

Developing an Interactive Textbook Using iBooks Author

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ABSTRACT

New technological developments provide a means of creating and using interactive textbooks delivered via iPad and other personal devices. This paper describes the development and use of an interactive textbook using iBook Author. Traditional and interactive texts are compared, and advantages and disadvantages of this method of development are addressed. In addition, alternate means of developing interactive texts are discussed. Finally, student reaction to using an interactive textbook and the iPad are presented.

Key Words: interactive textbook, electronic devices, learning process, online courses

INTRODUCTION

Critics of the application of new technologies to educational settings have repeatedly warned against using technology for technology's sake since the creation of the typewriter (if not before). Technology must not be used for its own sake, but to further the learning process.

If technology is to be employed as an integral tool, it must support fundamental literacy, serve the inquiry process, and extend the learning experience (Oehlkers and DiDonato 2012, 22)

Student engagement often begins with the textbook (Brantley 2012). This article describes the use of a new technology tool to create an interactive textbook. An interactive textbook is an ebook (electronic book) that includes interactive content. Unlike a traditional text and traditional ebooks, an interactive textbook can include multimedia, such as videos or interactive graphics, as well as review quizzes, photos with labels, photo/graphic galleries and more. These tools not only make the student's interaction with the textbook much more interesting, they also help reinforce the concepts the book is trying to explain.

This paper explains and describes interactive textbooks and how they can be created by just about any professor with some domain knowledge, time, a computer (preferably a Mac), and

some relatively common and inexpensive software. The next section describes interactive textbooks conceptually. Then, the software and process for creating these books is explained. The methods of distributing the books to students are enumerated. Student use of the book is then described as well as student perceptions of the usefulness of the text. Finally, the costs associated with the development of an interactive textbook are counted. The example of the development of a Cost Accounting text by the author is used as an illustration throughout this paper.

Interactive Textbook, Defined

A traditional textbook, of course, is printed on paper. It is two-dimensional. The student interacts with the book, hopefully, by reading it, taking notes, and, perhaps, working the assignments and examples included therein. A traditional textbook includes no overt interactive content.

An ebook is a book that is accessible via computer or other electronic device (including iPad, Kindle, etc.). Most ebooks are not interactive. Rather, most ebooks are simply electronic copies of the paper version of a textbook, usually delivered in PDF format. Generally, these PDF documents are carbon copies (to use a pre-technology boom word) of the paper versions of the text, right down to the page numbers, etc. For example, many students and professors are now accessing textbooks via CourseSmart, a website used by most textbook publishers to sell etextbooks. These books are identical to their paper twins, but simply accessed via computer or tablet technology. No interactive content is provided.

An *interactive ebook* (ibook) is, potentially, full of content that goes beyond text, diagrams and photos. The only examples of iBooks found by this author in the published literature on learning or online at university websites are in the medical training setting (Payne et al. 2012; Lockemer 2014), French language (Anderson 2013), a First Amendment course (Notre Dame 2015), and those in the grade school mathematics setting (Parrot and Holvig 2012). However, this technology may be very useful in accounting educational settings.

For example, in a cost accounting ibook, the text may explain an example and refer to figures, just as in a traditional text. However, it can also include a video demonstrating the example step by step with the professor (author) working the problem through by hand (video recorded using a tablet PC) or in Excel (video recorded using any PC with Microsoft's Excel) or using narrated PowerPoint slides to illustrate the example's solution step by step (video recorded using any computer with Microsoft's PowerPoint). Such videos are easy to make using Camtasia and other commercially available video/screen capture programs.

Developing an Interactive Textbook

The first software for developing such interactive textbooks is iBooks Author. This is a free software package from Apple™ for use on the Mac. iBooks Author allows the creation of an interactive textbook by anyone with a Mac. Books developed in iBooks Author can be made widely available (for free or for sale) via the iBooks store.

A cost accounting textbook was developed by the author. The author wrote the text and recorded the explanatory and demonstration videos. Many, but not all, of the videos had been previously recorded to use in an online course, mostly using Camtasia. The author created many example and assignment exercises. In addition, figures and graphics explaining concepts were

created, mostly using standard software (PowerPoint, Excel, and Adobe PhotoShop). Interactive review quizzes were also created for most chapter subsections.

iBooks Author has a number of widgets that make adding interactive content relatively easy. These include review quizzes, galleries (of figures or photos), media (movies), and a host of other widgets (Friedman 2012). The newest version of iBooks Author (2.0) has added several more widgets (Caldwell 2013) that were not used in the textbook described here.

