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Bridging the Gap: Exploring Interaction Metaphors to Facilitate Alternative Reading Modalities in Digital Scholarly Editions

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Abstract

The Digital Scholarly Edition sits at an intriguing cross-section within the academic landscape. While its analogue counterpart, the Scholarly Edition, is primarily written for a fairly specialised audience, the Digital Scholarly Edition is, by the nature of its distribution model, open to the general public. For the first time in the history of Scholarly Editing, these editions – once of interest to a fairly small subset of academics – are now available to everyone, both within and outside of traditional academia, as the internet provides them with a free (or in some cases, low cost) access model. While the Digital Scholarly Edition has adopted many metaphors from the traditional analogue Scholarly Edition (such as the footnote, index, and table of contents), these metaphors are often implemented in a literal fashion without concern for how they can evolve in a digital space. Drawing on the work of noted experts in the field of Interaction Design and Information Architecture, these interactions, along with additional interaction techniques, will be discussed in an effort to support new, digital modes of reading. A blended approach of the traditional interaction metaphors with newer metaphors will be advocated in order to support the forward momentum of the Digital Scholarly Edition and digital scholarship as a whole.

1 Introduction

Scholarly editions have long provided textual scholars with a mode of knowledge dissemination. However, the evolution of the edition into the digital landscape has created a new experience, allowing for interactions with the text which are far beyond what is capable in the physical medium. Unfortunately, the Digital Scholarly Edition still borrows heavily from its analogue counterpart with regard to the interface. The use of footnotes and endnotes, the inclusion of an index or table of contents, the notion of a *page turn*, and the function of a critical apparatus are all borrowed from the analogue book (or in the case of the critical apparatus, the scholarly edition as a book). Each of these components – which, when transferred to the digital, become known as functional metaphors – serves to facilitate the ultimate goal of the traditional

edition: reading. And while the Digital Scholarly Edition provides ample support for traditional close reading, research has shown that readers do not read the same digitally as they do when reading print (Liu 701; Burbules 102).

While it is true that some of these metaphors have been adapted to support alternative methods for navigating the Digital Scholarly Edition, many of the common metaphors borrowed from the book serve primarily to facilitate close reading. However, it is clear that most of these common metaphors do not provide support for alternative methods of textual engagement. As the digital medium removes the physical barriers associated with the book, scholars and the general public alike are provided with an environment which not only facilitates alternative methods of engagement, but actively encourages them. This can be seen most readily when examining various alternative methods of reading – such as *hyperreading*, *radial reading*, and *distant reading* – and understanding the interactions which support them. Through a careful examination of these modalities and how existing metaphors can be adapted or new metaphors can be created, Digital Scholarly Editions can transcend the artificial boundaries of their print counterparts and embrace an environment which supports not only its original intention – that of close reading – but also alternative reading modalities which actively engage with the medium, thus leading to an experience beyond the traditional scholarly work.

2 Problems with digital reading

Reading is defined as “the process of constructing meaning from written texts. It is a complex skill requiring the coordination of a number of interrelated sources of information” (qtd. in Anderson et al. 389). In an academic context, this process is taken a step further through *close reading*. Close reading, defined as “[the] instructional practice that makes complex texts accessible using repeated reading, cognitive scaffolding, and discussion” (Fisher and Frey 35), has been the traditional method of critically examining a text and continues to be a strong focus with regard to literacy and reading education. The U.S. Common Core standards specifically state the importance of close reading, noting:

Students who meet the Standards readily undertake the close, attentive reading that is at the heart of understanding and enjoying complex works of literature. They habitually perform the critical reading necessary to pick carefully through the staggering amount of information available today. (CCSSI 3)

The skills associated with close reading – such as meticulous analysis of language patterns, pattern combination, and analysis of irony, symbolism, and metaphor – are

seen as necessary to truly understand and comprehend the text in question (Hinchman and Moore 443).

Although traditionally, close reading techniques are generally applied to literary analysis, this type of close, attentive, sequential reading from beginning to end is a necessary part of the comprehension process of linear texts, whether it be in the form of a work of fiction, a poem, short story, periodical, letter from a loved one, etc. As an example, when reading a newspaper, a reader will often re-read given sections in order to facilitate the cognitive processes involved in parsing fact from opinion or to assist with her ability to construct an informed opinion on the subject matter. When reading a letter, a reader pays close attention to given sections, analysing the use of language, looking for the use of metaphors or symbolism, and interpreting the tone of the writing in order to tease out any subconscious clues related to the author's emotional state of being.

However, with the advent of digital technology and the plethora of information readily available via digital sources, close reading techniques are less likely to be used in digital environments (Hayles 56). Numerous studies have shown reliance upon traditional close reading techniques in digital environments lessens reading comprehension (Mangen et al. 65–67), a phenomenon which is not prevalent with printed materials (Jabr, par. 6). A study conducted by Mangen, Walgermo, and Brønnick in 2013 highlights many of the issues inherent with the application of close reading techniques in digital environments. In this study, Mangen and her team evaluated the rate of reading comprehension between two groups of readers, each reading two versions of the same text: one in an analogue (print) format and another in a digital (PDF) format. The text itself contained both a narrative text as well as an expository text. Her study demonstrated that those who read the analogue form of the text had a greater comprehension rate than the readers of the digital version of the text.

