**Cognitive Overload:**

**Moving from Overwhelmed to Deeply Immersed in Management Education**

Abstract

Cognitive overload hinders learning and engagement in the classroom and “causes learning to be slowed down or even stop, because the brain can no longer process all the information being presented” (InnerDrive, n.d., para. 2). Therefore, there is a need to reduce some of the learner’s cognitive overload by emphasizing focus on coursework completion instead of trying to navigate the course design. Further, this session will provide a course-design overview and classroom strategies that may be useful for management educators interested in reducing cognitive overload for their students. This session will provide an opportunity to apply the course-design strategies discussed that once applied may have a positive impact on the learning aspect of undergraduate and graduate students. In alignment with the conference theme, this session will discuss the importance of bridging the gap between cognitive overload and student learning and engagement related to management education.

*Keywords:* cognitive overload, management education, transparent instruction

**Cognitive Overload:**

**Moving from Overwhelmed to Deeply Immersed in Management Education**

Research indicates the brain can only process cognitively a handful of items at a time. More specifically, according to the crucial work of Miller (1956), the brain can only process cognitively 5–9 items at a time. Any more than that, we become overwhelmed, often discouraged, and reach a point of cognitive overload. According to Talking HealthTech (2022), “cognitive overload is a situation where one [i.e., a student] is given too much information at once, or too many simultaneous tasks, resulting in not being able to perform or process the information as it would otherwise happen if the amount was instead sustainable” (para. 1). As management educators, we are responsible for transferring large amounts of knowledge to our students in a relatively short amount of time. Further, we are responsible for creating assignments that sufficiently allow students to demonstrate their learning. The amount of information we share, along with any corresponding assignments, means students have to both correctly process the information received and accurately interpret our assignment guidelines.

Cognitive overload should be a concern for management educators since research shows cognitive overload hinders learning and student engagement. Therefore, management educators are encouraged to seek to reduce some of the cognitive overload of the learners. Management educators could consider creating assignments with clear objectives and concise instructions. Doing so will 1) reduce some of the cognitive overload of the learners, which is the desired outcome, 2) enhance the overall learning for the students, and 3) provide the opportunity for the students to engage in the content and focus on completing the coursework. Further, management educators should consider providing a conducive learning environment to enhance learning and increase engagement and participation.

We consider cognitive overload theory while designing courses to reduce some of the learner’s cognitive overload and ensure learning and retaining exist. Over the years, we have noticed if the course design is not modeled well/effectively, too much cognitive processing is focused on the course structure and not enough on the actual task at hand. Also, crowded course designs tend to make students less likely to remain engaged in the task at hand—another problem for the students and exactly why cognitive overload needs to be addressed.

A practical example: When designing a course using a learning management tool, we pay close attention to the general organization and quantity of tabs and folders in an effort not to overcrowd the design and keep it clear and simple for the students to focus on coursework completion and submission; therefore, reducing the cognitive-processing overload of the learners. Please refer to Appendix A for a screenshot of our course design.

**Theoretical Foundation/Teaching Implications**

As shared previously, the brain can only process a few items at once. The questions are: How do we reduce some of the cognitive overload of the learners while teaching and sharing information with the students? How much information is adequate for the learners not to feel overwhelmed? What can be done to ensure the information shared transfers to the appropriate place in the brain in order to ensure comprehension? As Willis (2011) described, the challenge is to work on avoiding the brain’s state of stress, from boredom, and seek to move toward activities that spark the state of voluntary behaviors. According to the American Psychological Association (n.d.), voluntary behavior is a “behavior that is intentional in nature (e.g., walking, typing), as opposed to reflexive” (para. 1). The emotional-filter part of the brain/switching station (the switching station in the brain called the amygdala) determines where the information shared is going in the brain (Willis, 2011). For example, if a student is in a state of stress, that part of the brain gets highly active and, therefore, the switching station sends the information shared to the lower 80% of the brain; that is the reactive/involuntary brain reaction and will result in a fight-flight-freeze response. The challenge is to keep the amygdala in a state of low stress Willis, 2011). The amygdala “is the integrative center for emotions, emotional behavior, and motivation. If the brain is turned upside down the end of the structure continuous with the hippocampus is called the uncus” (Wright, 2020, para. 1).