Student Use of Interactive Textbooks

The most obvious way for students to access an iBook created through iBooks Author is via the iBooks Store (students purchase the book or download it for free, at the author's discretion). Alternately, the book can be distributed in person by plugging an iPad into the Mac with the iBooks Author software and textbook files and downloading to the iPad using the Preview option. This is the method the author used to share the book with students, at no cost to the students.¹

Interactive texts created with iBooks Author may be sold via iBooks on the iPad, iPad Mini, iPhone, and Mac. Alternatively, they can be exported from iBooks Author as PDF, text, or ibooks files which can be distributed for free outside of the iBookstore (Apple 2012). Thus far, only the free method has been used by this author.

Cost Accounting, the iBook

Each of the ten chapters has text (just like any ordinary textbook), explanatory conceptual figures, calculated examples, voice over PowerPoint video explanations of concepts, demonstration videos (voice over the instructor's handwriting recorded via tablet PC and Camtasia), objective review quizzes and a selection of homework/practice exercises. Four screen shots are included below, of pages 86, 87, 105 and 157.

The first three are pages from the chapter on process costing. Page 86 illustrates explanatory conceptual figures shown in galleries. Note how Gallery 5.2 has two dots at the bottom. These dots indicate the gallery has two pictures (figures rather than photos in this case). The reader simply swipes a finger across the gallery to see the next figure. Page 87 (left side) illustrates a voice over PowerPoint video explanation of process costing concepts – note the PLAY button. On the right side of that page is a simple figure imbedded within the text (without using a gallery). The last screen shot is page 105, which is representative of the last page of every chapter. It has the homework or practice assignments for the process costing chapter.

Page 157 (left side) illustrates a demonstration video (note the PLAY button). The reader can click on the PDF link above to download a PDF of the given information for the example demonstrated. The right side of page 157 shows a set of review questions. Note “Question 1 of 5” which tells the student how many questions are available and the student can click any answer

¹ The College of Business was in the second semester of an iPad initiative in which students in two courses, including this one, were supplied with iPads to use. So, every student had access to an iPad. Subsequently, accounting majors have been required to have their own iPads. The iPad initiative has been chronicled elsewhere in Baldwin et al. (2013).

and check it or answer each one of the five (swiping the screen to get to the next one) and see their score.

All of the interactive elements, such as galleries and videos, can be easily maximized to fill the whole screen for each viewing. The interactive textbook is briefly demonstrated online in this video: <https://vimeo.com/97370824>.

PROS AND CONS OF DEVELOPING AN INTERACTIVE TEXTBOOK

The biggest cost is time, of course. In addition, software tools for creating specific content may be purchased. In this author's case, these purchases (financed by the university, fortunately), include several important items. First, a computer used for recording voice over PowerPoint. So MS Office is needed or some equivalent for the Mac of which several are available. Second, Camtasia (or similar) software for recording and editing videos. Ideally, the interactive text should not be created from scratch, but in stages, to spread the work burden over time.

For example, this author created an online course some years ago and wrote new materials, examples, assignments and made videos to go with them over more than year. Then, many of these materials were used as part of the interactive book. While more examples, assignments and videos were created specifically for the book, the author did not have to start from scratch.

Advantages of Using iBooks Author

The biggest advantages to using iBooks Author center around ease of use and flexibility. The user need not be a technology genius or have experience with textbook layout since templates are provided for several types of organization. The author of this article has never written a textbook nor used a Mac until starting this project, although the author has taught hybrid and online courses and developed countless hours of videos and hundreds of original exercises. Learning to use the Mac (after thirty years of PC use) is not a huge leap at all. iBooks Author makes creating a professional looking textbook quite easy, especially if the templates and media inserting option are used as designed.

The greatest advantage of using iBooks Author, is, of course, the ability to put interactive elements into a textbook, which is easy to use on an iPad. No other software currently exists for the purpose of creating an interactive textbook.

The author's employer does not provide release time for development of textbooks or classroom materials. Other employers, however, might have means for providing release time or extra compensation for such tasks. Any faculty member should consider not only the amount of time and effort needed to develop a textbook or other materials, but he or she must also consider how such activities will be viewed for promotion and tenure decisions. The author is a full professor and mostly took on this project out of personal interest but other faculty must consider the best use of their time and energy.

A further advantage to using a faculty developed interactive textbook is how personal the delivery seems to the students. Students appreciate learning directly from the professor, even in an online course. This book is clearly the work of their professor, is designed specifically for them, and all the audio and video in the book is in the professor's voice and so forth. This, no doubt, helps students feel more connected to the professor.

