# DESIGNING FOR INFORMAL LEARNING: THE CASE OF A MOBILE E-READER

Jason K. McDonald, *Brigham Young University*

This case describes the redesign of a mobile eReader application. The purpose of the redesign was to convert an existing eReader from a means of only reading books into a tool for informal learning. The case reports how the design team's definition of informal learning evolved throughout the product development process, and how design decisions were influenced by this changing definition. Over the period of time covered in the case, the eReader evolved from a tool used for reading eBooks, into one meant for personal study, and then into a product that supported serendipitous discovery of inspiring material (built under a philosophy that informal learning meant that people were able to discover interesting and uplifting material without exerting effort to find it). The end point of the eReader's evolution was as a subscription service for the company's eBooks and digital audiobooks, to allow customers to continually use them for educational purposes. This case is structured around the four iterations of the eReader design process. Each iteration reports how design decisions were made and what kind of results were achieved.

**Jason K. McDonald** is an associate professor in the department of Instructional Psychology & Technology, at Brigham Young University. His research interests include creativity in the instructional design process, and reflexive practice among designers.

## INTRODUCTION

This case describes the redesign of a mobile eReader application, focusing on the period of 2013–2016. The purpose of the redesign was to convert an existing eReader from a means of only reading books into a tool for informal learning. The case reveals how the design team operationalized the concept of informal learning, and how their definition of informal learning changed over time in response to customer research, market reaction to their product, and the evolving influence of individual employees. The case also describes how design decisions were affected as the definition of informal learning changed.

In deference to the company's desire to remain anonymous it will not be identified by name, but some basic information can be provided as background. For convenience, throughout the case the company will be referred to as the Acme corporation. Acme is a small firm that has been in business for over 150 years. Somewhat unique in the publishing industry, it not only owns a press but also a chain of over 30 retail stores in which they sell their own products as well as other products of interest to local communities.

This design case will focus on one division within Acme—the eReader design team. This team included the director of eReader product development (and author of the case), a graphic designer, a product analyst, and eBook production staff. Many of this team's decisions were coordinated with the programming team: the mobile development director, two other full-time programmers, and supplemental contractors as needed. Other decisions were influenced by company executives. A simplified organization chart showing the relationship between these groups is provided in Figure 1. The case will describe how these organizational relationships influenced the design team's definition of informal learning, the shape of product features, as well as other key design decisions.

Throughout the case the following terminology will be used. The product described is a mobile application for use on tablets and smartphones, and will be referred to as the eReader, even though (as will be seen) its purpose eventually
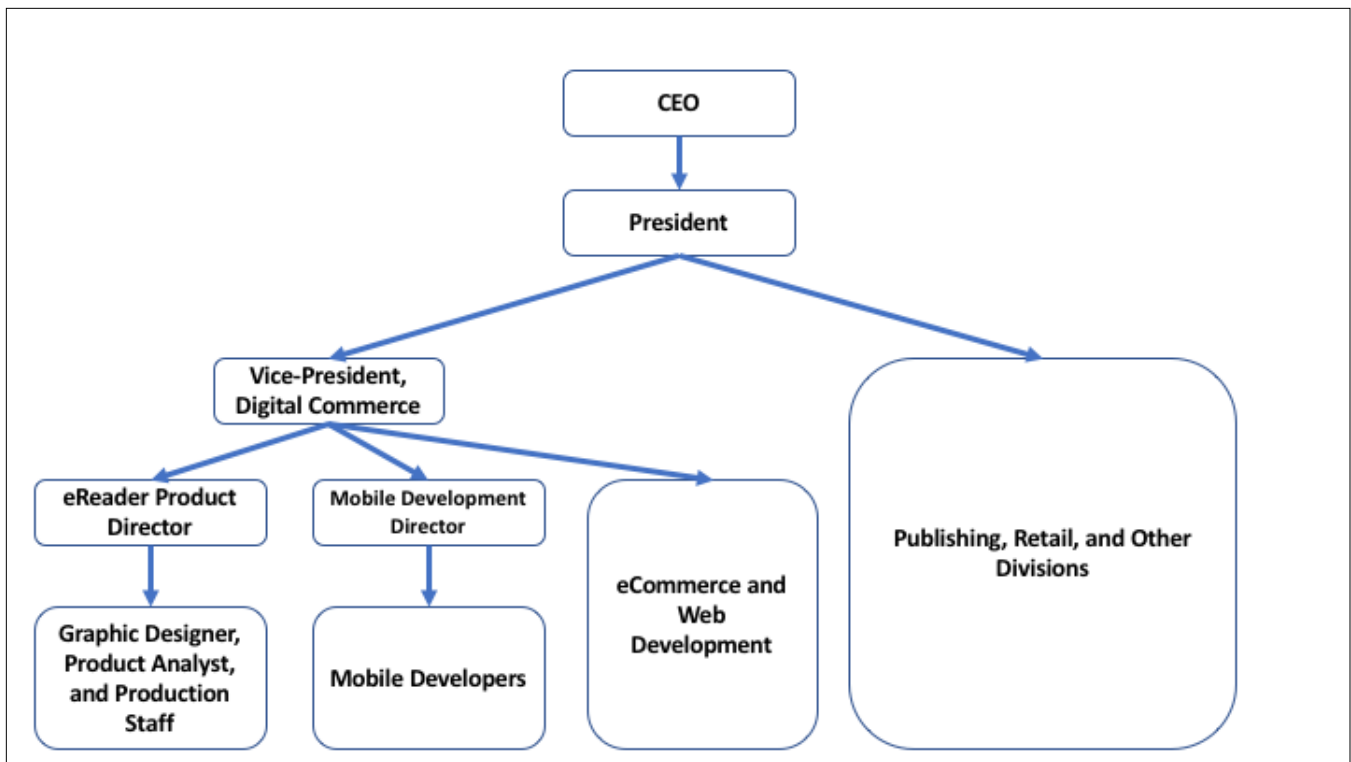
**FIGURE 1.** A simplified organizational chart for Acme Corporation.

grew beyond only reading eBooks. The eReader included a number of components that will be referred to as modules. A module is a group of related functions and screen displays, most often associated with an identifiable task such as executing a search.

This case is structured around four iterations of the eReader redesign process. Each iteration reports how design decisions were made for the product and what kind of results each iteration achieved. The author of this case began employment near the end of the first iteration and left near the end of the fourth. Notes in the text will identify at what points the author's employment began and ended. For consistency the actions of the design team, including the author, will be referred to in the third person.

While in hindsight it will seem clear that many key decisions reported in the case were poorly justified, at the time they seemed to be reasonable responses to the constraints placed upon the eReader design team. The design iterations that are described below should be interpreted with this in mind. The value of openly reporting both good and bad decisions is to illustrate the complex realities that often exist when designing, especially when key definitions of a product's purpose are evolving at the same time as is the design (in this case the definition of informal learning).

