

Books come in a variety of shapes and formats, from large, glossy cookbooks with full-page photos to cheap paperback reprints of classic literature and US letter-size sheet music. Readers form expectations from a book's materiality. For example, a large cookbook will be hardy enough to withstand contact with wet ingredients in the kitchen. Even if a book is blank, its materiality shapes our understanding, as Don McKenzie demonstrated by asking students to determine the contents of internally and externally blank books.<sup>1</sup> Conversely, ebooks are flat representations of a page on a screen and come with no embossed cover or pristine binding. The connection between material and content is broken. Even the most expensive ebook looks the same as a free public domain text. Early excitement about digital publishing suggested a grand revolution with enhanced multimodal books, but such promise could be fulfilled only with an exceptional level of investment. Attempts to build "enhanced" ebooks have been short-lived. Touchpress released critically acclaimed iOS app editions of Shakespeare's *Sonnets* and T. S. Eliot's *The Waste Land* in 2010, but after this success, the company decided to sell off its publishing-related portfolio and rebranded as Amphio in 2016 to focus on "culture, video and tech."<sup>2</sup> Examples like Touchpress reveal the tensions between the perception that digital books should be interactive multimedia packages and the demand from audiences more comfortable with reading linear text.

Amazon approached the challenge of "enhancing" books from a different angle. An individual Kindle device is not just an ebook reader but

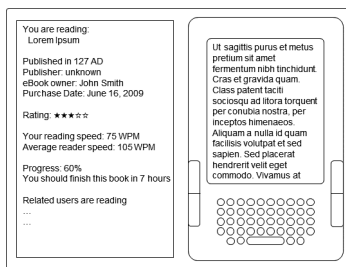
a single node in a densely connected network.<sup>3</sup> Amazon designed the platform as a service rather than a product, transforming the book from a discrete object into a networked entity. Publishers have remained faithful to the unity of individual books in their transition to digital products, so networks could only be formed as paratext rather than the erosion of barriers between titles proposed in earlier models of digital publishing such as Ted Nelson's Xanadu.<sup>4</sup> In response to these constraints, Amazon developed *paratext services* or features around the text that draw on different APIs (application programming interfaces) and data sources to construct ad hoc information about the book when a reader downloads it. The formulation of paratext services draws on both automation to create paratext and the encapsulation of the kind of fannish activity that Simone Murray calls the "digital literary sphere" within the Kindle ecosystem.<sup>5</sup> The vast range of curated and automated services available mirrors what Paul Benzon terms the DVD's "paratextual 'aesthetic of more' through special features."<sup>6</sup> Prompts to share the book, purchase similar titles, and remain online are pervasive throughout the interfacial paratext, often breaking the act of reading to encourage broader modes of consumption. Rather than building on the openness of the web as a global metatext or the closed models of the early 1990s wave of hypertext fiction and multimedia CD-ROMs, Amazon instead connected Kindle titles to its walled garden and selected third-party sources. This allowed a curated network rather than challenging the fundamental principles of the book trade.

To address ebooks' new features, Ellen McCracken extends Gérard Genette's concept of paratext to categorize the new genres created by ebook platforms through metaphors of gravitational force. McCracken reshaped centripetal and centrifugal forces to define paratext that encourages readers to escape from and remain in the ebook respectively. Centripetal paratext includes "formats, font changes, word searching, and other enhancements," while centrifugal paratext allows readers to "easily engage with blogs, other readers' comments, or an author's web page without putting aside the e-device."<sup>7</sup> While centrifugal paratext is considered the basis of any ebook, centripetal paratext is unique among formats and is often used for marketing purposes. The metaphor of centrifugal force suggests that readers *feel* as if they are leaving the platform, even while they remain within the bounds of the Kindle application. This has been a strength for Amazon, which achieved this balance by developing paratext services to introduce new updatable and dynamic features.

Paratext services can either *input* or *output* data. Input services include the integration of ancillary data sets for X-Ray; Amazon-owned services such as the Kindle storefront, Goodreads, and historically Shelfari; and

third-party data from Wikipedia. Output services include integration with Facebook and Twitter, popular highlights, Flashcards, and editing Goodreads. Both input and output paratext services rely on a combination of user-generated content from first- and third-party sources and algorithmic generation. The automation process replaces the work of editors, indexers, and other outsourced workers. While these services cut potential costs for self-published authors, industry professionals are hesitant to develop Kindle-exclusive paratext, as this would create a precedent of creating extra content for individual ebook platforms. Automation potentially solves this impasse, but without an adequate level of quality assurance across the five million titles available, any automation will inevitably lead to an inferior product.

All paratext services are opt-in. The popular highlights and Word Wise, an interlinear definition service, are the only two features that intrude in the framing of the main text, with the remaining features only accessible through pop-up menus. Kindle engineers explored fixing this separation in 2010 with a second electronic paper screen that provided a range of paratext information including progress indicators, navigational aids, cover art, and promotional information (figure 6.1).<sup>8</sup> Paratext is framed as separate from the page, which remains unified outside centripetal forces. Recent software updates have converged toward a minimal interface: Kindle for iPhone 6.7 allows users to view just the main body, and the Kindle 7 discreetly displays the location information in the footer. The ability to layer and separate paratext distinguishes the ebook from print, where running titles, page numbers, and reader annotations are all flattened on a single two-dimensional plane. Amazon introduced new services with each hardware generation to encourage users to upgrade to newer devices, but the core content has remained stable. Partially this is a symptom of feature creep, where the company needs to create new paratext for the sake of demonstrating the innovations of a new device or software.