Furthermore, Willis (2011) challenged us to ignite the attention of the learner by incorporating signals in the lesson. She explained that our brain decides which information will get our attention. For example, if an instructor sits on the floor when working on a case study, the students will be curious and wonder why the instructor sat on the floor, thus igniting their student’s attention. Willis offered more examples such as walking backward before working on negative numbers (in an accounting, math, or science course or putting on a hat when seeking students’ attention (then putting the hat on sideways). We could even consider putting on sunglasses with various colors, where green could mean what the faculty member is discussing is important, and yellow or orange could mean the topics being discussed are really important. These signals will ignite the interest of the students and put them in a state of low stress which is the desired objective.

As far as more classroom teaching strategies for reducing some of the cognitive overload of the learners, Transparency in Learning and Teaching (TILT) is a practical, viable teaching strategy focused on instructors being transparent with students through an explanation of an assignment’s objectives before students begin the assignment; this will have the opportunity to decrease the unnecessary, redundant information for the assignment. In terms of the purpose component of TILT assignments, Winkelmes’s (2013a) transparent assignment template encouraged educators to describe the goals of the assignments in order for the learners to understand how the assignments contribute to their learning process and how the knowledge gained will be utilized outside of the classroom; thus, helping the students to focus on coursework completion and submission. Regarding successful assignment completion, it is crucial to relate the expectations of the assignment and offer guidance throughout the process which may include showing examples.

Winkelmes (2014) indicated that the aim of TILT is to “understand how transparently-designed assignments can offer equitable opportunities for all college students to succeed” (p. 3). Winkelmes (2014) stated that “transparent teaching/learning methods benefit students who are unfamiliar with college success strategies by explicating learning/teaching processes” (p. 11). The development, or redevelopment, of meaningful assignments with a clear purpose, a detailed task, and evaluative criteria for success are critical toward shaping a favorable learning environment. More importantly, TILT contributes positively to the learning experience of the learners and their overall success (Winkelmes, 2013b).

One of the top influences in one’s learning stems from their active participation and reflection on a personal experience (Kiili, 2005; Kolb, 1984). For example, some students may be engaged via student interaction activities, hands-on learning, or small-group discussions and collaborations. According to Arnholz (2019), hands-on learning provides students the opportunity to learn by doing rather than passively listening to the instructor. Hands-on learning is effective because it activates both sides of the brain, increases attentiveness, and involves physiological and psychological processes (Arnholz, 2019). We believe engagement as a whole boosts learning and creates relatable experiences for many students; also, the application part makes learning more meaningful; thus, students’ participation is essential. Additionally, it is important to ensure a conducive, safe learning environment exists.

**Implications for Management Education**

Management and leadership faculty teach business-related content that can be overwhelming for students. The many definitions, concepts, and areas of study create potential for cognitive overload when course assignments are not clearly described and closely aligned with the content. This session will encourage management faculty to reflect on how their assignments may contribute toward or reduce cognitive overload. Despite our intent when creating assignments, the terminology we use, the details behind assignment descriptions, and the corresponding rubrics may inadvertently magnify cognitive overload for students. We will contrast example assignments to identify areas where confusion or overload may occur and collaboratively outline strategies for improving clarity and adding simplicity. Session attendees will be able to transfer the strategies discussed back into their own assignments as a means of reducing cognitive overload for students. Students who have a clear understanding of course and assignment expectations are, in turn, less likely to disengage from course materials/lectures and more likely to focus their attention on successfully completing all assignment requirements.