## BACKGROUND FOR THE DESIGN CASE

Over the past two decades, publishers have experienced disrupting forces similar to those shaping other industries: rapid technological advances; rising costs; power shifts away from traditional institutions; and increasing competition for peoples' attention. The most visible result of the disruption has been growing adoption of eBooks as an alternative to print. This has been accompanied by deep uncertainty in those who depend on strong demand for traditional books: authors, editors, publishing executives, book retailers, and even passionate readers (see Baron, 2015). Book publishing is typically a low-profit industry even in favorable circumstances, and many publishers have found financial returns still lower in the digital market. Consumers are usually unwilling to pay the same price for digital books as for print, and many publishers have been unsuccessful at cutting their costs sufficiently to remain profitable with these lower revenues (Bhaskar, 2013).

Acme has likewise struggled to respond to these revolutions in digital technology. One response has been to expand their physical product line beyond books, into music, film, and lifestyle goods such as home décor. The other major response was to develop a catalog of digital products to supplement sales of their physical goods. Acme entered the digital product business in 2009. Originally their efforts were directed towards creating eBooks for Amazon's Kindle service. But in 2011 they decided to create their own eReader through which they could sell eBooks directly to

consumers. Acme's executives perceived that the fees for selling through Amazon were too high, and that more profits could be generated by developing a proprietary platform for eBook reading and the direct sales that would result (even with the associated expenses of software development). Originally the Acme eReader was very similar to other eBook readers, primarily allowing people to open a book, navigate through the text, and create basic annotations like adding a bookmark.

Another reason Acme was interested in creating an eReader was related to perceptions executives and employees held about the company's mission. Many titles that Acme publishes are in the genres of reference and self-help. During decades of publishing experience, executives received feedback from some customers describing how they used Acme's products to create personal systems for informal learning. Many employees, executives, and members of the board of directors were this kind of customer themselves, and their own experiences disposed them towards trusting feedback from those who they considered loyal supporters. Over time, these customer assumptions became routinized, underlying many practices about what kinds of books to publish. Although Acme never entered the traditional textbook market, some of their titles evolved to appear more overtly educational. This, in turn, led to the idea that building educational affordances into the Acme eReader would help the company better fulfill its mission, better satisfy its customers, and by doing both lead to increased sales. With this decision to shape the eReader for educational purposes, the first iteration described in the case begins.

## ITERATION ONE: THE FIRST FEATURES FOR INFORMAL LEARNING

In 2013, two years after the first release of eReader, the design team began creating an initial set of educational features for the product. Their definition of education was activities associated with overt studying, such as taking notes, looking up definitions of words, or memorizing words and phrases. But because these activities were not associated with a formal curriculum the team referred to them as informal learning. Notable features they developed included

- Adding a tabbed interface (similar to a web browser) allowing people to open more than one book at a time so they could compare ideas across multiple sources.
- Additional colors for highlighting.
- Saving highlights and notes to a server so they were available across devices.

The design of these features was not based on educational or instructional theories, or even an intentional philosophy of learning. This was likely because at the time no one on the design team was trained in instructional design, educational technology, or similar fields. The ideas were more pragmatic,

inspired by the design team's own experiences studying for a college exam or completing a homework assignment. Other features were derived by identifying what they liked in other products (such as the Amazon Kindle eReader, the Barnes and Noble Nook eReader, or the Marvel eReader), which they then modified to make them more study-like. For example, while most eReaders would allow users to highlight a passage within an eBook, those highlights were only viewable when that specific book was open. Designers of Acme's eReader created a single screen allowing people to view and study all their highlights and notes made in any book.

A comparison between the original and new interfaces can be seen in Figures 2 and 3. The visual design of the original interface was based on the model of a physical bookshelf, which was a common metaphor for eReaders when it was released in 2011. The graphic designer on the team created the new interface based on feedback he solicited from people who worked on the same floor as himself. His process was to ask colleagues for their opinions about the current product and how they believed it fell short. The primary feedback was that they found the skeuomorphic design to be visually out-of-date. The graphic designer then created high fidelity interface mockups in Photoshop reflecting this feedback, eliminating the visual style of a bookshelf and altering the design metaphor to appear more like a web application. Once he considered the interface complete he
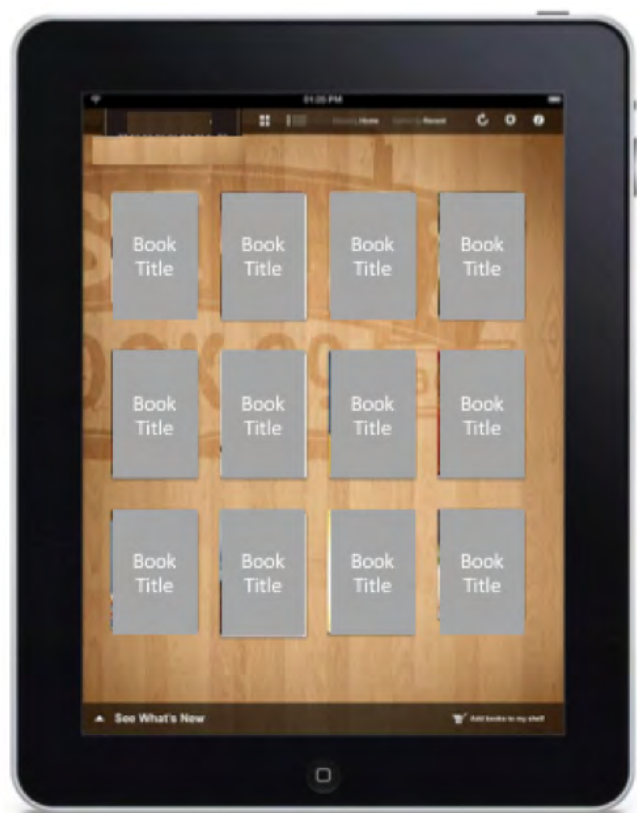


