

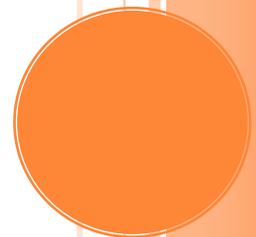
# BOOKLE

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## Abstract:

The purpose of this project is to define a web-based application named "Bookle" that will serve as an online discussion for e-books. With independent study, an individual may be limited in their understanding of a given text. By giving the individual access to a framework where they can express their thoughts and ideas on a particular text, they may benefit more from their initial interpretation. Currently, there is no general framework available to allow students to collaborate and discuss electronic books on the web. Bookle will leverage the power of social collaboration to create a rich learning environment based on electronic books, where users can select specific passages and ask questions. By having the choice of participating in a group, users can get answers directly from their peers, and optionally, a class instructor. Books will be uploaded by users or instructors, and automatically be parsed into individual pages.



# BOOKLE

## **Introduction**

In this paper, we begin with a description of the problem we are attempting to solve. Then, we discuss the details and requirements of our design solution, describing use cases, and emphasizing the potential impact and benefits of our proposal.

Next, we will discuss the implementation options we explored, focusing on a solution based on the Drupal content management system. We will provide a general perspective of the advantages and shortcomings we determined, as well as discuss other implementation options that are available.

We will give an overview of the prototyping work we produced, our learning experience, and the challenges we encountered. Finally, we will conclude with our recommendations for the continuation of this project, highlighting aspects that might require further research.

## **Problem Statement**

There are many websites available such as sparknotes.com and cliffnotes.com that analyze and discuss passages within books. However, they do not provide a sentence-by-sentence analysis or discussion that might help expand an individual's understanding of the reading. As a consequence, these readers might find themselves seeking other mediums, such as forums or

social applications, that may help them further understand the passages.

But these mediums are mainly created with the intention of providing a broad topic-based discussion, so a means for a structured discussion of specific details is not available.

### **Solution**

From the Bookle site, beginners in a subject can learn and expand their knowledge through their peers or experts and can discuss different perspectives of a topic. The Bookle site can also be used as a new tool for instructors or students to discuss their textbook and get confusing sections clarified by other students or the professor themselves.

The members of the site can potentially be comprised of a diverse and dynamic group. The potential for this diversity stems from the sheer ubiquity and recognition of the Internet. In today's society, the general public already accepts the Internet as a resource, and the project uses this fact to readily draw in users that seek the type of resource that Bookle provides.

Furthermore, the structure of Bookle easily supports classes with a heavy emphasis on the textbook by allowing the students of those classes to collaborate more efficiently. These two communities of knowledge-seeking Internet users and book-oriented college students contain the potential to assist each other far more effectively through Bookle, and even if the books

they choose to examine are different, the underlying system of Bookle can accommodate both these types of end users.

To better accommodate the classes that would utilize Bookle, an "upload book" function is provided that the professors may use to initiate discussion over their textbooks. In fact, the concept of Bookle was developed after a professor mentioned his desire for a website oriented around his textbook that could be used in conjunction with his class. Undoubtedly, other professors around the world would make use of such a system in the same manner. In order to facilitate this use of Bookle, after a professor has uploaded his/her textbook, we could provide him/her with the options to limit who gains access to the textbook. Furthermore, the student users who gain access to the textbook could be split into groups by class year and semester, if desired.

The use of Bookle extends beyond the initial idea of discussion around a professor's textbook in a class context to that of potential discussions of any book. To begin, literary classics that belong to the public domain may be uploaded to Bookle and used by the internet community to do further discussion on these classics. More importantly, individual authors can upload their own books to open them up to a community-driven discussion. This functionality is likely to appeal to authors who appreciate interaction with their readers and can serve as great utility outside of the pure University setting.

Bookle's overall potential impact can be viewed two ways, both in terms of the short-term or small scale impact, as well as long-term or widespread impact.

