

Sophie 2.0 and HTML5: DIY Publishing to Mobile Devices

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Abstract: *For an e-book to reach its maximum audience, it needs to be accessible on all modern reading devices in a consistent way. This work compares existing technology choices for publishing e-books for iPad and Android tablets. The research has been conducted in the context of Sophie, software for reading, writing, annotating and sharing networked books, with attention to the ongoing evolution of the software necessary to keep it relevant in a swiftly changing technology landscape. In particular, the article charts the development of the ability to create Sophie projects specifically for a new generation of mobile devices and tablets in support of a generation of students, scholars and publishers who expect easy collaboration, participation and interaction, and tools that allow for media-rich, mobile experiences.*

Keywords: *Sophie; mobile; e-publishing; HTML5; iPad Readers; Android Readers; E-book formats.*

Introduction

Sophie (Georgiev & Sredkov, 2010) is software for reading, writing, annotating and sharing networked books. With considerable support from The Andrew W. Mellon Foundation, Sophie has become a unique tool, allowing authors with normal computer skills to create professional e-books quickly and easily, without sacrificing the customary habits and practices unique to traditional reading and writing.

The primary users of Sophie at this point in 2011 are undergraduate students and faculty members on college and university campuses, where the drive to update learning by making it more collaborative and participatory coincides with the desire for new kinds of scholarly communication attuned to the networked interactions that have transformed contemporary culture. As many have pointed out (e.g., Davidson & Goldberg, 2009), it is imperative that learning institutions understand a generation of students accustomed to participatory learning and networked interactions. Similarly, it is incumbent upon software developers, designers and those who expect to use new tools to work together to create applications suited to collaboration, interaction, and transformation. This is not a trivial undertaking, nor is it one that should be relegated simply to software developers. As Drucker (2009) points out, “The design of digital tools for scholarship is an intellectual responsibility, not a technical task”. This paper illustrates how Sophie must now continue to evolve, working toward fulfilling its potential to allow users to create e-books that they can deliver to new reading devices, and explains the work undertaken to achieve that goal.

Continuous Evolution

Since its earliest incarnation as software released in the “Squeak” Smalltalk platform in 2008, Sophie has morphed in response to its sense of “intellectual responsibility” to a changing culture. When it became clear that Sophie required an extended user base in the open source community if it was to remain viable, the software was rewritten in Java to connect with that community. When it became clear that Sophie books composed as stand-alone objects no longer suited the desire for networked reading, and when notions of collaborative authoring moved from fantasy to reality, Sophie kept pace, and development focused on the Sophie Server, designed to allow users to collaborate easily and efficiently in real time.

