Essays from E-xcellence in Teaching
Volume XVII

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Introduction

This year’s volume of *E-xcellence in Teaching* contains invited essays originally published on the Society for the Teaching of Psychology’s (STP) PsychTeacher listserv, blog, and LinkedIn page. STP has featured the *E-xcellence in Teaching* essay series on the listserv since the spring of 2000, and blog and LinkedIn since 2016. This year’s essays present both practical strategies and food for thought on a wide range of topics.

Several of this year’s essays focused on pedagogical tools for the classroom. For example, in chapter one, Peter Frost examines the effectiveness of inter-teaching. Inter-teaching involves placing students in random pairs to answer questions involving application, synthesis and/or critical thinking by teaching each other. He found that attendance and average scores associated with motivation, were higher for inter-teaching than those for a control course. In chapter three, Megan Smith, Christopher Madan, and Yana Weinstein discuss the application of cognitive science to education. They discuss four evidence based techniques: 1) providing visual examples; (2) teaching students to explain and to do; (3) spaced practice; and (4) frequent quizzing. They found converging evidence from controlled laboratory studies and classroom research support their use to enhance student learning.

Hung-Tao Michael Chen looked at the usage of in-class small group with specific compositions to support at-risk students. In chapter eight, he explains how these groups may be benefitting high performing students more than low performing students. In chapter 10, Krisztina Jakobsen implemented a team based learning method where students learn primary course content outside of the classroom and work in permanent teams to engage with the material during class. She found that this technique was as effective as lectures with active learning components and may serve as an alternative for those seeking to move away from a purely lecture format of teaching. Jana Hackathorne, Amanda Joyce, and Michael Bordieri address the effectiveness of study guides in chapter 11. They found that traditional study guides, with definitions listed in a concept style, were ineffective. When students actively create their own study guides, they tend to perform better on exams. They discuss the dearth of research regarding the most appropriate uses and applications of study guides.

Some essays focused on specific assignments to enhance pedagogical practices. In chapter two, Rajiv Jhangiani, argues that disposable assignments, those that no one aside from the instructor sees, are not effective pedagogical tools. He suggests creating videos, editing wiki articles, or writing op-eds, may be the best way for us to “give psychology away” to the public. In chapter five, Mitchell Handelsman describes a writing assignment where students use at least two concepts from an assigned reading. This type of assignment encourages students to read and think, rather than just summarize course material.

Several other essays address flipping the classroom. Ellen Furlong, in chapter six, presented traditional lecture-based material (content) in an online video before class, and providing scaffolded practice (skill) during class. She found that this leads to deeper understanding of the content and greater skills in research methods as demonstrated by exams and quality of research papers. In chapter seven, Amanda Sommerfield discusses her experience flipping an abnormal psychology class. Flipping the course resulted in less concern with taking notes in class. This freed up the students to listen to their classmates, contribute to discussions, and engage fully in activities. As a result, a greater proportion of students participated in the flipped versus a traditional class.
A couple of essays address to the use of technology and media in the classroom. Lynne Kennette, in chapter four, discusses her use of media clips in the classroom to increase student engagement. She cautions that, just because students like something, doesn’t mean that they necessarily learn, perform, or retain the material better. She found increased student engagement with media clips, which can lead to increased learning, if used properly. In chapter nine, Tom Hutcheon addresses the technology ban that many instructors implement. He found a ban can be harmful to students’ engagement in the course, and provides recommendations for instructors to aid in the development of a technology policy. He discusses how to increase student engagement by considering the size of the class, minimizing other distractions and providing a rationale for any technology policy implemented.

Finally, in chapter 12, Jennifer McCabe and Dara Friedman-Wheeler incorporated the science and practice of mindfulness and meditation into four undergraduate psychology classes. They share their experiences with respect to course design, assignments and activities, and student reactions, as well as a summary of the results of their more systematic research on the effects of mindfulness in the college classroom.