**FIGURE 2.** A wireframe of the original eReader interface. Note the skeumorphic design (e.g. simulated wood).
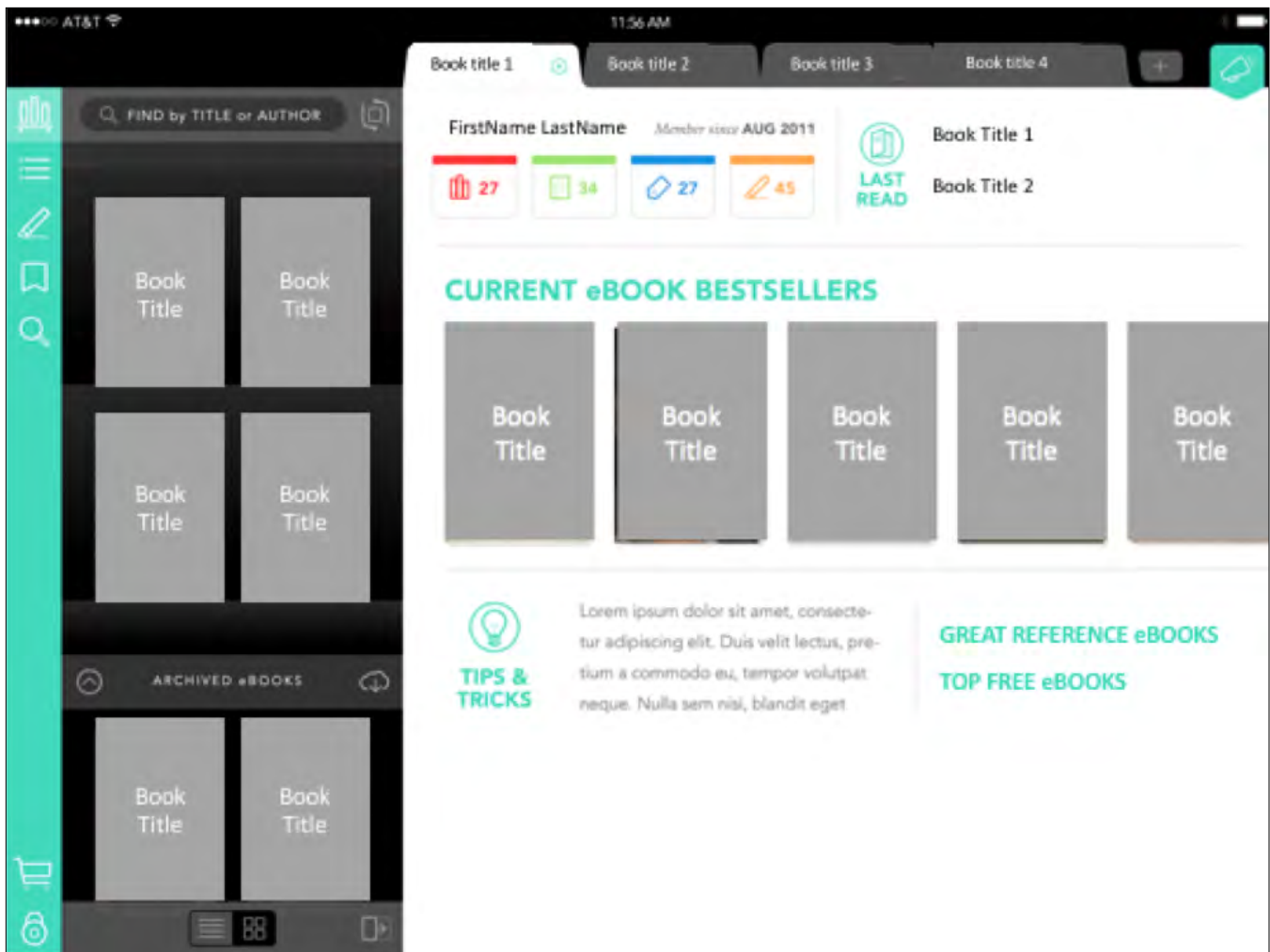
**FIGURE 3.** A wireframe of the updated eReader. Note the affordances of a web application in the interface: tabs at the top of the screen, and icons along the left side to access functions like search, or viewing notes and highlight.

segmented all the elements into individual graphic files and gave them to the programming team for implementation.

The design team also spent considerable time improving the eReader's search module. In the original product (as well as in competing products such as the Kindle or Nook) when customers executed a search, results were only returned from the eBook that was currently open. While this facilitated finding a passage in an individual title, it did not seem consistent with a study-centered approach that would allow customers to gain a broader view of a topic. The design team, therefore, planned a new search function that would retrieve results from all eBooks currently loaded on a person's device. They anticipated this would lead to increased learning as people were able to invest more time exploring individual concepts. In adding this feature, however, designers did not eliminate the possibility of searching only one eBook at a time. They added a filter to the search results screen allowing customers to see the full set of results

or, if a book was opened, to limit results to only that title. The graphic designer created this interface in the same manner as described above.

Finally, the eReader designers created a unique study module not found in competing products. This was an advanced research function that allowed one to save open eBooks and in-progress study aids (like results from a specific search term). They called this module "study sessions." After a study session was created, one could close the eBooks or search results it contained and use the eReader for other purposes. If one desired to return to the previous state, the study session module was opened and a session selected. The previous state of the eReader was then restored. Since the study session function only required minor elements in the interface that did not already exist, the team did not engage in a mockup or testing process. The graphic designer created what new elements were needed and gave them to the programming team for implementation

**Results of the Study-Focused eReader**

When this study-focused version of the eReader was released in January 2014, the design team noticed an immediate problem—the number of people adopting and actively using the product began to drop. During the period from December 2013 to June 2014, new weekly installs fell from 2,500 to 1,200. During the same period, the number of active users (those using the eReader at least monthly) fell from 84,000 to 55,000. Factoring in the growth that did occur, this was a usage drop from 26% of the total install base down to 15%. eBook sales also dropped during this period, from highs in December and January, to 75% or less of previous revenue totals in February and the months that followed (exact revenue figures are not provided because Acme did not authorize release of financial information). What made these trends more troubling was not only the decline, but that leading up to the new release all these measures had been on the rise for at least a year. The design team became discouraged. With these results following so quickly after their new product release, they were concerned that the company would lose confidence in their work.

Their response was to conduct a new round of customer research, hoping to discover insights into what could stimulate new interest and usage of the eReader. They chose a research methodology advocated by Acme's president: the jobs-to-be-done framework. This approach is based on the assumption that effective customer research does not rely on demographic data or asking people what kind of product features they prefer. Instead, customer research should investigate what problems people experience in their lives, and what kind of products they metaphorically might "hire" to solve those problems (Christensen, Hall, Dillon, & Duncan, 2016, p. 56).

The research was carried out by the new eReader product director (the author of this case), a recent hire who did not have emotional attachment to the product just released (he began employment a month before release of the study-focused product, in December 2013). His process was to select six people who represented typical customer segments, and with each person conduct an in-depth, semi-structured interview. Interview questions asked about issues related to people's general approach to reading, study, and personal enrichment. The product director then engaged in a free-form conversation with people about their responses to earlier questions. As recommended by Christensen et al. (2016), the interviews intentionally avoided discussion of Acme's eReader, mobile technology, or other company products. While these topics did come up in some interviews, they did so when initiated by interview subjects.

Through this research the product director found only one person who regularly used leisure time for self-directed study and learning, and then only occasionally using Acme's products. All other interviewees described study and study-like activities as very low priorities in their lives, although most of them described how they would occasionally read for pleasure. They discussed the general concept of learning as being important, but did not make time for it, as demonstrated by one man's comment, "how much does it bother me [that I don't take time for personal study]? Not much. I just figure its life and you just try your best every day." Another, when asked if he would change anything in his life so he could spend more time in informal learning, said, "no, I wouldn't do [anything] differently. . . . [it's just not] reasonable for me in my circumstances." One woman compared study to exercise:

> I know what I'm supposed to be doing, but it's kind of like how I should be exercising, just walking even, but I don't. One of my very favorite things to do is eat out. And eating out for me is a pleasure and an event [more so than exercising].

