

Significant but Meaningless Differences in Student Grades When Using E-Texts

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As instructors look for ways to lower costs for students, one solution has been to adopt e-texts in lieu of traditional paper textbooks. While the costs of these e-texts are significantly less, some wonder if student learning suffers as a result of the change in format. Two sections of students enrolled in introductory psychology using e-texts, $n = 363$ and $n = 372$ respectively, were compared to students who had been enrolled in those sections the previous year using a traditional textbook, $n = 383$ and $n = 344$ respectively. The same exams were administered both years, although the exams were different for each section. Average test grades were compared across the two years, with course section serving as a covariate.

Students in the e-text classes performed worse ($M = 71.58$, $SD = 10.16$) relative to students who had used a traditional textbook ($M = 72.74$, $SD = 10.44$), $F(1, 1468) = 4.66$, $p < .05$, $\eta_p^2 = .003$. This difference, while statistically significant, is too small to be of any practical importance. A secondary analysis examined students' ratings (1-5) of the extent to which the textbook helped their learning in the class. In this comparison, the traditional textbook was rated more helpful ($M = 4.04$, $SD = 1.05$) compared to the e-text ($M = 3.81$, $SD = 1.09$), $t(1228) = 3.76$, $p < .05$, $d = .21$.

Additional analyses examining student feedback at the end of the semester, found that the instructor was rated more helpful by students using the traditional textbook ($M = 4.12$, $SD = 1.03$) as compared to the ratings of students using the e-text ($M = 3.93$, $SD = 1.11$), $t(1229) = 3.11$, $p < .05$, $d = .18$. However, there were no differences across types of textbooks regarding self-reported learning gains ($M = 4.31$, $SD = 0.82$) from the learning gains reported by students using the e-text ($M = 4.22$, $SD = 0.92$), $t(1241) = 1.82$, $p > .05$, $d = .10$ or in the rated utility of the online quiz questions ($M = 4.01$, $SD = 1.10$) from the learning gains reported by students using the e-text ($M = 3.91$, $SD = 1.23$), $t(1241) = 1.80$, $p > .05$, $d = .10$.

These results suggest that instructors and students can be reassured that while students may find e-texts to be less helpful the impact on learning is negligible.

Table 1. Differences between student performance and attendance between classes using physical textbooks as compared to electronic textbooks.

	Physical Textbook Fall 2017 N = 729	e-Text Textbook Fall 2018 N = 742
Average Exam Performance*	72.74 (10.44)	71.58 (10.16)
Exam 1	72.60 (11.75)	71.78 (11.05)
Exam 2*	73.66 (12.37)	72.03 (12.52)
Exam 3*	73.54 (12.20)	71.81 (11.65)
Exam 4	71.46 (12.68)	71.46 (12.51)
Percent Classes Attended	80.95 (19.17)	82.09 (18.28)
Extra Credit Points Earned	11.62 (4.86)	11.98 (4.80)

- Difference between groups $p < .05$

Table 2. Student reported helpfulness of different learning tools amongst students using physical textbooks as compared to electronic textbooks.

	Physical Textbook Fall 2017 N = 605	e-Text Textbook Fall 2018 N = 626
Professor*	4.12 (1.03)	3.93 (1.11)
Textbook*	4.04 (1.05)	3.81 (1.09)
iClicker*	3.99 (1.12)	3.53 (1.30)
Online review quizzes	4.03 (1.10)	3.91 (1.23)
Visual resources, e.g. PowerPoint	4.17 (0.97)	4.16 (0.99)

- Difference between groups $p < .05$