named one folder the 'epub-working' version folder and, when I was trying out something experimentally with this working file, saved an earlier iteration to a version folder ('Ver_1', 'Ver_2', 'Ver_3', etc).

B. Reference Chart for colour choices & HTML entities

I put together an HTML table that allowed me to see browser renders of all of my SVG images as well as test XHTML numeric character entities, so that I was able to make decisions quickly around a) changing colour values for the images and b) which numeric entity belonging to which

punctuation character. In terms of latter task, it might be useful to quote here again from Garrish: "The other notable technical change that comes with dropping DTDs [Document Type Definitions] is that the HTML named entities are no longer supported. If you're used to adding — to your XHTML content instead of the actual Unicode character or the numeric entity —, you're not going to enjoy the new world order that now requires you to choose one of those two options" (epub-148). This table is available to the reader inside the downloadable folder labelled 'Plan' (See Appendix C for download URL). Open the page called 'table_wDecoratives.html' in a browser to view.

While developing the SVG image files, I wrote down all of the colour RGB and hexadecimal values as colour keys for possible use in styling purposes in the document – to give a consistent visual feel to the whole.

B. Working with Fonts

Early on in the process, I made a decision not to embed fonts in the document. The use of external fonts requires careful consideration. There are license issues, optimizing issues and UTF-8 (see Appendix A: Glossary) character-mapping issues. Whereas most print publishing protocols (and licences) use TrueType or Postscript fonts, EPUB3 will only render OpenType or WOFF fonts. The BISG (see Glossary: Appendix A) provides a number of articles and even a whole information booklet on the subject of font delivery choices and systems. I recommend that their *Field Guide to Fixed Layout for Ebooks* is studied prior to any designer choosing to use external fonts in an EPUB development (Albanese, 2013). The decision to not use external fonts is one that makes the most sense for a self-publisher. Type foundries charge a considerable fee (variable) for epub-font licenses, which are sold on a per-publication basis. Also, of the

recommended font formats, WOFF and OTF, only OTF can be rendered in InDesign. InDesign both obfuscates and sub-samples fonts upon export and only iBooks will render the obfuscated font encryption files. This means having to substitute complete font sets for each weight and style into the document for EPUBs designed for other reading systems – a measure that font foundries have objection to. Another reason is that, according to reader system specificity, user preferences will often override a designer's CSS styles. Users can optionally select their own preferred font from those provided within any reading system. Many reading systems have a selection of fonts for users to choose from. There is a far more comprehensive explanation of the logistics of including fonts in the book, *EPUB3 Best Practices*.

Later, this decision was amended. My tests showed that relying on reading systems to supply fonts consistently across the entire book was a mistake. When I realized this, I decided to go ahead and embed fonts to correspond with my design overall, using online free fonts. The best resource that I found for this is *fontsquirrel.com*. It is difficult to use these free fonts because glyphs that you might need are not always present. My body font, called 'Alegreya Sans' did not have curly quotes. I was forced to use another font, 'Droid Serif' specifically for the quotes, using the CSS 'content:' property substituting a set of curly quotes from a serif font into the body content, where applicable. This is probably a case of a style hack for the sake of presentation.

Later, when testing my document using VoiceOver TTS, I subsequently changed my indiscriminate use of these curly quote substitutions to only instances of actual spoken quotations and not as apostrophes. This was because the TTS could not 'see' the apostrophes as such and broke up the word which had this punctuation into separate sounds.

B. Working with Visual Assets

There are several methods for including SVG images in a document. I chose to use ' as a preference. The page load time is reasonable in my tests. Once again, I refer the reader to the several online discussions around using SVG, which is extensive, and more than I can include here. I ran into a snag at a certain point with the use of an SVG optimizer (see 'Appendix B: Resources') that stripped a 'type' attribute from the <style> tag and threw an error with EPUB validation. Once I traced the source of the error (several hours!) I was able to do a rapid 'search and replace' on the offending erroneous code. I lodged an issue with the code developer on his GitHub repository, so this might be fixed by the time you read this. The advantage of working in Dreamweaver, is that it will allow searches across the entire defined 'site' – all the documents present in the EPUB folder – an invaluable feature. However, Dreamweaver (DW) is an IDE for HTML-based documents and has issues with XML. EPUBs need XHTML and I ran into a snag where DW would 'auto-correct' the code and throw out parts it did not recognize. The problem I encountered had to do with one of the major differences between HTML and XML. XML requires values on all attributes, including attributes whose values are equivalent, whereas HTML does not. For example, <video… controls = "controls"…> is required XML but redundant in HMTL, so some versions of DW throw out the value on 'save' command. The latest version of DW has a preference to counter this behaviour but it is deeply buried in the 'Preferences' panel. The point being: TextWrangler® does a better job with XML. I also used TextWrangler to open, and work with, the 'package.otf' document, which is the organizing document for EPUB. As mentioned earlier, all the reading systems cache content and to view repeatedly, for testing purposes, a development document requires changing some aspect

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of the 'package.otf', so that the publication no longer displays as the same book. The optimal

method is to modify the <meta> tag that contains the 'modified date-time-stamp' <meta

dcterms:modified">2016-09-05T20:40:08Z… by changing the time over each iteration and then

re-zipping the folder, fooling the reading system into ingesting the book as a new package. Also,

opening our XHTML pages in a regular browser window serves the purpose of viewing

reasonably well in some instances.

B. 'a11y' markup and Reading System Tests for EPUB3 'a11y' support & specific book affordances

Marking up images for 'a11y' purposes requires the use of either alt="[description]" or an aria-

labelledby="id" reference for a description text block. I elected to place descriptions primarily

(except for the SVG Diagram and the audio and video sections) in the alt attribute because in

terms of future-proofing EPUB, the hope is that renderers will become increasingly responsive to

HTML5 semantic markup and the more-ubiquitous 'alt' attribute. This rationale is supported by

the statement of the WC3 report *Notes on Using ARIA in HTML: Editor's Draft 04 January 2016*

with its recommendation:

> "2.1 First rule of ARIA use
>
> "If you can use a native HTML element [HTML51] or attribute with the semantics and behaviour you require already built in, instead of re-purposing an element and adding an ARIA role, state or property to make it accessible, then do so." (WC3-Aria, web)

The alt attribute has a suggested character limit of 125 characters (to accommodate

JAWS TTS). For the decorative images, the preferred method is to mark them as ARIA

role="presentation" and alt="". The decision to depend purely on the HTML5 semantic tags for

'a11y' does not, however, mean that reading systems called-out the textual content of the alt

attribute within the EPUB3 book. Because of the huge numbers of reading systems, browsers and renderers out there, it's difficult to test for every eventuality. Although IDPF is recommending that HTML5 semantic tags act as appropriate triggers in the TTS environment, it's never clear whether a failure to behave as expected is a failure peculiar to a particular reading system or whether the native HTML5 code is not supported across a broad spectrum and may yet be a long way off from being properly supported inside the TTS protocol. I don't know Javascript. Yet a lot of the EPUB-generating sites and systems seem to use JS quite frequently, so this is a lack I will probably have to address in the future. In iBooks for desktop, as well as Readium and FF ePub, the Mac native TTS VoiceOver® ignored the <video> and <audio> tags, reading the 'aria-labelledby' information and recognizing a 'button' but failing to instantiate play upon request. I'm not an expert using TTS, so in my testing of these elements, I may have missed something. However, I went through the in-built training tutorial several times. It is a steep learning curve, though, using numerous keyboard commands and/or trackpad gesture signals either in a desktop, laptop or tablet environment. I'm continuing my various tests throughout the process of the final stages of this thesis. I have prepared my own summaries of these tests, looking at distinct affordances of the EPUB. These are presented in two tables ('Appendix D: Tables Showing Reading System Supports for Selected Affordances of an EPUB3 book') with results of tests in various reading systems on some of these affordances. In the table at epubtest.org, it lists iBooks as having an 'XHTML support of 34%', which, as I stated previously, is not very clear. As I come close to wrapping up the work of this thesis, this aspect may yet remain an unknown. I will be recording some of these efforts to show to my co-supervisors and examiners.

