

NOTE-TAKING IN THE 21st CENTURY: TIPS FOR INSTRUCTORS AND STUDENTS

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Perhaps when many of us were college students, taking notes in class meant one thing: listening to lectures and writing down whatever we thought was important. If we were lucky, our professor might write something on the chalkboard. Taking notes was something we learned how to do because we *had* to (although we might not have done it perfectly!). However, the classroom and note-taking experience is much different for today's college student, who has likely grown up with student-centered learning as well as PowerPoint as a popular mode of delivery, high school teachers shackled by standardized testing, and professors who provide lecture notes and printed slides packed with information. Today's student might *perceive* the note-taking process as less fundamental to their ultimate success in a course, unaware of its foundational benefits to their learning and unequipped to engage in it effectively. This paper will address the cognitive advantages of note-taking and the struggles many students face, offering strategies for instructors to help students take better notes.

WHY BOTHER TAKING NOTES?

This is a question many students might ask, especially if they have access to lectures and lecture notes outside of the classroom. Indeed, it's a fair question! Nevertheless, the body of research on note-taking reveals that in general, taking notes in class and reviewing those notes later positively impacts student learning (for instance, Bligh 2000; DeZure, Kaplan, & Deerman 2001; Kiewra et al 1991). While this might not be "news" to many of us in higher education, given the ubiquity of slideware programs like PowerPoint that make it easy to simply provide students with copies of our presentations, it is smart to stop and highlight the specific reasons to encourage note-taking in our students.

First, research shows that students recall more lecture material if they record it in their notes (Bligh 2000), and ultimately perform better on tests of recall and synthesis than students who do not take notes (Kiewra et al 1991). More specifically, note-taking serves two distinct functions for students: external storage and cognitive encoding.

- **External storage:** Notes obviously serve as a place to keep knowledge and information for later review – the purpose most students likely see as the primary purpose. This is undoubtedly a vital function, particularly when paired with review of those notes (Kiewra 1985; Kiewra et al 1991).
- **Encoding of information:** What students might not realize is that the note-taking process also serves a vital function in helping to write the information on the brain. The literature (Foos, Mora & Tkacz 1994; Katayama 2005) shows that people better retain materials that they have generated themselves (i.e., personal notes) than materials generated by others (i.e., someone else's notes), and that students actually begin to learn and memorize during note-taking,

particularly when engaged in deep comprehension (Piolat, Olive, & Kellog 2005; Williams & Eggert 2002).

Ultimately, the combination of *both* functions makes note-taking a crucial part of successful learning. In other words, simply reviewing any notes is less effective than reviewing notes you took yourself, but just taking notes without engaging in review is not an effective strategy alone.

STUDENT NOTE-TAKING SKILLS (OR LACK THEREOF...)

Encouraging students to take notes and explaining the importance of the process is just the first step towards success. Unfortunately, student notes are often inaccurate or incomplete, especially when recording diagrams, figures, equations, and other crucial material (DeZure, Kaplan, & Deerman 2001; Johnstone & Su 1994). Students also often struggle with following cues and prioritizing information or culling out what is most important; research indicates that students tend to record verbatim notes without much evidence of generative processing (Bretzing & Kulhavy 1981; Huxham 2010; Kiewra 1985). In some studies, even the best note-takers included less than 3/4 of critical issues in their notes, with first-year students recording on average only 11% (in Potts 1993). Further, most students make limited use of techniques such as abbreviations, diagrams, and symbols that can increase their note-taking efficiency and improve their ability to record more information (Badger et al 2001; Sutherland, Badger, & White 2002). Finally, students in general can demonstrate a lack of self-awareness, believing that they do take suitable notes (Bonner & Holliday 2006).