The implication being that studying, like exercise, was not important enough to change her behavior.

Interviewees were more interested in serendipitous moments of edification, meaning they enjoyed discovering ideas throughout the day that were uplifting or inspiring, without having to search to find them. All interviewees, including the one person who actively spent time studying, enjoyed motivating quotes or other encouraging thoughts, especially when such material applied to the way they were currently feeling, or to activities in which they were currently engaged. Some interview subjects also discussed how they looked for audio materials to uplift or edify them, preferring listening to reading. One interviewee described, "I have audio, MP3s, whatever I happen to have my iPod or something...We often listen to [stories or music] in the car." Equally important to some was also sharing with friends what they found, as illustrated by one comment:

> It's just like I'm having a conversation with someone.... If I know someone else struggling with this kind of thing, let me share [what I found] with her. Sometimes, I find articles, videos or other things that someone else has posted on Facebook and so I'll share them myself. Someone shared it with me, so let's keep that going.

The themes from these interviews were summarized into a survey and sent to the registered users of the eReader. About 22,000 people responded (6% of the install base). While 20% of respondents described being interested in search or study activities, fewer than 20% of those described their interest as anything more than moderate. Although the survey response rate was small, assuming it was reasonably representative of the entire user base meant that 1 in 25 users of the eReader were interested in the new, study-focused direction of the product. However, nearly 80% of the existing users described themselves as more than moderately interested

in the same kinds of serendipitous discovery described in customer interviews.

## ITERATION TWO: COMPETING RESPONSES TO THE RESEARCH

The eReader product director believed this research was evidence that however important studying was to the company, it was not an activity in which customers were interested. He further justified this interpretation using the drop in usage and new installs. With pressure being applied by executives to find a way to expand the eReader's usage, the product director believed that a new direction for the product ought to be explored even if it led away from focusing on study tools. His analysis led him to see a different way in which the eReader could be used for informal learning; instead of being a tool for in-depth study, he saw customer interest aligning with a product that allowed for discovery and sharing of interesting material. The product director believed this was not inconsistent with the company's educational identity, but it would require a new definition for what it meant to support informal learning. Instead of informal learning being a school-like study experience, he believed it could be any activity in which people experienced a new sense of insight or expanded perception, no matter how small. This definition was also influenced by the product director's background in instructional design and educational philosophy. His experience with designing informal learning environments attuned him to broader possibilities for what constituted education than only activities that could be described as studying.

Using this updated definition of informal learning the design team began two modules for the eReader: one that would deliver brief, inspirational quotes to users of the eReader, and one to play digital audiobooks.

### The Quotes Module

The first addition to the eReader was to a module to deliver brief quotes to peoples' mobile devices. This idea was not completely new to the company. Shortly after Acme first released the eReader in 2011, the design team created a different, stand-alone mobile application that used device notifications to send an inspirational quote to people every day. If users liked the quote, the notification allowed them to open the application and learn more about the source from which it came. They could also share the quote through Facebook, Twitter, SMS, or email. The product was generally well-used. 27% of those downloading it opened it at least weekly, and 41% opened it at least monthly. Additionally, over an 18-month period, the 10,000 people who downloaded it had shared over 94,000 quotes.

As usage of the eReader began to decline, the design team compared the eReader to the stand-alone quotes application and found the difference between them to be striking. By June 2014, monthly usage of the eReader was 15%. This was a difference of 26% when compared to monthly usage of the quotes application. The design team speculated that if they added a similar quote module to the eReader that delivered excerpts from the eBooks they were trying to market, people would begin opening the eReader at a similar rate as they did the quotes application. If only a small percentage of these people in turn purchased the eBook from which the quote was taken then revenue would also start to increase. Finally, if people shared quotes from inside the eReader, it would become a form of word-of-mouth advertising, generating even additional downloads and eBook sales. Customer research only increased the design team's interest in adding a quotes module to the eReader, as interviewees described their interest in both finding and sharing short, inspirational material. The team believed that helping people perform these activities would lead to them engaging in the new forms of informal learning they were trying to promote.

The quotes module interface was designed to closely mimic the interface of the stand-alone application. The product director created a wireframe that laid out elements to read a quote, link to its source, and share it through social media (see Figure 4). The graphic designer then created high fidelity mockups of the interface which he refined by showing to colleagues within the company. Those reviewing the interface offered little feedback, however, and the quotes module was developed in a manner highly aligned with the original wireframe.

Initially the quote module become a popular option. It was released in the late summer of 2014, and over the next six months opening a quote became the second-most frequently performed action in the eReader, behind actually viewing pages within eBooks. Additionally, active use of the product climbed nearly 1% each month, and over 7,000 people began sharing quotes from the eReader at least monthly.

