Time-on-Task Estimation Tool

Research and Design: [Betsy Barre](#), [Allen Brown](#), [Justin Esarey](#)
https://cat.wfu.edu/resources/tools/estimator2/ *(accessed 7/30/2020)*

COURSE INFO

Class Duration (Weeks):
15

READING ASSIGNMENTS

Pages Per Week:
0

Page Density:
450 Words

Difficulty:
No New Concepts

Purpose:
Survey

Estimated Reading Rate:
67 pages per hour

☐ manually adjust

WRITING ASSIGNMENTS

Pages Per Semester:
0

Page Density:
250 Words

Genre:
Reflection/Narrative

Drafting:
No Drafting

Estimated Writing Rate:
0.75 hours per page

☐ manually adjust

VIDEOS / PODCASTS

Hours Per Week:
0

DISCUSSION POSTS

Posts per Week:
0

Format:
Text

Avg. Length (Words):
250

Estimated Hours:
0 hours / week

☐ manually adjust

EXAMS

Exams Per Semester:
0

Study Hours Per Exam:
5

☐ Take-Home Exams

OTHER ASSIGNMENTS

Per Semester:
0

Hours Per Assignment:
0 ———————— 50
0 5 10 15 20 25 30 35 40 45 50

☐ Independent

CLASS MEETINGS

Live Meetings Per Week:
0

Meeting Length (Hours):
0

WORKLOAD ESTIMATES

Total: 0 hrs/wk
Independent: 0 hrs/wk
Contact: 0 hrs/wk

Estimation Details

Somewhat surprisingly, there is very little research about the amount of time it takes the average college student to complete common academic tasks. We have self-reported estimates of how much total time they spend on academic work outside of class (12-15 hours), but we don't know much about the quality and quantity of the work that is produced in that time frame (let alone how the time is allocated to different tasks). We also know quite a bit about how students tackle common academic tasks, but those studies rarely ask students to report on how long it takes them to complete the task (whether reading a book, writing a paper, or studying for an exam). The testing literature provides some clues (because valid instrument design depends on data about the average speed of test takers), but it's tough to generalize from the experience of taking high-stakes, timed tests to the experience of working on an assignment in the comfort of your dorm. And while there is a sizable literature on reading, the nature and purpose of the reading tasks in these experiments are also quite different from what students typically encounter in college.

All of which is to say the estimates above are just that: estimates.

To arrive at our estimates, we began with what we knew from the literature and then filled in the gaps by making a few key assumptions. The details of our calculations are below. If you still find our assumptions unreasonable, however, the estimator allows you to manually adjust our estimated rates. We also welcome those who have knowledge of research about which we are unaware to suggest improvements.

Reading Rates

Of all the work students might do outside of class, we know the most about their reading. Educators, cognitive psychologists, and linguists have been studying how human beings read for more than a century. One of the best summaries of this extensive literature is the the late Keith Rayner's recently published "So Much to Read, So Little Time: How Do We Read, and Can Speed Reading Help?" A central insight of this piece (along with the literature it summarizes) is that none of us read at a constant rate. Instead, we use varying rates that depend on the difficulty and purpose of the reading task (Rayner et al., 2016; Love, 2012; Aronson, 1983; Carver, 1983, 1992; Jay and Dahl, 1975; Parker, 1962; Carrillo and Sheldon, 1952; Robinson, 1941). Another obvious (but rarely acknowledged) insight is that a page-based reading rate is going to vary by the number of words on the page. As a result, our estimator assumes that reading rate will be a function of three factors: 1) page density, 2) text difficulty, and 3) reading purpose. For the sake of simplicity, we limited the variation within each factor to three levels.