B. Markup for Links

An 'a11y' requirement for 'links' is to retain underlining. This can have a visual effect of heaviness on a page that carries a number of links. In the EPUB, I created a "Resources" section with links to various online sources. To reduce the 'heaviness', I chose to use a CSS 'border-bottom' rule instead of 'text-decoration: underline', and applied a transparency setting to the border colour. This lightened the overall look of the page, while still visibly indicating links. I also added 'hover' and 'visited' effects to the links to visually support the interactivity.

B. EPUB Cover

 An EPUB needs to have a cover and it is displayed 'on the bookshelf' in any emporium at a postage stamp size. Knowing this, gives parameters on how a cover might be designed – calling for a high-contrast simple design with, preferably a proportionally larger title size. The cover can also be displayed inside of the open book with an instruction inside the <spine> section of the 'content.opf'. This section lists the page reading order of the book, with 'cover.xhmtl' being first. Add 'linear="yes"' to this reference, to view cover as the first inside page of the book. The cover size and aspect ratio relates to previous dimensions outlined. It must be a flat JPG image file (to which should be added an alt attribute that provides title text as well as image description).

B. Working with Film and Audio

Among the assets that are included in the EPUB3 folder are a film (included in two formats) and audio (also included in two formats). The different reading systems OSs are accommodated in the inclusion of two formats of audio and video files. I cannot detail here the necessity for using

two video formats. There is more information in the 'Resources' section that I list in this

document, as well as online. Here is some text from …*Best Practices*

> "So how do you handle video? The HTML5 working group mitigated the problem of variable codec support by allowing one or more source elements as the children of the audio and video elements […] each of these source elements includes its own src attribute defining the location of a potential resource.
> "You could now account for varying reading system support for video by providing both WebM and M4V video" (Garrish, epub-299)

Apple Compressor exported my raw film file as H264 with M4V format. In order to

create a WebM file, I converted this same file using an online application called Firefogg® (see

'Appendix B: Resources'). Similarly, with audio: Apple Compressor compresses raw audio with

an AAC-LC MP3 or MP4 audio file, which can then be converted by Firefogg to the necessary

ogv (Ogg Vorbis) format.

In terms of developing the content of the video, I affirm that knowledge of video editing

is essential. It is yet another skill to add to the generalist designer's toolkit. This kind of video,

however, equates to working up a spot illustration in a magazine. It is a language that has

become pervasive on YouTube®, so is a not-unusual enhancement to a text. I have worked with

online training videos to learn filmmaking editing techniques. I was also fortunate to be able to

take a film production class at York University taught by Professor John Greyson. A film clip

needs to be short (too long and the file size will quickly become unmanageable). Even with a

three-minute film and a 30-second audio clip, my EPUB is 34mb in size, which is on the large

side for a downloadable file. In keeping with my efforts to provide accessibility enhancement to

the greatest extent possible in this book, I created a timed subtitles track for the video. My tests

with this were somewhat disappointing. While the track appears in iBooks for Desktop, it was

awkward to activate it, as, initially the selection menu is blank. Activating subtitles in iPad was

only possible in 'full-screen' view, whereupon it promptly crashed the application. Both subtitle

and video controls disappear on click in Readium and subtitle controls are not present in FF

ePub. In the proprietary VitalSource Bookshelf app, the subtitling behaviour succeeded. So, in

the tests that I have made of a small sample group of reading systems, the ability to include

subtitles was a mere 20%. This is another area where the recommendation of the IDPF EPUB3

standard is to use the HTML5 native <video> and <track> tags and not import a custom player –

with the expectation that, at a certain point, the reading systems will come on board to fully

support the native video capability.

I solicited professional help for the recording of the song included in the film (through

York University Digital Media Department). When it comes to sound, I am not an expert and I

do not have the equipment or sound space to make a good quality audio recording. So, being able

to outsource this task relatively easily, was providential.

B. Reading System Behaviours, Workarounds and TTS

The EPUB3 publication was developed with the intention of producing an optimal book, and

exploiting enhancements made available through working within a digital form. This means

having the ability to properly use footnotes, to mark text, to copy text and to annotate the

content. Different reading systems provide a varying implementation of any of these tasks.

Because, iBooks does have a good support for all of these, my comments in terms of my design

work will be with reference to this reading system. iBooks uses a click-generated pop-up for

displaying a footnote. However, the typographical mark of a footnote – a single digit set as a

superscript often smaller than body font – offers only a minuscule clickable target area to initiate

the pop-up. This is especially too small for anyone with limited manual dexterity. To address this

problem, I created a larger, bold font for the footnote mark. I also added CSS padding to the 'a:link' pseudo class to increase the target click size. I decreased the 'vertical-align' so that the larger digit would not affect the 'line-height' of the paragraph too greatly. I applied a very light 'background-color' to the mark (digit), to increase its clickable-target-area visibility and gave this background a 'border-radius: 50%' to create a circle (in CSS). While this may give the design of a footnote mark a 'louder' appearance, it was necessary to provide a better 'a11y' support. VoiceOver (Apple's native TTS) instantiates the popup, 'interacts with the text' but could not exit from the region. iBooks has excellent support for copying texts, bookmarks and annotations.

Much of the narrative of the book is constructed around the voices of various contributors, speaking on subjects they have a familiarity with. I liked the conversational feel to the transcripts I made, of various interviews on what might otherwise have been a dry subject. To work with this trope, I elected to make a distinction (slight) between the voices, using the colour and shape of the opening quotes. In the print book normally, the typographical marking of the speaker of a long disquisition, is indicated by the use of opening quotes for each paragraph but without closing quotes. However, in XHTML an opening tag (in this case the <q>) must be accompanied by a closing tag. The behaviour of the <q> tag is to place open and closing double quotes around a text (to indicate a spoken voice) and to use single quotes for nested <q>s. When I first tested this in the EPUB reading system, I thought that this behaviour broke. I experimented with a number of options. These included hiding the auto-display quotes altogether and then adding them back in, manually, using a content substitution in the CSS to place an image of large, distinctive opening quotes on the opening <q> and placed normal-size quotes on the closing </q> tag, using the '”' numeric entity for closing double quotes. This was a way

to give the conversation a visible inflection. The font for each voice is similarly marked by a different colour on the <p> tag but this doesn't appear in every reading system. VoiceOver did announce "double-quotes" to indicate a speaker speaking. However, when testing in a regular browser, VoiceOver kept inserting the word 'image' into the audio delivery. This was not going to work. So I re-thought the solution, removing the images and replacing with a CSS-styled larger opening quote and regular closing quote, using the rule of 'content: open-quote'. Current testing in browser has VoiceOver not announcing the word 'double-quotes' but the annoying 'image' call-out is also eliminated. Why VoiceOver announces 'double-quotes' if the entity is included as part of an HTML document but does not when it is a CSS 'content:' substitution rule is a mystery, since the HTML source renders the same in both cases.

Generally, I found that working with CSS rules and properties in EPUB had a different adherence to specificity and inheritance behaviour than that which I have come to know with web design. I think that is a mark of the still-developing standard within the eco-system. Between the working groups that are managing specifications for HTML5 and XML, the expanding, dynamic Web, EPUB3, browser supports and independent reading systems, as well as the needs of WCAG and WAI, there are a huge number of stakeholders all trying to work toward a cohesive, flexible, accessible digital commons. I hope that this amazing eco-system matures in a way that it enables more writers and readers, including a wide spectrum of users of assistive technologies, to come into its fold.