Disadvantages of Using iBooks Author

Disadvantages of using iBooks Author include the need for the professor to have a Mac computer. Of course, any Mac running a fairly recent operating system (Lion or Mountain Lion) will work, so the cost of acquiring a Mac need not necessarily be prohibitive. However, that is a cost that must be incurred to use iBooks Author, although the software itself is free.

In the actual building of the textbook via iBooks Author, some obvious items are not so obvious in iBooks, requiring considerable experimentation. Following the templates as much as possible and using the interactive media options are the best way to create a quality book. That means, for example, that if one wants to insert figures, the Gallery tool should be used. No separate simple tool exists for inserting single static figures, although graphics can be directly inserted into the text. Unfortunately, the latter method is subject to text flowing around the graphics in unpredictable ways, that is, the graphic may not be exactly where you wanted it to be once you have edited the document more. Therefore, using the Gallery (which is meant to hold multiple photos or graphics) for a single graphic/figure is a good way to avoid that problem. Generally, that was the most difficult issue to understand in using the software. Everything else that this author used was rather simple to implement.

ALTERNATE DEVELOPMENT METHODS

One method of developing a somewhat similar product without the use of iBooks Author software and a Mac computer is to create a PDF document through more regular means, such as writing the text in Word and then printing it to a PDF file. PDF files are the easiest format to share on virtually any computer and most other handheld devices.

Of course, PDFs, by definition, do not have interactive content. However, some means of including access to such content is available via hypertext links inside the PDF. For example, if lecture videos or demonstration videos have been created and uploaded to a website such as Vimeo (author's preference) or YouTube, then links to those can be imbedded in the PDF document in the appropriate places. The reader viewing the document on any device need only click on the link to open the video.

In addition, other files may be uploaded to the author's website and linked into the PDF using the same method. This may be useful for PowerPoint explanations or Excel files to use as templates and other file types that are not video. In an accounting or finance class, for example, Excel templates may be provided to help students understand certain topics using what-if analysis or to provide them a starting point for a project. Even other PDF files can be linked for purposes such as homework or practice assignments or separate projects.

While this PDF method does not quite replace the rich variety of media and interactivity that can be easily created using iBooks Author, it does provide a low cost alternative option. Such PDFs need not be limited only to flat text and graphics when live links to videos and other resources are included.

Another method is the obvious one of building a website of textbook content, including the interactive elements. The technology needed is different than for the iBook but the finished result may be pedagogically similar. However, it might not have the easy portability of the iBook (in the iPad).

STUDENT REACTIONS TO THE INTERACTIVE TEXTBOOK

The first class of students who used the interactive Cost Accounting iBook were surveyed at the end of the semester. Amongst other questions, students were asked *How useful overall did you find the interactive iPad textbook as compared to traditional textbooks?* Answers were coded from 1 (not useful at all) to 5 (very useful). The average score was 4.75. Interestingly, all students, even the most critical in answering the open-ended questions, indicated the iBook was “very useful” or “somewhat useful.” No students chose “undecided/neutral” or “not very useful” or “not useful at all.”

Students were asked an open-ended question: What is the most important feedback you can give relating to the use of the interactive iPad textbook? Here are comments from the first class that used the iPad textbook (a hybrid course).

- It was my first experience using an e-text and I would like to use one every time if they are like this.
- Good tool.
- It is a great tool if taken advantage of.
- It was useful to be active, take notes or highlight texts in iPad textbook.
- Interactive demos and quizzes are critical.
- The videos were very helpful.
- Excellent tool for learning. It is practical!
- Really love it and like the wording much better than in a regular textbook.
- Very helpful. (x2)
- It's pretty good.
- Awesome. Just needs some editing.
- Liked it so much better than a regular textbook.
- Best experience ever.
- The videos of lecture and examples were the best. The quizzes at the end of the sections really helped with immediate feedback.
- I liked this textbook because the examples and homework were made by the instructor who is creating the exams.
- Loved the demo videos.
- It's a more convenient way.

The following semester, the iPad textbook was used in a full online course. These students answered the same question with these comments

- The iPad textbook was amazing.
- I think the demos and movies explaining problems were extremely important especially since I took this as an online class.
- I feel more examples would be useful in some chapters.
- I loved how interactive the iPad text was. Being able to watch videos and take the quizzes was essential.
- I think an iPad textbook should be used in every class. It's so light weight and easily accessible.
- Limit typos and provide more up to date examples. Needs more exercises and examples.

- I needed more information about the features. I just figured out at the end I could highlight parts and make them into flashcards.
- Every student should read and watch the demonstration videos and explanations of concepts for every chapter.
- Loved the video demonstrations.
- The book was direct and to the point. The demos are invaluable. The quizzes were reinforcing, but they need to be longer!