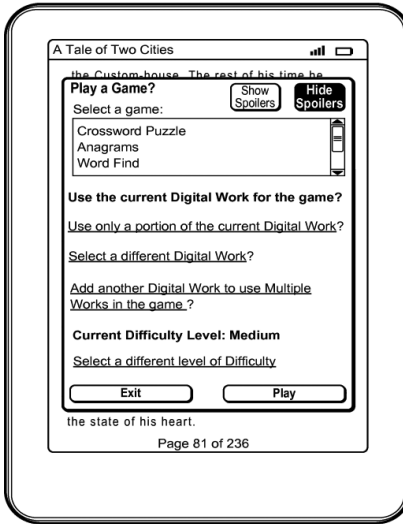
6.1 Service paratext on second screen (adapted from patent)

These new features, such as Page Flip, hide the text behind overwrought navigational interfaces. Page Flip evokes the ability to identify pages by layout, but when the Kindle layout is in flux and is often rendered at point of refresh, the connection between recognition and previously read materials is disconnected. Conversely, Kindle for Amazon Fire expanded the metaphor of the page with the introduction of “Page Turn,” animated feedback of a page turning patented by Apple after developing the design for iBooks.<sup>9</sup> Johanna Drucker criticized the iBooks equivalent of Page Turn, arguing that “a too-literal misapprehension of what constitutes the distinctive features of a material form can give rise to a misconceived model of what it should be when redesigned in another media environment.”<sup>10</sup> The aesthetic flourish of page turning loses all semantic information about progress or the perceived value of the book.

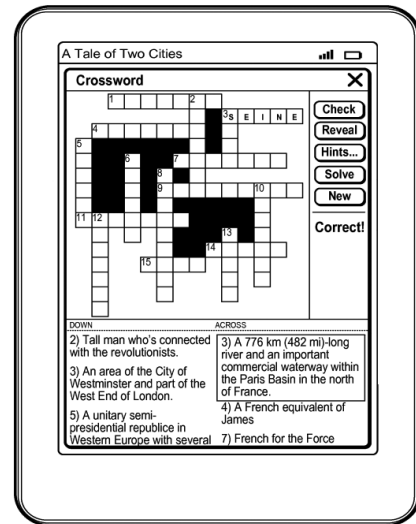
Despite Bezos’s initial claim that you “can’t outbook the book,” the Kindle Oasis’s product page listed paratext services under the title of “and goes beyond the book.”<sup>11</sup> Readers can access external information “without losing your place in the book” or calculate how long it will take to complete the book. None of these features offer a significant improvement over print, but combined, they increase the accessibility of a book and offer further chances to engage with fellow readers when compared to the flattened representation of the page emphasized by PDFs. Amazon continuously experimented with how to “outbook the book” with additional automated paratext. For example, Walter Tseng and colleagues from the Reading Experience team experimented with generating word games such as crosswords and anagrams from Kindle titles to improve comprehension and literacy (figure 6.2).<sup>12</sup> The games depended on the integrity of other Kindle paratext services such as Shelfari, X-Ray, dictionaries, and Wikipedia. The reliance on both automation and the affective labor of Shelfari and Wikipedia for Kindle users mirrors the importance of Amazon Web Services and Mechanical Turk to the broader Amazon infrastructure. Both automated and affective labor are contingent and can break down, as my examples in this chapter demonstrate.

Amazon shapes the Kindle’s paratext services through the acquisition of companies such as Shelfari and Goodreads and the internal development of services like X-Ray. Tully Barnett argues that these features allow “online friends, acquaintances, and strangers to co-inhabit a book with the reader and can co-construct a reading with more layers and nuances than was available for the printed book.”<sup>13</sup> The Kindle Touch marked a transition from early service paratexts to more advanced integration of X-Ray and Goodreads, which Amazon acquired in 2013. Recent e-readers introduced further services including Word Wise, an option for interlinear glosses

a)



b)



6.2 Tseng et al.'s prototype for automatically generating word games from Kindle titles (adapted from patent)

related to the most difficult words in a book.<sup>14</sup> Amazon marketed X-Ray on the ability to quickly navigate the book through a visual concordance of characters, themes, and locations, and Goodreads is now the primary form of social interaction on the Kindle, replacing custom-built offerings. The shift to Goodreads flattened Amazon's embedded social media from a diverse collection of tools and resources into a social book-shelving site. The consolidation of service paratext restricted how readers interacted with one another on the Kindle but foregrounded an already established reading social network masking a history of failed experiments.

### Shopping in the Ebook

By 2014, Lab126 revised its mission statement, indicating an ambition "to make available in less than 60 seconds every book, ever written, in any language, in print or out of print."<sup>15</sup> Delivery in a minute is impossible without integrating the Kindle Store into the reading software. Apple introduced the iPod to complement iTunes and allow seamless integration, but early iPhones could only connect to the iTunes Store via Wi-Fi. The Kindle replicated the iPhone's always-on model by integrating both 3G and Wi-Fi networks but restricted access to a substantial bookshop in exchange for offering broader fast access to the web without charging

for data transfer. An always-on bookshop removed several obstacles for continual consumption in app. Amazon even began to sell books from within other titles, although readers can opt out. For example, when readers complete Suzanne Collins's *The Hunger Games*,<sup>16</sup> a pop-up appears that encourages them to purchase *Catching Fire*, the second book in the trilogy. James Petts and colleagues working on the Personalization Platform developed an algorithm to further monetize reading through identifying references to books in a title and introducing links to their product page in the ebook.<sup>17</sup>

