Academic professor perception of the future of electronic textbooks

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Abstract. Electronic textbooks have slowly made their way into regular usage in classrooms, yet many electronic textbooks remain a digital representation of their physical counterparts and an understanding of how they should be organized or utilized is still lacking. In past research, questions to professors have not focused on how electronic textbooks are used in their course, how they believe students should use them, and what they believe is necessary in the future. Semi-structured interviews with design and engineering professors found that generally professors agreed with student ideas regarding future components. They did feel some additional components, such as tagging, would help facilitate student learning. This paper presents an understanding of different disciplines approaches and an understanding of electronic textbooks and what professors think should be included in the future. It also assists in highlighting any mismatch between student and professor perception of future electronic textbook components.

Keywords: Electronic textbooks · Textbook design · Contrasting perceptions · Interviews · Future design

1 Introduction

Electronic textbooks are not new, but their prevalence in universities around the world is increasing. There are many perspectives to take into account when investigating electronic textbooks and their future. While publishers are creating electronic textbooks, it is the instructors and students who really should be dictating changes, as they are the end-user. While professor perception of electronic textbooks has been identified in previous research, it has mainly been gathered during post experimental student usage in classrooms. Questions have not focused on how they believe current electronic textbooks fit in their courses, how they believe they should be used by students, and what they believe is necessary in the future for their students to meet their academic goals.

Electronic textbooks are commonly used by professors as one part of their larger teaching practices to support student learning [1]. Each professor's views on how they should be used differ, from an optional resource to required weekly readings.

Professors tend to use textbooks as a tool to supplement the material they give during their lectures, which may cause the information given in class to have an obscure relation to what is read in the textbook [2]. Some professors even find what they teach is in disagreement with the text itself causing issues for the student and instructors [2]. Finding one textbook to support all the needs of specific classes is very difficult. And writing individual textbooks would not only be time consuming but would not be applicable to broader audiences because of differences in teaching philosophies. Although this type of custom publishing allows for flexibility because instructors can select their own segments of text, there is a lack of ability to fully take the ideas used during a course and seamlessly integrating it into the created text [3]. Some instructors prefer not to officially suggest textbooks as they believe that students will not complete the readings assigned and instead rely on their lectures, tutorials, and some electronic texts as references [4]. When assigning readings from electronic textbooks, professors are mixed in how they encourage students to interact with the textbooks. Some instructors ask students to use built in components, such as note taking capabilities, while other instructors do not encourage students to interact with electronic textbooks in any particular way [1]. Students have more positive reactions to components of electronic textbooks when instructors explicitly encourage the use of those components [5].

Overall, professors are reported to being happy with electronic textbooks in terms of products and technical capabilities, but are concerned with cost and student access to material, yet not as concerned about the digital rights management [6]. Although they are generally happy, technical issues stop some professors from encouraging use of electronic textbooks in their classrooms. There is a distinct fear that students will run into technical difficulties while using the electronic textbooks and it will negatively affect their reading [7]. Another consideration is the cost of faculty time in adopting a new textbook which makes some instructors wary as they need to adjust all of their instructional materials around the new textbook, but they are willing to take the time to do this if there was a clear educational value to the students [1].

Cost is an important aspect in relation to textbooks. Professors are aware that students who are burdened by heavy textbook costs may extend their time in university to try to combat the immediate costs and which eventually influences their academic success [8]. While faculty considers this issue, if the best choice of textbook for their class is an expensive physical textbook they will choose that textbook over a less expensive electronic or physical textbook [9]. While electronic textbooks can make online courses easier, they could be considered something which can diminish the voice of the professor which may in turn negatively affect the university and professors' educational mission [6].

This paper will fill this gap in research by uncovering university professors' professional perceptions of electronic textbooks and their views of the necessary requirements of future electronic textbooks. Professors were selected from the Faculty of Engineering and the School of Design. By understanding how different disciplines approach and understand electronic textbooks and what they think should be included to create a textbook that meets their students' discipline specific needs will help to combat the one size fits all electronic textbooks that publishers are currently creating. The findings will also assist in highlighting any mismatch between the student and professor perception of electronic textbooks and their future.

2 Method

Design and engineering professors were chosen for comparison of views as these disciplines have many similar qualities while remaining distinct. In design, creativity in creating products is valued over working within the technological restrictions; whereas in engineering, practicality and working within the constraints to create a product is desired. Thus, design often focuses on a more aesthetic and a user focused approach to product creation, while engineering tends to be more practical and technical. Education in these particular disciplines aligns with these mentalities.

Short semi-structured interviews with engineering and design professors were conducted to gain an understanding of their views of electronic textbooks and the future of electronic textbooks. Each short session took less than 15 minutes and included six scripted questions and various follow-up questions based on necessity or clarification to explore the answers fully with flexibility [10]. The six questions asked were regarding their teaching experience, views on electronic textbooks in relation to personal teaching practices, beliefs on student engagement with electronic textbooks, views of the differences between physical and electronic textbooks, views on student responses regarding future electronic textbooks, and their professional beliefs on what should be included in future electronic textbooks.