While no differences in student course grades were observed, or have been observed since, student enthusiasm appears to be higher for the majority of students. Most students recognize the amount of work that went into the book and are appreciative of its interactivity, convenience, and, of course, its price tag. Most students are now using their iPads to access other e-books and course materials and for other learning related tasks, so this iBook fits in nicely with their connected learning.

CONCLUSION

Developing an interactive text in iBooks Author is no small task. However, it is much simpler than one would think, a priori. The pay-off is large, because an interactive textbook can deliver so much more than a traditional text. This paper demonstrates the process and its end result.

Future research should measure whether the use of an interactive text actually changes in some positive way how students learn accounting. Anecdotal evidence from other disciplines suggests that students pay more attention to an interactive text than to a traditional text (Lockemer 2014). What is the impact of the interactive textbook on student learning process? If technology is to be employed as an integral tool, it must support fundamental literacy, serve the inquiry process, and extend the learning experience.

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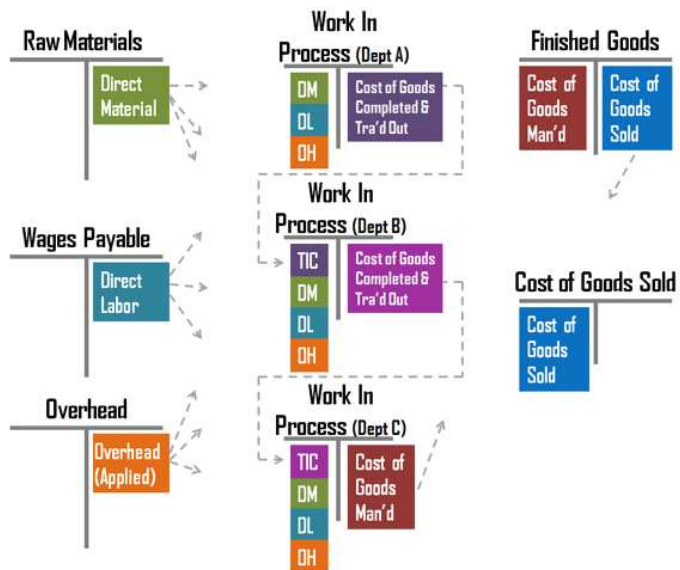
ABOUT THE AUTHOR

Amelia Baldwin is the Neal Pendergraft Professor of Accounting at the University of Arkansas – Fort Smith. She earned her Ph.D. in accounting and information systems from Virginia Tech, and master and bachelor's degrees in accounting from Auburn University. She researches technology in accounting and accounting education, the impacts of technology on the accounting profession, and issues of diversity in accounting academia. She has published dozens of journal articles and taught accounting on three continents.

Process Costing Flows

In contrast to job costing, in which each job, when finished, is moved to finished goods inventory, process costing's units generally flow through its departments sequentially. Therefore, only units completed in the final processing department will be transferred to finished goods inventory. All the other departments transfer completed units and their costs to the next department in sequence.

Gallery 5.2 Costing Flows

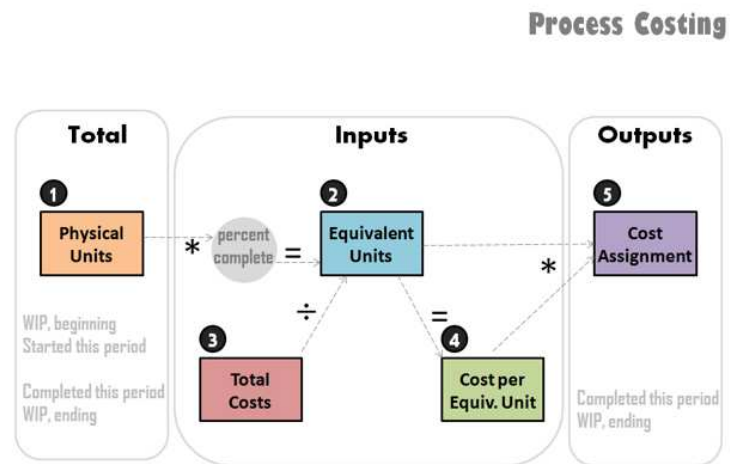


This figure illustrates the flow of costs in a processing system.

Process Costing Steps

Process costing, in its most simple form, simply calculates the cost per unit to process the product through a particular processing department. Whereas in job costing the cost object was the job. In process costing, the cost object is the identical unit. The costs in job costing were accumulated by jobs. In process costing, they are accumulated by department.