Mangen et al.'s study proposed two primary contributing factors: metacognition and navigability of the text. Metacognition, defined as “[k]nowledge and beliefs about one’s own cognitive processes” (Colman, par. 1), has been shown to have a strong influence on a reader’s ability to process text, due largely in part to inherent biases the reader possesses regarding digital versus analogue text (Ackerman and Goldsmith 28–29). According to Ackerman and Goldsmith, readers have an innate bias towards digital reading, viewing it as *easier* and *less effortful* than analogue reading; as a result, this bias creates a meta-metacognitive process (also known as a second-order level judgement), leading the reader to subconsciously allocate less attention to a digital rendition of a text (Ackerman and Goldsmith 29–30).

The use of navigation within the text highlighted by Mangen et al. is perhaps the more relevant issue, as it can be addressed through an application of solid design principles. They noted that one of the primary navigation issues was that of the

reader needing to *scroll* through the text, as the entire body of the text did not fit on screen, creating a type of “spatial instability” (65). Piolat et al. note the importance of positional placement when reading text. In their experiments using eye-tracking software, Piolat et al. noted how the gaze of the eye was forced to constantly reposition itself when reading in digital environments (565–566). Unlike in a print environment, where the eye remains relatively stable as it is only tracking a page at a time, the scroll effect in digital environments forces the eye to continually reposition in order to track changes within the environment. This spatial instability leads to a decrease in the reader’s ability to comprehend the text (Piolat et al. 566; Mangen et al. 65).

Spatial instability is not the only navigation-related problem in digital environments. Various studies have shown that readers rely upon the position of text within a physical space to aid in recall, particularly when attempting to recall specific information (Giulia Cataldo and Oakhill 797; Piolat et al. 566; Zechmeister and McKillip 451). By its very nature, printed text offers rigid, physical structure which allows the reader to construct a mental map of the text, regardless of the length of the text in question. This map is often referred to by the reader in order to recall relevant bits of information (McKnight et al. 72–73; O’Hara et al.), such as recalling the position of a passage being located on the lower left-hand side or the upper right-corner of the page. This recall assistance provides an easier path to cognition for the reader by providing her with an additional mode of categorisation: that of physical placement (Jabr, sec. “Navigating Textual Landscapes”, par. 3). However, in a digital environment, this rigid, physical structure is removed. Consider, for example, the earlier spatial instability problem where the text has no true, permanent place on screen but rather a fluid, virtual place. Mangen et al. note that without this physical boundary, the reader has lost a vital cue to aid in the recall process (65–66). Due to digital reading’s immersive and often multi-faceted nature, the cognitive functions of the brain engage with reading in ways different from that in print (Mangen 405).

These problems are inherent primarily when approaching the text utilising a traditional, close reading. However, as Hayles notes, the decline in close reading techniques, coupled with the problems intrinsic to close reading in digital environments has led to an evolution in how we engage with textual content in digital environments (Hayles 56–91). From this evolution, alternative modalities of reading have developed. For the purpose of this paper, three modalities will be discussed: hyperreading, radial reading, and distant reading.

3 Alternative reading modalities

Hyperreading, the most common of the three, is perhaps best defined as reading which takes place specifically with regard to hypertext and occurs in a non-linear

fashion (Zhang 24). While print media can be read in a non-linear fashion (via the use of tools such as the index or table of contents), for clarification purposes, the definition of hyperreading here specifically refers to non-linear readings of digital text. Despite the fact that hypertext can be read in a traditional manner, following a linear structure (like that of printed text), the nature of hypertext allows the reader to carve her own path through the narrative. Unlike hyperreading, traditional print reading within scholarly editions is hierarchical by nature. While print reading can be approached in a non-linear fashion (by jumping to end notes or the index, for example), the form of the book makes this cumbersome. Hypertext, by contrast, can be linear as well as lateral due to the lack of boundaries imposed by a physical medium, therefore breaking the metaphor of the linear, structured text and organisation of ideas. Hypertext, then, has the capacity to create nuanced and complex relationships between narratives (Burbules 107). Zhang notes that while traditional reading leads to the development of hierarchical thinking skills – due to the highly structured nature of a printed work – hyperreading promotes a kind of “thinking by association” (24).

This thinking by association can then lead to further cognitive development. Uso-Juan and Ruiz-Madrid note the importance hyperreading plays in the development of a user’s reading skills due to its reliance on a greater cognitive effort by the reader as a result of the multiple paths to content afforded by the environment (62). Such skills lend themselves to an increased flexibility in a reader’s ability to understand and consolidate information from a variety of sources. As Loretta Kasper notes:

Reading hypertext is a naturally dynamic, recursive, and integrated process, one that provides multiple opportunities for students to acquire, test and reframe knowledge through cognitive reconstruction of text, intertextual analysis and exposure to varied perspectives on issues. Thus, hypertext may promote increased comprehension through the elaboration and integration of new information into the existing knowledge network as readers create and expand the cognitive map that guides their construction of meaning. (Kasper, sec. “Hypertext and Reading Skills”)

However, it should be noted that hyperreading is not without its disadvantages (Uso-Juan and Ruiz-Madrid 63). Some of these disadvantages (such as a lack of clear navigational or contextual clues to and from various content nodes, or device-specific issues such as screen resolution, glare, or eye strain) can be addressed via solid information architecture practices or via more suitable hardware designs, which continue to evolve along with the requisite technology. The most glaring problem, however, lies within the notion of “cognitive overload”, as highlighted by Kasper.

