



## Using Mind Mapping Activities to Promote Transparency and Engagement

Amanda W. Joyce  
Murray State University, [awatson22@muraystate.edu](mailto:awatson22@muraystate.edu)

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**Author's Notes**

Correspondence concerning this article should be addressed to Amanda W. Joyce, Department of Psychology, Murray State University, 204 Wells Hall, Murray, KY 42071. Email: [awatson22@muraystate.edu](mailto:awatson22@muraystate.edu) .

**Author Biography**

Dr. Amanda Joyce is an Associate Professor of Psychology at Murray State University. She teaches courses in Introductory Psychology and Research Methods as well as several courses in her specialty area of Development Psychology and more. Her research interests include childhood cognitive development as well as best practices for teaching and learning in the college classroom.

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## Using Mind Mapping Activities to Promote Transparency and Engagement

**Amanda W. Joyce**

Murray State University

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*While instructors often have the benefit of years of experience, students, as novice learners, have a more “sparse and superficial” content knowledge that does not allow them to organize their thoughts as well. Yet, this organization is important for recall. One way of encouraging concept organization is through mind-mapping, a strategy that improves retention by allowing students to graphically depict their knowledge. The purpose of this investigation is to examine the effectiveness of a series of mind-mapping activities on a group of students who completed these exercises during the Spring 2020 semester.*

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In *Small Teaching*, James Lang (2016) discussed the importance of helping students to find connections between aspects of course material. While instructors often have the benefit of years of experience, students, as novice learners, have a more “sparse and superficial” content knowledge that does not allow them to organize their thoughts as well (Ambrose et al., 2010, p. 49; Lang, 2016). In other words, without the benefit of having already learned a semester’s worth of information on the first day of class, students struggle to find the interconnections between pieces of material as it is presented to them.

However, students who are better able to categorically organize and to draw connections between material are also better at recalling this information from their long-term memory (Gelman, 2010). Similarly, they are better able to view material as providing them with information about concepts that they have not yet learned but that they will learn in the future (Herman, 1998). There are a number of ways to encourage students toward organizing their knowledge. Research has explored the effectiveness of everything from flow charts and diagrams to crib sheets (Ellis & Turner, 2003; Herman, 1998, Weimer, 2013). However, the most popular method for helping students to organize information seems to involve encouraging them to create mind maps.

Mind-mapping is a strategy that allows students to graphically depict their knowledge. It typically involves encouraging the learner to visually display the interconnections that they perceive between pieces of material (Davies, 2011). While course lectures are often presented in a linear fashion, mind maps are rarely linear. Thus, they allow students to find groupings of material and interconnections between pieces of information that they otherwise may not have considered during a typical class period. Not surprisingly, then, mind-mapping has been shown to improve retention and achievement in students from elementary to medical school in nations around the world (Adodo, 2013; D'Antoni et al., 2010; Goodnough & Long, 2002).

Such an undertaking can be unfamiliar or overwhelming to students who have not previously organized their thoughts in this way, though. In this case, instructional scaffolding can help students to successfully learn this new skill. Scaffolding involves providing structure and support to a student as they learn, much like how a material scaffold provides physical support to a worker as they paint (Vygotsky, 1978). Instructors who scaffold meet their students where they are in their learning journey and guide them progressively through more and more challenging concepts and skills. College students who are scaffolded can show improvements in skills including their rate of assignment submission and the strength of their writing arguments (Carson & Kavish, 2018; Gomez-Laich et al., 2019; Kellen & Antonenko, 2018).

Given this, the purpose of this investigation was to examine the effectiveness of a series of scaffolded mind-mapping activities on student engagement and memory retention.

### **A Mind Mapping Assignment**

Students in a medium-sized (60-person) sophomore-level psychology course were given opportunities to use class time during the Spring 2020 semester to collaboratively mind-map recently-presented material. During the first week of class, the instructor presented students with information about what mind maps are and why mind-mapping could help them to organize their ideas and ultimately improve their test performance. Then she gave them examples of mind maps, and encouraged them to work either individually or in small groups (according to their preference) on creating their first mind map. The instructor walked around the room during mind mapping time to offer support and to address any questions or concerns.

This exercise was repeated once per unit of material, which averaged to approximately once per week. In the days leading up to each exam, students were presented with instructor- or TA-generated mind maps to compare with their own. During the second half of the semester, classes were unexpectedly moved online in an asynchronous format. During that time, the instructor still encouraged mind-mapping at the end of each unit of material, though this encouragement was provided in the format of course announcements and at the end of pre-recorded lectures. An example of a partial mind map can be found in the appendix of this paper (Figure 1).

