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Notetaking: Is Handwriting or Typing More Effective?

Is notetaking on a laptop or digital device as effective in terms of remembering and using the lecture information later as handwritten notes? The answer is not completely straightforward according to recent research.

A 2018 study by Mueller & Oppenheimer found that those who took handwritten notes scored statistically significantly higher on a test for conceptual questions only. For factual questions, there was little difference. It was a short experiment in simulated conditions: 67 undergraduate students viewed 15-minute TED talks on topics of interest that were not common knowledge. They then did 30 minutes of distracter tasks, then were tested with factual and conceptual questions.

They repeated the experiment with a different set of 151 students but with instructions to laptop users to avoid transcribing and use keywords. This reduced the advantage of handwritten notes to substantial but no longer significant for conceptual questions.

They repeated the experiment a third time with 109 students but changed a couple of things. Instead of a TED talk video, the video was of a graduate student reading lecture notes. The video viewing and test taking were two separate events on different days. And, for some students they added 10-minutes of study before taking the test. Handwritten notes with study statistically significantly outperformed the other conditions (laptop with study, laptop without study, handwritten with study, handwritten without study), for both factual and conceptual questions. The only other statistically significant result was for longhand notetakers without study for factual questions only.

A 2011 study by Lin & Bigenho with 47 undergraduate students resulted in only a marginal and not statistically significant test score advantage for students who had taken handwritten notes, but the experiment was recall of word lists, the lowest level of learning in Bloom's Taxonomy.

A 2017 study by Eason had 72 Psych 1000 students view a TED talk video and be tested, some immediately after and some a week later, with instructions to study beforehand. The result was no significant difference in scores. Notetakers of both types did score statistically significantly higher than those who did not take notes (some students were asked to not take notes) but only for the test administered immediately after, not the one given a week later.

All of the experiments cited above used convenience samples.

It may be that the disadvantage of laptop notetaking is that students are tempted to transcribe everything that the instructor says (since one can type much faster than write by hand), so most of their cognitive capacity is taken up by getting all the words down rather than listening attentively. As students refine their notetaking methods to listen closely to the lecture and type keywords, the disadvantage will likely decline. With handwritten notes, a lot of cognitive processing is happening while students write keywords (they can't handwrite quickly enough to transcribe so they don't even try) and also while they sketch tabular information, concept diagrams, and draw circles and arrows to emphasize important bits of information and interconnections between them. When they read their notes later, enough of their

senses were involved in the notetaking that they can reconstruct their memory of the lecture better than those who did not take notes in this way.*

Annotation software, such as Microsoft OneNote and iAnnotate, lets students with touch screen laptops and tablets or smart phones mark up their notes, thus reproducing in the digital environment a wide range of encoding and imprinting that gives handwritten notes their advantage. Over time, the difference in effectiveness of the two notetaking methods should vanish. This would be an interesting new line of study of this issue.

** This is also why it's not that helpful for students who miss class to catch up by borrowing another student's notes. Those notes are only meaningful for that student, because only that student has had the experience of imprinting and encoding that will help recall what was said in class.*

References:

- Eason, T. (2017). *Various Methods of Note-taking and How they Compare in Terms of Information Retention*. (Unpublished thesis for the requirements of the degree of MA, CAS, School Psychology). East Carolina University, Greenville, North Carolina.
- Lin, L. & Bigenho, C. (2011). Note-Taking and Memory in Different Media Environments. *Computers in the Schools*, 28(3).
- Mueller, P. M., & Oppenheimer, D. M. (2018). Corrigendum: The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking in *Psychological Science*, 1(4).