3 Results

3.1 Participants

Four design professors and four engineering professors who teach undergraduate courses participated in the interviews. Design professors' experience teaching at a university level ranged from 4 years to 22 years with a median of 15.5 years of experience. Engineering professors had between 2 and 20 years of experience teaching at the university level with a median of 12 years' experience. The ethnicity of both the design and engineering professors were mixed, with the majority being Asian.

3.2 Professional Views on Electronic Textbooks

First professors were asked to discuss how and if electronic textbooks were used in their teaching practices. Design professors generally assigned electronic textbooks in their class assignments, mostly telling their students to access the electronic textbooks through the library website. They gave various reasons for their choice to use electronic textbooks such as the ability to give last minute readings to students, the ability to link directly from Blackboard, and an assurance that students will be able to access enough copies of the books. Design professors did acknowledge that electronic textbooks could not always fit their needs as an instructor or those of their students. Professors did discuss how textbooks for courses that require many images or which teach typography need a physical textbook due to quality concerns. In addition, it was reported that students often go to YouTube for tutorials over their textbooks for written information. Engineering professors had more of a mixed use of electronic text-

books within their teaching practices. Most engineering professors reported using both physical and electronic textbooks or not encouraging the use of one at all. Overall, all of the engineering professors believed that their students almost exclusively use electronic textbooks, as they believed they were easier to access, cheaper, and that students were more familiar with reading on monitors. The professors who did use electronic textbooks in their courses reported various reasons for their use, such as electronic textbooks made it easier to integrate information into their class presentations and that physical textbooks are becoming obsolete. Two professors, one from each discipline, reported that they rarely assign electronic textbooks in their teaching recently but still encouraged their students to use electronic textbooks as a referencing tool with very specific passages to read identified for the students.

Following that, professors were asked how they thought their students engaged with electronic textbooks. Design professors reported that they assumed their students were reading, but they were unaware of how their students were actually reading nor did they encourage a specific way of interaction. Some professors did not believed there was a difference in engagement while others believed that students were not reading as deeply as they should to succeed academically. Design professors also believed there were some unethical behavior occurring that may be associated with electronic textbooks, such as plagiarism and the downloading of pirated .pdf versions of electronic textbooks. Engineering professors believed that students did not like to read and would only read what they absolutely had to. Similarly to many design professors, engineering professors believe that the interaction did not change much between physical and electronic textbooks but raised the same concerns about students no longer reading deeply.

Professors were then asked what they believed were the differences between physical and electronic textbooks. Design professors believed there were benefits to electronic textbooks. They reported that electronic textbooks cost less, provided a minimal aesthetic, offered access that was more convenient, allowed for zooming and reading in the darkness, and allowed students to optimize their searching. While electronic textbooks afford these benefits, professors also reported that students had slippage between what they are referencing and what they did themselves. Design professors also reported that there were still some benefits to physical textbooks. By using physical libraries, students were able to find resources they would not previously have known about because of the structure of libraries. There was also a sense of urgency with a physical textbook that needed to be returned. While they saw those advantages, they believed that the advantages of physical textbooks are fading. Engineering professors generally believed that electronic textbooks were similar to their physical counterparts with some additional benefits. Professors reported that some electronic textbooks have beneficial components, such as video, better formatting, were more reader friendly, allowed for quicker searching, and allowed students to carry more books with them at one time.

3.3 View on Future Electronic Textbooks

After the previous views were elicited, professors were asked about their views regarding answers given by students about components they wished to be included in future electronic textbooks identified during a university wide survey [11] and later

verified during small focus groups. Professors were first provided with the top five components their students desired in their future electronic textbooks (*see Table 1*). All the design professors felt that the students' views are understandable. While they felt some of these components were already available in some cases, they were not as convenient as they should be. Professors were especially open to the idea of videos, although one professor believed that the inclusion of videos might cover up learning disabilities or a lack of literacy. Engineering professors felt that the students' views on desirable components were understandable and in line with current student interactions. They felt that video integrates exceptionally well and enhances concept comprehension, but one professor thought that videos would be better used during lectures.

Table 1. The top five desired components by Design and Engineering students.

Rank	Design Students Components	Engineering Students Components
1	Multimedia	Text
2	Bookmarks	Highlighting Tool
3	Highlighting Tools	Multimedia
4	Text	Bookmarks
5	Translation, Dictionary, & Encyclopedia	Translation, Dictionary, & Encyclopedia

Professors were then provided with the top five components their students felt were undesirable for their discipline specific future electronic textbooks (*see Table 2*). Design professors mostly felt that the views of students made sense. One professor thought that the components were not vital but still found value in them. Another professor thought that some of the components considered undesirable were related to language issues and may be cultural. Overall, engineering professors thought that the student views were valid except for the case of 3D and manipulatable images which they thought had a place in engineering textbooks, especially those dealing with circuit boards and proteins, to assist in concept comprehension.