Cognitive overload occurs when working memory, defined as “the set of mental processes holding limited information in a temporarily accessible state in service of cognition” (Jaeggi et al. 75), is provided with an influx of information beyond

its capacity to process. The phenomenon is a common, recurring problem with digital reading. While it is often presented as a problem specifically with regard to hyperreading, studies have shown it to be problematic with how we consume standard text in digital formats as well (Horava 83). Some of the factors which contribute to cognitive overload – such as the meta-metacognitive response to digital reading versus print or the lack of a physical boundary to assist with recall, both of which were highlighted above – cannot be easily addressed. Others, such as spatial instability or textual layout, however, can be addressed via the implementation of design principles. Thus, it becomes an issue of usability design to ensure non-linear content is presented in such a way so as not to cause a *rabbit hole* scenario in which the reader becomes lost in a virtual quagmire of content due to this type of information overload. Burbules also notes that while digital environments have conditioned us to screen information more efficiently, as a consequence we have also seen a reduction in our ability to sustain attention for any length of time (108). This, in turn, makes traditional close reading techniques more difficult in digital environments, a problem which is not as prevalent in traditional print environments (Jabr, par. 6).

Hyperreading is but one of the alternative modalities available to the reader. Jerome McGann has long been a proponent of looking at text differently in digital environments. In his book *Radiant Textuality*, McGann notes the limitations of text in the physical book and recognises the possibilities offered by digital tools and their environments, stating:

When we use books to study books or hard copy texts to analyze other hard copy texts, the scale of the tools seriously limits the possible results [...] electronic tools in literary studies don't simply provide a new point of view on the materials, they lift one's general level of attention to a higher order. (McGann, *Radiant Textuality* 55)

He goes on to note that scholarly editions are notoriously difficult to read because they employ a book form to study another book form. In McGann's words, "[t]his symmetry between the tool and its subject forces the scholar to invent analytic mechanisms that must be displayed and engaged at the primary reading level" (*Radiant Textuality* 56). Digitisation removes the physical barriers by moving the content into a virtual environment, no longer dependent upon the physical medium, allowing "semantic and visual features" to be "simultaneously present" (McGann, *Radiant Textuality* 57).

This digitisation of text thus supports McGann's concept of "radial reading", which he first proposed in 1991. Radial reading involves reading *outward* from the text by expanding the content of the text with external sources (McGann, *The Textual Condition* 120). Radial reading is inherent in traditional scholarly editions by encouraging the reader to refer to the notes (both footnotes and endnotes) and via the use of the index. However, this type of reading in a physical environment can be cumbersome,

Wednesday, 5th January, 1916

No news this morning.

Aunt Maisie lent us the small motor

in the afternoon so we went to see

Aunt Helena she was very grieved

to hear that we had no news of **you**

& is praying hard & getting prayers

said for **you**. We spent quite a long t

& then **Ethel** & I went on to the **Col**

Convent at Donnybrook to get pra

there. We had a most amusing

experience as the gate happened to

open & the car drove in. So **Ethel** &

ventured in where a door was open

& light shining but we saw we could

get no further & heard a very low

mysterious voice coming from we

knew not where & but we could not

make ourselves understood & ran away.

We called at the lodge & saw two women

there who were fearfully excited & told

us to take the car away at once it

should never have gone in. & that we

would not have found the gate open

only they were expecting a hearse.

However we said we would write our business

Charles Andrew Martin

Born 3 June 1895, Charles Andrew was Mary Martin's son. This diary is dedicated to him. He was reported wounded and missing in December 1915 and died of his wounds on December 8 while in Bulgarian captivity, aged 20. However it wasn't until July 1 1916 that official confirmation of his death was received.

Figure 1: Modal popups in *The Diary of Mary Martin*. Reproduced with permission from the project team.

as it can disrupt the natural flow of the reader, as she must interrupt the reading process to turn pages in order to locate additional information elsewhere within the text. This utilisation harkens back to McGann's earlier quote above, which specifically addresses the notion of using a book form to study a book form. However, in a digital environment, with the physical constraints of the book removed, radial reading can be easily supported by placing the apparatus and its subsequent components at the fingertips of the reader, allowing these external sources to flow alongside (or even within) the body of the text. This can be accomplished in numerous ways, perhaps the most common being that of the modal popup as seen in *A Family at War: The Diary of Mary Martin* (see figure 1).

Franco Moretti offers a more revolutionary approach to reading. Whereas Hayles and McGann largely concern themselves with reading environments for a small corpus or edition, Moretti seeks to answer the question originally proposed by Gregory Crane: "How do you read a million books?" (Crane). He points out what he perceives to be the inherent flaw with close reading which is that, by design, it depends upon an extremely small corpus (Moretti 48). In his work with world literature, Moretti felt

it important to migrate away from the notion of a small canon to truly understand a particular genre, stating “[close reading is] a theological exercise – very solemn treatment of very few texts taken very seriously – whereas what we really need is a little pact with the devil: we know how to read texts, now let’s learn how not to read them” (48).

From this idea, Moretti developed his notion of distant reading, defined as the ability to “focus on units that are much smaller or much larger than the text: devices, themes, tropes – or genres and systems” (48–49). Through the use of tools such as topic modelling, network analysis, and data visualisations, distant reading techniques can provide the reader with a *30,000-foot view* of the corpus in question, allowing readers to note patterns that may not be visible utilising only a close study. Distant reading provides Digital Scholarly Editions with a unique method of investigation.

