E-books or textbooks: Students prefer textbooks

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ARTICLE INFO

ABSTRACT

Previous research has demonstrated that the experience of reading e-books is not equivalent to reading textbooks. This study examines factors influencing preference for e-books as well as reported use of e-book content. Although the present student cohort is the most technologically savvy to ever enter universities, students do not prefer e-books over textbooks regardless of their gender, computer use or comfort with computers. No significant correlations existed between the number of e-books previously used and overall preference of e-books: Participants who had previously used an e-book still preferred print texts for learning. Despite the ability to easily access supplemental content through e-books via hyperlinks and other features, students were more likely to use special features in print books than in e-books.

1. Introduction

Relatively rare just 10 years ago, most publishers of introductory-level textbooks in higher education now offer e-book alternatives to the vast majority of their titles. Although not necessarily grounded in practical application, e-books have many supporters, at least in concept. One potential advantage is the greater flexibility and accessibility of e-books over paper-based texts; others include increased visual appeal of e-books due to features such as still and moving graphics, and video clips, as well as the potential to add supportive materials such as audio collections, links to activities and websites, etc. It is important to evaluate electronic texts as learning tools before recommending or requiring their use as a substitute for print textbooks.

Often marketed as lower cost options for students on a budget, there is scant peer-reviewed research regarding the use and preference of electronic texts as educational tools, especially in higher education. Factors such as gender, comfort with computers, familiarity, and appropriate design have yet to be fully investigated with respect to e-books. For example, gender differences in the use of, and comfort with, computers have been reported since computers emerged into the college classroom (Young, 2000). Although efforts to increase comfort with computer use and specific training seem to lessen these differences (Shashaani, 1997), such interventions are not typically employed with e-book adoption nor is there evidence to suggest that they may or may not be needed. The possibility that e-texts could have differential effects on learning based on gender or other variables is an important consideration in the adoption of a text option for every student.

As Schumacher and Waller (1985) so eloquently argued in the context of reading research in general, we risk losing important information by not focusing upon the process variables associated with the reader's use and interaction with the text. For example, user variables associated with the manner in which students interact with e-books as well as their comfort and familiarity with the medium are important considerations. The design of the text, for example, whether electronic or print, can influence its effectiveness, as well as student motivation to interact with it. The placement of illustrations and other textbook features, for example, has been demonstrated to impact learning (Levin & Mayer, 1993; Mayer, Steinhoff, Bower, & Mars, 1995) as well as student preference (Marek, Griggs, & Christopher, 1999). Many e-textbooks are often a pdf of the actual textbook page (or html/php equivalents) with the possible addition of hyperlinks and other features. Although e-books tend to mimic their print counterparts, students may not read e-books the same way as they do textbooks. For example, readers report skimming computer-based text more often than paper-based text (Nielson, 1997; Rho & Gedeon, 2000) and reading e-text in an "F" pattern, searching for key terms rather than reading line by line (Nielson, 2006). Thus, although differences in comprehension may not be

immediately evident (Aust, Kelley, & Roby, 1993), process variables such as student effort, differences in processing, and eye strain from computer screens can lead to a level of discomfort and differential usage of this medium (Kropman, Schoch, & Teoh, 2004) that could affect students' preferences.

Student use and preference for interacting with textbooks is related to previous use (e.g., Marek et al., 1999). With regard to e-books, previous use could mitigate some of the process variables outlined above, encouraging greater efficiency and increased comfort as well as preference. Alternatively, prior use can aid in the development of negative habits (e.g., Gurung & Daniel, 2005) or biases against the medium. We describe student use and comfort with computers, preference, and satisfaction for e-books and printed textbooks as a function of previous e-book experience. We hypothesized that those students who had previously chosen to use e-books would report greater use comfort with computers as well as greater preference for and satisfaction with e-books as compared to traditional textbooks. Additionally, for those who had previously used e-books, we assessed students' use of special features in both e-books and print books.

2. Method

2.1. Participants

Participants were 91 students (45 males and 46 females) who participated in a larger study to fulfill a General Psychology course requirement at a medium-sized regional university. We selected these students from the larger sample because they indicated that they had previously had an option of using an e-book for a college course. The mean age was 19.1 (SD = .98); 54 students were freshmen, and 37 were not. We treated all participants in accordance with American Psychological Association ethical guidelines (APA, 2002).