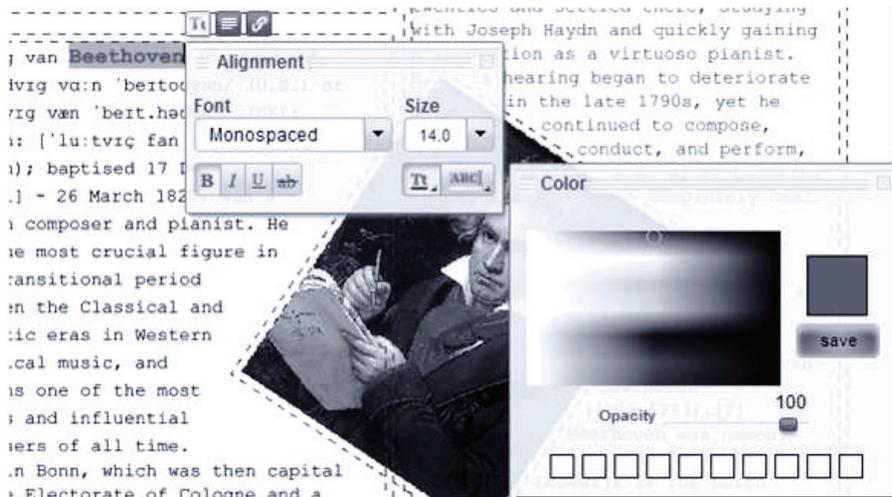


Figure 1. A glimpse of Sophie’s interface

Now, Sophie faces a similar juncture. Sophie must adapt to the recent explosion of interest in mobile readers such as the iPad and the Nook, and it must support publishing on a broad scale, offering the publishing community a robust and innovative tool for disseminating media-rich, networked reading experiences on a wide range of devices. To this end, the Mellon Foundation funded an initiative titled “Sophie 2.0: From Projects to Publishing,” which includes support for the creation of six exemplary book projects at universities across the USA, along with funding for two marketing projects dedicated to investigating Sophie’s potential role in publishing. The first marketing project was a brief survey designed to gauge the impact on publishers of adding a feature to Sophie for exporting books in a format suitable for reading on an Apple iPad; the second was a longer survey (due for completion in second quarter 2011) to identify further functionalities desired by publishers.

While the iPad Survey was being planned, however, the industry continued its quick evolution, easily evident at the 2010 Consumer Electronics Show in Las Vegas, where tablets and networked reading devices were among the most popular – and prevalent – technologies presented. Low-power and low-cost processors that are robust enough to support networked activities have contributed to the proliferation of tablets and e-book readers, and dozens of manufacturers internationally have produced devices. Further, the Google Android operating system-based readers gained significance in the fourth quarter of 2010, with Gartner, a leading technology research company, stating in September 2010 that “the worldwide mobile operating system (OS) market will be dominated by Symbian and Android, as the two OSs will account for 59.8 percent of mobile OS sales by 2014” (Gartner, 2010). Indeed, this shift in turn prompted the Sophie team to revise the “iPad Survey” to become the “iPad and Android Survey.” Finally, yet another example of the rising significance of a new range of mobile devices was recently reinforced by the *2011 Horizon Report* (Johnson, Smith, Levine & Haywood, 2011), published jointly by the New Media Consortium and EDUCAUSE, which lists electronic books and mobile devices as the two most significant technologies destined to impact higher education in the coming twelve months.

The iPad and Android Survey

The perceived need for iPad and Android as primary publishing options was verified in several ways, the primary one being a survey of publisher interest in the platforms. The brief survey, conducted in Fall 2010, was focused on a single purpose: providing data for making an informed decision whether or not to extend Sophie functionality based on the importance of the iPad and Android to decision makers in the electronic publishing industry.

Publisher Corroboration by Survey Results

The market study was completed by the Morey Evans Agency to determine whether or not the Apple iPad reader and Google Android reader products are important to qualified experts in the book publishing industry. These experts were associated with organizations that included large publishers, small publishers, self publishers and academic presses. The study was a part of a Mellon Foundation funded project that includes the Exemplary Books project.

The Purpose of the Survey

The intent of the iPad-Android survey was very focused. It had the single purpose of providing data for making an informed decision on whether or not to extend Sophie functionality based on the importance of the iPad and Android to decision makers in the electronic publishing industry. Since it appeared that both iPad and Android readers could be served by the same mechanism, Android was added to test the validity of claims that Android was rising rapidly as an iPad competitor. Near term results for the survey were sought so that, if the results were positive, export extension could be added to Sophie to keep it in contention with other solutions in a rapidly evolving market environment. It is thought that having iPad and Android compatibility actually in work will give potential publishing adopters some assurance that these platforms will be supported and make the effort to attract new users far more productive. The need for an early determination drove many of the design decisions for the survey.

The Design of the Survey

The survey design was based on examining the importance of the iPad and Android as electronic book reading platforms to decision makers in publishing organizations. Targeting a specific population minimized coverage bias stemming from samples not representative of the population. Sources of coverage bias are typically a less carefully targeted respondent population, unreliable contact information, or lack of incentive or motivation to respond. It became clear that determining the correct non-biased discriminator for isolating decision makers was the overriding issue in crafting a meaningful survey. Thomas Minkus agreed to triage the collected job titles at publishing houses in order to give the best access to decision makers based on his twenty years of experience. Mr. Minkus is the Vice President for Emerging Media of the Frankfurt Book Fair, the largest book fair in the world, the major concentration of publishing executives each year. Using this guidance, it was determined that direct email addresses for specific people with these titles were difficult to obtain and that general email for a survey is typically discarded or not answered by the intended level of person. This tended to limit the initial sample in number, which in turn prompted a survey design aimed at improving response rate. Although the sample size was small, the sample represented the thought leaders in electronic publishing, and their opinions have greater weight than a larger, more general survey. The point was to target people who will actually make decisions about which books and tools to use in order to make a go/no-go decision for implementation of new export features for Sophie.