REINFORCING EFFECTIVE NOTE-TAKING

Given the importance of note-taking, married with students' struggles with the process, it is imperative that instructors consider the role we could play in helping our students grow as learners and succeed in our classrooms. Note-taking is, after all, an incredibly complex task that requires many cognitive resources (Peverly et al 2007; Stefanou, Hoffman & Vielee 2008). And while it might be tempting to assume that the tech-savvy Millennial generation does not *want* to take notes, they are still requesting lecture notes from instructors, and one study (Marsh & Sink 2010) suggests that 74% of students prefer to have access to slide handouts prior to lecture to help with note-taking *during* class. So what can we do as instructors to help them record accurate information, engage with the material during class, and improve their note-taking skills?

PowerPoint Slides: To Supply or not Supply?

Many instructors struggle with this decision. Some are reluctant to distribute handouts of PowerPoint presentations or lecture notes for fear that students will substitute them for class attendance, won't pay attention during class, or will fail to develop note-taking skills. Conversely, others feel that such handouts allow students to pay more attention to lecture by relieving them of the need to write as much, and ensure that students have accurate information.

While the note-taking process is important for student learning, new research also reveals that providing student with guided notes does not harm performance on exams and can help students more accurately record critical points and examples (Austin, Lee, & Carr 2004; Marsh & Sink 2010; Rayver & Maydosz 2010). Kiewra (1985) likewise reported that students who review detailed *instructor* notes

generally outperform students who only review *their own* notes on fact-based tests (1985), and others (Babb & Ross 2009) observe that guided notes could help improve student participation.

While this research is compelling, it does not suggest that instructors should simply begin providing students with full transcripts of lectures! Although full instructors' notes are "better" than students' notes, it is crucial to bear in mind that they are *not* as useful when higher-order learning is required (Kiewra 1985; Neef, McCord & Ferreri 2006; Potts 1993).

Perhaps the compromise that best assists students is the provision of ***partial or guided notes***. Skeletal outlines or handouts can provide a scaffold for accurate student note-taking while still requiring their attention, active engagement, and attendance. Guided rather than complete notes provided *prior* to class time can also allow students to prepare and review material for concepts in need of further explanation (Babb & Ross 2009), with the added benefits of increasing student engagement with the content and improving their accuracy. (Preparing such notes can also help *you* prioritize and focus your lecture content!) Guided or partial-note handouts can take on several forms, such as outlines, graphic organizers like charts or matrices, or printable PowerPoint slide handouts that provide spaces to take notes and/or in which portions of slides are left blank for students to fill in. If you are still concerned about the impact on attendance, be sure to use class time for interactions that cannot be replicated on a handout (DeZure, Kaplan, & Deerman 2001), or even consider a specific attendance policy.

*For more ideas about **creating effective handouts for students and using PowerPoint to encourage participation**, see this website from the University of Minnesota Center for Teaching and Learning:*

<http://www1.umn.edu/ohr/teachlearn/tutorials/powerpoint/handouts/index.html>

Additional Strategies to Consider

Offering students guided notes is just one option for helping them improve their notes and note-taking skills in general. There are many other ways that we can provide guidance along the way. Here are a few to consider.

- **Space is important.** If you *do* decide to offer your students some form of handout or guides for their notes, keep in mind the amount of space you provide for their actual note-taking. This amount of space has a major impact on the actual amount of notes students will make (Potts 1993). That is, the more space you provide, the more they will likely write! Consider this especially in regard to those "notes pages" that PowerPoint provides; a tiny slide with a few lines next to it might not lead to detailed notes.
- **Provide clear cues and good pacing.** Because students struggle – perhaps unwittingly – to determine what information is important enough to write down or read subtle cues instructors might provide, it is also important to make an effort to offer transparent cues and follow a

reasonable pace. We speak at a much faster rate than students can write: researchers measured the average rate of speech at 2 – 3 words per second, while the average handwriting speed is only .2 - .3 words per second (Makany, Kemp, & Dror 2008).