The technology team never implemented the algorithm due to the sanctity of the page, but it transformed other parts of the Kindle app to include personalized advertising. Kindle e-readers' home page libraries from the Kindle Touch onward feature a bar of recommended titles by default, with only three of the reader's owned books appearing until the reader clicks through to their full library. Free titles are conspicuously absent in these recommendations, even if a reader primarily consumes this material. Daily deals and best sellers are prominently displayed and can fill up to a third of the screen on dedicated devices. In the default setup for the Kindle Touch 5.3.7.3, the advertised books outnumber the titles in a user's library in volume, although proportionally, owned books take up most of the screen space. Nonetheless, users are constantly reminded that they are only a click away from purchasing new titles.

The Kindle 5 extended the logic of always-on consumption by integrating "special offers," or advertisements on the sleep mode screen, in exchange for a small reduction in the cost of the hardware. Users could purchase the subsidized device for \$10 cheaper than full price, with the opportunity to pay \$30 to remove the advertisements from the device at a later date. Many advertisements delivered to my devices displayed offers exclusively related to Kindle accessories and purchasing books via the store, but Amazon provides the opportunity for third parties to advertise products (books or otherwise) on the platform.<sup>18</sup> The shift from culturally significant to commodified screen savers demonstrates that Amazon's self-reported customer-centric approach can instead be seen as an attempt to monetize all areas of the Kindle platform.

## User Labor

Beyond the storefront, Amazon relies on user-generated content to increase the appeal of its ebook catalog. This is most prominent in Kindle Popular Highlights, discussed in detail in the next chapter, but there are further examples of the company repurposing user labor to create

metadata for books through Shelfari. Josh Hug and Kevin Beukelman, two former employees of RealNetworks, an early audio streaming service, founded Shelfari as a social network for bibliophiles in late 2006. Hug and Beukelman wanted to compete with LibraryThing, launched by Tim Spalding in 2005, by funding a social reading platform through Amazon affiliate links.<sup>19</sup> Amazon eventually purchased the start-up in 2008 to form the foundations of the “book extras” function after investing \$1 million in the company in 2007.<sup>20</sup> More recent changes in the Kindle platform suggest that this was a forerunner of the consolidation of reading-related activities to Goodreads, an acquisition that was initially positioned as independent from Amazon’s core activities but has become more integrated into the platform with each new hardware launch. The six-year period of Shelfari’s integration into the Kindle platform helps illuminate how these paratext services survive while Amazon considered them valuable and how the company retains the most useful aspects and deletes the less desirable.

Shelfari data formed the basis of the Kindle’s “book extras” feature until the introduction of “About the Book” and integration of Goodreads in 2014. “Book extras” contained a range of trivia related to the title including a synopsis, awards, and brief descriptions of characters. A small disclaimer at the top of the pop-up started: “This content comes from Shelfari, the editable book encyclopedia.” The feature is only available in books downloaded before the introduction of “About the Book.” Newer titles integrate data from Goodreads, and any extra contextual information in the “X-Ray” sidebar appears directly from Wikipedia, removing any book-specific information. While the switch removed several core features of Shelfari, it also decreased redundancy between features present on both platforms, including outlining characters and awards.

Shelfari was initially kept separate from the main Amazon services before its integration into the Kindle reading system. This follows the example of both the Internet Movie Database (IMDb) and Twitch.tv, which were acquired by Amazon in 1998 and 2014 respectively, with press releases indicating that the services would remain separate from Amazon’s primary businesses. While both sites remain independent through mid-2017, there has been an increased level of integration between primary and secondary businesses. In the case of IMDb, the vast cache of actors, trivia, and other film-related data has been used as part of “X-Ray for Movies and TV shows,” a service for Amazon Video that replicates the functionality of Kindle X-Ray for visual content. Twitch.tv’s independence has already been challenged by the launch of Twitch Prime, linked to Amazon Prime accounts.

Shelfari remained semiautonomous from the Kindle, as directly editing content from the reading system was never possible. Users would need to sign in to the service via a web browser to update any incorrect information. The social network functioned primarily in a similar way to Goodreads, allowing users to create virtual bookshelves and review content in a social network dedicated to book reading. In late 2009, Amazon made a major alteration to the design of Shelfari pages through a beta editable book details page.<sup>21</sup> Users were now directed to produce information on specific topics such as “description,” “ridiculously simplified synopsis,” brief descriptions of characters, bibliographic information, quotations, themes, interpretation, and other paratext that might be expected in a critical edition.<sup>22</sup> Amazon changed Shelfari from a third-party marketing tool for affiliate sales to a labor force for an optional paratext feature. The user base was not large enough to undertake this work in any uniform fashion, leaving the “Book Extras” page uneven across ebooks.

The integration of user-generated content into the “authorized” space of the book masked the underlying exploitative wiki-based labor practices on sites such as Shelfari. Users were encouraged with frequent references to editing pages or seeing their history. Even though Shelfari offered a direct login from Amazon accounts, no clear information indicated that any edits on the website would be scraped for inclusion in commercial ebooks. New pages were left empty, and users were expected to fill them in with a series of edits. As a consequence, the pages for popular books such as the *Harry Potter* series were replete with relevant information and minutiae, while many pages were left empty. The quality of the final product was variable and based on the free labor of volunteers. This was further complicated by the presence of “Shelfari librarians,” who monitored changes and often rejected changes made by Shelfari staff.<sup>23</sup> The community policing and affective labor behind Shelfari librarians ensured a baseline for quality, but without further investment from either publishers or Amazon, the resource was inconsistent and dependent on the whims of a book’s fan base.