The practices guiding survey design were:

- Find contacts that are likely to have an interest;
- Keep the survey short and to the point;
- Make answering simple;
- Clearly state the purpose;
- Avoid coverage bias;
- Provide a respondent-friendly survey questionnaire;
- The question asked must be clear, non offensive and easy to respond to for the subjects under study.

These guidelines were employed with the counsel of USC professor and marketing expert David Weitzner.

The two questions asked were chosen to get a snapshot of the value of iPad and Android to this group in order to proceed with iPad additions to Sophie as quickly as possible, if warranted by results. The use of a simple, straightforward two-question survey without additional complication was employed to elicit the most reliable near-term measure. A simple one-page Website was used to gather results. This was done according to the proposal under the current Mellon project that specified this survey to support the need for the iPad for Sophie. (The second survey under the current grant is intended to gauge the need for a longer list of publishing capabilities and will be sent to a much larger group.)

Survey Raw Results

With a response of 48% from a small sample population (115) of publishing decision makers, the results of the survey are:

Question 1: Is iPad compatibility of your electronic books an important part of your publishing strategy?

Responses allowed were: Yes, No, I don't have an opinion.

Result was Yes 80.8%, No 19.2%; No opinion 0%

Question 2: Is Android compatibility of your electronic books an important part of your publishing strategy?

Responses allowed were: Yes, No, I don't have an opinion.

Result was Yes 73.1%, No 26.9%; No opinion 0%

Responders were all qualified professionals at all sizes of publishing organizations, with such titles as: Vice President International Sales, Publisher, Editor in Chief, Vice President Sales, and Publishing Director. Publishing organizations included: QA International, Hachette, Simon & Schuster, Bloomsbury, Penguin Group, Open Letter Books, Yale University Press, Equinox Publishing, Wiley, and Galileo Books.

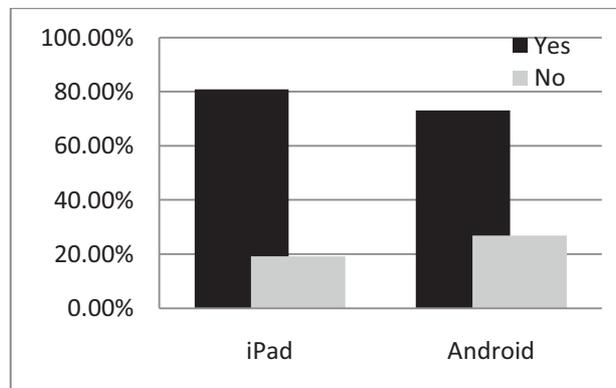


Figure 2. Survey results

This survey would have been followed up by a second survey if needed. However, the results provided a statistical basis for proposing the additional export functions for Sophie (see below).

Significance of the Results

Several factors are significant in evaluating these results:

First is the meaning of the response rate of 48%. Response rates vary widely depending on the type of relationship the survey provider has with potential respondents. The type of relationship of the survey provider to the respondents is an indicator of the level of response to be expected in relation to other surveys of the same type, and provides a measure of response quality. This survey was of type “no relationship”. This is the most difficult situation – obtaining responses from those with whom the survey provider has no relationship. No relationship surveys typically have a response of 0% to 20%. The population in the iPad-Android survey was of the “no relationship” type since the members were

not from any unifying organization. There was no common bond between responders other than working in the same field at an upper level. The response rate of over 48% is significantly higher than the usually expected upper bound for “no relationship” marketing surveys.

Second is the quality of the respondent sample. All members of the sample were of a level to speak knowledgeably about e-book platforms in qualified companies and institutions. It was a random sample within the bounds of the expert population.

Third is the large skewing of the expressed opinion. The respondents show interest in the iPad and Android by responding at a 48% rate and by indicating the desirability of the iPad capability of 80% and Android capability of 73%, both quite high.