Gallery 5.3 Process Costing



This figure summarizes the generic steps in process costing for each department.

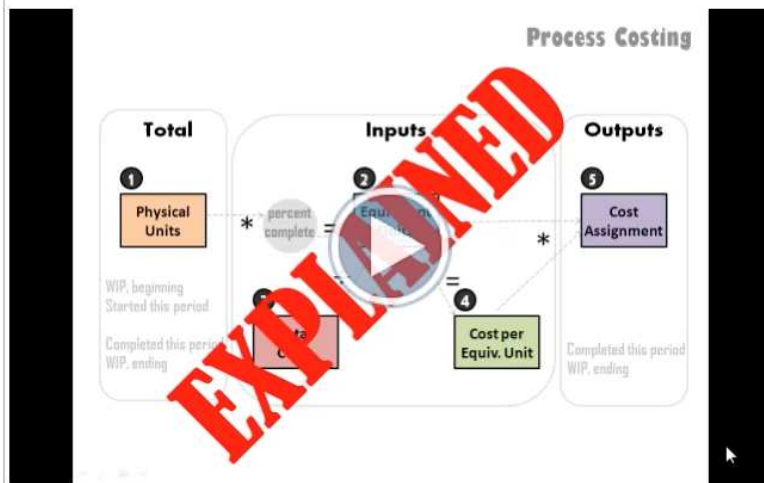
The steps in process costing revolve around

1. Physical units
2. Equivalent units
3. Total costs
4. Cost per equivalent unit
5. Cost Assignment

In this section, the first two will be generally explained.

Physical Units

Movie 5.1 Process Costing Explained [3 minutes]



This movie explains the process costing figure in Gallery 5.2.

Physical units are the units that are in process in any part of the manufacturing system. With respect to a particular department, physical units may exist in beginning inventory, be started during the current period, be completed during the current period, or remain in ending work in process inventory, because they are not yet completely processed.

Suppose a processing department that had no work in process inventory at the beginning of the period, started 10,000 units in process, and completed 8,000 units. The remaining 2,000 units would be left in work in process inventory as incomplete units. The physical units for this department could be summarized like this:

	Physical Units
Flow of production	
Work in process, beginning	-
Started this period	10,000
<i>Account for these units:</i>	10,000
Completed & transferred out	8,000
Work in process, ending	2,000
<i>Accounted for these units:</i>	10,000

This is the first step in process costing. Note that if only three of these four numbers (Beginning work in process, started this period, completed and transferred out, and ending work in process) are given, the fourth can be easily be calculated. Physical

Note that only the main product's ending inventory is recognized on the balance sheet. As calculated in the previous paragraph, the balance of the main product is \$11,111.

DEMO 8.5 Accounting for By Products

Download a copy of the Pure Peanut Processing Company problem and work it for practice. You can find the PDF [here](#). Work the problem first, then watch the following video demonstration to see if you worked it correctly.

Movie 8.5 Accounting for By Products (both methods)



By Product	(inventory in kilograms)	Quality Peanut	
		Peanuts	Shells
Beginning inventory	-	-	-
Production	90,000	10,000	
Sales	80,000	4,000	
Ending inventory	10,000	6,000	
Selling price	\$2.50	\$0.19	

This movie demonstrates both the production method and the sales method of accounting for by products.

Review 8.2 Accounting for By Products

Question 1 of 5

How are the main product inventories valued on the income statement?

- A. at cost
- B. at NRV
- C. at selling price
- D. none of the above

Practice

Practice

1. Using the iThoughtsHD app on the iPad, draw a diagram that helps you understand process costing.
2. Complete these Chapter 5 homework problems.
 1. [Albasini Liquids, Inc.](#)
 2. [Ciolek Corporation](#)
 3. [Gerrans Technology Ltd.](#)
 4. [Ciolek Company](#)
 5. [Gerrans Technology Ltd.](#)
 6. [Ryder Hesjedal Mfg.](#)
 7. [Ryder Hesjedal Mfg.](#)
 8. [Kreuziger Company](#)
 9. [Kreuziger Company](#)
3. Using your iPad, take photos representing products or services that are likely candidates for process costing.



Process costing is used for products that are produced in large quantities or masses in continuous production cycles, including many drinks and foods that are bottled or canned.

Complete the assignments listed on the left before the due date. Always show all your work, and be neat, organized and professional.

Work all your homework by hand on paper (preferably with pencil).

A dream doesn't become reality through magic; it takes sweat, determination and hard work.

COLIN POWELL