In 2017, Amazon closed the remaining Kindle Popular Highlights and Shelfari services to consolidate reading social networks. Numbers talk; Goodreads boasts over twenty million active users. After resisting integration, the service’s “To Read” lists and a feed of friends’ activity appeared on the Kindle home screen for users.<sup>24</sup> This new feature lacked the ability to talk about the book without exiting the primary reading interface or edit the data about a book, as is possible with Shelfari. Users can access the full range of Goodreads services through a link, but this remains at a distance to the Kindle content beyond the home page. The new social infrastructure lacked the granularity of the separate social networks available to readers



beforehand. Users could no longer directly influence on the information “About the Book,” and Goodreads encourages them to comment on pages rather than specific quotations.

The restructuring also created borders between the distinct parts of Amazon’s service paratext. Rather than gravitating around a centripetal force, users needed to leave the main book interface to access new features related to the book. For example, the Kindle for Fire OS 10.29, one of the most feature-rich reading systems, separates the Kindle Store, Goodreads, Audible, Wish Lists, Word Runner, and Flashcards into discrete entities. Readers could access a wealth of extra information about a book or otherwise view or hear the book in a different form, but this needed to be a conscious decision rather than accidentally clicking on the wrong option. The separation of different paratext service indicates Amazon’s acknowledgment that the platform’s feature creep challenged the unity of a discrete book.

### Automation

While its reliance on user labor for paratext services has diminished, Amazon continues to use automation as a remedy for the lack of platform-exclusive content from publishers. Many of these services for the Kindle rely on text processing, which requires high competencies in natural language processing, from the ability to deduce the meaning of a word from context to disambiguation of words and correctly identifying parts of speech.<sup>25</sup> The algorithms and data structures underpinning these efforts remain proprietary, but errors in available tools show that Amazon is unlikely to have invested the resources into refining the automation to avoid incorrect markup for a corpus featuring billions of words, despite investment in these areas to develop the Alexa voice assistant ecosystem. Three major services—the dictionary, X-Ray indexing, and ebook searches—depend heavily on automation to provide users with adequate definitions and navigation.

The dictionary function suffers from both presentational and semantic issues. The feature is emphasized by a pop-up box that appears with a definition if a user highlights a word on all but the Kindle 1. If a definition is too short, multiple words are displayed to fill the space. For example, when searching for the definition of “cofounder” in “EDWIN CATMULL. A cofounder of Pixar and later a Disney Executive,”<sup>26</sup> the two-line definition states:

co·found·er n. a joint founder, co-found v,  
co·func·tion n. [MATHEMATICS] the trigonometric<sup>27</sup>

This is followed by a prompt for users to view the definition with the dictionary ebook. Users will likely recognize “cofunction” as a separate definition rather than an extension of the looked-up word. Nonetheless, the presentational quirk could be avoided if Amazon loaded the dictionary as a database rather than pulling content from a regular ebook without checking for overlapping definitions. Since this would require a different content license and more investment, the lack of nuance for this feature demonstrates Amazon’s inability to develop features that would benefit the user unless they offer a substantial payoff in data collection or audience development.

In an extensive analysis of the Kindle’s dictionary mechanism, two lexicographers, Theo Bothma and D. J. Prinsloo, document a smorgasbord of errors in the automated tagging system as the result of incorrect links between words and definitions.<sup>28</sup> Automated dictionaries require accurate tagging, particularly with identifying lemmas, or the “canonical” form of a word. For example, the word “men” does not have its own dictionary entry but should redirect to the lemma “man” with a note that “men” is the plural form. The researchers found several major parsing errors. For example, “who’s” correctly linked to “who,” but if the first letter was capitalized, the algorithm rendered the whole word in uppercase, leading to a definition of “World Health Organization” instead. Other errors are more inexplicable, including “but” linking to “and” as well as “lay” changing to “burn.”<sup>29</sup> Bothma and Prinsloo could not identify the cause of these errors, but their analysis points toward some significant fissures in the dictionary algorithm. Since 2013, Amazon has invested substantially in voice recognition for Alexa, which requires more nuanced natural language processing to respond correctly to questions. The Kindle’s dictionary errors point toward this infrastructure not being integrated into the ebook services, revealing its place in the Amazon hierarchy.

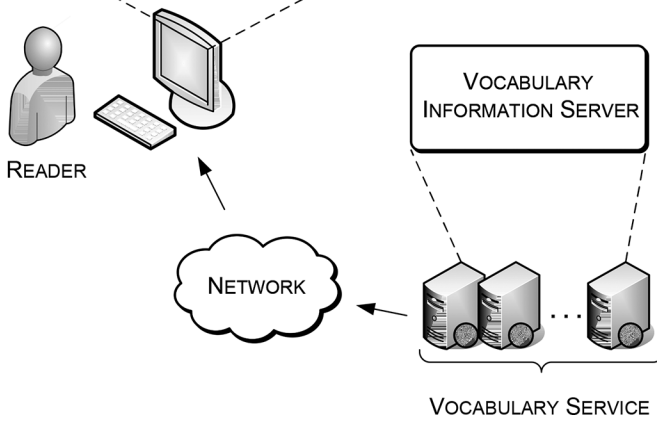
If the dictionary does not contain a definition, which is often the case for proper nouns such as famous people or companies, Wikipedia is the fallback. Users can also search for phrases via Wikipedia where the dictionary only defines a single word. The website mixes Amazon’s predilection for both automation and user labor. Kindle integration endorses Wikipedia’s quality despite frequent controversies regarding its commitment to “neutral points of view” and uneven coverage of subjects according to users’ interests.<sup>30</sup> Where multiple instances of the same name exist, users are presented with the disambiguation page. For example, a search for “Bisitritz” in *Dracula* links to a page that lists several locations across Romania and the Czech Republic, where readers unfamiliar with the novel’s context may not know that the top result in Transylvania is the likely destination.<sup>31</sup>