## **Student Outcomes**

Though the unexpected format of the course suddenly moving online prevented formal data collection on the effectiveness of the assignment, the instructor collected data in the form of comments made during informal interactions during office hour meetings as well as comments made on end-of-semester evaluations and end-of-semester course grades.

### ***The Positive***

Informally, students overwhelmingly reported positive experiences with the mind maps, saying that they: (1) helped them to organize their ideas, (2) helped them to reflect on interconnections between material, (3) and helped them to prepare for their exams. More formally, one student indicated on her end of semester evaluations that the mind maps were the aspect of the course that most contributed to her learning, reporting “Making mental mind maps after each chapter really helped me learn.”

Additionally, a final grade point average was assigned to the class based on the average distributions of A’s, B’s, C’s, D’s, and E’s among students. This grade point average was a 2.77, which was the highest of the last five times that this course has been taught (2.27-2.65). Care should be taken while interpreting this information, of course, given the unusual nature of the mid-semester switch in course format. Still, given the previous literature, one could hope that the assignment helped students in a way that at least partially contributed to their higher grades. This is encouraging in that students’ perceptions of what helps them to learn does not always align with those techniques that actually help them to learn (Cushen et al., 2019). While more work is necessary to determine this, I am hopeful that this technique is both perceived as helpful to learning and also actually helps this learning.

## ***The Negative***

Of course the assignment was not universally accepted. A small number of students (n=2) expressed that they (1) did not see the purpose of the exercise and (2) would have rather spent class time on something else. It is not at all uncommon to see student pushback to novel and unfamiliar student-centered techniques (Weimer, 2002). It is also true that there is no one-size-fits-all approach to teaching and that different students respond differently to different pedagogical techniques (Gašević et al., 2016). This suggests that, while mind mapping may be a useful tool for helping some students to form schemas of difficult course concepts, care should be taken to provide students with a wide variety of opportunities for review so that they can find one that best suits their needs.

## **Conclusions and Future Directions**

Students often struggle to learn information in a new subject area simply because they view it as a series of facts to be memorized rather than a cohesive network of ideas. The purpose of this work was to examine the effectiveness of a scaffolded mind-mapping technique meant to help students learn to organize information for themselves. While not all students appreciated the assignment, a large number of students did enjoy the assignment and they perceived it as being helpful to their learning. Additionally, there was a modest bump in average grades this semester relative to previous semesters, which may suggest that the assignment helped students to better retain information for exams.

That said, our conclusions are limited by one major difficulty—that this assignment was introduced during a global pandemic that, among other things, disrupted the format of these students' classes for approximately half of a semester. Perhaps students' positive attitudes and increase in GPA can be attributed not to the mind-mapping exercises but rather to factors like changes in their living arrangements, changes in course load, or changes in social activities (i.e. "I might as well study if I can't go anywhere."). Alternatively, it is possible that the mind maps were helpful during the first half of the semester, but that students stopped doing them or stopped putting as much effort into them after the online-transition prevented in-class interaction regarding the exercise. In that case, it could be possible that the positive effect of the assignment was actually blunted by the pandemic and that it would work even better in a more traditional semester. Unfortunately, there was no data collected on these unknown variables. Still, the activity was promising enough that I will continue to implement it in future courses. Given this, more

data can be collected in the future to further determine the effectiveness of the assignment.

In the meantime, I encourage others to implement similar techniques in their classrooms. This exercise worked very well here in an entry level course in psychology. However, any variety of subjects require students to have an organized conceptualization of the material that they are learning. Therefore, I believe that this technique can be successfully implemented in just about any subject. More than that, this technique could work well in classrooms of many sizes. I have shown in a medium-sized classroom that students reacted well to being allowed to create their mind maps either individually or in small groups. Because of this, I believe that the exercise could scale to large classrooms as well. Though, if possible, the large classrooms might benefit from having more scaffolding in the form of instructors, teaching assistants, or perhaps even senior students moving around the classroom to answer questions and concerns. In a sufficiently small classroom, on the other hand, the exercise may be best transformed into an opportunity for the whole class to work together. There are benefits to such active learning strategies implemented in classrooms of all sizes. When students in small classes engage with active learning activities, they report more meaningful processing of material, whereas when students engaged in active learning techniques in larger lecture halls report deeper processing of material and better learning and understanding of material (Bolden et al., 2019).

In conclusion, I have implemented in a medium-sized, sophomore level, psychology course an activity meant to improve students' ability to organize their knowledge and make connections among pieces of material learned in class in the hopes that it could improve student learning. The activity seems to have been enjoyable and helpful to students, despite considerable disruptions to the semester. It can likely be implemented across a number of disciplines and in classrooms of various sizes, and I would encourage other instructors to consider implementing similar activities in their own classroom.

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