While Moretti originally proposed the idea with a large corpus in mind, distant reading techniques can easily be applied to a smaller corpus and still provide the reader with valuable insight. For example, *The Letters of 1916*, a corpus of roughly 1,400 letters at the time of this writing, would not be considered a particularly large corpus by Moretti’s standards. It would be feasible to read through all 1,400 letters and conduct a close reading of each. However, distant reading techniques – such as a network analysis of the senders and recipients, or data visualisations which allow the reader to investigate the corpus by topic or gender – provide a pictographic, high-level view of the data, which can be easier to process, cognitively speaking (Drucker 65). These types of visualisation techniques allow us to “break the literalism of representational strategies and engage with innovations in interpretative and inferential modes that augment human cognition” (Drucker 71). However, it is important to note that while the tools and insights offered by distant reading are unique – and, by some standards, revolutionary – it is not meant to replace close reading, but rather to augment it.

4 The role of the interface

Understanding the ways in which readers engage with text in a digital environment via alternative modalities of reading is only the first step. The role of the interface also plays a vital part in engaging the reader. Not only does the interface play a role in how well the user can locate information within a system, but one of the cornerstones of Human Computer Interaction is the notion of *retention* – how long over a period of time the user is able to retain and recall information derived from an electronic source – which is strongly influenced by how much time the reader spends obtaining the information and how frequently the digital system is utilised (Shneiderman et al. 14). Johnson notes the importance of consistency in the user interface with regard to enhancing long-term memory retention (Johnson 92–95). In

order to illustrate this, Johnson cites the example of the copy-and-paste functionality within word processing software (Johnson 94–95). Word processing software can support various types of content: text, images, embedded video, tables, pre-defined shapes, and so on. In the first design scenario, all of these content types support copy-and-paste functions via the same keystroke (for the purposes of this example, Ctrl+c and Ctrl+v). In the second design scenario, each content type has its own copy and paste keystroke (text will use Ctrl+c and Ctrl+v; images will use Ctrl+k and Ctrl+l; video will use Ctrl+r and Ctrl+t; etc.). In the final design scenario, all content types will utilise the same keystrokes for copy and paste *except* videos which will use a different keystroke (for example all but video use Ctrl+c and Ctrl+v but video uses Ctrl+y and Ctrl+t). Using this example, it is easily understood that the first design scenario is the easiest to learn and recall because all modalities of content leverage the same, consistent keystroke pattern to perform the same function. In the other two design scenarios, a more significant burden is placed on the user's cognitive abilities, thus making the system more difficult to learn and recall (Johnson 95).

Wiedenbeck also notes the role of the interface with regard to learning and retention. In her article, Wiedenbeck examined the use of icons and labels to denote system functionality. She had users with little to no experience of a system attempt to use that system in three different scenarios: one scenario where functions were depicted by only icons; one scenario where functions were depicted by only labels; and a third scenario where functions were depicted by both an icon and label. Her findings showed that users in the first scenario had more difficulty than those in the second and third scenarios. She theorises this is due to the fact that in the second and third scenarios the users need only interpret the functionality the language points to, as they intuitively understand the natural language of the labels; whereas in the first scenario, the user must first interpret the symbol – translating to natural language – and *then* interpret the functionality within the system to which the icon refers. This dual interpretation leads to an increase in cognitive load which by default causes retention to become more cumbersome (Wiedenbeck 79–80).

Proper categorisation within the interface can also aid in the brain's ability to retain and recall information (Johnson 139–141). Consider the organisation of the standard webpage, which has evolved over the past 20 or so years. The commonly accepted format for any website is for the logo to appear in the upper left (which is hyperlinked to always return to the home page); the navigation to appear either along the top of the page as a pull-down menu, along the left-hand side of the page as a list, or hidden behind a "hamburger menu" which causes either a left-hand or right-hand slide-out to appear with the menu options; and content in the centre of the page. This consistent layout implementation is done in a hierarchical and categorical method in order to facilitate retention. If a user needs to locate a navigation item or quickly return to the homepage, she knows immediately where to access these

items on the page, regardless of how deep she may be within the website itself. If this categorisation did not exist and these elements did not appear consistently or were scattered across the location of the page, the user would have a significantly more difficult time locating the information for which she is searching.

The study of this type of categorisation is a primary function of the field of Information Architecture, known as “the art and science of shaping information products and experiences to support usability, findability, and understanding” (Rosenfeld et al. 23). Information Architecture provides a framework for which designers can reduce the cognitive load of the user. It is concerned with more than just the names of control labels or the icons used within a given system. It extends the study far beyond, considering the greater eco-system as a whole (Morville, loc. 244–256 of 2808). The previously mentioned categorisation is essential, then, because it considers not just the placement of the logo or the labels used within the navigation scheme but rather how each of these components work together to form a holistic approach which enhances usability and decreases the cognitive load which can inhibit memory and retention.