These effects were short-lived, however. After a few months people began to complain about the device notifications used to inform them of a new quote. In the stand-alone quotes application, notifications included a short excerpt from the actual quote, which generated interest in the quote and encouraged people to open the application to read more. But this type of notification required people's mobile devices to communicate with a server each day, to retrieve individual excerpts for display. Similar functionality for the eReader quotes module could not be added because of workload given to the programming team by the company CEO (to be described in a later section). As an alternative, programmers implemented an easier notification that was generated by the device itself. This notification displayed a
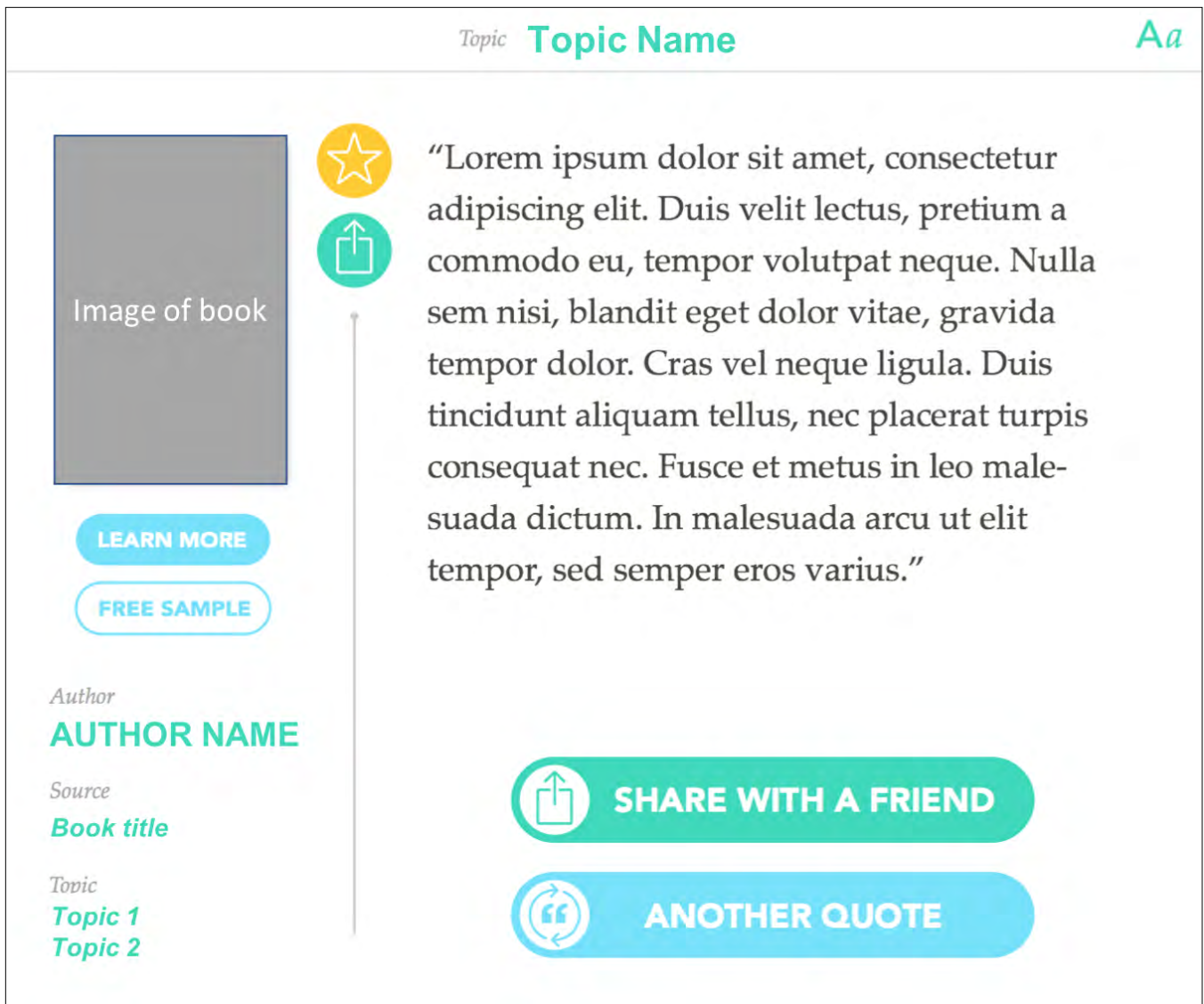
**FIGURE 4.** A wireframe of the quotes interface.

generic message informing people that a new quote was available and they should open the eReader to view it. Over time people reporting being annoyed by such an uninformative prompt. They also began disabling the notification. After six months of climbing usage, the number of active users began to decline again, as people presumably forgot about the quotes function when they were not receiving regular notifications.

**The Audiobook Module**

Acme's second addition to the eReader was a module to play digital audiobooks. For years Acme had converted audiobook titles from CD to MP3, making them available for purchase on their website. Shortly after the initial eReader launch in 2011, the design team began debating whether they should update the product to allow it to play these audio titles. Some members of team looked at the popularity

of services like Audible and hypothesized that their own customers would be equally interested in audio products. These advocates became re-enthused about the possibility presented by audiobooks when results from customer interviews suggested that some of Acme's customers were more interested in listening than in reading. The new eReader product director also believed that adding audiobook playback would be a means of shaping the product to be more aligned with the new definition of informal learning for which he was advocating.

Others on the design team were not in favor of expanding into audio, however. They focused on the relative sales of audiobooks compared to eBooks, and believed that even if audio sales increased it would not be as helpful to total revenue as would other changes that could potentially augment eBook sales.

Ultimately, Acme's president made the decision to add audio playback into the eReader. His decision was not based on how the eReader could become a better tool for learning, however. The president was also new to the company and did not seem interested in perceptions about Acme as an educational company (whether focused on study or otherwise). His decision, then, was based on his view that if adding audio to the eReader improved sales at all, it would be enough justification for Acme to remain in the audiobook market for the foreseeable future. While he observed the overall trend of audio sales declining company-wide, he also believed that the audio market was not one which the company could abandon completely, at least not without a final attempt at improving sales.

Audio playback was integrated into the eReader by both creating a mechanism to listen to, and a mechanism to find, audio titles. Playback controls were modeled on other popular audiobook players like Audible (see Figure 5). Finding audio titles in one's library relied on the same screen displays as existed for finding eBooks. The product director created a wireframe of an audiobook interface that allowed customers to view their audio titles in the same library as they viewed eBook titles. When a user selected an audio title, it opened in the frame that was typically used to display an eBook, with playback controls available in place of text. Audio titles were distinguished from eBooks in the library by an icon in the upper-left corner of the title's thumbnail image. When the graphic designer developed the wireframe into a higher fidelity mockup he tested different icons for identifying audio titles, starting with variations of a standard Play icon (a small triangle pointing to the right), before settling on an icon representing a pair of headphones. His testing took place with other employees of the company, who gave feedback that that since audio playback was a new feature, users may not be primed to associate a triangle with the ability to listen. An icon more closely associated with listening, therefore, would be preferable.

Use of audiobooks became a more popular option in the eReader than quotes. Upon release of the audio module in early 2015, active use of the eReader rose again, nearly 4% within the first month. The effects were also longer lasting, with this increase in usage being permanent. Also, sales of digital audiobooks doubled in the first month after release, with subsequent months at least doubling and sometimes tripling previous levels of revenue.

