

In Support of Student Learning: Managing Cognitive Load During Emergency Remote Instruction

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We have known for some time that high levels of stress can wreak havoc on our overall health. In addition to heightening levels of stress, COVID-19 and the ensuing changes in one's personal life have also increased anxiety levels for many in our community.

“Anxiety is a state of heightened vigilance that is associated with an increase in overall sensory sensitivity due to uncertainty. A characteristic feature of anxiety is the limited control over worrying thoughts and attentional biases, contributing to a greater focus on negative stimuli... anxiety disrupts cognitive performance, including working memory... across task paradigms and contents” (Lukasik, Waris, Soceri, Lehtonen & Laine, 2019, 1; Moran, 2016).

For our first-generation and/or underrepresented minority college students, both impostor syndrome and stereotype threat pose additional challenges to their academic performance. The move to *emergency remote instruction* (ERI) presents students with an unfamiliar academic context that may activate or amplify these physical and psychological reactions. Still further, the increased demands associated with working in this remote educational environment has simultaneously raised the cognitive load placed on students and poses additional risks to deep and lasting learning.

Cognitive load refers to the amount of resources in *working memory* that are being used by students for processing and encoding new information. We understand that some level of difficulty and challenge is beneficial during the learning process, but when cognitive load is too high, frustrations rise, comprehension suffers, and some students give up completely (Plass, Moreno, & Brünken, 2010). Reducing excessive and/or extraneous cognitive load is completely in the hands of the instructor. In 2017, Malamed, an elearning coach, offered some advice that seems especially relevant to faculty during ERI. She argues, “by reducing the extra mental effort required to learn new information, we can assure greater learner success” (Malamed, 2017, Par. 3). While we have little control over the demands placed on our students outside of the educational environment, we can take steps to reduce the extraneous load placed on students during the learning process. In doing so, we can focus student effort on essential understandings and set them up for higher-level thinking. Below are five strategies for your consideration.

5 Strategies to Reduce Cognitive Load

(adapted from Malamed, 2017)

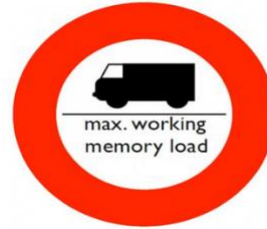


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1. Amplify Critical Content

What knowledge, understandings, skills, and dispositions associated with your course is essential (i.e., it would be a travesty if students left your course without mastering this content)? What extraneous information may be causing unneeded complexity and distraction for your students? By removing some of the unnecessary material, even if you believe it is important and/or worth students being familiar with, you can reduce the demand on the limited cognitive resources available in working memory and set students up for success. *Amplify the essential content associated with your course learning outcomes.*

2. Communicate Concisely

Communicating concisely is another way to reduce cognitive load. In the case of writing, especially instructions, more is not necessarily better. *Choose your words carefully*; use only those which are needed to explain, clarify, or provide direction. When it comes to content delivery, often a shorter article, text passage, or multimedia source can convey content just as well and reduce cognitive load. Reduce long periods of lecturing; employ synchronous instruction to clarify major concepts or principles, address misconceptions common to the discipline, and clarify assignment expectations.

3. Use Generative Strategies

Reflection and elaboration are essential to the learning process. Have students pause to think about what they have just learned, express ideas and concepts in their own words, and elaborate on a concept by linking it to their lived experiences and/or other familiar concepts. Within a presentation of information, whether a recorded lecture, video, or other multimedia source, *embed prompts that force students to stop and reflect* about what has just been presented. For example, embed active learning strategies like the minute paper; the clearest and muddiest point; explain in your own words, etc. In the synchronous environment, you might have students enter a sentence into the chat window or discuss with peers in a breakout room. Within an asynchronous environment, students may be asked to contribute thoughts within a discussion board.

4. Provide Scaffolding and Cognitive Aids

Scaffolding and other cognitive aids are instructional support techniques implemented to reduce the demands placed on working memory during an instructional event or learning task. These supports are intentionally designed to assist students as they read through complex material, research articles, and/or complete assignments, lab exercises, and simulations. *Scaffolds and cognitive aids come in many forms: a checklist, a flow chart, a timeline, guiding questions, worked problems as examples, tables or concept maps revealing concept*

relationships, or even a quick-reference glossary for new and essential terminology. These supports can be particularly useful for group work, presentations, and projects. As students become more proficient, supports may be reduced or withdrawn. Especially in the remote learning environment, it is important to identify parts of a learning task that may present the most challenge. Then, embed appropriate supports into the learning module that students can select to use if they need extra help.

5. Increase Opportunities for Collaboration

In collaborative learning, the memory demands required for the learning task are divided among several individuals. This is especially helpful with complex content or assignments. Group members will still need to re-integrate information and coordinate their learning, but group processing is believed to provide a more robust learning environment that *results in deeper processing and more meaningful learning than individual work.* In a remote learning environment, you can arrange collaborative learning through synchronous video conferencing and breakout rooms or asynchronous platforms such as a discussion board, blog, or twitter entries.

References

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