On a small scale: If realized as intended, Bookle would enable students to view and collaborate with other students as well as professors in real time, and share ideas about any given text or shared material. This would revolutionize learning in classes utilizing Bookle because Bookle would create and extend the discussion of the classroom to any and (according to the curiosity of the teachers or students) every point of interest in a given text or reading. Where there is a limited amount of time for questions and answers inside the traditional classroom paradigm, Bookle is an always available resource for questions, answers, brainstorming, and general theorizing on any given subject matter inside of the class. A small scale example of the potential impact of Bookle is the situation of a literature class uploading and discussing various sections of a Shakespearean classic. By highlighting (which can be opened to be driven by either the teacher or students) points of interest or thought in the work, teachers can guide and preside over discussion of those highlighted points, and engage in thought-provoking thought and conversation outside the limits of the traditional classroom setting.

On a large (global) scale: If realized as intended, Bookle would present the first framework of its kind as a sharing of interpretation of knowledge itself. Though sites like Wikipedia and other online encyclopedias may seem similar, Bookle is the first of its kind in that given the same source material, it emphasizes not the "presumed" or assumed correct interpretation or interpreted fact, but instead the wide variety of interpretations of a given text. The increase in availability of these interpretations of the work (of course depending on the quality of the interpretations given), increases the understanding of the reader, and minimizes the need for outside instruction. Simply put, Bookle can make the interpretation and understanding of a text by a qualified professional or reputable source available to all people who are connected to it, which eliminates the need to be tutored or attend professional seminars on the same series of text, as the interpretation that would essentially be fed to the user at the seminar or in the class would be available on line.

Bookle would serve as a step further in equalizing the learning environment across continents, as even though countries at present may have access to the same textbooks, the quality of interpretation of the information contained within the textbooks cause a disconnect and inevitably inequality in the information provided to the students. Due to Bookle's unique approach of sharing the interpretation and the thought processes of a certain passage

of text or material, the perusing student or reader is exposed to a wider spectrum of thought than he or she would ever have available otherwise.

A large scale example of Bookle's use could be collaboration of world-class scientists on a recent finding concerning research in their related fields. By emphasizing portions of the research that must be tweaked or explored, other researchers may contribute their own theories, findings, or ideas on the specified areas. Research progresses more rapidly when different viewpoints and ideas are accessible to collaborators. While concerns may arise over issues of intellectual property, the potential gain from the open collaboration that Bookle will provide greatly outweighs such concerns.

## **Implementation**

Various platforms were considered in the development of the Bookle project. A mobile platform such as Apple's iOS was considered because it enables users to conveniently look up information; however, mobile device platforms pose technical challenges and limit potential users. Bookle incorporates the use of comments and allows users to ask and answer questions within specific sections of a text. Using a small keyboard or touch screen from a mobile device is not practical for increasingly complex questions or responses. Creating a platform specific solution suffers the same limitations as a mobile platform solution. Ultimately, making Bookle a web application allows for the greatest impact to the greatest number of users.

The ubiquity of the Internet allows access from any platform mobile or otherwise.

Due to the inherent difficulty in creating an application that will achieve the established goals within the semester, a content management system (CMS) was suggested as viable alternative to implementing a solution independent of outside resources. Content management systems provide durable frameworks that minimize the amount of code that must be written. Low cost, open source content management systems were prioritized. In particular, Wordpress and Drupal were the top candidates as they both utilized a combination of PHP and MySQL supported framework (both free/open source technologies), and have large development communities available to provide support. With the guidance of our advisor, Drupal became the platform of choice for the project. The Drupal community has created over 11,000 different Drupal modules (add-ons to the Drupal core), many of which could easily be incorporated by Bookle. In addition, custom modules can easily be developed if no suitable modules are available.

Initially, after setting up a basic Drupal environment, incorporating the included text-based, book module, the team implemented a basic commenting system to allow users to discuss specific sections in a book. While working on the project, the learning curve associated with Drupal consumed a significant amount of time. Team advisors and leadership advocated time on a Drupal training program, which lead to improved

implementation of the project as well as efficient use of Drupal as a tool. As a result of the training, a voting system was incorporated in addition to the existing commenting functionality. The ability to upload existing books in a variety of formats and import them in rich-text format into the Drupal system posed a significant challenge that remains open for future innovation. Other features, such as a text highlighting feature, were prototyped in PHP independently of Drupal and served as proof of concepts for the project. These features were implemented and hosted on a web server (“Z server”) provided by the university<sup>1</sup>.