Despite these limitations, sideloaded Wikipedia and the dictionaries is cheaper for both platforms and publishers, although without careful NLP and human auditing to ensure that the correct reference always appears, the resource can only be as valuable as the “I’m feeling lucky” result for each definition.<sup>32</sup> Paratext services that update can relieve the burden of updating an eBook’s metadata, but the system is only as reliable as the data and algorithms underpinning it.<sup>33</sup> The Kindle’s service paratexts are often superficial and therefore lead to errant responses.

When a word might have multiple definitions, the algorithm does not flag the word for review to ensure the most accurate definition is returned, but the first result in the chosen dictionary appears by default. For example, on my Kindle 2, when I click on “Lee,” the software returns the first biographical result for the surname Lee in the dictionary (“**Lee**’ Ann [1736–84] U.S. religious leader . . .”)<sup>34</sup> rather than noting the word is a popular fore- and surname. Proper nouns can be disambiguated through context, which could be provided by the publisher or otherwise deduced by the text, but Amazon’s efforts largely depend on the available external data. Despite the issues with developing sophisticated NLP techniques for dictionary identification, Amazon was confident in its service infrastructure to correctly identify definitions through a combination of machine learning and Mechanical Turk volunteers.<sup>35</sup> Daniel Rausch, a publisher who was hired by Amazon to lead Kindle product management, filed a patent in 2010 that used the dictionary extensively as a service. Rausch detailed Amazon’s ability to build vocabulary tests, diachronic analysis of meaning changes, and recommendations for titles using the word in the same sense (figure 6.3). When combined with demographic data including reading level, the service paratext would also alter the text to adjust to the literacy of the reader.<sup>36</sup> This intrusive service exists only in the theoretical realm of patents, not least because editing texts would present challenges with intellectual property. All evidence of language-based automation also demonstrates that attempts to alter the text would likely lead to incorrectly changed material.

Amazon’s marketing for X-Ray states that the feature “lets you explore the ‘bones of a book.’ You can also view more detailed information from Wikipedia and from Shelfari, Amazon’s community-powered encyclopaedia for book lovers.”<sup>37</sup> X-Ray uses a “term frequency–inverse document frequency (TF-IDF)” algorithm to determine which terms are significant enough to index rather than more nuanced or human-curated mechanisms.<sup>38</sup> As the name suggests, the Kindle’s TD-IDF compares how frequently a word appears in a text with other Kindle titles. The algorithm can identify unusual terms but would not necessarily identify common terms

The screenshot shows the EBOOKSERVICE.COM website. At the top, there are navigation icons for back, forward, home, search, and favorites. The address bar shows the URL: [HTTP://EBOOKSERVICE.COM/RIGHTSHOLDER091790](http://EBOOKSERVICE.COM/RIGHTSHOLDER091790). The main content area is titled "Fair" and includes a definition: "Definition \`fer\`", "Adj. Impartial or without bias", "Noun. a gathering of buyers and sellers", "Adj. flawless", "Adj. Sufficient but not ample", and "Slang. Beyond good." There is a button labeled "ABOUT USE OF THE TERM". Below the definition is a section "Build a Question?" with a text input field. A "Microblog Rank: 11,287<sup>th</sup>" is displayed, along with two blog entries: "Blogger A: 'I love Shakespeare. Don't see fair used like this much anymore'" and "Blogger B: 'Fair the well!'". On the right side, there is a "Noted in..." section with two book covers: "ROMEO & JULIET by William Shakespeare" and "JOHN LEEVY'S ENGLAND by Julia Verne". Below the second book cover is the text: "The rules of fair play do not apply in love and war." and a "more" link.



6.3 Amazon's prototype "vocabulary service" (adapted from patent). Source: Killalea and Hamaker, Disambiguation of term meaning.

such as “God” or “books” that might be central to a particular title. Amazon discourages the use of a print index in favor of X-Ray. Jan Wright questions the intellectual property of this arrangement: “Who owns the X-Ray file: the author, Amazon, the publisher?”<sup>39</sup> This question can be extended to multiple elements of the automated Kindle infrastructure. Elsey notes that the licensing mess associated with backlist titles—ensuring ebook edition rights for photographs, illustrations, and quotations—creates an extra burden.<sup>40</sup> Automated paratext exacerbates the challenges of both licensing and updatability, since it takes agency from the publisher, which may no longer control the overall quality of its project despite an association with all the material provided by the platforms.