CONCLUSION

The above analysis of an applied EPUB development marks the end of my thesis. My work here is finished. It is also just beginning. I intend to continue to work within the EPUB ecosystem to explore possibilities for narrative and the many nuances of text deliveries that are user-friendly and inclusive and adhere to optimal accessibility support protocols. The choice for certain types of publication, particularly those of the self-publisher, whose work contributes to the overall knowledge realm has currency today. We live in a world immersed in a noisy textual terrain of 140-character-bites, marketing spins and the cognitive dissonance of manifest destiny. At a recent conference, Tim Berners-Lee advocated for a joining of forces between the IDPF and the WC3, in the interests of bolstering the establishment of an informational commons (DBW, web). This thesis has organized itself around advocating for just this sort of initiative, provided of course, that the book continues to be valued as an autonomous medium of epistemological or creative texts. Universal access to knowledge-based, peer-reviewed publications will help to improve human decision-making and actions, just at a time when the world needs a clear resolve to avoid increasing threats of climate change.

A question that I have not answered with this thesis is the extent to which the vast ecosystem that is responsible for computer technologies, hardware, software and innovation is itself immune to regulations in respect to the hazards it poses on our lives and our planet—to

own its own carbon footprint and other environmental or social justice offences. At my colloquium presentation I projected an image of a forest, with the caption: 'this is what may be saved by an ebook'. It was, as was pointed out, a somewhat one-sided observation.

I have worked for many years inside an economic structure where computers are ubiquitous. Yet I feel strongly that a technology that has as many advantages for those who are in need of its demonstrable benefits must still be vested within an ethical and sustainable practice milieu. My accompanying ebook is after all, about sustainability in a discrete sense. I invite readers, as I have, to inform themselves of the ways in which these technologies respect or cross ecological and social justice boundaries and to criticize the industry for the ways it ignores ethical mores. Digital data is volatile. Can we, in fact, accept that some data might and even should inevitably, die? Perhaps. Do we necessarily need to save everything—in yottabytes (1000^8 bytes) of energy-hungry storage? Can we find better ways to build a computer than exploited labour and egregious environmental impacts? Hopefully. Can we find ways to power our computers using renewable, sustainable energy? Information, as powerful as it is, born of inhumane systems cannot, in the end, help any of us move forward. After all, many of the computer training manuals that I have used (notably O'Reilly Publications) feature a selection exotic natural fauna on their covers. In the case of O'Reilly, there is a web page explaining this design decision:

> "On a more somber note, working with the animal engravings has made me much more aware of what is happening to our environment. Many of the animals that appear on our covers are endangered – the tarsier from *Learning the vi Editor*, the lorises from *sed & awk*, the Victoria Crowned Pigeons from *lex & yacc*, and the Florida panther from *Java Foundation Classes in a Nutshell*, just to name a few. At the time most of the engravings were created, in the last century, these animals were plentiful. Perhaps our use of animal images on our covers will encourage people to work harder to save the species that are still sharing the planet with us." (Freedman, web)

With these thoughts in mind, I hope that readers and writers will avail themselves of the choices that are opening up, to become both critical appraisers and open-minded participants in the ebook experiment, whether in terms of creating, learning or consuming—and whether inside or alongside the print industry that exists today and into tomorrow.

APPENDIX A: GLOSSARY

This thesis is one whose research is based within an interdisciplinary focus, combining the disciplines of Design, Film and Computer Science. In this regard, there is a need for definition of terms particular to the context of this research.

accessibility: specific the digital realm, this is the work of achieving universal accessibility for digital devices as well as software and communication protocols. It is an area of investigation that occupies a number of discipline-categories. Specific to my own researches and dealing principally with aspects of Internet communication protocols (which EPUB protocols in large measure utilize), I refer to literature about identifying and employing accessibility standards found in the WAI (defined separately) site and the working document guidelines of the WCAG (defined separately). Beyond these considerations, is that of access by any single population demographic to the content of digital information, given that these are often channeled through devices and software APIs (defined separately) that may have proprietary restrictions imposed upon them. My research will engage with this aspect of accessibility and related marginality. A paper presented at the International conference on information and communication technologies and development in 2013 states: "Marginalization derives from a certain set of structural relationships that impact individuals' ability to aspire, and those structural relationships serve as the primary impediments to the functional expansion of such aspiration […] urban sociologist Robert Park suggested that those who are in a marginalized social location can appropriate and integrate the marginal and dominant world views and create a new worldview that is creative, hybrid, innovative and empowering" (Pal, 69). It is important to note that while standards recommended by the bodies associated with this task are always in a state of update (and while I, in my research project will strive to implement these), the numbers of delivery systems (browsers or epub readers, for

example) may or may not support these accessibility entity hooks at the time of production.

a11y: in the cryptic world of keyboard communications (twitter, et al.) this is the stand-in shorter term for 'accessibility' (which correlates to a mnemonic of 'a' + '11 letters' + 'y')

ARIA: ARIA is general tool which can be used to add accessibility to many different technologies. WAI-ARIA helps close the gap between the advanced capabilities of the Open Web Platform and technologies available for implementing accessibility requirements. Web developers increasingly create user interface controls that allow users to get new Web content without requesting a full page refresh. WAI-ARIA provides key support for conforming with the Web Content Accessibility Guidelines (WCAG) 2.0, the international standard for accessibility of websites and applications.

API: is an acronym for "Application Program Interface". It is defined as "a set of commands, functions, and protocols which programmers can use when building software for a specific operating system. The API allows programmers to use predefined functions to interact with the operating system, instead of writing them from scratch."

BISG: is an acronym for the "Book Industry Study Group, Inc.", which, as stated on the website welcome page is: "a not-for-profit book trade association with the mission of facilitating innovation and shared solutions for the benefit of all companies and practitioners who create, produce, and distribute published content, and the organizations that support them." (web)

CSS3: this definition text taken from Mozilla developer website: "CSS3 is the latest evolution of the Cascading Style Sheets language and aims at extending CSS2.1 […] CSS Level 2 needed 9 years, from August 2002 to June 2011 to reach the Recommendation status […] In order to accelerate the standardization of non-problematic features, the CSS Working Group of the W3C, in a decision referred as the Beijing doctrine, divided CSS in smaller components called modules . Each of these modules is now an independent part of the language and moves towards standardization at its own pace […] Formally, there is no CSS3 standard per se. Each

module being standardized independently, the standard CSS consists of CSS2.1 amended and extended by the completed modules, not necessary all with the same level number. At each point of time, a snapshot of the CSS standard can be defined, listing CSS2.1 and the mature modules."

design*: is made up of both surface elements – communication flows – and the underlying technical processes for developing the final object. Within digital objects, the underlying structure is programming code and markup languages. In an ebook these consist primarily (and currently) of XHTML (also HTML5), CSS(2.1/and some 3) and JavaScript (all defined separately). A research paper by John Zimmerman shows that "many HCI [defined separately] researchers commonly view design as providing surface structure or decoration [which represents a] lack of a vision for interaction design research [and] a lost opportunity for the HCI (defined separately) research community to benefit from the added perspective of design thinking in a collaborative research environment" (Zimmerman, 2007). In this respect, design is as much about process, engagement and integration of components as it is about surface. Within my thesis I will self-reflexively detail my design process so as to document the iterative development. It is also useful to note that as designers, we are essentially working on what is understood to be in the "frontend" of a technology package; in the Web technology world, backend technologies usually consist of programming languages like PHP, Ruby, Python.

DRY: coding acronym for "don't repeat yourself"

ebook: a digital object possessing the linear narrative characteristics of a physical book, as well as other signifiers such as chapters, index, author(s), page numbers, etc. but also potentially utilizing enhanced media: images, video, sound, hyperlinks, 'universal design' characteristics–interchangeable with the term 'transmedia object'.