Page Density *

- 450 words: Typical of paperback pages, as well as the 6" x 9" pages of academic journal articles
- 600 words: Typical of academic monograph pages
- 750 words: Typical of textbook pages that are 25% images, as well as the full-size pages of two-column academic journal articles

*estimates were determined by direct sampling of texts in our personal collection

Text Difficulty

- No New Concepts: The reader knows the meaning of each word and has enough background knowledge to immediately understand the ideas expressed
- Some New Concepts: The reader is unfamiliar with the meaning of some words and doesn't have enough background knowledge to immediately understand some of the ideas expressed.
- Many New Concepts: The reader is unfamiliar with the meaning of many words and doesn't have enough background knowledge to immediately understand most of the ideas expressed

Reading Purpose

- Survey: Reading to survey main ideas; OK to skip entire portions of text
- Understand: Reading to understand the meaning of each sentence
- Engage: Reading while also working problems, drawing inferences, questioning, and evaluating

What we know from the research:

- The optimal reading rate of the skilled adult reader (including college students) is around 300 words per minute. This assumes a "normal" reading environment in which there are no new words or concepts in the text and the purpose of the reading is to understand the meaning of each sentence (Rayner et al., 2016; Carver, 1982).

- Adults can read faster than 300 words per minute, but if the goal is to understand the meaning of sentences, rates beyond 300 words per minute reduce comprehension in a near linear fashion (Zacks and Treiman, 2016; Love, 2012; Carver, 1982).

- The default reading rates of college students under these normal conditions can range from 100-400 words per minute (Rayner et al., 2016; Siegenthaler et al., 2011; Acheson et al., 2008; Carver, 1982, 1983, 1992; Underwood et al., 1990; Hausfeld, 1981; Just and Carpenter, 1980; Jay and Dahl, 1975; Grob, 1970; McLaughlin, 1969; Robinson and Hall, 1941).

- There is no real upper limit on skimming speeds, but the average college student skims for main ideas at rates between 450 and 600 words per minute (Rayner et al., 2016; Carver 1992; Just and Carpenter, 1980; Jay and Dahl, 1975)

- In conditions where the material is more difficult (i.e., with some new words and concepts), the optimal reading rate slows to 200 words per minute (Carver, 1992).

- In conditions where the purpose is to memorize the text for later recall, the optimal reading rate slows even further to 138 words per minute or lower (Carver, 1992).

- Although this has not been measured (to our knowledge), reading experts have argued that it is perfectly reasonable to slow down to rates below 50 words per minute if the goal is to engage a text (Parker, 1962).

What we don't know, but deduce and/or stipulate:

- Given that the rates above were discovered in laboratory conditions, when subjects are asked to perform in short, time-constrained intervals, we assume that the reading rates in actual conditions, when students read for longer periods with periodic breaks, will be slightly slower.

- Because there is no research on the time it takes students to engage texts, we assume that the rates would be similar to the rates found when students are asked to memorize a text for later recall. Although these are incredibly different tasks, both require attention to details alongside additional processing. If anything, we imagine equating these two rates significantly underestimates the time it takes to read for engagement (for an example of the sort of reading that is likely to take more time than it takes to memorize, see the appendix of Perry et al., 2015).

- If the reading purpose remains the same, the change in reading rates across text difficulty levels is linear.

- The rate of change in reading rates across text difficulty levels is the same across reading purposes.

Combining what we know with what we assume allows us to construct the following table of estimated reading rates (with rates about which we are most confident in yellow):

	450 Words (Paperback)	600 Words (Monograph)	750 Words (Textbook)
Survey; No New Concepts (500 wpm)	67 pages per hour	50 pages per hour	40 pages per hour
Survey; Some New Concepts (350 wpm)	47 pages per hour	35 pages per hour	28 pages per hour
Survey; Many New Concepts (250 wpm)	33 pages per hour	25 pages per hour	20 pages per hour
Understand; No New Concepts (250 wpm)	33 pages per hour	25 pages per hour	20 pages per hour
Understand; Some New Concepts (180 wpm)	24 pages per hour	18 pages per hour	14 pages per hour
Understand; Many New Concepts (130 wpm)	17 pages per hour	13 pages per hour	10 pages per hour
Engage; No New Concepts (130 wpm)	17 pages per hour	13 pages per hour	10 pages per hour
Engage; Some New Concepts (90 wpm)	12 pages per hour	9 pages per hour	7 pages per hour
Engage; Many New Concepts (65 wpm)	9 pages per hour	7 pages per hour	5 pages per hour