Wright concludes that X-Ray lacks the finer detail made possible through a carefully curated index.<sup>41</sup> For example, in Richard Wrangham’s *Catching Fire*, indexes contain relational information allowing a reader to identify passages on “fat” and more specifically on the relationship between “fat” and “energy.”<sup>42</sup> Despite this lack of complexity in mapping relationships, the X-Ray format is technically sophisticated compared to other paratext services after Amazon changed the storage medium from JSON to SQL, a database language that emphasizes relationships between entities. X-Ray files now construct relationships between excerpts, book locations, concepts, and definitions to ensure information is delivered consistently across reading systems. The data are still prepopulated, however, and users need to update the content manually or through an update pushed by Amazon and the publisher. Mistakes are common, as descriptions frequently come from Wikipedia, leading to awkward references to apple trees in place of Apple Inc., or Muhammad the Prophet rather than a character called Muhammad. Human intervention could catch these errors, although it would require understanding the context, and this would be an additional cost for publishers or Amazon.

Of the 210 titles available for the Kindle that appeared on Amazon Charts lists between May and September 2017, around 70 percent use X-Ray. Fiction is more likely (80 percent) to feature the function than nonfiction (64 percent). Print versions of nonfiction titles often include an index, which is easier to convert to an ebook, while fiction may benefit from this conceptual map if automated even when the print edition does not require an index. No correlation exists between the publisher’s investment in a book and the appearance of an X-Ray index, as prominent publications such as Hillary Clinton’s *What Happened* launched without the feature. X-Ray is not universal; since it requires publishers to create a dedicated index for the Kindle, this is unsurprising. Amazon’s rejection

of broader cross compatibility reduces the number of features available compared to competitor platforms, which do not have the same user base, ensuring development is limited. This limits the potential of ebooks overall, as there is no one platform where innovation is profitable for publisher or platform.

Amazon promoted X-Ray's ability to visualize the book on a one-dimensional plane, showing where characters, places, and themes appear across the novel.<sup>43</sup> Readers can use this information to ascertain how important a character or theme is to the book, although in fiction this led to spoilers if a character reappears after a lengthy absence from the narrative.<sup>44</sup> Since the process is automated, clustering can occur in interesting ways. For example, in Donna Tartt's *The Goldfinch*, the relational database entries from excerpts can be 3,835 bytes long and contain as many as ten entities (three locations and seven characters).<sup>45</sup> If an entity is referenced multiple times in a single passage, the data are amalgamated into a single reference. For instance, Hobie appears in the excerpt but is continuously highlighted for a much larger region of the text. Likewise, the indexing catches the variations between "Andy," "Andy's," and "Andy Barbour." The index algorithm is greedy, matching the garbled phrase "Andy's death, Death in general) if I thought a familiar person came to meet us at the door, because—writing this now, I'm close to tears—I think of poor Andy" as a single instance because of how Amazon's search tool splits the blocks of text into the discrete chunks of text as locations.<sup>46</sup> The index therefore returns entries in proximity rather than revealing multiple instances in short passages. Since the algorithm iterates the overlap detection mechanism, results can encapsulate lengthy passages unintentionally.

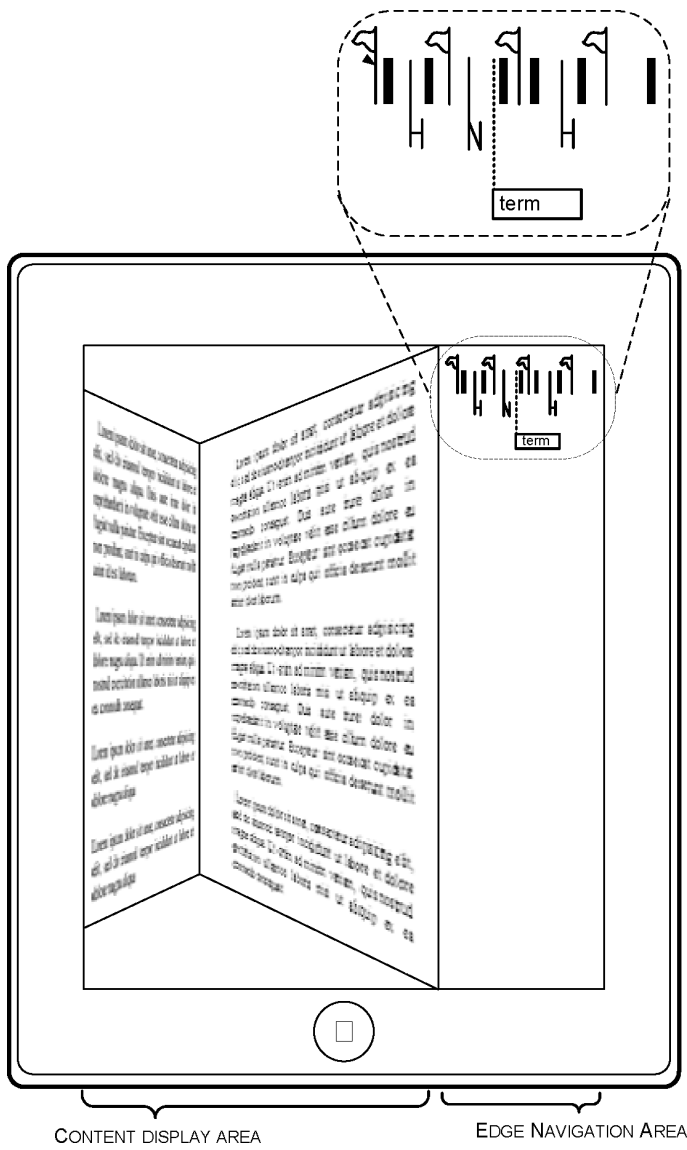
The in-text search feature reveals the limitations of Amazon's natural language processing facilities.<sup>47</sup> A search for "man" in Milton's *Paradise Lost* returns all words in the text containing "man," including "manner," "commander," "mans," and "Adamantine," even when punctuation or white space is included at the beginning or end of the word.<sup>48</sup> The only exception comes from "man!" which only matches exact results, including punctuation. While the patterns appear to suggest that the search results favor "man" as a prefix, returning "Adamantine" demonstrates that the pattern also matches the term in the middle of a word. If white space is added to both sides of the word to indicate searching for the word in isolation, the results are greedier, returning "command" and other words not present in the original search. "Man." and "man?" follow the same patterns respectively. This comes at a cost, as any other search for "man" will not catch this in the results because the exclamation mark is inextricably bound to the word. Likewise, any instances of "man" at the

