The Perceived Value of College Physics Textbooks

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Students in four introductory college physics courses were surveyed to find out: how much they read their physics textbook; when they read; what effect (if any) this had on their performance; if different textbooks/instructors made a difference.

Summary

- We found that while 97% of students buy the textbook:
  1. Less than 41% regularly read.
  2. 26.9% read after lecture.
  3. There is little (or no) correlation between reading habits and course grade.
  4. These results were strikingly similar across conceptual-, algebra-, and calculus-based courses with different instructors and textbooks.
- We build on previous studies that found similar results.

The Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Textbook</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculus-based</td>
<td>Fundamentals of Physics, Halliday, Resnick, and</td>
<td>479 (402)</td>
</tr>
<tr>
<td>(Fall 04)</td>
<td>Walker¹</td>
<td></td>
</tr>
<tr>
<td>Calculus-based</td>
<td>Physics, Knight¹</td>
<td>334 (215)</td>
</tr>
<tr>
<td>(Spring 05)</td>
<td></td>
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</tr>
<tr>
<td>Algebra-based</td>
<td>Physics, Giancoli²</td>
<td>423 (183)</td>
</tr>
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<td>(Spring 05)</td>
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<tr>
<td>Conceptual-based</td>
<td>How Things Work: Bionicsalität²</td>
<td>49 (20)</td>
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<td>(Spr 05)</td>
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- Four courses were involved in the study. All were in the second semester of a two-semester sequence.
- Numbers in parentheses in right-hand column indicate the numbers of students responding to the survey.
- The grade distributions for students taking the survey had a high correlation (r > 0.9) with the grade distribution for the class as a whole.

Student Interviews

We interviewed several students, who told us about many ways they use their textbooks.

- “I read word-for-word with understanding”, “pause after a concept and then think about it.”
- “I think that the majority of the material can be learned from attending class, actively participating, going to recitation and asking questions, and doing the [homework].” “I don’t ever read the text” except for “looking up constants.”
- “I read all the material in the book, so I guess I did it about right.”
- “[The textbook] was really useful for [homework] but the material on the exams is similar to the format of the lecture but not so much similar to the book.”

Acknowledgements

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References

4. R. D. Knight, Physics for Scientists and Engineers (Addison Wesley, 2003)

Effect on Performance

- For algebra- and calculus-based courses, we found no significant correlation between course grade and how much students read (average correlation coefficient r=0.07)
- For the conceptual-based course, there is a moderate correlation (r=0.47) that is weakly significant due to the small number of students responding.

Average grade vs. reading habits for each course. Error bars represent 95% confidence intervals. Numbers below the x-axis are the average grade in each course.

For each course, we divided the students equally into the top, middle, and bottom 1/3 (by course grade) and compared the reading habits at each level.

While physics instructors tend advise their students to read the textbook before coming to class, we find that most students do not. These students are not necessarily hurt (performance-wise) compared to students who read as instructed. We do not know if students self-select appropriate reading habits, or if it does not matter how students use the textbook.

Our findings should prompt educators to examine just what role textbooks play in their courses, particularly from the point of view of the students.

Conclusion