**Additional Updates to the Search**

While customer research influenced the product director to modify his definition of informal learning, others in the company did not respond the same way. Most notably, when research findings were presented to Acme's CEO, she responded that she believed that customers did not report study as a priority because the company had never given
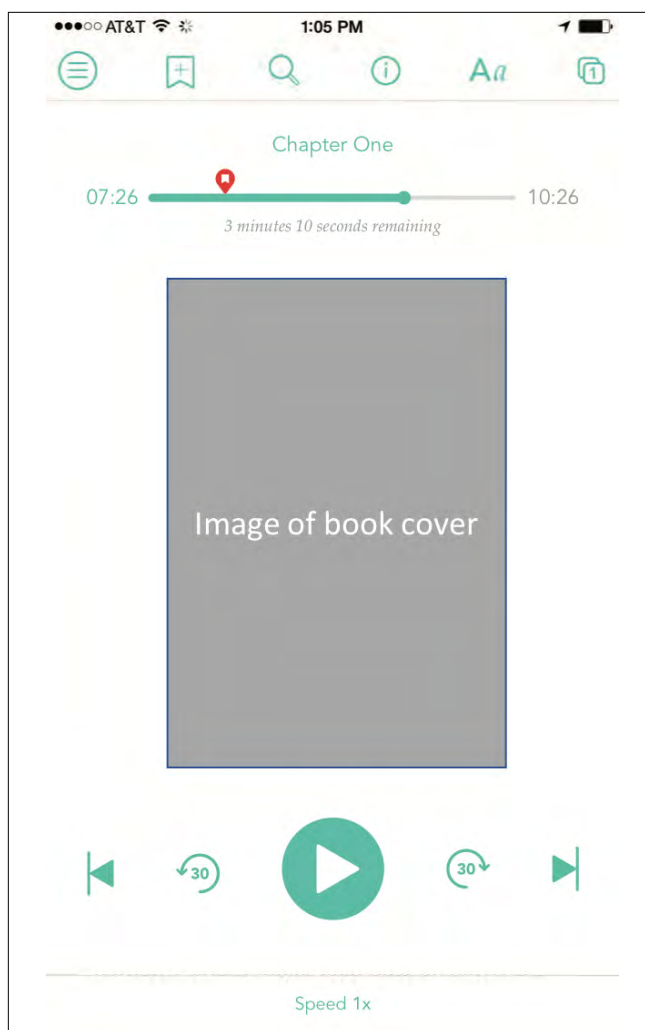


**FIGURE 5.** A wireframe of the audiobook interface.

them a high-quality study experience. She personally had been let down by the eReader's study functions, especially through her use of the search module which consistently returned results that she found disappointing. She described how she would test the eReader by searching for phrases she knew were in a book on her device, yet that book would not be returned in her search results. She was convinced that customers were testing the product the same way. Her deeply-held belief was that if Acme's customers were provided with an effective search module they would see how important personal study could be to their lives. Her formula was that, "fantastic search, combined with [Acme's] fantastic content, would equal a win in the marketplace."

The CEO's response created a tension for the eReader design team. They had already begun to develop the quote and audiobook modules, and allocating effort towards improving search results created more work than they could effectively handle. Effective search tools are more difficult to develop than is commonly perceived. People performing a search may have different intents, with some looking for results

from the full-text of a book, and others interested in searching meta-data like title, author, or subject. This both makes it difficult to design a search interface that is clear and easy to interpret, as well as adding complexity to the engineering and programing of the search system. Text to be searched is also often stored in multiple file types, each of which has its own conventions for finding, retrieving, and displaying results. Additionally, popular search services like Google devote millions of dollars to improving search results by correcting for common misspellings, searching for synonyms in addition to the words entered into the search, or parsing search phrases to better determine user intent. The ease-of-use available from popular services sets expectations for people searching digital content elsewhere, and while some of this search technology is commercially available, its cost as well as the expertise required to implement it can make it difficult for a small company like Acme to improve search results to an extent that satisfies customers.

As a result, since the design team did not have the option to disagree with the CEO's direction they tried to balance her request with the other modules they were developing. This was not an attempt to actively defy the CEO, as she also affirmed that she did not want to abandon work that had already started. One means of simplifying the work was to not update the existing search interface, since the team believed that while the interface had some usability problems, it was not the primary source of the problem. They instead relied on the programming team to update the technology so that a search was executed on Acme's servers instead of on a customer's device. The server-based technology allowed for more advanced search algorithms than could be executed on a device, which the team believed would solve the problem of poor quality results. It would also allow them to return search results from the entire catalog of Acme's eBooks, including titles not owned by the customer, providing new marketing opportunities. However, even with attempts to balance the workload, the programming team still had to eliminate some features. The most significant was the elimination of the sophisticated notification for the quotes module, described earlier. Other features eliminated were adding word stem searching and synonym searching.

The heavy workload on the team had additional consequences as well. The search mechanisms were only given a few hours of quality testing from internal staff, who used carefully controlled search terms to judge whether the results were improving. They did not broaden their quality tests to include search terms that were ambiguous, vague, or had multiple meanings (such as were often performed by real customers). Consequently, when the new search module was released in October 2015 the response from users was poor. Most people continued to ignore search (over the next year it consistently ranked in the bottom 5% of features used). And those who did use it reported that the quality of results was actually worse than before. As one example,

a user reported that when he or she searched for a phrase that included the word "in," the second result was the word "teachings," which contained the letters "in" but was otherwise unconnected to the search phrase.

## ITERATION THREE: EREADER MESSAGES

In 2015 the eReader team was presented with another opportunity to implement their new definition of informal learning. This opportunity, however, started in the form of a diversion from their development roadmap. In a product development meeting, the mobile development director presented an idea for building a communication module into the eReader itself. He believed there would be a compelling training benefit to send notifications and messages to customers from inside the product. It could let people know about new features, provide workarounds for bugs, or train users on the product's capabilities. The product director was reluctant to approve the idea and decided to defer until further analysis could be conducted. But in a subsequent status meeting the development director reported that the communication module was nearly complete and would be available in the next product release. He had completed it by using graphic files from existing interface elements, so as to not require the work of the graphic designer. Whether by honest miscommunication, or whether he decided to create the module on his own initiative, he was too far into development to abandon the messaging system without cost (which was an unattractive option given the downward trend of sales revenue). However, using the module for customer training or similar purposes did not support the design team's focus on informal learning, since creating training units or troubleshooting guides would incur additional costs for someone to develop the material. The eReader team was given direction by company leadership to find a way to use the messaging module to recover at least some of the costs incurred in its development, while at the same time not slowing work down on other modules.

The module functioned by delivering HTML messages to people when they actually opened the eReader. When a new message was delivered, upon opening the eReader a small badge over an icon alerted people to its availability. If users selected this icon, they could view the message. An administrative interface allowed one to create messages, set up a distribution list (such as to people using different versions of the product, or who owned different types of devices), and schedule the messages' delivery.

As the product director analyzed the messaging module he found some affordances that he believed could add value to the informal learning focus of eReader. The length of messages would allow the company to send longer material to customers than could be sent through device notifications (which were most useful for sending short messages). Additionally, since customers were already displeased with

device notifications being sent through the quotes module, even though the design team had brainstormed other ways they might communicate with customers they were reluctant to use device notifications because they did not want to induce more people to disable them completely. The team hypothesized that the eReader messaging channel could avoid the communication fatigue they thought might happen by using device notifications more frequently.

Based on these affordances, the product director created a set of "book club"-type readings that could be sent to customers through the eReader messaging module. These consisted of short passages from eBooks in Acme's catalog, accompanied by summaries of main points from the readings, and questions to help people reflect on what they read. Although the messaging module did not allow the company to track usage of individual readings, they could measure sales on titles referenced in the messages. Every time the team published a new reading, sales of referenced works increased during the following weeks, providing some indication of both use of the book club and the value that it provided.

