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Supercharge Your Slide Deck for Student Learning

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All the world's a stage—particularly your seated, online, or hybrid classroom, where slides can set the scene, provide drama, and sing backing vocals. Unfortunately, many faculty matriculated in an era when wordy, bullet-laden PowerPoints were abundant, and too often, we bring poor slides to our classrooms. For many, the stage set by our slides suffers from numerous pitfalls. Fortunately, impactful, student-focused slides can be generated or quickly modified by understanding and planning in three areas: subvocalization, cognitive load, and dual coding.

Subvocalization is that little voice in your head that you hear when you read text. Even as I write this article, I hear the words. Not everyone has an inner monologue, but in informal polling I have conducted in faculty development sessions and classes, more than 90 percent of faculty and students say they do. In the classroom, subvocalization has significant implications. Students will read every word you put on the slide and hear that voice within. If you are talking simultaneously, it will be hard for students to appreciate either voice fully. When slides are too wordy, we must make adjustments to ensure the slides act as good backup singers. It's not like students can shut off their inner monologue.

A "less is more" approach limits subvocalization issues, with no slides having more than 15 words. With the low word count on each slide, students can quickly read using their internal voice, and their minds will be clear when you begin adding details, stories, and examples to strengthen the slide's message. Critically, you must give students time to read each slide when you click on a new one. Subvocalization issues will persist if you talk continuously during transitions, even if your slide is well-designed. To limit slides to 15 words in practice, the "less is more" approach requires splitting wordy slides. One slide might become two, three, or four easily readable slides with an appropriate image or graphic to provide context or exploit dual coding—which we'll get to later.

Cognitive load is the next element to consider for slide construction. Cognitive load theory describes how brains work when learning or working on problems (Lovell, 2020). Our brains have a finite amount of working memory to dedicate to learning, split into three domains: intrinsic, extraneous, and germane. Intrinsic load is the working memory used to deal with the difficulty of the task at hand. Extraneous load represents the work the brain is doing to deal with internal and external distractions. Germane load describes the portion of working memory dedicated to the learning or problem solving we want to take place during class. The intrinsic load takes its share of the working memory first, the extraneous load takes its part second, and the germane load gets any remaining working memory. For those of you in difficult subject areas or with

challenging units throughout the semester, less working memory will be available to students due to the high intrinsic load. Of course, it is essential to recognize that the intrinsic and extraneous loads may vary wildly from student to student in your classes.

Concerning slides, billboards are my inspiration for keeping cognitive load down. Even at 75 miles an hour, with a screaming kid, a barking dog, and a hangry partner, you can catch the number of the exit you need for a much-needed dinner stop. You only need two strategies to develop slides that function as billboards for distracted students: (1) one thought per slide and (2) good fonts.

All good billboards include just one thought to reduce the distracted driver's cognitive load. To maximize thinking in class (germane load), we must avoid complicated, full slides that increase students' intrinsic and extraneous loads. The one-thought-per-slide strategy ensures that students can wrap their heads around any new ideas presented. Remember, our students are novices in our subject areas, and they simply cannot process or deal with all the complex scenarios we have come to understand over many years of specialized training. What might feel easy to us can feel impossible to students.

The one-thought-per-slide approach requires splitting complex, complicated slides, just like the approach for subvocalization. One complex slide should become two, three, four, or more easily digestible slides with an appropriate image or graphic to provide context or exploit dual coding. In a few instances, I have turned one slide into seven or eight. The "one thought" could be a concept introduction or a summary, where multiple icons or simple graphics represent parts of the whole. When using an introductory slide, follow with one or more slides for each specific part.

And yes, I know what you are thinking: *My slide deck will be huge if I split wordy and complicated slides*. If your concern is file size, that is not an issue in the age of flash memory and the cloud. If your concern is the number of slides, no worries. Your new, supercharged slides are simple to understand and easy for students to digest, so let go of tying the number of slides to the length of your class. Ultimately, you are explaining the same information you did previously but in a much easier-to-digest format. The simplicity of your new slides will help students understand things more quickly.

The second key to slides that function like billboards is choosing fonts carefully and avoiding decorative fonts. Sans serif fonts, the ones without the flourishes, work best. Like the billboards we are mimicking, street signs also use these fonts to ensure readability. I often use Ebrima in PowerPoint, but I prefer Google Slides, which has hundreds of sans-serif fonts available. Find your own font and make it part of your teaching brand.

The last element for slide development is **dual coding**, a true power-up for student learning, which takes advantage of our brains' dual processing power (Caviglioli, 2019). Though I'm oversimplifying, one channel in our brain processes graphics, images, pictures, and icons, while a second channel simultaneously processes text and spoken words. When the graphics and words are married together, the collective impact is greater than the two parts, a synergy. I try to exploit dual coding in every slide, and I urge you to utilize the strategy whenever you can. I use images, pictures, and diagrams to provide context for students, and I use a lot of icons to serve as visual hooks for students to hang new information. You can further amplify dual coding by

developing handouts with key icons and images for students to make notes. The graphic next to their own words is likely even more potent than the dual coding on your slides.

When maximizing the power of dual coding and graphics, I address one of two questions for every slide. (1) Does the image or graphic provide the appropriate context for a novice learner in this class? (2) Does the icon, graphic, or picture provide an appropriate hook for students to hang information using dual coding? In these questions, “appropriate” means the image, graphic, or icon relates to or is of interest to the students in your current class. A lot of different tools are available to help you build supercharged slides. PowerPoint and Google Slides offer some icons, but [Noun Project](#) ^[1] has everything you need. [Pixabay](#) ^[2] and [Pexels](#) ^[3] are great places to start for high-impact, royalty-free images.

As experts in our fields, it is easy for us to conjure images in our minds, but our students don’t have our lived experience or context. Using multiple high-resolution pictures in various scenarios will help build student understanding by providing the context they need. This power to provide instant context is why I moved from handwritten notes to slides years ago. I could write all I wanted on the board, but the students still had no idea what a water treatment sedimentation basin looked like, hindering their basic understanding of the treatment processes. For teachers who primarily handwrite notes, a supercharged slide deck also reduces student cognitive load associated with all the notes on the board and opens the door for many more dual coding opportunities.

Now that you know about subvocalization, cognitive load, and dual coding, don’t try to swallow an elephant. Start your process to supercharged slides slowly and intentionally. First, check out the [slide deck](#) ^[4] and the [handout](#) ^[5] I used at the 2023 Teaching Professor Conference. Second, find *your* font. Third, split a few wordy or complicated slides. Fourth, try a little dual coding. With some practice, the forethought and skill needed to generate slides that aid student learning becomes second nature. Good luck on your adventure to supercharged slides.

References

Caviglioli, O. (2019). *Dual coding with teachers*. John Catt Educational.

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