

Lexia: Undergraduate Journal in Writing, Rhetoric & Technical Communication

Volume V

2016–2017

[The Benefits of Hand-written Versus Digital
Notetaking in College Lectures]

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Abstract

Many students have begun taking notes on laptops rather than using pen and paper in their college classes. Typing notes on a computer allows for more words to be written, but research from Princeton University and University of California show that this may not be as beneficial as it seems for the notetaker. Students who took notes on computers tended to transcribe words directly from the source rather than putting the information in their own words. Taking notes longhand allows for better encoding of the information and leads to better performance on tests. Because handwriting notes is a slower process, those who handwrite their notes are forced to interpret the information and put it into their own words. As such, students who hand write notes are able to better understand content.

In each of my college lecture classes, I am surrounded by the sound of keyboard clicks as students type notes from the lecture. A trend that I have noticed in the sound is that it always lasts for about a minute after the slide on the professor's PowerPoint has changed. Once the students have copied all the words down from the slide, the typing ceases. To me, taking notes on a laptop seems ineffective. As a person who writes all my notes by hand, I am busy writing during the entire lecture, creating diagrams and connecting ideas throughout my notes. After researching the effectiveness of both methods of notetaking (digitally and longhand) and the differences between them, I've found that taking notes by hand allows for better and more personalized notes, as well as improved encoding and retention of information.

The most common response I receive when I ask my peers why they like to take notes digitally rather than by hand is that laptop notetaking is much faster. Students believe that because they can get more words written down, they are taking better notes. The diagram below, used in an *Of Tech and Learning* article, presents some features of the two main notetaking methods (2016). This diagram includes "faster (more notes)" as a characteristic of taking notes digitally.

While quantity is seen as a plus for taking notes on a laptop, Pam Mueller (2014) and Daniel Oppenheimer (2014) of Princeton University and the University of California Los Angeles researched factors that contribute to the success of both note-taking methods. Mueller and Oppenheimer researched whether faster notetaking on a laptop is more effective than notes taken by hand (2014). The findings of the study relates to the factors listed in the above diagram: the ability to type faster notes on a laptop that led to more verbatim notes; however, notetaking by hand resulted in more interpretive notes.