Table 2. The top five undesired components by Design and Engineering students.

Rank	Design Students Components	Engineering Students Components
1	Hide Unimportant Aspects of Books	Hide Unimportant Aspects of Books
2	Speech to Text	Time Management System
3	Time Management System	Speech to Text
4	Link to Experts to Answer Questions	Text to Speech
5	Text to Speech	3D and Manipulatable Images

Following that, professors were asked what they wished to be included in future electronic textbooks. All design professors wished for their future electronic textbooks to include an advanced tagging system so that students and instructors could cross-reference with other materials to see more critical and diverse opinions. Design professors also wished for linking to other online media, direct links to materials from

the reference sections, better access to encyclopedias, and more integrated touch menus. Engineering professors felt future electronic textbooks should not only include what the students felt, but they also felt that there should be links to experts for answers to student questions and so that authors could get direct feedback for edition changes. They also wished to see 3D and manipulatable images, supplemental materials such as PowerPoints for their use, and augmented virtual reality for better engage students in the material and assisting in making abstract concepts understandable in their future electronic textbooks. Professors thought that students should be able to mark on electronic textbooks in similar ways to how they mark physical textbooks, such as writing in the margins.

4 Discussion

How each instructor uses electronic textbooks in their courses change drastically [1], something that was reported by professors who took part in these interview sessions. Similar to previous studies, professors assume that students do not deeply read their textbooks and do not rely as heavily on them during course creation and instruction, leading students to feel that the text is irrelevant [3]. In fact, some professors believe that students do not read at all and will then not supply a suggested textbook for the course [4]. Yet, one study showed that students do complete their reading but the vast majority does so only before the exam [12]. In fact, overall students read less than the instructors think is ideal for the student [1]. During interviews, professors reported uncertainty that students actually completed readings and most professors interviewed did not even encourage students to read or read a certain way when assigning electronic textbooks. This would seem to be detrimental to students' overall success as instructors who encouraged students to actively read and use some of the built in components found that their students use them more [1]. It should then be suggested that the professors, a vital end user of electronic textbooks, should be more active in encouraging students to use electronic textbooks to their full potential, not something that many instructors report doing. This encouragement will then have a positive effect on student success.

There are a few factors which faculty members have reported influence their decision to use electronic textbooks and which will influence their future adoption. One of which reported in interviews is the cost of textbooks, which has also been reported in the past [8]. Not all courses identify electronic textbooks which are appropriate for the needs. As design professors have reported, courses such as typography and image driven courses will still require physical textbooks. Previously, professors have also reported that they will choose a high cost physical copy of the textbook if it is more appropriate for their class [9]. In addition to generally lower costs, professors have also reported that electronic textbooks are more convenient for their students to access especially when they want to assign last minute readings. Almost all the professors interviewed discussed sending their students to the library's website for access to the electronic textbooks, although some were aware that students chose to download electronic textbooks illegally. While they reported this, they weren't very focused on it, which is in line with previous findings [6].

Overall, professors and students have similar beliefs about future discipline specific electronic textbooks. They stated that the components students desired will assist in concept comprehension, which may have been lost because of the change in reading techniques caused by the use of electronic textbooks. Professors did have some reservations regarding additional components added to electronic textbooks, such as multimedia, which may mask learning disabilities or limited literacy. Engineering professors did not always agree with students' views on undesirable components, especially 3D and manipulatable images. Past research has shown similar professor views on interactive figures, which they considered beneficial to learning, visualization, and student engagement in specific disciplines even after student enthusiasm for the component waned [5]. A professor interviewed also reported that edition revisions would be easier if future electronic textbooks included a way for students to send questions to authors. Similarly, it has been found that electronic textbooks also allow for easier reporting of incorrect material to the publishers [6]. The ease of finding out what information is troubling students or what information is incorrect that is afforded by electronic textbooks, would be valuable not only to students and faculty but also the industry as a whole. There are some other components that professors wished to be included in future electronic textbooks, such as high level tagging features. They not only thought it would be beneficial to their research, but thought that their students would benefit from seeing different views, finding more information on assigned topics, and engaging more with the concepts combating surface reading. It is understandable that most students would not report this type of component as undergraduates are not working at as high level of critical research as professors. Without professor insight, components such as this would be lost.

5 Conclusion

Overall, professors tend to be open to electronic textbooks but are skeptical about student reading in general. They also agree with student perception of components necessary for future electronic textbooks, except in the case of 3D and manipulatable images. Since professors understand the rigors of research, they would like components such as tagging added to future electronic textbooks. Their insights on the requirements of student success may combat some of the issues with electronic textbooks, such as surface reading, because they will facilitate students' ability to understand complex concepts. By understanding how different disciplines approach and understand electronic textbooks and what they think should be included to create a textbook that meets their students' discipline specific needs will help to combat the one size fits all electronic textbooks that publishers tend to create. The findings also assist in highlighting any mismatch between student and professor perception of electronic textbooks and their future.

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