EPUB3: this definition taken from http://idpf.org/epub "EPUB is the distribution and interchange format standard for digital publications and documents based on Web Standards. EPUB defines a means of representing, packaging and encoding structured and semantically enhanced Web content – including XHTML, CSS, SVG, images, and other resources – for distribution in a single-file format. EPUB allows

publishers to produce and send a single digital publication file through distribution and offers consumers interoperability between software/hardware for unencrypted reflowable digital books and other publications." The specification is overseen by the IDPF (defined separately).

extensibility: there are two meanings to this term. In the XML (see separate definition) protocol, this allows for the transformation of the XML using a tool called XSLT into other forms of markup such as HTML, PDF or even into a simple delimited text file. XML is the language that is used to build metadata information for the ebook, using a standard such as ONIX, a publisher cataloguing system. Additionally, the digital cultural object allows for the updating and/or expanding of content–as information changes. In traditional publishing, this function is provided by each edition of a publication, whose timeframe is constrained by the production limitations of a paper/print industry; but digital texts are easier to edit, package and redeploy (and also, potentially, re-engineer, as standards shift). This poses potential benefits, in particular, for areas of study where information changes on a rapid basis, as for example, regional effects of climate change.

Front-end developers are responsible for a website's user-facing code and the architecture of its immersive user experiences. In order to execute those objectives, front-end devs must be adept at three main languages: HTML, CSS, and Javascript programming.

GitHub: Git is a version control system. When developers are creating something (an application, for example), they are making constant changes to the code and releasing new versions, up to and after the first official (non-beta) release. GitHub.com is where developers can store their projects and network with likeminded people. A repository is a location where all the files for a particular project are stored, usually abbreviated to "repo." Each project will have its own repo, and can be accessed by a unique URL.

HCI: is an acronym for "Human Computer Interaction". This term arose out of an older discipline called "human factors", which is "both a science and a field of engineering". (MacKenzie, 2) Defined as a discipline concerning itself with "human

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capabilities, limitations, and performance, and with the design of systems that are efficient, safe, comfortable and even enjoyable for the humans who use them" (2)

HTML5: Definition on 'webopedia.com' is: "a W3C specification that defines the fifth major revision of the Hypertext Markup Language (HTML)." Importantly, for the purposes of my thesis is to note that the XHTML that is used in EPUB production, allows for HTML5 (in best-use-cases) use of extended semantic tags, thus enhancing accessibility of the EPUB publication. HTML is the markup language that semantically defines the content of a digital text. And CSS (defined separately) is the markup language that styles that content. Tests conducted by the author would indicate that support implementation for these tags in readers is still in process.

IDPF: is an acronym for "International Digital Publishing Forum – Trade and Standards Organization for the Digital Publishing Industry". Quoting from the IDPF site "IDPF develops and maintains, EPUB®, the next-generation open standard for accessible, interoperable digital publications, learning content, and other electronic documents. IDPF also provides a forum that fosters enhanced communication between all stakeholders in the global digital publishing industry […] The key IDPF standard is EPUB®, the current version is EPUB 3.0.1."

ISBN: is an acronym for "International Standard Book Number" and is a 13-digit number assigned by agencies to a published volume. In the U.S. ISBNs are charged for by independent agencies; in Canada, they are free and are administered by Library & Archives Canada (LAC). Since they are free, it is useful to obtain, as it allows for a self-published work to be catalogued at the LAC.

JAVASCRIPT: this definition is from 'techterms.com' website:

> "JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. While JavaScript is influenced by Java, the syntax is more similar to C and is based on ECMAScript, a scripting language developed by Sun Microsystems. JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript functions can run after a webpage has loaded without communicating with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required fields have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server."

This scripting language can be inaccessible for those who do not have the Javascript loaded on the device in use. From the point of view of accessibility it is not recommended; using Javascript might also slow down the reader application. However, it is possible to use JavaScript with EPUB, if deemed necessary.

OpenType: Fonts have historically come in two flavors: PostScript and TrueType. Neither format was developed with electronic publishing in mind, and both impose substantial limitations on designers. Complex character sets are handled idiosyncratically (and differently by different manufacturers), multiple languages can be difficult or impossible to support, and neither format is implemented quite the same way on both Macs and PCs. To answer these challenges, Adobe and Microsoft introduced the OpenType font format in 1997 as a successor to the legacy formats. Now entering its second decade, OpenType enjoys universal support across operating systems, wide support among applications, and – perhaps most importantly – the multilateral support of the software industry.

PLS: is an acronym for Pronunciation Lexicon Specification. This a system which can be used by text-to-speech software to help with the pronunciation of word homonyms (words that are spelt the same but sounded differently: for example, "live" as in "I live next door" and "live" as in "I went to a live concert"). As described on the W3C: "A phonemic/phonetic alphabet is used to specify a pronunciation. An alphabet in this context refers to a collection of symbols to represent the sounds of one or more human languages. In the PLS specification the pronunciation alphabet is specified by the *alphabet* attribute"; its rules are made up of a separate linked file. The EPUB can utilize the ASCII-encoded phonemes of X-SAMPA. This technology/capability may or may not be implemented in the Research Project I create; also, it is not supported across all reading devices or softwares.

SMIL: is an acronym for Synchronized Multimedia Integration Language. The W3C defines this as "an author may describe the temporal behaviour of a multimedia presentation, associate hyperlinks with media objects and describe the layout of the presentation on a screen." In today's web applications (as well as EPUB) SMIL can

be used to synchronize an audio with a visual presentation using styling markup "for persons with print disabilities, including blindness, low-vision, and dyslexia". (W3C, smil-introduction). This technology may or may not be implemented in the Research Project I create; also, it is not supported across all reading devices or softwares.

SVG: Definition on 'w3schools.com' site: "SVG is an acronym for Scalable Vector Graphics. SVG defines vector-based graphics in XML format." What makes this a preferred graphics format is the greater number of usable accessibility hooks. To quote from the 'W3C […] /svgally' site "SVG, as a text format for graphics, already has a lot of potential for accessibility. It's not just that SVG can be made accessible, it's that SVG can be much more accessible than other graphics formats, with very little extra effort on the part of developers and designers." In terms of uses within an EPUB document, and SVG also has a very light-weight file size, which is an important consideration in an EUPB. Where I have utilized the SVG format in my publication, the images are all less than 10Kb in size. Current tests by the author would indicate that support implementation for these tags in readers is still in process.

TTS: Text to speech is a form of speech synthesis that converts text into spoken voice output. Text to speech systems were first developed to aid the visually impaired by offering a computer-generated spoken voice that would "read" text to the user.

UTF-8: UTF-8 is a character encoding capable of encoding all possible characters, or code points, defined by Unicode. The encoding is variable-length and uses 8-bit code units. It was designed for backward compatibility with ASCII, an earlier code character mapping. The name is derived from: Universal Coded Character Set + Transformation Format. UTF-8 is the dominant character encoding for the World Wide Web, accounting for 86.5% of all Web pages in March 2016. (Wikipedia, web)

W3C: The acronym for the World Wide Web Consortium: Definition taken from the website front page: "The World Wide Web Consortium (W3C) is an international community that develops open standards to ensure the long-term growth of the Web.