Together, these essays make up Volume XVII of E-xcellence in Teaching. We hope our readers find both thought-provoking ideas and practical teaching help in these essays. We thank the contributors for sharing their experiences and ideas with the readers of PsychTeacher, the STP blog, LinkedIn, and with the rest of the psychology teaching community.
Chapter 1

From Passive Learner to Active Participant: Examining the Effectiveness of Inter-Teaching

Peter Frost, PhD

Southern New Hampshire University

Typically, inter-teaching requires that random pairs of students answer questions involving application, synthesis and/or critical thinking by teaching each other during a portion of class (Boyce & Hineline, 2002; Saville, et al., 2011). Generally, the professor sets up questions for each inter-teaching session. Students are expected to prepare answers to all questions since they usually don’t know which question will be used during a particular inter-teaching session. During each inter-teaching session, students are randomly assigned to dyads or triads and spend part (as in our approach) or all of class to discuss the question and write-up a response. The professor or student helpers/coaches observe the groups to help correct any misconceptions, or help answer questions through Socratic dialogue. Write-ups of each group’s responses are collected, graded, and typically handed back by the next class meeting. Some versions of inter-teaching also include a peer review process of some sort. Many versions of inter-teaching exist; we describe our version in the Methods section.

Regardless of the variation used, inter-teaching is intended to encourage students to take ownership of their learning since they are responsible for contributing to their peer partnership and knowing the material well enough to teach it. The peer review process places additional pressure on students to know information ahead of class.

The version of inter-teaching we used, adopted with some modification from Carroll (2011), also included the use of online practice quizzes (described in more detail in the Methods section). We designed the quizzes to ensure students knew basic and fundamental concepts ahead of each inter-teaching session, using an approach developed by Daniel and Broida (2004) described below.

Past studies have shown that courses with inter-teaching lead to higher exam scores (Saville, et al., 2011) and greater long-term recognition memory of course concepts (Saville, Bureau, Eckenrode, Fullerton, Herbert, Maley, Porter, & Zombakis, 2014) than traditional lecture courses. We suspected that inter-teaching would facilitate intrinsic motivation. To test this, we examined whether students using inter-teaching in a section of Cognitive Psychology would find their section more stimulating and worthwhile compared to students using a traditional lecture approach in another section of Cognitive Psychology. As with past studies, we also suspected that students in the inter-teaching section would show evidence for greater learning and retention of course concepts.
Method

Participants

We compared two sections of Cognitive Psychology offered during the Fall 2014 semester. One section (n = 22) was randomly assigned to implement inter-teaching while a second (n = 24) implemented a lecture-based course. Both courses were taught by the same professor, covered the same content, and included the same lecture format.

Materials and Procedures

We provided a study guide to the inter-teaching section at the beginning of the semester. A set of between two and five questions was shown for each of seven inter-teaching sessions that were conducted throughout the semester (see example, below). We informed students that they had to prepare for all of the questions for each session since they would not know which question would be part of an inter-teaching session. Inter-teaching questions were designed to encourage thought, application, or synthesis.

Question for Inter-Teaching Session 1

Names: 

Perception
The painting above by Gustave Caillebotte is called Paris Street: A Rainy Day (1877). Include your names above, then discuss the questions below. Record your answer on the lined piece of paper attached.

What are monocular cues? How are monocular cues to depth represented in this painting? Include a description of relative size, texture gradient, occlusion, aerial perspective, and linear perspective.
Each inter-teaching session ran at the beginning of class for about 15 to 30 minutes, depending on the difficulty of the question. We paired students randomly, and they all received the same question. If the students had questions during the session, the teacher would use Socratic dialogue to help prompt an answer (the answer was never provided). Student pairs handed in a written response to the question based on their discussion.

We gave the students feedback about their written responses by the next class. We also asked them to fill out a peer review assessment survey (below) made available on Blackboard.

Students in the inter-teaching section also took an online practice quiz designed to help them master the facts needed for the inter-teaching sessions. The parameters of our online practice quizzes (based largely on the approach described by Daniel and Broida, 2004) were as follows:

- A large number of multiple-choice items were included (40 – 100).
- Students could re-take each quiz as often as they wanted until the due date. The highest grade achieved was recorded.
- Questions were scrambled, as were answer choices.
• Once logged in, students had to complete the quiz.
• The quiz was timed.
• Students could view only one question at a time.
• Feedback was restricted to ‘correct’ or ‘incorrect’ for each item.