## ITERATION FOUR: A SUBSCRIPTION SERVICE

Near the end of 2015 Acme's president decided to take a more direct role in the eReader's development. The vice president overseeing the design team had left employment, and rather than hiring a replacement the president decided to assume those duties himself. His direction was to expand the scope of the eReader further, towards becoming a subscription service for eBooks and audiobooks, similar to Amazon's Kindle Unlimited service.

A subscription service seemed to be an attractive option aligned with the eReader's focus on informal learning. In particular, the company viewed many of their educational and reference titles as having long-lasting value, but after a 17-week marketing window Acme had to shift their promotional efforts towards newer titles. This resulted in a substantial decrease in sales for older books despite the value the company thought they could continue to provide. By making those titles available through a subscription, people could be reminded of them regardless of their age, and continue to use them for learning purposes as long as they paid their subscription fees. Acme's president also wanted the subscription service to provide more access to the company's audio titles. After the success of the audio-book module, he was persuaded that customers really were interested in this form of informal learning. He believed that if the service focused on audio titles that many customers would subscribe.

Verifying these assumptions took place through a set of customer surveys sent to existing users of the eReader. About 19,000 people responded. The survey presented customers with a number of questions, each containing a binary choice. Each choice consisted of a type of subscription service (e.g. X number of audiobooks, Y number of eBooks) at a given, monthly cost. For example, one choice might be 1,000 eBooks and 100 audiobooks for $4.99 a month, with the second choice being 800 eBooks and 300 audiobooks for $5.99 a month. Analysis of the choices customers made indicated how much value they placed on possible configurations of the service. By comparing these potential values with the cost of providing that type of subscriptions (including possible lost sales if a customer did not buy a title because it was available through the service), the team converged on a subscription that included all digital audiobooks from the day they were released (over 400 titles), with all eBooks older than 18-months, and that had sold less than 50 copies in the previous quarter (a selection of about 1,500 titles). The company projected that subscription revenue would grow to over double the amount of individual eBook sales within three years.

After this product scope had been determined, Acme's president gave additional instructions that would affect the product's design. He directed that the team finally fix the quality of search results, since he did not believe the company could completely abandon customers who were interested in a study-focused product, however small that number might be. He additionally directed that all of the components that had been added over the previous two years (e.g., quotes, messages) be integrated into a single library interface. Finally, he wanted a system for recommending new titles to customers based on their previous purchases and well as popular titles as measured by company-wide sales. His timeline to design a new interface as well as a technology plan supporting these activities was about six weeks.

In response to these requests the design team created a process that both allowed for, and relied on, external review of interface ideas. Up to this point the graphic designer primarily relied on internal feedback on his ideas because he perceived the effort to seek out external feedback would be too time intensive. To speed up the process of testing the interface, the product director created a rapid prototyping system using Microsoft PowerPoint. After the graphic designer created high fidelity mockups of an interface, he gave the graphic files to the product director who used PowerPoint to create a set of slides that advanced through possible states of the eReader interface. The initial set of graphics were based on wireframes created by the product director, with later iterations based on feedback gathered as described below. Hyperlinks were added to the icons on each screen in PowerPoint, linking the individual slides together into a simulated product that allowed users to interact with various functions. On a tablet or smartphone, under controlled conditions the prototype's behavior was nearly indistinguishable from that of the actual product.
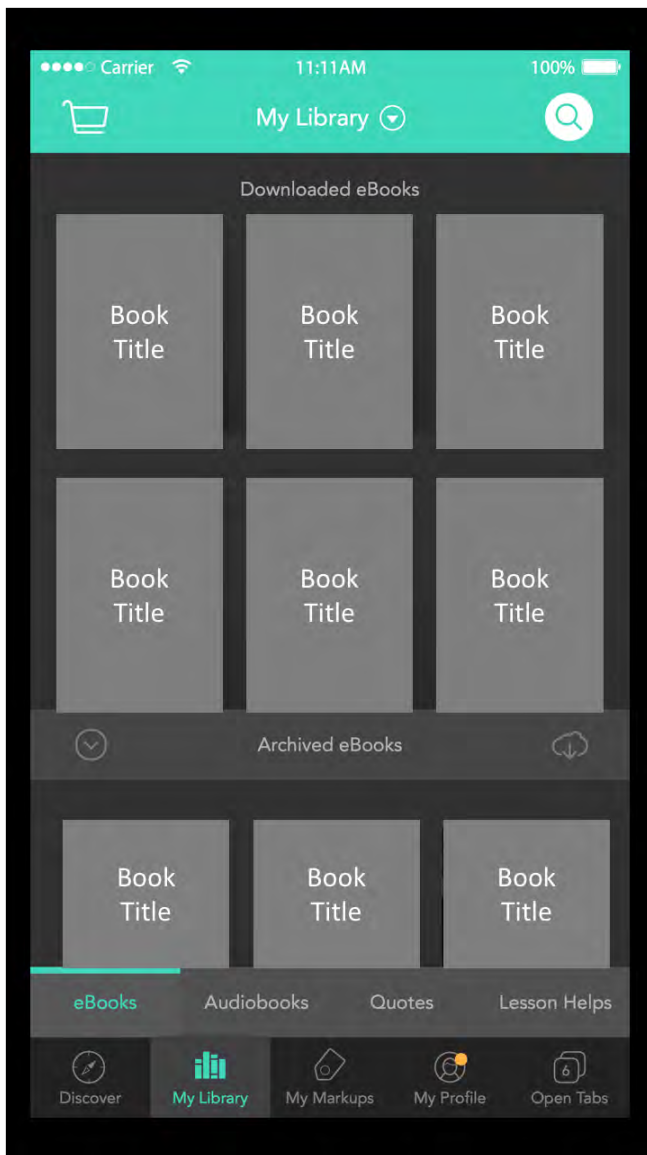
**FIGURE 6.** A mockup of the new library interface.



**FIGURE 7.** A wireframe of the recommendations interface.

The design team then used this prototype to test the new interface with customers in Acme's retail stores. A test protocol was created by product director, consisting of 12 scenarios that focused on discovering new material, browsing a library, searching, or executing other common functions. Based on feedback given by customers in the test, the graphic designer updated the mockups and the product director created a new prototype for additional testing. Each prototype took about 30 minutes to assemble, and test cycles were rapid enough that either two or three tests could be completed each week during the six-week cycle of interface development.