WAI: is the acronym for "Web Accessibility Initiative". This is an online resource and research body, a subsection of the W3C, which works on research and development of Internet accessibility protocols and guidelines. There are many subgroups engaged

in this process, amongst them the WCAG (see definition below) as well as UAAG (User Agent Accessibility Guidelines), the DPub_AAM (Digital publishing Accessibility API Mappings), WAI-ARIA (ARIA is an acronym for Accessible Rich Internet Applications: this is a semantic contextual mark-up protocol to assist in screen reader delivery processes). The WAI splash page carries a quote by Tim Berners-Lee, the inventor of the World Wide Web, "[t]he power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

WCAG: This is an acronym for 'Web Content Accessibility Guidelines'. This group states as their goal, one of

> "[providing] a single shared standard for web content accessibility that meet the needs of individuals, organizations, and governments internationally" (WCAG, 2016). The guidelines arise out of a development process of the WAI, which include "WAI W3C recommendations, Working Group Notes […] with input from the community. WAI actively encourages broad participation from industry, disability organizations, accessibility researchers, government, and others interested in Web accessibility" (WAI, 2016).

WEB2.0: the term, originally coined by Tim O'Reilly was a future-proofing term for the public use of the Internet. This definition is taken from 'oreilly.com' which provides a lengthy discussion on the subject:

> "[l]ike many important concepts, Web 2.0 doesn't have a hard boundary, but rather, a gravitational core. You can visualize Web 2.0 as a set of principles and practices that tie together a veritable solar system of sites that demonstrate some or all of those principles, at a varying distance from that core." Some aspects of this include "the shift from software as artifact to software as service […] Users must be treated as co-developers, in a reflection of open source development practices […] The Web 2.0 mindset is good at re-use […] software above the level of a single device […] the development of the web as platform with synthetic applications composed of services provided by multiple computers" (page 4)

WOFF: The font data is compressed, so sites using WOFF will use less bandwidth and will load faster than if they used equivalent uncompressed TrueType or OpenType files. Many font vendors that are unwilling to license their TrueType or OpenType format fonts for use on the web will license WOFF format fonts.

XHTML: EPUB uses both HTML5 semantic tags as well as XML and so it is useful to understand a little of the differences between the two. This definition comes from the 'w3cschools.com' site: "XHTML is an acronym for EXtensible HyperText Markup Language. XHTML is almost identical to HTML. XHTML is stricter than HTML. XHTML is HTML defined as an XML (defined separately) application. XHTML is supported by all major browsers." The EPUB uses a strict XHTML and validation is an important part of the development of the publication. (See my chapter on the development of the Research Project component of my thesis).

XML: XML stands for EXtensible Markup Language (see my entry for the term "extensible"). XML is a software- and hardware-independent tool for storing and transporting data.

XSLT: XSLT is used to transform an XML document into another XML document, or another type of document that is recognized by a browser, like HTML and XHTML. Normally XSLT does this by transforming each XML element into an (X)HTML element. With XSLT you can add/remove elements and attributes to or from the output file. You can also rearrange and sort elements, perform tests and make decisions about which elements to hide and display, and a lot more. A common way to describe the transformation process is to say that XSLT transforms an XML source-tree into an XML result-tree.

Sources for Glossary Terms & Definitions

ARIA. definition. https://www.w3.org/2014/03/aria.html.en

BISG. https://www.bisg.org/

Christensson, Per. "API Definition." TechTerms. Sharpened Productions, 2006. Web. 05 January 2016. <http://techterms.com/definition/api>.

Christensson, Per. "JavaScript Definition." TechTerms. Sharpened Productions, 08 August 2014. Web. 05 January 2016. <http://techterms.com/definition/javascript>.

CSS3. https://developer.mozilla.org/en/docs/Web/CSS/CSS3

DESIGN: definition of frontend and backend. http://blog.teamtreehouse.com/i-dont-speak-your-language-frontend-vs-backend

EPUB3. http://idpf.org/epub

Front-end. http://blog.udacity.com/2014/12/front-end-vs-back-end-vs-full-stack-web-developers.html

GitHub. http://www.howtogeek.com/180167/htg-explains-what-is-github-and-what-do-geeks-use-it-for/?PageSpeed=noscript <accessed: 10/05/2016>

HTML5 definition. http://www.webopedia.com/TERM/H/HTML5.html <accessed 5 Jan 2016>

IDPF http://idpf.org/ <Accessed: 10/04/2015>

JAVASCRIPT. http://techterms.com/definition/javascript

MacKenzie, I. Scott. Human-computer Interaction: An Empirical Research Perspective. Morgan Kaufman, Elsevier. Waltham, MA. 2013. Print.

OpenType. definition. http://www.typography.com/techniques/opentype/

Pal J., et al. "Marginality, Aspiration and Accessibility in ICTD" ICTD 2013, December 07 - 10 2013, Cape Town, South Africa Copyright 2013 ACM 978-1-4503-1906-5/13/12

PLS. http://www.w3.org/TR/pronunciation-lexicon/

SMIL. http://www.w3.org/TR/REC-smil/smil-introduction.html

SVG. http://www.w3schools.com/svg/

_____. https://www.w3.org/community/svga11y/

TTS. definition. http://www.webopedia.com/TERM/T/TTS.html

UTF-8. https://en.wikipedia.org/wiki/UTF-8

W3C. http://www.w3.org/

W3Cschools. Definition XML. http://www.w3schools.com/xml/xml_whatis.asp <accessed Feb. 2016>

_____, Definition XSLT. http://www.w3schools.com/xsl/xsl_intro.asp <accessed April, 2016>

WAI. http://www.w3.org/WAI/

WAI. http://www.w3.org/WAI/intro/w3c-process.php <accessed 5 May 2105>

WCAG. http://www.w3.org/WAI/intro/wcag <accessed 5 May 2105>

WEB2.0. http://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html?page=1

WOFF. definition. https://developer.mozilla.org/en-US/docs/Web/Guide/WOFF

Zimmerman, John, et al. "Research through design as a method for interaction design research in HCI" Human-Computer Interaction Institute and The School of Design, Carnegie Mellon University, 2007.

APPENDIX B: RESOURCES FOR EPUB3 DEVELOPMENT

Resources for building EPUB3 book

Brady, Laura. *Ebook Accessibility: Why, How, and What For* - ebookcraft 2016. http://www.slideshare.net/booknetcanada/ebook-accessibility-why-how-and-what-for-ebookcraft-2016-laura-brady

Digital Book World Conference 2016. http://digitalbookworldconference.com/

EPUB3 http://www.idpf.org/accessibility/guidelines/

free fonts: https://www.fontsquirrel.com/

Garrish, Matt, and Markus Gylling. *EPUB 3 Best Practices*. Farnham: O'Reilly, 2013. EPUB.

Garrish, Matt. *Accessible EPUB 3*. 2012 O'Reilly Media, Inc. Sebastopol, CA 95472 United States of America.

IDPF test suite. http://www.epubtest.org/testsuite/epub3/

Schultz, Derrick. *99 Problems*. https://github.com/dvschultz/99problems/labels/iBooks%20iPad <accessed 7 April, 2016>

WC3-Aria Notes. http://w3c.github.io/aria-in-html/ <accessed 19 May, 2016>

Zeldman, Jeffrey, and Ethan Marcotte. *Designing with Web Standards*. Third ed. Indianapolis, IN: New Riders, 2003. Print.

Sites, Scripts and downloads:

eCanCrusher (for zipping and unzipping EPUB): http://www.docdataflow.com/ecancrusher/

Pagina epubcheck (for EPUB3 validation): http://www.pagina-online.de/produkte/epub-checker/

GitHub Repository for EPUB3: https://github.com/IDPF

InDesign to EPUB3 training: https://www.lynda.com/

My own table mnemonic for epub development (part of Thesis submission): plan/table_wDecoratives.html

svg optimization tool: https://jakearchibald.github.io/svgomg/
      [but MUST ADD BACK IN <style type="text/css"… >which gets stripped]

to format video as webM: https://firefogg.org/

IDPF test suite. http://www.epubtest.org/testsuite/epub3/

APPENDIX C: ONLINE LINKS TO RESEARCH CREATION PROJECT

The Honeyed Tale: An Interrogative Poetic on Bees is freely available (Creative Commons) for download at http://www.artbyrt.com/rt/tht-epub3.html. The link makes available: the EPUB3 ebook for ingestion into an ebook reader that supports either Apple iBooks or also *Google Readium®, or *Firefox ePub®.