Johanna Drucker also notes the importance the interface plays with regard to cognition, specifically distributed cognition which is defined as the idea that both sensory and motor activities contribute to one’s ability to gain knowledge or experience (140). In her book *Graphesis*, Drucker discusses the early importance of sensory input in order for humans to effectively utilise computers. Pioneers such as Douglas Engelbart (who created a prototype for the first mouse device) and Ivan Sutherland (who created one of the first head-mounted displays in an early attempt at virtual reality) recognised the importance the interface plays in engaging the user (Drucker 140–141). Whether through the use of external peripheral or through effective usability design (such as Shneiderman et al.’s direct manipulation style of interaction), immersion plays an important role regarding the user experience. By increasing the sense of immersion, digital environments can greatly increase a reader’s ability to comprehend the text (Dede 66). This immersive nature of the interface can be seen throughout the evolution of personal computing. In the early years, immersion was brought to the forefront via the use of additional peripheral, such as the keyboard or mouse. In more recent years, immersion has been addressed via design techniques which seek to draw the attention of the reader and engage her on a more than intellectual level.¹

The interface also acts as a gateway to the information contained within the Digital Scholarly Edition, not only due to the importance of how the information is organised

¹ Shneiderman et al. discuss the use of direct manipulation techniques to increase the level of immersion. This is primarily done by implementing affordances which provide immediate feedback to the user, giving the illusion of control (Shneiderman et al. 67–68, 199–204). This can be seen in many modern interfaces through the use of slider controls (which may control video playback, the zoom level for an image, or sound volume) or the “drag and drop” feature common within many file-based systems.

but also through the emotional interplay which can be evoked by the interface itself. If the interface is unfriendly or provokes a negative emotional response, the user will navigate away from the material. As Shih and Liu note, “[u]sers are no longer satisfied with efficiency and effectiveness; they are also looking for emotional satisfaction” (203). Unlike printed material, which largely conforms to a universal set of rules and has interactions and affordances bound by the physicality of the medium, the Digital Scholarly Edition does not possess such uniformity, providing each edition with the opportunity to produce a unique experience. While this uniqueness can set the edition apart within the mind of the reader, it can also create unnecessary barriers to information if the interface is not properly considered. Items such as interactivity, immersion, information architecture, and even the use of colour can have a strong impact upon the reader’s experience within the edition.

While many of the former items (interactivity, immersion, and information architecture) are given priority of place in design discussions, too often the use of colour is not considered from a psychological standpoint. Colour has a major impact in how the reader processes and receives information: “[a] person’s response to color and tone can help determine how information is understood and can affect whether a consumer buys a product or uses a client’s services” (Aaris 78). Despite the more private sector focus of Aaris’s quote, her assertion holds true even in scholarly works, as colour can affect the reader’s emotional response to the text, thus biasing her consumption of particular information or even causing her to navigate away from the edition (Aaris 79–82). Colour theory is still in its infancy with regard to how it affects readers and their respective experiences with digital content, but there is enough data to highlight it as an item of relevance.

The emotional interplay brought about by the use of colour, coupled with the way in which a reader interacts with the edition based on her user experience and emotional response serve an obviously vital role in the *success* of the edition. It is through this careful balance of utility and functionality coupled with the aesthetic lure that leads to an increased emotional response that can transform an edition from digital text to a digital *experience* (Hartson and Pyla 29). Norman discusses this balance,² noting the importance it plays regarding decision making and behaviour: “One of the ways by which emotions work is through neurochemicals that bathe particular brain centers and modify perception, decision making, and behavior. These neurochemicals change the parameters of thought” (*Emotional Design* 10). Aspects such as colour (which

² Norman (*Emotional Design*) breaks down the emotional response into three primary components: the visceral (which deals primarily with the response to an aesthetic), the behavioural (which is found primarily in the response to the functional aspects of a system) and the reflective (concerned with the *after-effect* of a system whereby the user reflects upon her interaction with the system after use and makes decisions regarding its usefulness or effectiveness) (Norman, *The Design of Everyday Things* 5, 37–38).

elicits a visceral response) or systems which support information-seeking³ (which tends to have a reflective response) are just as important as the more functional (or behavioural) aspects of the interface.

Finally, Ruecker et al. note the other important role the interface plays with regard to engagement: that of a marketing tool or attraction method. With the ubiquitous nature of digital content, Digital Scholarly Editions compete for a *mindshare* of the individual's resources. As most of this digital content is designed to be attractive and memorable, it is only logical that the interface for a Digital Scholarly Edition must also be designed in such a way as to compete for this mindshare and separate itself from the plethora of online materials available on a given subject (Ruecker et al. 172). The Digital Scholarly Edition is more widely available to the average reader than its analogue counterpart, thus the notion of *attraction* – the ability of the edition to *stand out* and mark its place in the reader's mindshare – is an essential component to be considered.

5 Examples of alternative interactions

By understanding the ways in which readers can engage with digital text via alternative reading modalities, as well as the role the interface plays in the support of digital interaction, new interaction paradigms can be explored and discovered. Some of the *stock* interactions commonly used by Digital Scholarly Editions can be reworked to support alternative approaches to close reading. For example, footnotes and endnotes can be implemented in a literal fashion with the existence of the note at the bottom of the virtual *page* as seen in *The Letters of Matthew Arnold* (see figure 2); however, they can also be implemented as modal overlays as seen in *The Woodman Diary* (see figure 3), an interaction impossible to achieve with an analogue book but quite native and familiar in a digital environment. In both examples, a close reading experience is possible and is enhanced by the inclusion of additional material. However, in the latter example, hyperreading is also supported through the introduction of the modal overlay, primarily through the use of the *View in Glossary* function (which can be seen in figure 3). This function redirects the user to a page with further information about the particular item being described (see figure 4). If available, this *glossary view* will also detail other entries within the diary which mention the term in question. This facilitates a more *non-linear* reading of the source material. In addition, external resources are often supplied in the *glossary view*, thus allowing for further readings

³ Information-seeking (Carenini 383) plays a vital role in what Attrill defines as a *need for cognition*, which she defines as “desire to both employ cognitive effort and to enjoy the rewards of that effort” (39). This need plays a significant role in how users leverage systems. Norman's three types of emotional responses all seek to meet this need for cognition.