A Likert-like Scale survey was given at the end of the semester to assess student motivation for each section of Cognitive Psychology. The questions took on the form as follows:

Did you find that time in class was worthwhile (circle one)?

Not at all ← 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% → Absolutely

Results

Although no main effects occurred for Type of Course (Inter-Teaching versus Traditional) nor GPA (upper versus lower GPAs), $p > .05$, there was a statistically significant Type of Class by GPA interaction, $F(1, 42) = 4.23, p = .046$ (see Figure 1). Inter-teaching appears to have improved the test scores of students in the lower 50th percentile, but not students in the upper 50th percentile.

![Figure 1. Average Difference Scores (Final Exam – Exam 1) as a Function of Type of Course (Standard Versus Inter-Teaching) and Higher GPA (Upper 50th Percentile) versus Lower GPA (Lower 50th Percentile)]
Table 1 shows the descriptive statistics associated with the student engagement questionnaire. We found that overall scores associated with engagement for inter-teaching were higher than for the lecture section, $t(44) = 15.52, p = .02$. Attendance was higher for IT than that for the lecture section (94% attendance on average for IT and 86% attendance for a control group).

Table 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Teaching Method</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time in Class was</td>
<td>Standard</td>
<td>55.45</td>
<td>9.04</td>
</tr>
<tr>
<td>Worthwhile</td>
<td>Inter-teaching</td>
<td>82.02</td>
<td>5.23</td>
</tr>
<tr>
<td>Class Intellectually</td>
<td>Standard</td>
<td>66.82</td>
<td>10.98</td>
</tr>
<tr>
<td>Stimulating</td>
<td>Inter-teaching</td>
<td>76.25</td>
<td>7.00</td>
</tr>
<tr>
<td>Instructional Method Helpful</td>
<td>Standard</td>
<td>61.90</td>
<td>9.61</td>
</tr>
<tr>
<td></td>
<td>Inter-teaching</td>
<td>73.84</td>
<td>8.20</td>
</tr>
<tr>
<td>Want to Learn More</td>
<td>Standard</td>
<td>65.72</td>
<td>11.63</td>
</tr>
<tr>
<td></td>
<td>Inter-teaching</td>
<td>78.66</td>
<td>10.01</td>
</tr>
</tbody>
</table>

*Note.* Both courses were taught in the same semester and by the same instructor. Each course covered the same content. Each included the same exams and lecture format.

**Discussion**

Our findings replicate other studies showing that inter-teaching methods and online practice quizzes can help improve exam scores (Daniel & Broida, 2004; Saville, et al., 2011; Saville, et al., 2014), but our results suggest the benefit is exclusive to students with lower GPAs. Inter-teaching did not improve test scores for higher-performing students, perhaps because their scores were closer to ceiling from the start of the semester.

As predicted by our hypothesis, inter-teaching led to evidence of enhanced intrinsic motivation as shown by higher ratings (relative to an exclusively lecture-based course) associated with viewing the course as worthwhile and intellectually stimulating, rating the instructional method as helpful, and wanting to learn more. Moreover, inter-teaching was also associated with greater attendance.
There are many variants of the inter-teaching method. For example, peer evaluation can either be figured into the grade or not (we did not include ratings in peer evaluations as part of the grade); some teachers choose to lend significant time to inter-teaching activities (we only had seven inter-teaching sessions over the semester between 15 and 30 minutes each). Inter-teaching is versatile enough to be adapted to course needs.

Our inter-teaching approach had several potentially beneficial aspects, but a limitation of our study is that we did not determine the extent to which the different aspects benefited learning and motivation. Future research should analyze how different aspects and variations contribute to the effectiveness of the inter-teaching method. Our findings show that the effectiveness of inter-teaching, both with regard to improving academic performance for lower-performing students and facilitating motivation in all students, makes further research into what makes this method effective worthwhile.