As stated in Chapter 5, both these reading systems are not fully supporting accessibility, HTML5, video behaviours and also, in the case of FF, CSS font styles.

SUMMARY TABLES SHOWING READING SYSTEM SUPPORTS FOR SELECTED AFFORDANCES OF AN EPUB3 BOOK

Using Text to Speech Technologies

Mac OS VoiceOver	announces 'image'	reads contents of 'alt' attribute	announces 'video/audio' > 'button'	instantiates 'play' for video/audio	announces 'open double quotes'	announces 'close double quotes'	reads aria-labelledby for video, SVG diagram	instantiates links	announces footnotes	returns to original text footnote trigger in text	announces lists, i.e. 'group'	announces 'transition' via <hr> trigger
ibooks for ipad mini*	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE
ibooks for Mac OS Desktop*	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
FF ePub*	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	TRUE	TRUE
Chrome Readium*	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
VitalSouce Bookshelf- using an in-app TTS*	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE

Test for XHTML5 and CSS Rendering Support

	Supports CSS font, incl. Line Height	Supports CSS property 'display: none; visibility: hidden'	Supports CSS styling <i>, <b>	Supports CSS styling <q>	Supports HTML5 behaviour <q>	Renders playable Video Skin	Renders playable audio Skin	Supports HTML5 <track> element - user selects captions successfully	Renders Footnotes as visible, clickable link	Resume reading after looking at footnote	Supports 'bookmarks'	Supports 'annotations'	Supports book-wide searches
ibooks for ipad mini*	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
ibooks Mac OS Desktop*	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
FF ePub*	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE
Chrome Readium*	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE
Chrome Readium scrolling layout	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE
Chrome Readium for Windows													
VitalSouce Bookshelf- using an in-app TTS*	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE

*See accompanying summary notes

APPENDIX D: SUMMARY TABLES SHOWING READING SYSTEM SUPPORTS NOTES

These notes relate to tests conducted using various reading systems, selecting affordances that both map those of a print book to the EPUB3 book and offer enhancements. Below are notes that further describe the results of tests specific to reach reading system.

iPad Mini iBooks
Test Using VoiceOver (using gestures)
- *does not call out <ul> as 'list' or describe each <li> as 'item'; I did select 'list' option in the VO rotor in accessibility chooser*
- *does not announce quotes; I specified announcing 'punctuation' in the same chooser but this only resulted in stating the word 'slash' for '/'*
- *occasionally will repeat a reading region, duplicating the content of the continuous reading option*
- *depending on the mode of reading selected (2-finger swipe up or 3-finger swipe R) would skip sections of the text*
- *determined that to use VoiceOver it is essential to have the book in 'page' mode and not in 'scrolling' mode*
- *calling out 'image' and reading 'alt' text was inconsistent; at one point called out 'sound file here' but I could not repeat this behaviour and I was never able to persuade VoiceOver to activate the audio element*
- *skipped over audio and video; not not read the 'aria-labelledby' text for either of these elements*

Tests for support XHTML5 and CSS
- *attempts to access captions of the <video> element resulted in crash of the application*

Apple Macbook Pro Desktop iBooks (using keyboard)
Test Using VoiceOver (using keyboard commands)
- *does not call out <ul> as 'list' or describe each <li> as 'item'*
- *does not announce quotes*
- *calling out 'image' and reading 'alt' text was consistent*
- *called out 'audio file here' but I could not instantiate 'play'*
- *called out 'video' but I could not instantiate 'play'*

Tests for support appearance of XHTML5 and CSS
- *enabled captions in the video very nicely*

Firefox ePub

Test Using VoiceOver (using keyboard commands)

- *does call out <ul> as 'group' but also repeats each <li> 'item'*
- *does not announce quotes*
- *calls out 'image' but does not read the more descriptive 'alt' text; reads only the <figcaption> text (twice)*
- *stops at 'audio element; does not announce 'audio', only word 'frame' and 'button'; does not instantiate 'play' upon press*
- *same behaviour with audio element*
- *inconsistent support of CSS font sizing; does not change inside <ul>; but is supported for inscription <blockquote>*
- *freezes at SVG page (Diagram of Langstroth Hive)*
- *does not announce chapters or responds to <hr> transition element but does call out 'h2' for chapter heading*

Tests for support appearance of XHTML5 and CSS

- *video will not open up to a full-screen*
- *video does not display captions (<track> element icon is not displayed inside skin)*

Chrome Readium

Test Using VoiceOver (using keyboard commands)

- *does call out <ul> as 'group' but also repeats each <li> 'item'*
- *does not announce quotes*
- *does not announce chapters or responds to <hr> transition element but does call out 'h2' for chapter heading*

Tests for support appearance of XHTML5 and CSS

- *video controls disappear after instantiating play*
- *video does not display captions (<track> element icon displayed but not instantiated)*

VitalSource Bookshelf

 this is a proprietary educational reading system and I think that I did not have sufficient permissions to access it's full functionality; it failed in numerous 'a11y' tasks

Test Using VoiceOver (I did not have access to any keyboard commands; the system began at the top and continued)

- *does call out <ul> as 'list' or 'group'*
- *did read the contents of 'alt' attribute*
- *did read out the aria-labelledby text for video and diagram*
- *there was no 'a11y' button for instantiation of video or audio*
- *there were no call outs for 'image'; the 'alt' text was read as if it were part of the 'body' content text*

Tests for support appearance of XHTML5 and CSS
- *captions disappear, if the video is opened to full-screen*

BIBLIOGRAPHY

Works Cited and Consulted

Albanese, Lucy ed. *Field Guide to Fixed Layout for Ebooks*. Book Industry Study Group,
    Inc. (BISG) HarperCollins Publishers. New York, 2013

Bastawrous, Andrew, et al. "mHealth Possibilities In A Changing World. Distribution Of Global
    Cell Phone", *Journal Of Mobile Technology In Medicine Vol 1*. *Issue 1*. Feb 2012 22.
    www.journalmtm.com <accessed 20 October 2015>

Bergdoll, Barry, and Leah Dickerman. *Bauhaus 1919-1933: Workshops for Modernity*. New
    York: Museum of Modern Art, 2009. Print.

Bernard, Michael, et al. T*he Effects of Font Type and Size on the Legibility and Reading
    Time of Online Text by Older Adults*. Software Usability Research Laboratory
    Department of Psychology Wichita State University Wichita, CHI 2001

Berners-Lee, Tim, and Mark Fischetti. *Weaving the Web: The Original Design and
    Ultimate Destiny of the World Wide Web by Its Inventor*. San Francisco:
    HarperSanFrancisco, 1999. Print.

Boulton, Jim. *100 Ideas That Changed the Web*. London: Laurence King Publishing,
    2014. Print.

Bradley, Steven. *Does Form Follow Function?* 2010.
    https://www.smashingmagazine.com/2010/03/does-form-follow-function/

Brady, Laura. *Ebook Accessibility: Why, How, and What For* - ebookcraft 2016.
    http://www.slideshare.net/booknetcanada/ebook-accessibility-why-how-and-what-
    for-ebookcraft-2016-laura-brady

Bredehoft, Thomas A. *The Visible Text: Textual Production and Reproduction from Beowulf to
    Maus*. U.K.: Oxford University Press, 2014 Print.

Brügger, Niels, ed. *Web History*. New York: P. Lang, 2010. Print.