The Letters of Matthew Arnold *A Digital Edition*

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Letter **Mary Penrose Arnold to Jane Penrose and C. Lydia Penrose, 8 December 1838**

V1P34D1

Rugby
[December 8, 1838]

Matt: is not at home, having been invited to the dig at Sir Gray Skipwiths¹—& the promise of a double barrelled gun for his entertainment so filled him with joy that I believe he has thought of little else since the invitation came—This shooting mania I cannot like—but we have given him to understand that it must be indulged sparingly, & his father does not think it right to debar him from an amusement he so delights in. A gun is bought accordingly which is to go to Fox How, & live there—only with these conditions that it shall be considered the gardener’s gun, & that there is to be no hedge popping or slaughter of little birds. I was interrupted by his return from Newbold Hall—& hearing his history of his day of enjoyment—Now he is gone to bed.

MS. Brotherton Collection.

1. Sir Gray Skipwith (1771–1852; 8th bt), of Newbold Hall, nearby, had been a trustee of Rugby School since 1804.

← Previous letter | Next letter →

Figure 2: Footnotes in *The Letters of Matthew Arnold* (annotation added). Reproduced with permission of the University of Virginia Press.

outside the source text, which can provide for further engagement with the text and provides support for a radial reading approach.

One can also examine these same two examples from both a utilitarian and aesthetic viewpoint. *The Letters of Matthew Arnold* relies upon the Gestalt principle of similarity (Johnson 14–15). By grouping the footnotes at the end of the document and decreasing the point size of the font (see figure 2), it is clear to the reader that the footnotes play a different role than the standard body text. However, under the *Gestalt* principle of proximity, these footnotes are also de-emphasised and, thus, seen as “less important” to the user (Johnson 11–13; Schlatter and Levinson 37–38), a factor which may or may not be problematic depending upon the goals of the editor or the reader. However, in *The Woodman Diary*, these footnotes, which also rely on the principle of similarity by the use of coloured text (see figure 3), are not de-emphasised because their placement remains directly within the primary text, giving them equal *weight* of importance in the mind of the reader due to both the principle of proximity and the principle of

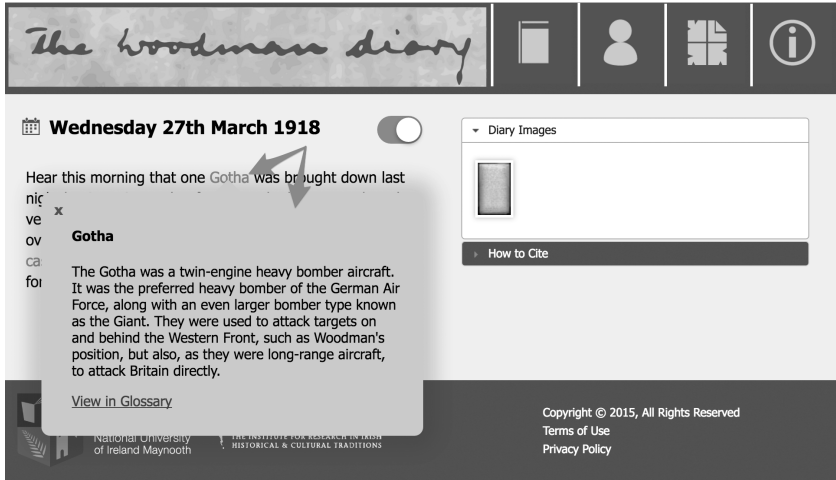


Figure 3: Footnotes in *The Woodman Diary* (annotation added). Reproduced with permission of An Foras Feasa.



Figure 4: Use of the Glossary in *The Woodman Diary*. Reproduced with permission of An Foras Feasa.