Taking Notes: Typing vs. Handwriting

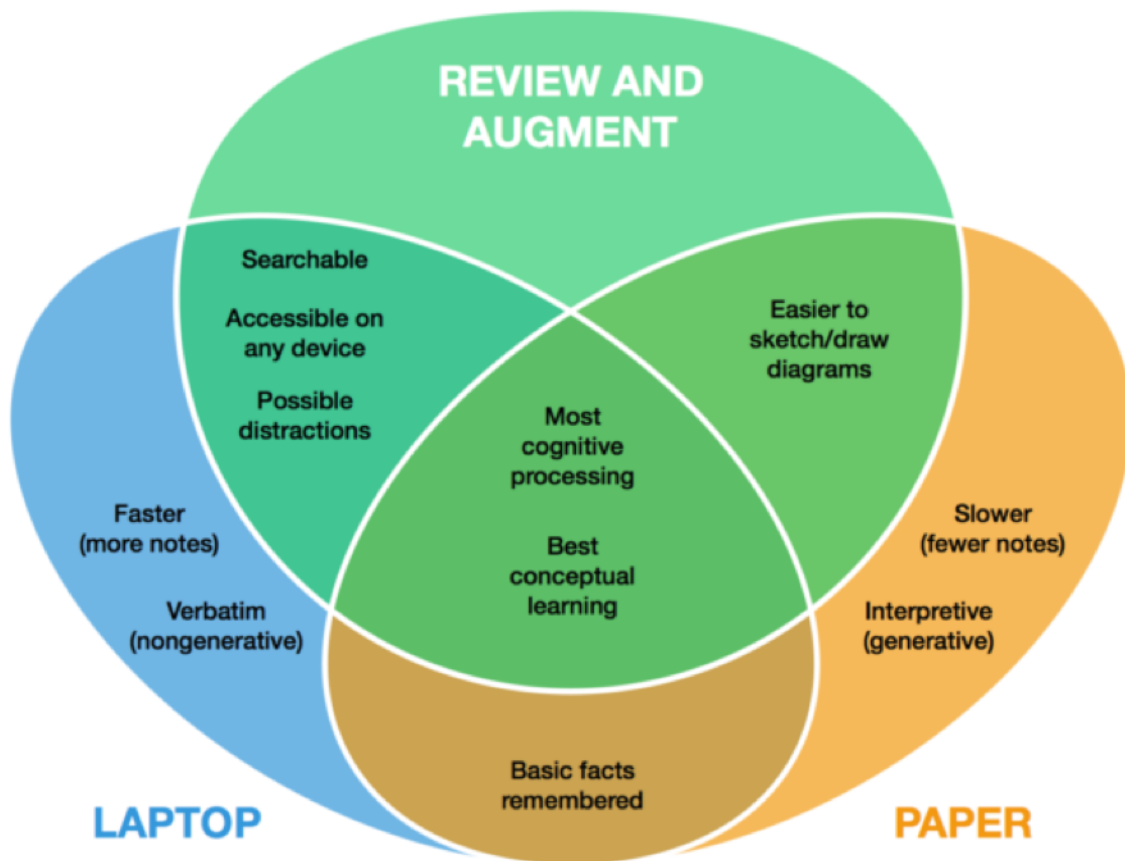


Figure 1. This Venn diagram illustrates the some of the most substantial pros and cons of each method of notetaking.

Those who take notes on the computer are less likely to seek out the most important information in a lecture and tend to write class notes exactly as they appear on the professor’s version. One of Mueller’s most prominent findings included in “The Pen Is Mightier Than the Keyboard” is that laptop note-takers can type much faster than other students can handwrite, causing them to have verbatim notes to those the professor provides. By contrast, students who handwrite their notes write less, and have to summarize the main ideas of the notes in their own words (2014).

Students may think they are taking better notes on their laptop because taking notes on the computer is more efficient and allows for more words to be written down (Figure 1). However, the findings of all three studies by UCLA and Princeton made the distinction: “Although more notes are beneficial, at least to a point, if the notes are taken indiscriminately or by mindlessly transcribing content, as is more likely the case on a laptop than when notes are taken longhand, the benefit disappears” (2014).

Handwritten notes, while including fewer words, are more effective because they are usually more centered around the most important points.

Furthermore, the transcription that stems from taking notes digitally oftentimes is unnecessary, as many professors will offer transcripts of lectures to students. All of my professors, for example, post their lectures, exactly as they are narrated in class, online and the lecture information is available anytime. Because all the lectures are posted online, transcribing words from the lecture into class notes is redundant.

Some laptop notetakers may argue that they do not copy down their notes exactly as they appear during the lecture. Even so, the digital method of notetaking is still less effective than taking notes by hand due to the encoding of the information. This encoding phenomenon is discussed in later paragraphs and is also part of Mueller’s research.

Another reason some students prefer to take notes digitally rather than by hand is because they believe their notes look more organized. I would like to think this is all up to the individual. I like taking notes because it is much easier to personalize my notes on paper rather than on a laptop, and I can quickly organize them how I like them to be. The *Of Tech and Learning* diagram above notes that students can create diagrams and sketch more easily on handwritten notes, as I typically do in class.

Students present many reasons for taking notes on their laptops; however, I often see online shopping and Facebook scrolling when I look at the computers in front of me in class. Is taking notes by hand better because students are less likely to get distracted? Carrie Fried (2007), a member of the psychology department at Winona State University in Minnesota, notes that the “orientation and visual nature of laptops, along with pop-ups, instant messages, movement and lighting of text, and even things like low-battery warnings, make laptops inherently distracting” (par. 7). It is unlikely that a student would turn off these notifications prior to class, and this action may not even be offered on many computers. Laptop notifications cause a temporary distraction from the lecture and the student’s attention is split, making it more difficult to focus on the material.

Even if the student tries to stay on task and does not click on any pop-up notifications, they are still getting distracted. Fried (2007) argues that students’ attention is still being divided even if they are not actively doing anything: “although attention is often controlled voluntarily, external events and visual stimulation can result in involuntary shifts of attention” (par. 7). If a student is trying to focus on their notes and a notification pops up on their screen, not only will it be tempting for the student to click it, it is going to be difficult to return their complete attention to their notes. This involuntary distraction also applies to the students who are hard at work during the lecture, but are surrounded by the students who are off task.

As I described earlier, I have seen students using their laptops in class to go off task on the internet. This is unfortunate for me because this student has forced my attention to become distracted and I have had to try and focus back on my notes. Fried (2007) brings up the point that the “vertical orientation” of the computer screens makes

it much easier for surrounding students to become distracted (par. 7). If a student in front of me was off task using a paper notebook (the only way I can imagine a student getting off task with a notebook would be through the act of doodling), I would be much less likely to see it and become distracted by it because of the flat orientation of the notebook.

Taking notes by hand, the student is much less likely to become distracted. But, if a student typing notes on a laptop stays on task the entire time and has no distractions, is their method of note-taking still less effective than taking notes by hand? Pam Mueller of the psychology department at Princeton University argued that “even when laptops are used solely to take notes, they may still be impairing learning because their use results in shallower processing.” This assertion implies that laptops are affecting comprehension in more ways than just serving as a distraction. The difference between handwritten and typed notes lies in the encoding of information. Psychologists define encoding as the process of putting new information into memory, which according to Princeton and UCLA’s research (2014), is a process affected by the method of notetaking.