Carolan, Simon and Evain, Christine. *Shifting Authority: (Ex)*. . *Changing Roles in the Evolving
    Publishing Environment* The International Journal of the Book Volume 10, 2013,
    www.booksandpublishing. com, ISSN 1447-9516 © Common Ground

Cavalier III, Forrest J. *Some Implications of Bazaar Size Third Draft*. Aug 11, 1998 Mib
    Software http://www.mibsoftware.com/bazdev/0003.htm <accessed 7 Apr, 2016>

CBC Ideas. '*Social reading*' *the next phase of ebook revolution*. By Sean Prpick, CBC
    News Posted: Feb 25, 2013 http://www.cbc.ca/news/canada/social-reading-the-next-
    phase-of-ebook-revolution-1.1339149 <accessed 5 July, 2016>

CELA. *What is a Print Disability*.
    http://iguana.celalibrary.ca/iguana/www.main.cls?surl=CELA-
    WhatIsAPrintDisability&lang=eng&theme=reset <accessed 16 May 2016>

Chaparro, B. S., et al.*Comparing the legibility of six ClearType typefaces to Verdana and
    Times New Roman*. Information Design Journal 18(1), 36–49 © 2010 John Benjamins
    Publishing Company

Chaparro, Barbara S. et. al.,*Examination of the legibility of isolated characters of onscreen typefaces*. Information Design Journal 19(1), 28–45 © 2011 John Benjamins Publishing Company

Chief Oren Lyons, Oneida. *Address to the Non-Governmental Organizations of the United Nations, Geneva, Switzerland*. http://www.legendsofamerica.com/na-quotes.html

Claude E. Shannon, *A Mathematical Theory of Communication*. The Bell System Technical Journal, Vol. 27, pp. 379–423, 623–656, July, October, 1948.

Danet, Pierre. *The Future of Book Publishing: Seven Technology Trends and Three Industry Goals*. Published online: 7 August 2014 Springer Science+Business Media New York 2014

DBW Press Release. http://www.digitalbookworld.com/2016/w3c-and-idpf-are-exploring-plans-to-combine/ <accessed 12 May 2016>

Dickson, Gary. *Function is Dead – Long Live Function*. 2006. http://www.graphic-design.com/DTG/dickson/form_follows_function.html <accessed 6 July, 2016>

Digital Book World Conference 2016. http://digitalbookworldconference.com/

Doctorow, Cory. *Information doesn't want to be free [electronic resource] : laws for the Internet age*. San Francisco : McSweeney's, 2014

Douglas, Carla "A manifesto for all writers" Published October 11, 2015 by http://www.thebookseller.com/futurebook/manifesto-all-writers-314256 <accessed 12 Oct 15>

DRM discussion. https://www.eff.org/deeplinks/2016/01/you-cant-destroy-village-save-it-w3c-vs-drm-round-two <accessed 16 May 2106>

Eisenstein, Elizabeth L. *The Printing Revolution in Early Modern Europe*. Cambridge: Cambridge UP, 1997. Print.

Febvre, Lucien, and Henri-Jean Martin. *The Coming of the Book: The Impact of Printing 1450-1800*. London: Verso, 1976. Print.

Finkelstein, David, and Alistair McCleery, ed. *The Book History Reader*. London: Routledge, 2002. Print.

Foucault, Michel. *Lecture presented to the Societé Francais de philosophie*. 22 February 1969. http://www.movementresearch.org/classesworkshops/melt/Foucault_WhatIsAnAuthor.pdf

Fraser, Robert, and Mary Hammond. *Books without Borders*. Basingstoke: Palgrave Macmillan, 2008. Print.

Freedman, Eddie. *Origin of Species: A History of O'Reilly Animals*. http://archive.oreilly.com/pub/a/oreilly//news/ediemals_0400.html. 2000, web <accessed 22 May, 2016>

Further Accessibility Resources available at: http://www.uiaccess.com/accessucd/resources_videos.html

Further Accessibility Resources available at: http://www.w3.org/TR/wai-aria/introduction#contractmodel

Further Accessibility Resources available at: http://www.w3.org/WAI/gettingstarted/tips/

Galey, Alan. "The Enkindling Reciter: Ebooks in the Bibliographical Imagination" *Book History*, Volume 15, 2012, pp. 210-247 (Article) The Johns Hopkins University Press

Gani, Aisha and Shaheen, Kareem. *Journalist Ruqia Hassan murdered by Isis after writing on life in Raqqa*. Tuesday 5 January 2016.

https://www.theguardian.com/world/2016/jan/05/journalist-ruqia-hassan-killed-isis-raqqa-syria <accessed July 5, 2016>

Garrish, Matt, and Markus Gylling. *EPUB 3 Best Practices*. Farnham: O'Reilly, 2013. EPUB. .

Garrish, Matt. *Accessible EPUB 3*. 2012 O'Reilly Media, Inc. Sebastopol, CA 95472 United States of America.

Genner, Noah. *BNC Research: Millennial Book Consumers Now - Tech Forum 2016*. http://www.slideshare.net/booknetcanada/bnc-research-millennial-book-consumers-now-tech-forum-2016-noah-genner <accessed 16 May 2016>

Greyson, John. *Gazonto - imagine Toronto bombed like Gaza*. film https://www.youtube.com/watch?v=_-ZXOUYfhiE <accessed 9 Jan 2016>

Hayles, N. Katherine. My Mother Was a Computer : Digital Subjects and Literary Texts. Chicago, IL, USA: University of Chicago Press, 2010

DataGuy. *January 2015 Author Earnings Report* http://authorearnings.com/report/january-2015-author-earnings-report/ <accessed 11 January 2016>

Howsam, Leslie, ed. *The Cambridge Companion to the History of the Book*. Cambridge: Cambridge UP, 2015. Print.

IDPF forums. pagebreak questions: http://idpf.org/forum/topic-1216.

Jayanth, Meg. *52% of gamers are women – but the industry doesn't know it*. Thursday 18 September 2014. https://www.theguardian.com/commentisfree/2014/sep/18/52-percent-people-playing-games-women-industry-doesnt-know <accessed July 5, 2016>

Jenkins, Henry. *Convergence Culture: Where Old and New Media Collide*. New York: New York UP, 2006. Print.

Jiri. *Modern Architecture Dogmas*. 9 Mar, 2013. http://www.digital-web.com/articles/form_follows_function/

Kawin, Bruce F. *Mindscreen: Bergman, Godard, and First-person Film*. Princeton, NJ: Princeton UP, 1978. Print.

Kleinfeld, Sanders.*The Ebook Developer's Toolbox*. ebookCraft conference 2016. http://techforum.booknetcanada.ca/events/tech-forum-2016/custom-18-b26e185c19fe4e919f04e6e5cde72c4f.aspx

Knappenberger, Brian - Luminant Media.*The Internet's Own Boy: The Story of Aaron Swartz*. https://www.youtube.com/watch?v=vXr-2hwTk58. film <accessed Dec 2015>

Koch, Peter-Paul. Form follows function. 2003. http://www.digital-web.com/articles/form_follows_function <accessed 6 July, 2016>

Kremer, John. *The Self-Publishing Hall of Fame* http://www.selfpublishinghalloffame.com/a.htm <accessed 13 May 2016>

La Farge, Paul. *The Deep Space of Digital Reading,* nautil.us. January 7, 2016. web. http://nautil.us/issue/32/space/the-deep-space-of-digital-reading?utm_source=BNC+eNews&utm_campaign=8c8a596f83-BNC_eNews_January_19_2016&utm_medium=email&utm_term=0_a10723ac8b-8c8a596f83-321513101 <accessed Jan 2016>

Laquintano, Tim 'Sustained Authorship: Digital Writing, Self-Publishing, and the Ebook' *Written Communication* 27(4) 469 – 493 © 2010 SAGE Publications

LeGuin, Ursula. ed. Sander, David. "From Elfland to Poughkeepsie" 1973. *Fantastic Literature* EBSCO Publishing-Net Library; printed on 10/25/2010 University of Florida,

Maguire, Gregory. *Review for 'Spirits and Sinners'*. The New York Times Book Review, January 16-17, 2016

Mak, Bonnie. *How the Page Matters*. Toronto: U of Toronto, 2011. Print.