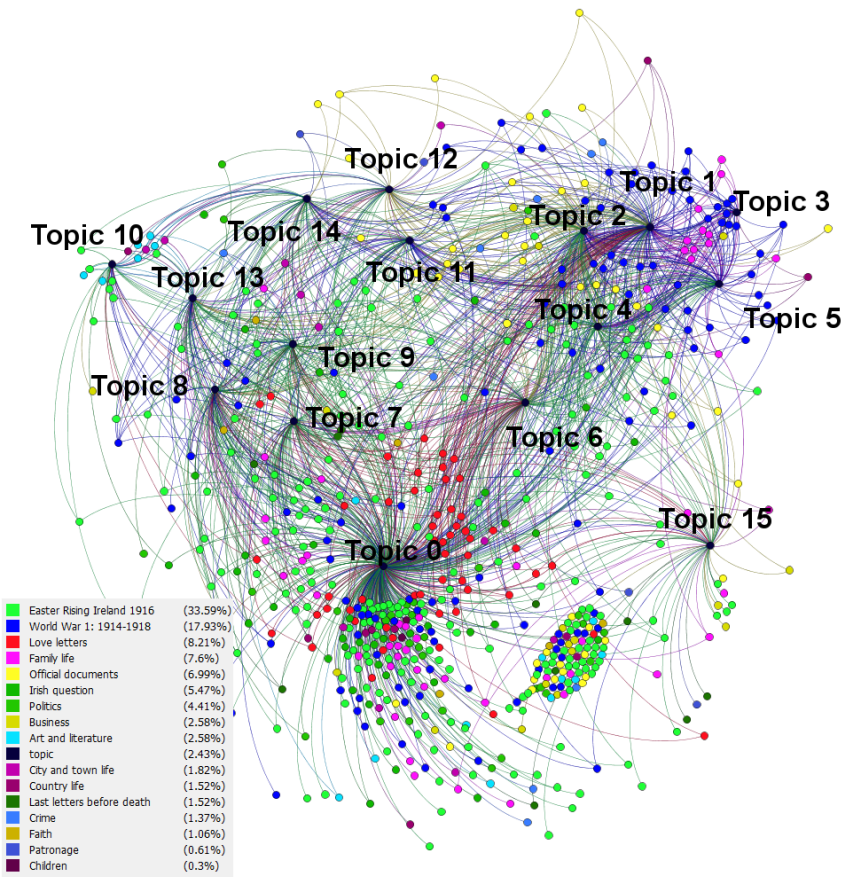


Figure 5: Visualisation in *The Letters of 1916* showing the distribution of letters into topics using LDA topic modelling and Gensim (Bleier, sec. Gensim – 16 topics). Reproduced by permission of An Foras Feasa.

figure/ground (Johnson 14–15). Additionally, the interface appears less *busy* as the text is hidden behind an overlay which could hold appeal to the user from an aesthetic standpoint as design patterns move more towards flatter, less crowded environments.

Distant reading provides the reader with perhaps the most unique opportunities from an interaction standpoint. Support for distant reading is seen in the use of data visualisations and topic models. For example, *The Letters of 1916* has begun to

develop static visualisations in order to facilitate a distant reading approach across the corpus of letters (see figure 5). These visualisations provide a valuable research tool for those interested in dissecting information across various categories, by gender of the author(s), or perhaps by location. While this same information could be obtained through a close reading of each letter in the corpus, this process would be time-consuming. By leveraging topic models and the requisite visualisations built atop them, a reader can begin to look for patterns to help narrow down interest or look for anomalies.

However, these static visualisations only take the reader so far. Without some level of interactivity, the reader cannot pick out a subset of material, thus providing for a deeper engagement with the corpus and, more importantly, acting as an enrichment to the close reading process. These pictographic representations of textual content provide readers with a much more intuitive mode of interaction with the text than traditional reading. Reading itself is not a natural process from a neurological standpoint. Unlike speaking and understanding language, which is a natural ability with dedicated neural pathways, reading is not a hard-wired activity in the brain; however, the ability of the brain to recognise patterns and shapes is a process which is entirely natural and supported by neural pathways forged over thousands of years of evolution (Johnson 33). Therefore, providing the reader with images and visualisations as a starting point is a logical extension of the process of reading within the brain. By providing the visualisation of data as a starting point for research, the brain can begin to immediately recognise patterns and look for clusters of information which may be of interest to the reader. Because images do not have a codified language and structure, they are also highly qualitative and subjective. As Drucker notes, “[u]nlike language, which has a grammar, or mathematics, which operates on explicit protocols, visual images are not governed by principles in which a finite set of components is combined in accordance with stable, fixed, and finite rules” (24). Through the use of data visualisations, the user is empowered to begin to make connections and draw conclusions which would not be otherwise apparent through a traditional close reading of the text.

6 Conclusion

The Digital Scholarly Edition is far from static, however, and continues to grow and evolve alongside technology. More editions are embracing hyper- and radial reading approaches, such as *Letters and Texts* at the Humboldt University (see figure 6) and *Borchward’s Journey* (see figure 7). Additionally, other editions have begun to incorporate visualisations as research and finding aides. For example, *The Diplomatic Correspondence of Thomas Bodley* uses a timeline graph as a method of “browsing” the

Full screen Hide second column

previous letter next letter

6
à Magdeburgce 13 Aout 1761.

Monsieur,

Ce n'est, que dans la satisfaction, que Vous avés a obliger Vos amis, et dans le petit degré de ce sentiment, que Vous supposés en moi, que peuvent être fondés Vos excuses; de ne m'avoir pas envoyé les lettres sur la littérature nouvelle avec la premiere poste. Je craindrois, de Vous charger d'aucune commission, si je ne croyois qu'un de Vos partis de plaisir en puisse être derangé. Je suis fâché, de la negligence de mon domestique Vous ait empêché de m'envoyer N° 17 de ces feuilles, dans lequel la critique de la nouvelle Heloise commence; ce que ces Journa listes disent du stile de ce Roman, me paroit assés fondé; il y a plus d'imagination, que du sentiment; mais la description de la mort de Julie, faite par Mr. Wollmar me paroit toujours un fort beau morceau, elle m'a tiré des larmes, ce qui est chés moi la pierre de touche du pathetique. Cependant les Romans de Richardson me plaisent d'avantage, parcequ'ils peignent plus exactement la nature et n'emploient pas des traits moins forts. que ceux

Facsimile Dipl. transcription Reading text Metadata Entities XML

Figure 6: Hyperreading as seen in *Letters and Texts* (annotations added). Reproduced under Creative Commons Attribution 3.0.

collection by date (see figure 8). Rather than listing out years or months for the user to simply click on and see a list (as can be seen in various other editions), the timeline view allows the reader to visualise how Bodley's correspondence clusters within a given time period. The same information can be extrapolated from both methods; however, the use of the timeline is easier to understand due to its reliance on imagery.