Fourth is the relationship of the sample size to the population size. Research of senior executives in September 2010 by the Frankfurt Book Fair involving all large and midsize publishers in the United States and the United Kingdom indicated that the population of such individuals is approximately 1500. These two countries are among those with highest level of adoption of digital publishing products worldwide. Based on this number, a goal of this survey was to obtain sufficient response to represent the views of a population of 5,000 such experts with a 90% confidence.

Statistical Significance

The positive response of 80.8% to the iPad question for the sample indicates a 90% confidence that a population of 5,000 individuals with the same level of familiarity with electronic publishing would respond positively between 70% and 95% concerning the importance of the iPad in their organizations.

The positive response of 73.1% to the Android question for the sample indicates a 90% confidence that a population of 5,000 individuals with the same level of familiarity with electronic publishing would respond positively between 58% and 88% concerning the importance of Android in their organizations.

Even the lower bound of extrapolated iPad responses shows a clear majority. The Android, while a smaller percentage, is still a majority. These results are taken as a good indicator that iPad and Android are considered to be important to publishers because they are important to readers, and by extension they are important to the spread of Sophie as an authoring environment. The intention of this survey was to provide a quick assessment of the merit of adding iPad, Android devices, or both as available platforms for Sophie books. The results give good support for adding both the iPad and Android as reading platforms.

Choosing a Format for Interactive Books. Drawbacks of EPUB

The EPUB format's purpose is to define the mechanisms by which the various components of a publication are tied together and to provide additional structure and semantics to the electronic publication. The “carrier” of the digital content is based on XHTML 1.1, resulting in a number of additional limitations over certain elements. For example, XHTML 1.1 does not support audio and video elements. Although many modern EPUB Readers (such as iBooks) do support HTML5 media elements in the XHTML book content, EPUB books are, by design, static. EPUB does not provide the means to define and incorporate interactivity elements in an e-book, which are important features of Sophie books.

HTML5 adds new features to HTML. Video, audio and “canvas” elements, as well as scalable vector graphics, have been added. Perhaps most significantly in the context of Sophie, however, is the improved handling of media-rich material on the Web, without having to deploy proprietary plug-ins and their APIs. Using HTML5 as a content carrier for electronic books would enable the use of multimedia and interactivity, the lack of which is a significant drawback of EPUB as an e-book format. Eventually, new versions of EPUB will potentially be based on new versions of XHTML and will support multimedia in the future. However, the unsupported content types are not the only limitation that prevents the use of the format for rich interactive books like the books created with Sophie. These limitations are additionally due to the underlying concepts of EPUB being generally a packaging format for XHTML content.

HTML5 is a young and evolving format but is being eagerly embraced by the Internet community. Even though HTML5 is currently a W3C working draft published in 2008, all major browser developers have already implemented support for its multimedia elements. Large industry leaders, such as Apple, Google, and Microsoft, display strong support for the technology and, through groups like WHATWG (<http://www.whatwg.org/>), drive it toward quick development and adoption. The current level of support for HTML5 by the WebKit-based Safari browser on the iPad and Android Web Browser enables the development of the e-book features enabled by Sophie. There is little doubt that support of these features will be continued in any future versions of HTML5, as they are at the base of the ideas that drive HTML5.

A recent article (Weiss, 2010) published by the American Society for Training & Development lists an overview of the coming benefits of HTML5 in e-learning:

- HTML5 improves video and audio quality extensively. As a result, your social learning/social media experience has just increased infinitely. Vivemo, Blip.tv, and YouTube (beta) are already offering videos in HTML5 players.
- HTML5 is open source.
- HTML5 provides enhanced multimedia.
- HTML5 works in the iPad tablet, and will work in other manufacturers' tablets and smart phones. M-learning to the next level, and e-Readers down the pipeline.
- HTML5 eliminates plug-ins.
- You can build courses in HTML5, as you would in Flash. As rapid e-learning authoring tools see HTML5 as commonplace, they will need to adapt, thus enabling HTML5 files to be inserted.
- HTML5 will offer mobile learning features that will far exceed anything that is possible today. (Weiss, 2010)

It is important to point out that HTML5 is not an e-book format. It is a markup language for defining rich and interactive Web pages which, together with JavaScript, provides all necessary technological tools to implement an e-book. The breadth of HTML5 makes it inconvenient as a book format since it does not impose any strict structure over the content. Page structure, metadata, interactive objects, and relations between book objects are pieces of book data that need to be presented in a structured, declarative, and well-defined way to enable consistent interpretation by various types of reader software (not necessarily web-based).