end of a sentence are not included owing to the proximity of a punctuation mark. Due to this awkward mix of part-of-speech tagging without associated documentation to explain discrepancies, the search function is highly volatile and cannot return reliable results. Automation has become a crutch for Amazon in the harsh reality of publishers' hesitance to create content optimized for the Kindle. These extra features are useful marketing tools, but without further investment and quality control, the invisible biases and limitations of the tools hinder reader interpretation, thus running counter to their designed use.

The natural language struggles are matched by further challenges in constructing new navigation idioms with the flat screen. In one instance, Amazon considered extending the X-Ray/spine metaphor of the book further through a new navigation tool described in the patent "Edge navigation user interface."<sup>49</sup> Scott Dixon, a Kindle Software Development Kit (SDK) engineer, conceptualized X-Ray as the literal spine of three-dimensional book interface (figure 6.4). The metaphorical use of three-dimensional space to navigate the book was just one of several experiments, although it was the most grounded in physical metaphors. The patent contains several images of more complex navigational tropes that rely on users' knowledge of multitouch interfaces. Augmenting the book is a central element of the patent's background. Dixon suggests that "as electronic devices continue to evolve, there remains a need for improving a reader's ability to interact with these devices."<sup>50</sup> The X-Ray metaphor requires further visual elements to enhance the reader's understanding of the ebook's representation of a two-dimensional object. This intervention sought to use the visualizations as a direct navigational tool. Unfortunately, this was never integrated and was superseded by the later addition of Page Flip as a two-dimensional version of the same trope. Alongside other new navigation elements and counter to improving the automation of X-Ray, search, and other features, these new paratext features emphasize feature creep and innovation. The reading space of the Kindle has remained consistent over its first decade, but new paratext services serve to justify yearly updates on the marketing copy for the product page. Hardware innovations have been glacial, so minor software adjustments and new services represent the best opportunity for marketing.

## Synchronizing Media

While automation is used primarily for metadata production, it has been most successful in linking media. This refashioning of the text as a malleable object to be reused in various contexts was one of the strengths of the



6.4 The Kindle team’s vision for three-dimensional navigation using a multitouch interface (adapted from patent). Source: Dixon, Edge navigation user interface, figure 3.

ebook’s promise. Platform developers were early to explore this promise. For example, in 2009 Intel launched its own e-reader, which specialized in text-to-speech conversion for users with visual impairments.<sup>51</sup> The Intel Reader scanned text provided by readers with optical character



recognition. The Digital Accessible Information System (DAISY) standard provided its framework, but data could also be formatted in EPUB to store any relevant paratext. A high-quality marked-up file improves the quality of text-to-speech conversion, and EPUB or the Kindle file formats represented a robust commercial format rather than using a more open-source format such as TEI (Text Encoding Initiative), which prioritizes semantics over representation. Ebooks with full tagging offer untapped potential, with humans and machines equally able to read the text. While the semantic potential of natural language processing has not been fulfilled on the Kindle, Amazon has invested more substantially in linking audio and ebook implementations of the same book.

The company experimented with using paratext services to enhance the reading experience with the launch of Word Runner exclusively on Android-based Kindle apps including the Fire. Amazon describes Word Runner as “a fun new way to read faster. It keeps your eyes focused on the center of the page and brings each word right to where your eyes already are.”<sup>52</sup> This speed-reading concept harks back to Bob Brown’s *The Readies* but attempts to use an algorithm to improve on the concept by slowing down for difficult words.<sup>53</sup> Amazon employs gamification to encourage readers to use the feature. Readers are encouraged to share their speed-reading results on Twitter and Facebook, and each chapter is segmented according to how long it would take the reader to complete it on the basis of their average reading speed and the time-saving potential of using Word Runner to speed-read the book. The feature emphasizes speed over comprehension, which goes without mention in the marketing for Word Runner. The research into similar applications suggests that there “is probably no quick fix for circumventing the temporal demands of reading without a cost to some aspect of comprehension.”<sup>54</sup> The feature therefore exists as another paratext service designed for fun rather than function. The emphasis of such features is often to separate the Kindle platform from others for marketing purposes.