Princeton University took their study beyond the encoding of information and examined which method resulted in better external storage of information. Because the laptop note-takers wrote more words into their notes, the researchers wanted to find out if this would be more effective for studying. According to the study, “participants who took longhand notes and were able to study them performed significantly better” (2014). Once again, the handwritten notes proved to be more beneficial to the students than the typed notes.

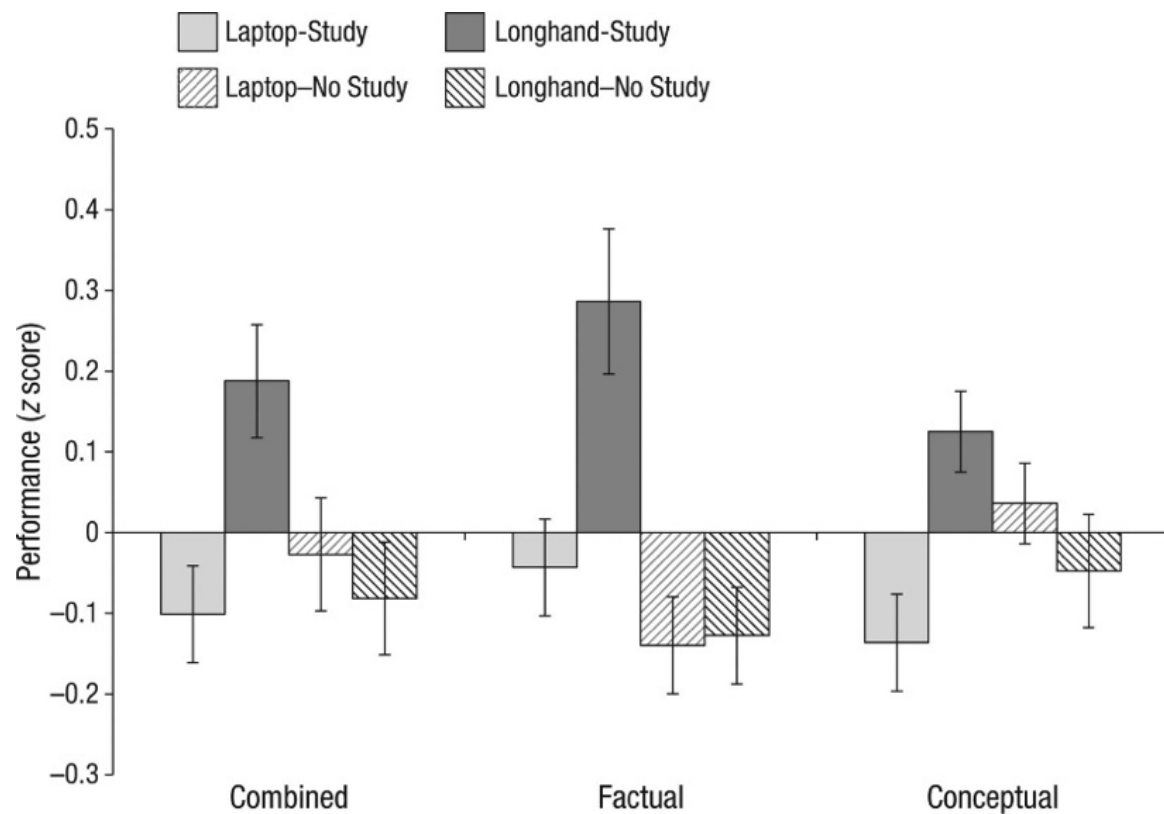


Figure 2. Z-scores of test results from 2014 Princeton study on the retention of information.

The above diagram (Figure 2) displays the results of the groups in Princeton’s third study (2014) and the subjects’ performance on the tests shown as z-scores (a positive z-score means the student’s test grade was above average, a negative number shows a test grade below average). The dark gray boxes represent the group of students who handwrote their notes and were allowed to study them for the week before being tested. These students clearly performed better than any other group, indicating that handwritten notes could be more effective for studying than typed notes (Figure 2). The handwritten notes are written mostly in the student’s own words and incorporate their interpretation of the information (less verbatim); therefore, the students may have a

better time studying them and find the handwritten notes easier to understand. The laptop note-takers may not remember the meaning of some of what they wrote in their notes because it most likely does not include the student's own interpretation, which would be evident in handwritten notes.

Taking notes on laptops has become a widely accepted form of notetaking for college students. Notetaking this way not only negatively affects how the information gets processed into memory, but also makes it more difficult to study and understand. By taking notes by hand, students are forced to think about the most important concepts, and the handwritten notes are much more personalized. These studies show that sometimes technology application, while more efficient, should not wipe out the "old-fashioned" way of learning.

References

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