Verbal and visual cues can help students recognize critical material as well as important structural or organizational relationships. **Verbal cues** might include phrases such as, “The 4 main arguments are...,” “A major development was...,” “Applying that concept...,” or “This was an example of...,” to name just a few (DeZure, Kaplan, & Deerman 2001). **Visual cues** might include diagrams or charts, or key statements in writing on the board or on a slide. One popular approach is to provide a topic outline at the start of class. Written cues are especially important, given students’ proclivity to record material from the blackboard or PowerPoint. However, keep in mind that filling slides with text is *not* an effective strategy; too much text leads to cognitive overload for students and potentially *fewer* notes, or conversely, blind transcription. Indeed, one study (Huxham 2010) found that slide cues alone for student notes led to lower quality notes in terms of contextualization or understanding. Stefanou, Hoffman, & Vielee (2008) confirm that in lectures where the amount of material presented in “visual scaffolds” is neither too much nor too little, students write *more* (p. 15), so balance is key. Further, remember that students frequently record information inaccurately, so if you feel that exact wording or a perfect diagram are necessary, consider providing that material on a handout.

Regarding pace, research indicates that a moderate speed of delivery, around 135 words per minute, best supports student note-taking (Peters 1972; DeZure, Kaplan & Deerman 2001). If you are unsure whether you utilize a reasonable pace, simply poll your students and ask for feedback. In addition, more difficult or unfamiliar material will warrant a slightly slower pace, so work to balance the simple and familiar with the complex and new material (DeZure, Kaplan & Deerman 2001; Potts 1993).

- Try the pause procedure. One technique that can enhance note-taking and student learning simply involves incorporating brief, 2-minute pauses several times during lecture to allow students to discuss and rework their notes together. A study by Ruhl, Hughes, and Schloss (1987) discovered that when using this procedure, students performed significantly better -- as much as two letter grades better! -- on a free recall and comprehensive test than students who simply listened to lecture. In other words, if we talk less, students learn more! Undoubtedly, these counterintuitive results supports the research that suggests that students’ ability to retain information decreases substantially after 10-20 minutes, and that reinforcing presented information increases student learning. Another study (Huxham 2010) also found that providing students with an “interactive window” during lecture to discuss the material and compare notes led to better comprehension and higher test scores than simply providing students with notes.
- Expose students to alternative and non-linear note-taking techniques. Students might not realize that there is more than one way to take notes. While many might comfortably and successfully rely on the traditional linear model, many other models have surfaced in recent years that might be more effective for some students – *if they are familiar with those models*. The Cornell Method, for instance, involves creating separate columns for notes and cues/questions, with a summary at the bottom of the page. Non-linear approaches such as concept maps, matrices, or even the “Smart Wisdom” method from the UK can also be beneficial. In fact, a study by Makany, Kemp, & Dror (2008) found that non-linear note-takers performed on average 20% better than linear control groups measuring comprehension and

metacognitive skills, surmising that non-linear strategies offer a visually accessible format that decreases cognitive load and enables deeper understanding through improved knowledge management and organization.

- Teach students *how to take notes*. Perhaps the most important, most effective strategy we can employ to help our students is merely to be transparent and actually explain to them what good note-taking entails. While it might be easiest to assume our students already know what to do, or to lament that they *don't* know what to do, it is always better to take action and provide them with the right tools! Consider talking to your students early in the semester about your expectations for their engagement and participation in your course, and about how they can be most successful in their note-taking. You might even demonstrate some strategies for them, or ask to peruse their notes once or twice to assess their accuracy and completeness. **In addition, see the handout at the end of this article and consider providing it as a resource for your students.**

For more information on alternative note-taking models, please see the following:

- **The Cornell Method:**
http://lsc.cornell.edu/Sidebars/Study_Skills_Resources/cornellsystem.pdf
- **Concept Mapping:**
<http://cmap.ihmc.us/publications/researchpapers/theorycmaps/theoryunderlyingconceptmaps.htm>
- **Smart Wisdom Method:**
<http://www.drewhajduk.co.uk/index.php/smart-wisdom-note-taking-made-easy/>
- **Matrix Note-Taking:**
http://cte.uwaterloo.ca/teaching_resources/tips/building_note_taking_skills_for_students.html
http://www.youtube.com/watch?v=ZoU257QR_f0

CONCLUSION

It is clear that note-taking remains an integral part of the learning process, even on our high-tech campuses and for our digital native students. While some strategies might have changed over time, students will always need help in fine-tuning their skills, and if we want our students to be successful learners, it can't hurt for us to offer a little guidance. For more information on note-taking, see the additional resources and references below, and feel free to contact the TLPDC with any questions you might have.