2.2. Materials and procedure

Participants completed a demographics questionnaire and stated whether they had ever had an e-book available and, if available, whether they had chosen an e-book. Next, participants reported the number of hours they spent on the computer each week, used a 9-point scale (1 = never, 9 = always) to answer four questions related to computer usage and comfort, used a second 9-point scale (1 = not at all satisfied, 9 = extremely satisfied) to rate their satisfaction with e-books, and used a third separate 9-point scale (1 = e-book, 5 = either, 9 = print book) to rate their preferences for e-books and print books. Next, participants responded to five questions adapted from Gurung (2005) by using a 9-point scale (1 = never, 9 = always) to rate their usage of features of e-books and paper textbooks; only students who had used e-books completed these measures for e-books.

3. Results

3.1. E-Book preference

Of the 91 participants, 54 (59.3%) had decided to use an available e-book in a previous course. Gender did not predict e-book use. Of the 45 men in the study, 62.2% (n = 28) had chosen to use an e-book; 56.5% of the 46 women (n = 26) had chosen to use an e-book. Gender and e-book choices were not significantly associated; $X^2(1, N = 91) = .31, p = .58$.

To investigate possible differences in reported computer uses and comfort as related to choice of e-books, we used a series of ANOVAs with participants' choice to use or not use an available e-book as a between participants quasi-independent variable and participants' self-reports of hours of computer use per week, how often they read text at their computers, how often they look up information online while studying, how often they complete assignments on a computer, and their comfort level with computers as dependent variables (see Table 1). As shown in Table 1, univariate results revealed that only participants' reports of how often they read text on their computers and look up information while studying were significantly and positively associated with participants' decisions to use e-books.

On a 9-point scale (1 = not at all satisfied, 9 = extremely satisfied) participants who had used an e-book reported greater satisfaction with e-books (M = 5.33, SD = 2.07) than participants who had not chosen to use e-books anticipated (M = 2.68, SD = 2.74), t(89) = 5.28, p < .001, d = 1.12. Despite these differences, when participants used a 9-point scale (1 = e-book, 5 = either text, 9 = print textbook) to rate the way they would prefer to learn, responses from students who had used an e-book (M = 6.46, SD = 2.26) did not differ from the responses of students who had not chosen to use an e-book (M = 6.92, SD = 2.01), t(89) = .99, p = .32. The number of e-books previously used (M = 1.42, SD = .63) did not correlate with satisfaction with e-books, r(89) = .18, p = .09, or preference of e-books or textbooks, r(89) = −.15, p = .16.

3.2. E-Book use

The 54 students who had used e-books reported their use of e-book and print book special features and their satisfaction with e-books and print books (see Table 2). We used a Repeated Measures Analysis of Variance (RMANOVA) with media type (e-book and print book) and

Table 1
Means, standard deviations, and univariate statistics for participants' self-reports of computer use.

Measure	e-Book user	e-Book nonuser	Univariate results
Hours per week at computer	13.48 (11.31)	11.32 (7.96)	$F(1, 89) = 1.00, p = .32$
Read text at computer	5.19 (1.75)	4.27 (1.61)	$F(1, 89) = 6.40, p = .013, \eta_p^2 = .07$
Look up information online while studying.	7.04 (1.53)	6.24 (1.72)	$F(1, 89) = 5.34, p = .02, \eta_p^2 = .06$
Complete assignments using computer	7.17 (.95)	7.19 (1.31)	$F(1, 89) = .01, p = .92$
Comfort level with computers	7.39 (1.24)	7.51 (1.45)	$F(1, 89) = .19, p = .66$

Note. Participants used a 9-point scale (1 = never, 9 = always) to respond to questions two through five.

Table 2
Means, standard deviations, and univariate statistics for participants' self-reported use of special features and satisfaction with e-books and print books.