Writing Rates

Sadly, we know much less about student writing rates than we do about reading rates. This is no doubt because writing rates vary even more widely than reading rates. Nevertheless, we've found at least one study that can give us a place to begin. In "Individual Differences in Undergraduate Essay-Writing Strategies," Mark Torrance and his colleagues find (among other things) that 493 students reported spending anywhere between 9 to 15 hours on 1500-word essays. In these essays, students were asked to produce a "critical description and discussion of psychological themes" using at least one outside source. Torrance and his colleagues also show that students who spent the least time reported no drafting, while those who spent the most time reported multiple drafts, along with detailed outlining and planning. And the students who spent the most time received higher marks than those who spent the least (Torrance et al., 2000).

Although the sample of this study is sizable, we should not read too much into a single result of student self-reports about a single assignment from a single institution. But to arrive at our estimates, we must. Users should simply be aware that the table below is far more speculative than our reading rate estimates. And that the time your students spend on these tasks is likely to vary from these estimates in significant ways.

As with reading rates, we assume that writing rates will be a function of a variety of factors. The three we take into account are 1) page density, 2) text genre, 3) degree of drafting and revision.

Page Density

- 250 words: Double-Spaced, Times New Roman, 12-Point Font, 1" Margins
- 500 words: Single-Spaced, Times New Roman, 12-Point Font, 1" Margins

Text Genre

- Reflection/Narrative: Essays that require very little planning or critical engagement with content
- Argument: Essays that require critical engagement with content and detailed planning, but no outside research

- Research: Essays that require detailed planning, outside research, and critical engagement

Drafting and Revision

- No Drafting: Students submit essays that were never revised
- Minimal Drafting: Students submit essays that were revised at least once
- Extensive Drafting: Students submit essays that were revised multiple times

What we assume to arrive at our estimates:

- The results of the Torrance study are reasonably accurate.

- The assignment in the study falls within the "argument" genre. It's hard to tell without more details, but "critical description and discussion" seems to imply more than reflection. And while an outside source was required, finding and using a single source falls well below the expectations of a traditional research paper.

- Students write at a constant rate. That is, we assume that a student writing the same sort of essay will take exactly twice as much time to write a 12 page paper as she takes to write a 6 page paper. There are good reasons to think this assumption is unrealistic, but because we have no way of knowing how much rate might shift over the course of a paper, we assume constancy.

- Students will spend less time writing a reflective or narrative essay than they spend constructing an argumentative essay (assuming the same degree of drafting and revision). For simplicity's sake, we assume they will spend exactly half the time. It's highly unlikely to be this linear, but we don't know enough to make a more accurate assumption.

- Students will spend more time writing a research paper than they spend on their argumentative essays. Again, for simplicity's sake, we assume they will spend exactly twice the amount of time. It's not only unlikely to be this linear, it's also likely to vary greatly by the amount of outside reading a student does and the difficulty of the sources he or she tackles.

These assumptions allow us to construct the following table of estimated writing rates (with rates about which we are most confident in yellow):

	250 Words (Double Spaced)	500 Words (Single Spaced)
Reflection/Narrative; No Drafting	45 minutes per page	1 hour 30 minutes per page
Reflection/Narrative; Minimal Drafting	1 hour per page	2 hours per page
Reflection/Narrative; Extensive Drafting	1 hour and 15 minutes per page	2 hours and 30 minutes per page
Argument; No Drafting	1 hour and 30 minutes per page	3 hours per page
Argument; Minimal Drafting	2 hours per page	4 hours per page
Argument; Extensive Drafting	2 hours and 30 minutes per page	5 hours per page
Research; No Drafting	3 hours per page	6 hours per page
Research; Minimal Drafting	4 hours per page	8 hours per page
Research; Extensive Drafting	5 hours per page	10 hours per page

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