TIPS FOR EFFECTIVE NOTETAKING¹

Teaching, Learning, and Professional Development Center
Texas Tech University

A GENERAL NOTE:

Taking good notes during class is an important part of the learning process – even when your instructor provides lecture notes, outlines, or PowerPoint slides. The process of note-taking actually helps you learn and cognitively store the material in addition to providing you with something to review later. Effective note-taking is more than just writing quickly, too! Here are a few tips to help you take the best notes possible.

BEFORE CLASS

- **Do your assigned readings and review any notes** your instructor has provided for you prior to class. This will help you prepare for the class period and recognize if there are questions you might need to ask or material in need of clarification.
- **Stay organized.** Keep your notes in one place you can easily access later.

DURING CLASS

- **Pay attention to cues from the instructor and prioritize information.** Instructors often give signals during class about what's important (which doesn't always include saying "write this down, it's important!"). Look for cues such as:
 - Material written on the blackboard or whiteboard
 - Repetition
 - Emphasis through tone of voice, body language, number of examples, or time spent on a subject.
 - Word signals (such as "first, second, third..." or "Now we'll discuss...")
 - Reviews, summaries, lists, and questions
- **Keep your notes brief.** It is time-consuming to write down every single word spoken or provided on a slide! Here are some strategies for efficient note-taking:
 - *Abbreviate.* Think of meaningful ways to shorten words you have to write frequently. (For instance, b/c for "because," w/ for "with," or nat'l for "national"...)
 - *Write key words and shortened phrases* rather than complete sentences.
 - *Use meaningful symbols* when possible. (For instance, use an arrow to indicate results or causality, = to indicate equivalent relationships, or develop your own system!)
 - *Leave space* to fill in additional information if you fall behind.
 - *Make notes for yourself*, such as circling terms you don't understand or writing question marks.

¹ Adapted from information from the Academic Skills Center at Dartmouth College and the Center for Research on Learning and Teaching at the University of Michigan.

- **Make your notes accurate and complete.**
 - Write down *key points, theories, definitions, formulas, facts, etc.*
 - Make note of *diagrams and charts*, and do so correctly.
 - Write down *important examples* connected to key points.
 - Keep your notes *organized*. Try using bullet points, indentations, numbering, outlines, or other graphic organizers (such as charts, matrices, lists, etc.) Date your notes and consider adding page numbers as well.
 - While you should keep your writing brief, this is to allow you to *write as much important information as you can*. Studies show that students who take more notes perform better!

AFTER CLASS

- Review your notes regularly, not just the night before an exam.
- Compare notes with classmates to supplement or clarify your own.
- Identify concepts that are still *confusing or unclear*, and ask your instructor for assistance.
- Reorganize your notes as needed
 - Try summarizing the information or creating additional outlines, diagrams, concept maps, and charts.
 - Use various colored pens/highlighters to help identify important information.
- Evaluate the quality of your notes.
 - Are there lots of errors or gaps?
 - Are they helping you study? If not, think about making changes to your note-taking methods.
 - Ask your instructor or TA to review your notes and make suggestions for improvement.

ADDITIONAL ONLINE RESOURCES:

Building your Note-Taking and Study Skills: A Guide for Students. From the University of Waterloo Centre for Teaching Excellence.

http://cte.uwaterloo.ca/teaching_resources/tips/building_note_taking_skills_for_students.html

Research on Student Notetaking: Implications for Faculty and Graduate Student Instructors, by DeZure, Kaplan, and Deerman. University of Michigan Center for Research on Learning and Teaching.

http://www.crlt.umich.edu/publinks/CRLT_no16.pdf

Large Class FAQ: Notetaking, from the Schreyer Institute at Penn State University.

http://www.schreyerinstitute.psu.edu/pdf/Large_Class_FAQ_Notetaking.pdf

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