Enhance Cognitive Capacity to Maximize Learning

by Christina Petersen

Four Key Strategies

Cognitive load refers to the amount of mental effort expended in your brain's working memory. Learners only have so much working memory available. With attention to cognitive capacity and cognitive load, we support learners in managing the Too Much Information monster. When learning new material, what may be a simple concept for the instructor, as an expert or experienced learner, may be much more complex for the students as novice learners, whether in a new field or new to college-level learning. Thus, it is easy to overload students with too much information so that they miss some ideas or points that we think are important.

This post proposes 4 strategies teachers can employ to adjust the cognitive load to support learners in engaging new course concepts and materials. Most of these strategies are easy to implement and the new practices begun immediately:

1. Prioritize

There is only so much information students can process when they are learning new material, especially when they are accessing this new information through our time-bound, attention-intensive presentations. Since teachers can't present *everything*, and students can be overwhelmed by too *much information*, prioritize what you want students to learn.

- **Organize your class sessions around 3 main points.**
    - Use the question "If my students only remember one thing from class today what should it be?" and/or currently-relevant ultimate or mediating learning aim to help identify these main points.
    - If you are having trouble limiting yourself to 3 main points, you may be trying to cover too much information.
    - This is also the time to examine homework/preparing for class and in-class activities to determine how they support - and/or might be revised to better support - students in working with these main points.
- **Online and Inperson, break complex material into smaller, sequential pieces.** These smaller pieces will be easier for students to learn as part of working with working and long-term memory as you - and they - build upon each point throughout your class to frame the core idea.

Video focusing on Prioritization

2. Provide Navigation

These basic strategies for providing navigation can be implemented during a class session presentation, in a sequence of activities, and as part of the

meta-communication embedded in your course management system. Small changes, these navigation strategies can have a big effect in increasing cognitive capacity and, therefore, on student understanding:

- **Remember those 3 main points?** Use these to organize your class session and be explicit with your students about that organization. Having an agenda that includes the 3 key points as signposts, and referring to the agenda as part of class will help students orient themselves to what you want them to learn.
- **Use verbal cues within your presentations** whether video or face-to-face. – "The FIRST strategy is…" "The SECOND strategy is…" This simple strategy has been shown to significantly increase student learning (LINK) and only takes a few seconds to do.
- **Create a Canvas site that is easy to navigate**. Recent research has shown that the ease of course navigation determines students' attitudes towards a course and the instructor and affects their motivation to work in the course.
- **Use visual organizers in class and on your Canvas site.** For instance during a PowerPoint presentation you can insert Section-formatted slides to indicate that you are beginning a new section. On your Canvas site this may take the form using Headings within Pages to provide guidance with categories such as Before Class, During Class, and After Class. (You could do this throughout Canvas by using such markers as part of descriptive, consistent naming in setting out titles in other tools within Canvas, such as Assignments, Module components.)

Video focusing on Navigation.

3. Consolidate via "Chunking"

If you don't provide a framework for students to consolidate the material you present, they will create their own, often inadequate, frameworks. Providing guidance – via a process of "chunking" information (which builds on the navigation cues suggested in item #2) – will help learners to see segments/sections, comparisons/interconnections among information and ideas you are presenting, essential for consolidation of information.

- **Provide your students with organizing schemas.** These can be verbal, visual or both. Provide students with a very simple framework with which to organize future information they will receive throughout your course. This may take the form of a hierarchy or categorizing grid.
- **Refer back to your organizing schema throughout your course**. This will reinforce the use of the schema and build good habits in your students that can persist after the course is over.
- **Provide opportunities for students to consolidate information**. Adding brief pauses during your presentations to allow students to reflect on and organize material can help their learning. One study showed that three two-minute pauses

during a lecture resulted in significantly greater learning for students compared to their peers who did not have the pauses.

Chunking Information for Instructional Design provides a helpful – and brief – review of the "why" and "how to" of chunking.

Video focusing on consolidation via "chunking":

4. Collect Feedback*

One of the easiest ways to find out if your students are benefiting from these strategies is to ask them. These suggestions for collecting and responding to student feedback produce real-time data, with themes you discern prioritized into actions you can take now or in future courses, and comments shared via brief comments you share with students to convey what you have heard, and actions you will be taking.

- **Collect feedback early in the semester, ideally after the 3rd or 4th week**. This will give you time to make adjustments. The feedback can be as simple as two questions "What about this course is helping your learning?" "What are your suggestions for improvement?"
- **Respond to student feedback**. Summarize the feedback you receive and tell students what changes you will make based on that feedback. If students request a change you are not willing to make, acknowledge that and tell them why you won't be making the change.
- **Collect follow-up feedback to see if your modifications are working**. These actions help you improve your course and demonstrate to students that you care about their learning.