Due to the large learning curve associated with Drupal, a PDF parser and viewer with basic, per-page commenting functionality in PHP and MySQL was created. Other features include a table of contents display, on-demand page loading, and a gallery page of existing books. This prototype demonstrates a functional, albeit limited, proof of concept. With future innovation, the prototype could become a full fledged solution, despite not taking advantage of the existing framework that Drupal provides as an out-of-the-box content management system. This system was developed on a separate hosting service<sup>2</sup>, and the code has been committed to the ELA Github account<sup>3</sup>.

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<sup>1</sup> Drupal-based prototype, <https://zweb.cs.utexas.edu/users/samsa/ela/>

<sup>2</sup> Book viewer demo, <http://ela.n1.cl/>

<sup>3</sup> ELA Github account, <https://github.com/ELAResearch2011/Application2011/tree/master/pdf-parser>

## Conclusion

The Bookle project started as a simple idea which has continuously evolved as use cases as well as implementation were explored. From the beginning, this project has been shaped by the things we have been learning at each step of the way. We have dealt with challenges that include but are not limited to: brainstorming many ideas, selecting the best idea, culminating in building a successful project from the ground up.

The first and arguably most important lesson learned was the importance of brainstorming and creating a workable and sufficiently interesting concept. If brainstorming is not made a priority and given an appropriate amount of time and dedication, the project's goals will be largely undefined and the implementation phase will have a slow take off. In addition, the brainstorming phase can become increasingly difficult if unnecessarily prolonged. It is easy to get caught up in unnecessary details that are better decided as the project is being implemented, since at that time all participants will have a clearer idea of the project's needs and requirements.

Closely related to brainstorming, the specifics related to successfully designing a project were of critical importance. Initially, the brainstorming and design phases were mixed; and while this is expected and arguably inevitable, it must be kept to a bare minimum. It became clear that when brainstorming, the platform and main resources can be discussed, but the

specific details of how the project's features will be implemented should not be discussed until the design phase. Furthermore, bringing an entire team to agree on design decisions unilaterally is a difficult way to approach a design problem. Each person has different levels of experience and knowledge of different tools, so having all members agree on one solution is challenging, if not impossible. It is best to select two or three individuals who will make the initial decisions with regards to overall design or direction and then delegate tasks to other members as appropriate. Each of these tasks is best determined in a fashion broad enough so that the each contributing party can choose how to implement it (within certain limitations/constraints).

As previously mentioned, this project utilized the UT CS Department's server with MySQL. Setting this up was one of the largest bottlenecks faced, since the project's progress depended on the CS department as well as various bureaucratic elements to get things running. Though there may have been ways to avoid a loss in efficiency by working on other features of the project while we waited for the setup to be completed, needing to learn about the server and MySQL hindered us from bypassing this bottleneck.

Other lessons learned were the advantages and disadvantages of using a content management system such as Drupal. Learning to use Drupal, its setup, features, limitations, etc., was very time consuming. Furthermore, months if not years of Drupal experience are necessary to fully learn, understand, and utilize Drupal and the modules available that might be

useful for Bookle. The second option explored, building an entirely independent framework and website with PHP, faced the difficulty of requiring significantly more development time. Many software engineering hours would be spent in designing and implementing features of the project that are already potentially provided through content management systems. Nevertheless, this option has the advantage of fewer limitations due to the freedom in choosing how to build and implement Bookle's features. Additionally, it is easier to modularize the framework and the website content if the project is independent of a pre-established content management system.

Overall, we have determined that the PHP-based Bookle implementation is a better option than the previously explored Drupal-based implementation. Developing Bookle on Drupal paradoxically empowered yet constricted the team as the framework and the deficiency of modules specifically designed to meet our needs were not available. If the project is to be continued next semester, future teams should start from the previous mentioned PDF parser and viewer, which provide basic functionality to the Bookle website.