**Session Description**

We will begin the session with an introduction to current research on cognitive overload and discuss why the term is critical for management educators. The discussion will then move toward an examination of practices used to reduce cognitive overload for students in a course we designed. We will share specific strategies used while designing a course and corresponding assignments and discuss how the practices have influenced student engagement in the classroom. This session will also provide an opportunity for the participants to apply their knowledge. Session attendees will receive a pre-created assignment description template designed to reduce cognitive overload. Attendees will use the template to create a management assignment that incorporates various cognitive overload reduction strategies and clearly communicates instructor expectations.

The 60-minute roundtable discussion will be divided into four parts––

**Discussion of Applicable Research** (**10 minutes**):

* We will define and discuss cognitive overload with attendees, and share our applicable research

**Course-Design Overview/Classroom Application** (**10 minutes**):

* We will go through a course-design overview and discuss how one particular course was designed to reduce learners’ cognitive overload

**Cognitive Overload Reduction Exercise** (**20 minutes**):

* We will present a partner exercise where attendees will craft the framework of an assignment based on a pre-developed cognitive overload reduction assignment template we provide

**Debrief and Discussion** (**20 minutes**):

* We will discuss additional, replicable classroom strategies to reduce cognitive overload
* Participants will be invited to share their own strategies and discuss how our classroom strategies could apply in their classroom
* Session takeaways will be reviewed

**Learning Objectives**

1. Participants will understand cognitive overload and its effect on hindering learning;
2. Participants will be exposed to a course-design overview and ways to reduce some of the cognitive overload of the learners;
3. Participants will be familiar with classroom strategies to reduce cognitive overload; and;
4. Participants will be introduced to research that examined student engagement and participation.

**References**

American Psychological Association. (n.d.). *APA Dictionary of Psychology*.

<https://dictionary.apa.org/voluntary-behavior%5D>

Arnholz, J. (2019, February 12). Is hands-on learning better? *BYF: Build Your Future*. <https://www.byf.org/news-item/is-hands-on-learning-better/>

InnerDrive. (n.d.). *Using Cognitive Load Theory in the Classroom*.

<https://blog.innerdrive.co.uk/using-cognitive-load-theory-in-the-classroom#:~:text=Cognitive%20Load%20Theory%20highlights%20how,all%20the%20information%20being%20presented>.

Kiili, K. (2005). Participatory multimedia learning: Engaging learners. *Australasian Journal of Educational Technology*, *21*(3), 302–322. <https://ajet.org.au/index.php/AJET/article/view/1322/693>

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.

Talking HealthTech. (2022). *Cognitive Overload*.

<https://www.talkinghealthtech.com/glossary/cognitive-overload#:~:text=A%20Cognitive%20Overload%20is%2C%20by,the%20amount%20was%20instead%20sustainable>.

Willis, J. (2011, June 21). *Judy Willis on the Science of Learning: Big Thinkers* [Video].

YouTube. <https://www.youtube.com/watch?v=J6FqAiAbUFs>

Winkelmes, M. (2013a). *Transparent Assignment Template*.

<https://drive.google.com/file/d/1N9UakNBix9XyQ9-Ny5LVtTMzoH6IgLze/view?usp=share_link>

Winkelmes, M. (2013b). Transparency in teaching: Faculty share data and improve students’ learning. *Association of American Colleges and Universities*.

<https://drive.google.com/file/d/1QRkxIxcca9xbM73gViOoNiLR4dE4JGHp/view?usp=share_link>

Winkelmes, M. (2014). *Using transparent assignments to promote equitable opportunities for student success*.

<https://drive.google.com/file/d/1Ywx9jK6T9FUvpwTX7UqajNdf8QbnyfBE/view?usp=share_link>

Wright, A. (2020). *Chapter 6: Limbic System: Amygdala*. Neuroscience Online. UTHealth. The

University of Texas Health Science Center of Houston. McGovern Medical School. <https://nba.uth.tmc.edu/neuroscience/m/s4/chapter06.html#:~:text=Amygdala%20is%20the%20integrative%20center,the%20anterior%20of%20the%20hippocampus>.

APPENDIX A: COURSE-DESIGN SCREENSHOT