Therefore, although HTML5 provides the necessary means to build web-based readers which display dynamic content, it is not itself a convenient format for this content. The project team is currently working on a specification draft for a JSON-based declarative e-book format that reuses concepts of EPUB but allows for a well-structured definition of rich, interactive multimedia books. The results from this effort will be presented in a subsequent paper.

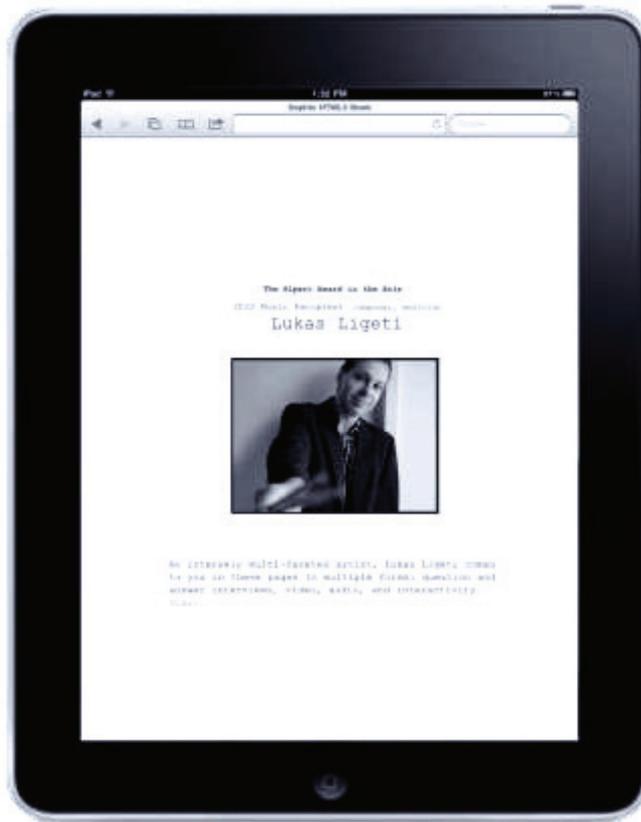


Figure 3. A view of one of the prototype Sophie 2.0 iPad books

Conclusion

Using HTML5 to make Sophie projects readable on a new generation of mobile devices and tablets makes complete sense and continues Sophie's ongoing evolution in dialogue with the culture and communities that both desire and need it. Content authoring platforms of today are facing the unavoidable challenge of supporting multi-channel publishing to the diverse types of widely used reading devices. For an e-book to reach its maximum audience, it needs to be accessible on all these devices in a consistent way. Among the available technology choices for distributing rich, interactive, electronic books for the Web, iPad and Android devices, HTML5 stands out as virtually the only feasible solution. Because of its support by the WebKit-based iOS and Android tablets and by an ever increasing number of desktop-based browsers, HTML5-based e-Readers will enjoy an increasing opportunity to provide a platform independent, consistent reading experience to all users, regardless of the hardware they are using.

Results of an industry survey showed that publishers believe that both iPad and Android are important to their planning. In addition, authors currently working with Sophie as part of the project to create six model books have expressed a desire to have their work available on the iPad. A feasibility study determined that the use of HTML5 as an output format would allow Sophie books to be read on both iPad and Android devices. While HTML5 is at the beginning of its life cycle, it clearly offers extended usefulness to Sophie. Indeed, using HTML5 would not only provide iPad and Android support, but would also support future HTML5 readers and attract additional developers from the open source community. The Sophie support team is currently focusing efforts on developing this capacity in tandem with the Exemplary Book project, with the goal of keeping Sophie relevant as the software continues to build a base of authoring knowledge.

Development began with a four-month feasibility study that reviewed EPUB and HTML5 as possible technologies for making Sophie books available on the iPad and Android devices. EPUB was chosen among the available e-book formats for inclusion in the study because of its widespread use and the

number of popular applications currently using it, including the iBooks and Nook Readers (Wikipedia, 2011).

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