The link between audio and text was more productive. The Kindle 2 courted controversy with its built-in text-to-speech capabilities when the Authors Guild immediately responded to the feature by arguing that it breached copyright law, since Amazon did not own audio rights.<sup>55</sup> In a press release responding to the claims, Amazon rebutted: “Kindle 2’s experimental text-to-speech feature is legal: no copy is made, no derivative work is created, and no performance is being given.”<sup>56</sup> Amazon continued to affirm that it sells audiobooks through Audible and the decision to compete against itself was counterintuitive.<sup>57</sup> The response indicates a distinction between the automated and curated, as the press release emphasizes

the benefits of human intervention over algorithmic creation. Despite this and the company's framing as a customer-centric business, algorithms dominate many paratext services. The text-to-speech feature complements rather than replaces the Audible version of the text, as users who wish to have a fuller experience will choose to purchase the audiobook. In 2019 the introduction of Audible Captions reignited the same controversy, but in reverse, when users could view the written text of an audiobook.

The flagship tenth-anniversary release of the luxury Kindle Oasis introduced the first e-reader to offer Audible integration despite earlier use of audio ports on dedicated hardware. The decision was a core separator between the basic and luxury devices. The text-to-speech controversy led to a shift in Amazon's approach to audio with dedicated devices. All Kindles launched before the Paperwhite in 2012 featured 3.5 mm audio ports. The first-generation device offered an "experimental" MP3 player, and subsequent iterations used the feature for text-to-speech. Amazon phased out the software and hardware capability with the Paperwhite, and this only returned with the Oasis through integration with Bluetooth headphones or speakers, a requirement because of the device's waterproofing.

The second revelation from the announcement—the integration of Audible with the Kindle Oasis—highlights the increased fragmentation of the Kindle ecosystem. Mobile device implementations of the Kindle app have offered a "read and listen" function that allows users to access Audible content from within the Kindle app. The Kindle for Android app has further advantages over the iOS implementation, as it borrows from the Fire software, which currently offers the greatest variety in paratext services. Kindle in Motion, the integration of animated GIFs into Kindle titles, is available only for Android and iOS, not on the dedicated hardware or the desktop software packages available for PC or Mac. The Mac version went two years without an update from June 2015 to September 2017. We can rank the prioritization of hardware and software as follows:

1. Kindle for Fire OS (and Android derivatives)
2. Kindle for iOS58
3. Flagship Kindle device
4. Other dedicated hardware (descending according to age of device)
5. Kindle for Mac/PC

This hierarchy establishes Amazon's strategic priorities according to what hardware it updates most frequently. As ebook reading has expanded from dedicated hardware to multifunctional devices including the

Amazon Fire, e-readers have been left behind in the rollout of new paratext services, although users can still access the same range of titles across hardware configurations. The limitations of electronic paper screens and requirements for low battery consumption determine this separation. The lack of interest in Kindle for Mac/PC reveals a dilemma: why do the most powerful computers have the worst versions of the reading system? Simple: a lack of users. Ebooks are designed to read on a smaller screen.

Beyond the tiered provision of services, the Audible-Kindle integration completes the feedback loop of paratext services and text. Amazon largely runs Audible and the Kindle as two discrete business lines.<sup>58</sup> By offering users the opportunity to connect the two, the Kindle book becomes an additional paratext service of the Audible content, and vice versa. The Whispersync for Voice scheme codifies the link between the two even outside their respective software packages. The feature extends the Whispersync functionality to different media by allowing a user to read part of an ebook and then sync up to the exact location with the audiobook.<sup>59</sup> This mechanism only functions if the two media work together through curated metadata. In this instance, Amazon has invested in ensuring that Whispersync effectively traces the relative position of the reader in both Audible and the Kindle. Amazon's scale and dominance in both ebook and audiobook platforms allow the company to build cross-media links, while rivals do not have the same infrastructure. The company can afford to provide poor-quality automated services at the periphery if it offers unique features that are more important to customers' concerns, and the links between Audible and Kindle certainly offer a good incentive.

The decline of large publishers' interest in ebooks since 2011 with the introduction of agency pricing has created a dilemma in marketing ebooks. The rhetoric of "outbooking the book" is difficult to actualize if ebooks are perceived as second-class citizens compared to print. Automation of paratext services has become a cornerstone of Amazon's strategy for enhancing ebooks while occasionally using the vast consumption data set the company has captured. While not always successful, the practice demonstrates how platforms can create a baseline for paratext where authors and publishers might not have the resources. The more substantial recastings of the ebook-as-text have led to greater success in turning the container into the paratext in the form of the links between Word Runner, Audible, and the base Kindle reading application. The three media work in tandem to create different visual or auditory experiences that build on one another. The value of augmentation thus comes from how Amazon can build an infrastructure around the text that allows readers to create the most appropriate method of consumption for their needs.

The constant addition of new paratext services has become a bugbear for many users. This has led some to maintain support for their older devices, which have not been updated to add these new features. Others latched on to a proposed India-only version of the Android app called “Kindle Lite.” The app was advertised as taking up just two megabytes of space and facilitating data transfer on 2G networks.<sup>60</sup> As a compromise, Amazon stripped features such as Goodreads and Word Runner to enhance performance, acknowledging that the features were not a core part of the platform. Amazon’s cross-media integration of Audible and Kindle runs counter to the weaker attempts at automation of services including indexing and searching. The two core innovations of digital publishing platforms have been the introduction of manipulable text and the ability to use it to link different media into a coherent book unit. Not all of Amazon’s paratext service experiments have been successful, but as the platform matured, a range of tools has been whittled down to the elements users are most interested in. Nonetheless, the broader method of paratext services, drawn from both user and automated labor, enabled Amazon to attempt to “outbook the book” while working in an environment where publishers are unlikely to invest extra resource in producing customized Kindle titles.

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# Four Shades of Gray

## The Amazon Kindle Platform

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