Measure	E-book	Print books	Tukey significance
How often they used the activities or online resources	4.76 (2.14)	4.44 (2.42)	$p > .05$
How often read section summaries	5.61 (2.33)	6.13 (2.07)	$p > .05$
How often answer study questions	4.76 (2.37)	5.26 (2.07)	$p > .05$
How often read captions and charts	4.93 (2.07)	5.94 (1.92)	$p < .05$
Satisfaction	5.33 (2.07)	6.83 (1.53)	$p < .01$

Note. Participants used a 9-point scale (1 = *never*, 9 = *always*) to respond to questions.

five questions for each media type as within-participants independent variables. The RMANOVA revealed significant multivariate effects for media type, *Wilks' Lambda F* (1, 53) = 11.93, $p = .0011$, $\eta_p^2 = .18$, question, *Wilks' Lambda F* (4, 50) = 10.74, $p < .0001$, $\eta_p^2 = .46$, and the interaction of these two effects, *Wilks' Lambda F* (4, 50) = 4.13, $p = .006$, $\eta_p^2 = .25$[1]. As shown in Table 2, to further explore the differences related to e-books and print textbooks across these dimensions, we used a series of post-hoc Tukey tests to evaluate each of the five pairs of questions; participants reported that they were more likely to read captions and charts in print books than in e-books and that they experienced greater satisfaction with print books. There were no differences in reported rates at which students read section summaries or answered study questions; additionally, students reported that they were not more likely to use embedded links in e-books than they were to use online resources in print books.

4. Discussion

4.1. E-Book preference

This comparison of students' preferences and uses of e-books revealed several important findings. There were no gender effects in previous selection of e-books or comfort with computers found in the current study. The gender differences in computer use and preference previously reported (e.g., Young, 2000) may have decreased this past decade for the cohort of new millennium freshmen, many of whom spend a proportion of each day interacting with computers. Second, the data do not indicate that preference for e-books is positively associated with previous usage or comfort with the medium (see also Shepperd, Grace, & Koch, 2008).

It is interesting to note that previous experience with e-books does not increase preference for e-books, despite relatively high levels of comfort with computers. No significant correlations existed between the number of e-books previously used and current preference for e-books in comparison with textbooks. Although participants who had used an e-book reported more satisfaction with e-books than participants who had not used e-books anticipated, e-book users still preferred print texts for learning, and their preference ratings did not significantly differ from those of non-users.

In a recent examination of student buying patterns (Shepperd et al., 2008), 90% of students who were given the option of purchasing an e-book or a more expensive textbook did not purchase the e-book, despite easy access and an in-class demonstration of the e-book. Our results provide additional evidence for what seems to be an aversion to e-books on the part of undergraduate students.

4.2. E-Book use

Despite the lack of student e-book preference in this and the Shepperd et al. (2008), no differences between the e-book and textbook groups in learning outcomes were evident. Perhaps the cause of the low ratings is that students interact differently with e-books. In the present study, the 54 students who had previously used e-books reported their use of e-book and print book special features. There was a main effect for media type across all questions. Specifically, students were more likely to read captions and charts in print books. Although not significantly different, student reports for reading section summaries and answering study questions fit the overall trend of more usage of special features of print texts than of e-books. Additionally, although e-book users can examine online content through embedded links while print book users must set the text aside to do web activities, e-book users reported that they were not more likely engage in these activities in e-books than print books. Clearly, more research is needed to determine how readers interact with e-books and how to design e-books for optimal usage.

5. Conclusions

It is heartening that measures of computer comfort and gender differences may not impact the use and selection of e-books (see also Shepperd et al., 2008). However, significant hurdles exist with regard to making e-books a viable option for most students. It is becoming quite clear that, despite the ubiquity of computers and interactive technology in their lives, students preferred textbooks over e-books for learning and this preference is not altered by familiarity with the medium.

Further, the strong visual and interactive elements in e-books that are commonly touted as strengths of e-books do not seem to be used to their potential by this sample and, in fact, may be used less in e-books than in textbooks as currently designed. Based on these results, we argue that at this time the medium itself may not be as comfortable as a textbook experience for readers and that the design of an e-book may need to differ from that of a textbook to make for a more constructive user experience. The lack of differences in learning outcomes (Shepperd et al., 2008), however, holds promise for e-books, despite students' preferences. Much more research is needed to identify and

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[1] According to Cohen (1988), for research in the social sciences, η_p^2 values of .01 indicate small effects, values of .06 indicate medium effects, and values of .14 indicate large effects. Interpretations should also consider scaling and the phenomena of study among other considerations (see e.g., Cohen, 1988; Ferguson, 2009).

remedy differences due to the physical medium (e.g., eye-strain, navigation, etc.) as well as user differences in habits for interacting with electronic text before e-books can be considered viable alternatives to the printed textbook.

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