While the examples provided above have made some progress in breaking away from analogue metaphors, these interactions must continue to be driven forward. Hyper- and radial reading require a distinct editorial decision on how the text is structured and linked. They move beyond simply presenting links, instead providing non-linear pathways through the text. These methods of alternative reading are relatively inexpensive to support from a technical standpoint but require significant editorial intervention in order to adequately link the content. These hyperlinks, which support hyper- and radial reading, can also be used to imply a *semic relationship* between texts or nodes of information, not only by implying relationships but also by controlling access to information in a sense, as readers may not be aware of certain

Vorerinnerung

#1 Da ich Potsdam schon öftters besucht, und die meisten Seltenheiten daselbst gesehen hatte; so richtete ich vor dißmahl meine Aufmerksamkeit nur auf das enige, was seit 4 Jahren von S[eine]r: jetzt regierenden Königlichen: Majestät: daselbst an dem alten Schloß verändert, und in Sans Souci angeleget worden.²

#Abb_01

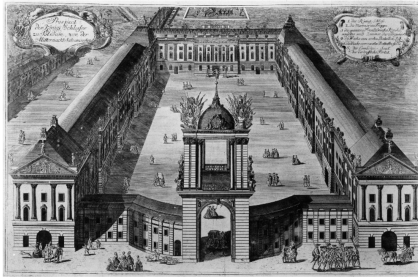


Abb. 01: Johann David Schleuen d. Ä.: »Prospect des Königl. Schlosses zu Potsdam, von der Mitternacht-Seite anzusehen«, um 1755, Kupferstich und Radierung, SPSPG, GK II (1) 7545. © SPSPG, DIZ / Fotothek

Gemeint sind das als »altes Schloß« bezeichnete Potsdamer Stadtschloß und Schloss Sanssouci. Das Stadtschloß wurde am 14. April 1945 durch Bombenabwürfe zerstört, 1959–1961 gesprengt und abgetragen. (J. W.) Die Entwicklung des Parkes Sanssouci begann mit der Anpflanzung des Weinberges am 4. April 1744, dem Befehl zur Anlage der Weinbergterrassen vom 10. August des Jahres und der Anordnung vom 13. Februar 1745 zum Bau des Schlosses Sanssouci nach den Ideen des Königs und Plänen von Georg Wenzeslaus von Knobelsdorff (Giersberg 1986, S. 55). (S. H.) Gleichzeitig mit dem Terrassenbau wurde 1744 auf Anordnung von Friedrich eine Grufte an der Ostseite der obersten Terrasse als letzte Ruhestätte des Königs angelegt (Manger 1789, Bd. 2, S. 504. – Giersberg / Krüger 1992). (C. D.)

Figure 7: Hyperreading as seen in *Borchward's Journey* (annotations added). Reproduced with permission of Perspectivia.

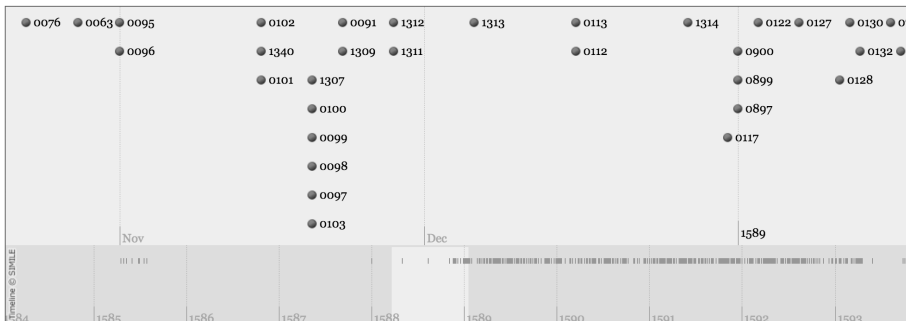


Figure 8: Use of visualisations (timeline graph) to facilitate search in *The Diplomatic Correspondence of Thomas Bodley*. Reproduced under Creative Commons Attribution 3.0.

information contained elsewhere within the corpus without the hyperlink which calls attention to it (Burbules 105). However, the use of these links can also become problematic as they do not necessarily provide a reciprocal relationship; that is, a hyperlink may exist from page A to page B, but the inverse may not be true. Here lies potential for a new interaction paradigm, which could assist both the editor and the reader with linking information and nodes within the content. Further research is needed.

Finally, it is through support for distant reading – specifically via the use of interactive visualisations – that the Digital Scholarly Edition will alter the landscape of digital textual scholarship. By allowing other scholars and researchers to explore the content via means which are inherently natural to the brain, these techniques provide the potential to unlock not only new realms of understanding and scholarship, but also awaken curiosity for humanities data across a broader spectrum of the populace. As Drucker notes, “[a]s a scholarly act, interpretation has almost always been textual, based on close reading, and intimately bound to the graphic form of the work to which it attaches. None of this is exclusively true any longer” (180). Embracing the importance of interface and the role it plays with regard to the consumption of digital content is a first step towards shifting the Digital Scholarly Edition from a simple information source to a truly interactive research experience.

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