Much of the feedback indicated that early iterations of the new interface were difficult for users of the current eReader to interpret. For example, the first iteration of the new interface did not include any labels on icons. The graphic
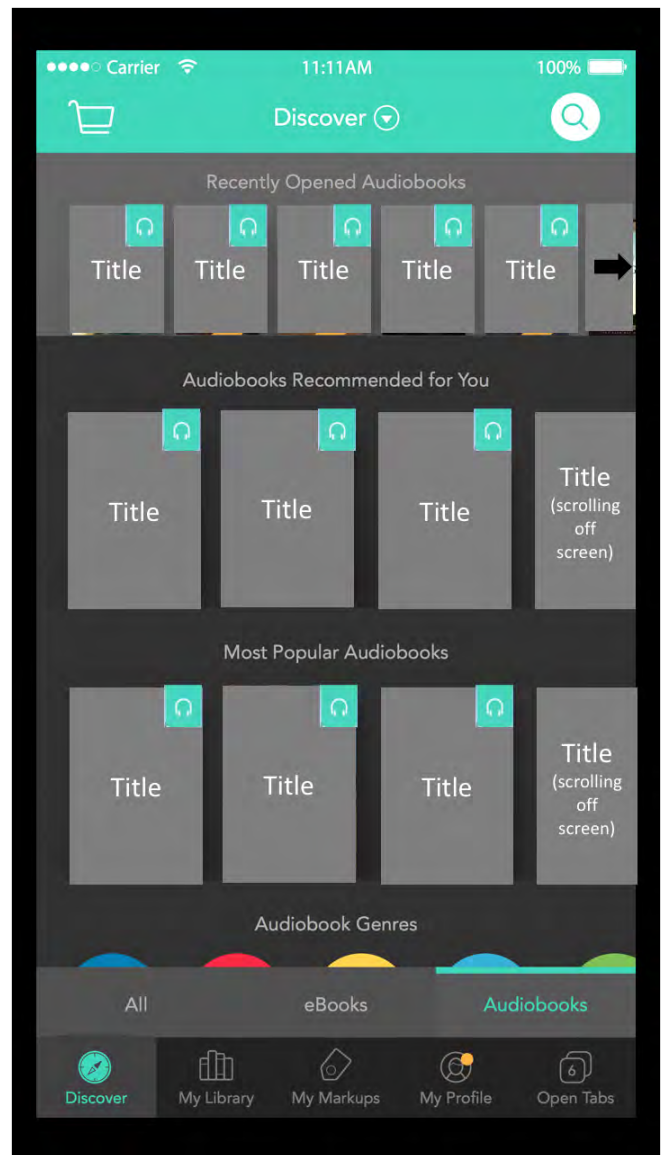
designer's reason was that he wanted the interface to appear less cluttered by text. But users had difficulty distinguishing the display of product recommendations (a new feature) from the library of titles they already owned (the feature they often used in the current eReader). After testing, the design team decided to add labels to icons so people would be able to rely on more than only a visual cue to determine where a function was located. Later testing showed that users still had trouble distinguishing these screens after labels were added, however. In response, additional visual cues were added to distinguish the screens. The library screen was created to only scroll vertically, with columns of book covers that were completely visible in width, but with the bottom row partially hidden (indicating that scrolling down would reveal the rest of the cover). The recommendations screen indicated that it could scroll both horizontally and vertically,

by partially hiding the covers in both the right-most column and the bottom row of the interface (see Figures 6 and 7).

Another challenge discovered through testing was helping people interpret search results. The new search module integrated results from multiple sources:

- A keyword search of the entire Acme library;
- Words found in book titles, author names, or other metadata fields
- The quotes library
- Markups people had made to their personal library (like adding a note).

Both the product director (in the wireframe process) and the graphic designer found it difficult to shape a layout that communicated the differences between these materials in the search results (see Figure 8 for one iteration). No iteration
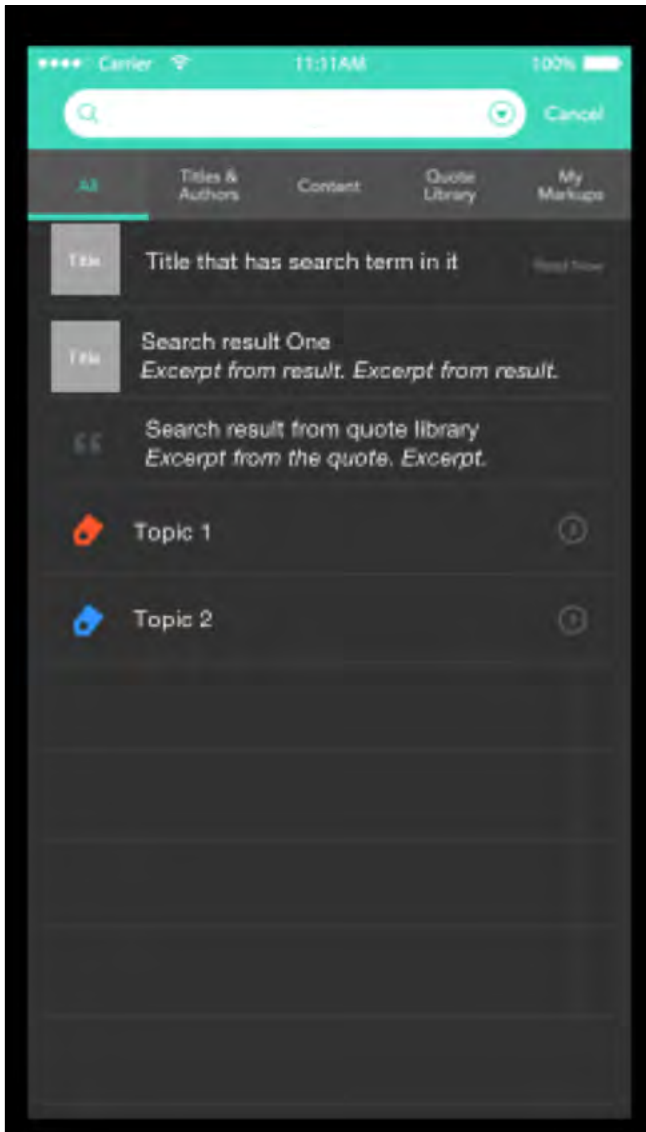
of the search results screen completely solved the problems that people encountered during testing. But as the six-week window for interface development ended, Acme's president decided to lock the product for development despite not all of the problems being resolved. This occurred at the end of 2015 (this is also the point that the author of the case left employment at Acme).

The subscription service was developed throughout 2016 and released in 2017. At the time of this writing, there is not sufficient data to describe how consumers are reacting to the service.

## CONCLUSION

This case described how the Acme company redesigned their eReader so it became a product that facilitated informal learning. It also described how the definition of informal learning used in the redesign process changed due to both internal and external influences, and how that definition impacted the product's form in various iterations. Over the period of time covered in the case, Acme's eReader evolved from a tool for personal study, into a product that supported serendipitous discovery of inspiring, easy-to-understand material, and finally into a subscription service that allowed customers to continually access digital audiobooks and eBooks, thereby expanding the lifecycle of Acme's educational products.

Cumulatively, these efforts were met with mixed success, as measured by customer reaction and financial results. But since the digital publishing market is still evolving, Acme will almost certainly continue to update their eReader in the future. How the product will be influenced by their definition of informal learning, as well as how their definition of informal learning will continue to evolve in response to their environment, remains to be seen.

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**FIGURE 8.** A wireframe of the new search interface.