Maloney, Jennifer. "The Rise of Phone Reading" Aug. 14, 2015 http://www.wsj.com/articles/the-rise-of-phone-reading-1439398395 <accessed 20 October, 2015>

Manguel, Alberto. *A History of Reading*. Toronto, Canada: Alfred A. Knopf, 1996. Print.

McLuhan, Marshall. Essays by W. Terrence Gordon et al. *The Gutenberg Galaxy: The Making of Typographic Man*. Toronto: University of Toronto, 2011. Print.

Meyer, Eric. *Designing for Crisis*. An Event Apart 2014. https://vimeo.com/148927676 <accessed Feb. 2015>

Meyer, Eric. *Eric Meyer (Complex Spiral Consulting) interviewed at Fluent 2015* https://www.youtube.com/watch?v=wajRhuMZzS0 <accessed Feb. 2016>

Meyer, Eric. *Eric Meyer, Meyerweb - XOXO Festival (2015)* https://www.youtube.com/watch?v=sj-_NTCYzFk <accessed Feb. 2016>

Meyer, Eric. *This Web App Best Viewed by Someone Else*. https://www.youtube.com/watch?v=r38al1w-h4k&feature=youtu.be <accessed Feb. 2016>

Meyers, Peter. *Breaking the Page: Transforming Books and the Reading Experience*. Copyright © Peter Meyers, 2014

MIT panel on the W3C's decision to make DRM part of the Web's "open" standards. http://boingboing.net/2016/04/06/mit-panel-on-the-w3cs-decisi.html <accessed 6 Apr, 2016>

Michl, Jan. *Form Follows WHAT?* http://janmichl.com/eng.fff-hai.html <accessed 5 July, 2016>

Nash, Richard. *What is the business of Literature?* Virginia Quarterly Review. Spring 2013

Newell, Alan et. al. https://vimeo.com/52490117 <accessed Feb. 2016>

Newell, Alan et. al. *Relatively PC* https://vimeo.com/52490115 <accessed Feb. 2016>

Newell, Alan F. *Design and the Digital Divide Insights from 40 Years in Computer Support for Older and Disabled People*. A Publication in the Morgan & Claypool Publishers series Copyright © 2011 by Morgan & Claypool www.morganclaypool.com

Nix, Charles. http://www.newschool.edu/parsons/faculty.aspx?id=4e6a-557a-4e6a-553d

Nix, Charles. https://vimeo.com/2820733

PG. 7 October 2013 http://www.thepassivevoice.com/10/2013/told-by-an-idiot/ <accessed 12 October, 2015>

Poster, Mark. *Information Please: Culture and Politics in the Age of Digital Machines*. Durham: Duke UP, 2006. Print.

Price, Bruce. *FORM, FUNCTION, FOOLISHNESS*. 2006. http://www.creativity-portal.com/articles/otoh/form.function.foolishness.html <accessed 6 July, 2016>

Prpick, Sean *'Social reading' the next phase of ebook revolution*. CBC News Feb 25, 2013. http://www.cbc.ca/news/canada/social-reading-the-next-phase-of-ebook-revolution-1.1339149 <accessed July 5, 2016>

Race, The Floating Signifier. Dir. Sut Jhally. Perf. Stuart Hall. Media Education Foundation, 1997. Transcript.

Raymond, Eric S. http://www.catb.org/esr/writings/cathedral-bazaar/ <accessed 7 Apr 2016>

Raymond, Eric S. *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. Beijing: O'Reilly, 2001. Print.

Representation & the Media. Dir. Sut Jhally. Perf. Stuart Hall. Media Education Foundation, 2005. Transcript.

Said, Edward W. *Culture and Imperialism*. New York: Vintage, 1994. Print.

Schultz, Derrick. *99 Problems*. https://github.com/dvschultz/99problems/labels/iBooks%20iPad <accessed 7 April, 2016>

Schultz, Derrick. *99 Problems*. https://github.com/dvschultz/99problems/labels/iBooks%20iPad <accessed 7 April, 2016>

Stallman, Richard. *Opposing Digital Rights Mismanagement*. http://www.gnu.org/philosophy/opposing-drm.en.html

Stephenson-Abetz, Jenna. "Everyday Activism as a Dialogic Practice: Narratives of Feminist Daughters Department of Communication Studies", University of Nebraska – Lincoln, Lincoln, Nebraska, USA 2012.

Stuart Hall: The Origins of Cultural Studies. Dir. Sut Jhally. Perf. Stuart Hall. Media Education Foundation, 2006. Transcript.

Swartz, Aaron. *Guerilla Open Access Manifesto*. https://archive.org/stream/GuerillaOpenAccessManifesto/Goamjuly2008_djvu.txt

Swartz, Aaron. *The Boy Who Could Change the World: The Writings of Aaron Swartz*. Pub. Verso 2016. http://www.versobooks.com/books/2077-the-boy-who-could-change-the-world <accessed 9 April, 2016>

Tait, Janice. *Learning To Live: A Memoir of Sisterhood*. Toronto: Janice Tait Press, 2012, ebook.

Tait, Janice. *The Devil's Snare*. Toronto: McGilligan Press, 2005, Print.

Taylor, Jim, Dr. University of San Francisco "Are Self-published Authors Really Authors or Even Published?" Posted: 09/30/2013 12:11 pm EDT http://www.huffingtonpost.com/dr-jim-taylor/are-self-published-author_b_4017301.html <accessed 12 Oct 15>

Tschichold, Jan. web. http://www.azquotes.com/quote/712760 <accessed 12 Mar., 2016>

Verma, Henrietta. *www.libraryjournalcom Reviews, News*. *And More* September 15, 2015 Library Journal

Vivienne, Sonja and Burgess, Jean *The Digital Storyteller's Stage: Queer Everyday Activists Negotiating Privacy and Publicness* 2012 Broadcast Education Association Journal of Broadcasting & Electronic Media 56(3), 2012, pp. 362 – 377

WAI http://www.w3.org/WAI/intro/w3c-process.php <accessed 5 May 2105>

Waller, Robert. *Graphic Literacies for a Digital Age: The Survival of Layout*. The Information Society: An International Journal, 28:4, 236-252 (2012)

WC3-Aria Notes. http://w3c.github.io/aria-in-html/ <accessed 19 May, 2016>

WCAG http://www.w3.org/WAI/intro/wcag <accessed 5 May 2105>

Weaver, Matthew & Brown, Mark http://www.theguardian.com/books/2015/oct/14/man-booker-prize-marlon-james-debut-novel-rejected-nearly-80-times 15 October 2015 <accessed 18 October 2015>

Wilson, Tom. *The ebooks research project*. Funded by Vetenskapsrådet – the Swedish Research Council. https://projectebooks.wordpress.com/2015/09/05/international-conference-by-thebook-2015-books-and-reading-in-an-age-of-media-overload-18-19-june-2015-florence-italy/ Sep. 2015 <accessed 12 October 2015>

Wolf, Maryanne, and Catherine J. Stoodley. *Proust and the Squid: The Story and Science of the Reading Brain*. New York, NY: Harper, 2007. Print.

Wolinsky, Art. *The History of the Internet and the World Wide Web*. Berkeley Heights, NJ: Enslow Pub. 1999,.Print

Wooyong Yi et al. *Ebook Readability, Comprehensibility and Satisfaction*. ICUIMC'11, February 21–23, 2011, Seoul, Korea

Zeldman, Jeffrey, and Ethan Marcotte. *Designing with Web Standards*. Third ed. Indianapolis, IN: New Riders, 2003. Print.