References


Ditching the “Disposable Assignment” in Favor of Open Pedagogy

Rajiv S. Jhangiani
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Ever since George Miller’s famous (1969) APA presidential address, many others have called upon our field to “give psychology away” (e.g., Epstein, 2006; Goldman, 2014; Klatzky, 2009; Lilienfeld, Ammirati, & Landfield, 2009; Tomes, 2000; Zimbardo, 2004). There is arguably no better way to achieve this than by adopting open pedagogy to place the knowledge base of our discipline in as many hands as possible.

With open pedagogy, students are not just consumers of educational resources but also producers of educational resources. A key aspect of open pedagogy therefore involves replacing “disposable assignments” with “renewable assignments” (Wiley, 2013). Disposable assignments are those that are typically only seen by the instructor. Students often see little point in them (and rarely revisit them) and many instructors despise grading them. David Wiley, an open education pioneer, describes them bluntly:

They’re assignments that add no value to the world – after a student spends three hours creating it, a teacher spends 30 minutes grading it, and then the student throws it away. Not only do these assignments add no value to the world, they actually suck value out of the world. Talk about an incredible waste of time and brain power (and a potentially huge source of cognitive surplus)! (2013, para. 5)

By contrast, renewable assignments are those in which the students’ energy and efforts are repurposed by having them generate materials and resources for the “commons,” including future students taking their course and other formal and informal learners around the world. The materials produced might include developing tutorials, wiki entries, or even videos posted online.

Incorporating openness into pedagogy is simultaneously liberating and terrifying. It challenges instructors to reflect on their practices and move away from the traditional top-down model of pedagogy by assigning open-ended problems and empowering students to act as co-creators (Rosen & Smale, 2015). But whereas it takes a degree of courage to untether oneself from the security and predictability of the staid research essay, once accomplished, the benefits to the learning process are
sizable. For one, students and instructors work collaboratively towards creating resources for public consumption, adding tangible value to the world outside of their classroom. Second, students tend to invest more effort and care more deeply about the product when they know that their work has a larger potential audience than just their instructor (Farzan & Kraut, 2013). Third, open pedagogy unleashes the students’ creative potential, allowing them to ascend the rungs of the cognitive process dimension in Bloom’s revised taxonomy (Anderson & Krathwohl, 2001). Here they generate, plan, and produce instead of merely recognizing and recalling, in the process acquiring higher-order cognitive and meta-cognitive skills that will serve them throughout their university education and career. Fourth, depending on the specific nature of the assignment, the resource produced may serve as an enduring electronic portfolio of their academic work that can be shared with others, including potential employers. In this fashion they may showcase their writing skills (e.g., blogs, wiki entries, etc.), multimedia skills (e.g., videos, websites, etc.), or even their ability to integrate and apply research findings (e.g., policy proposals or briefs). And finally, “because any one of these remixes might end up helping next semester’s students finally grasp the concept that has proven so difficult in the past, faculty are willing to invest in feedback and encouragement at a different level” (Wiley, 2013, para. 16).

Instructors interested in experimenting with open pedagogy might, for example, design course assignments that require students to create a guide for parents on the use of rewards and punishments with young children based on principles from learning theory, design a public service announcement for a local nonprofit organization based on principles from social psychology, build and edit a wiki that might serve as an instructional resource for future students, write questions for an in-class practice quiz ahead of midterm examinations, or publish blog posts that critically analyze depictions of psychological phenomena in popular films. On a larger scale, an excellent example of an organized open pedagogy initiative is the Association for Psychological Science’s (APS) Wikipedia Initiative.

**APS Wikipedia Initiative**

Wikipedia is a free, online encyclopedia, written and edited collaboratively by those who use it. Its English language edition includes about 4.7 million articles and is the sixth most popular website in the world, with nearly 500 million unique visitors every month ("Wikipedia," n.d.). Its incredible popularity among students, for whom it is often the first resource accessed when looking up background information for a term paper (Head & Eisenberg, 2009; Lim, 2009), is matched only by its equal unpopularity among faculty, who strongly caution against citing its articles or even penalize their students for doing so (Waters, 2007). Some instructors may work with librarians to better instruct their students on how (and why) to access refereed articles from research databases, but this strategy is merely a weak left jab at the problem. The APS Wikipedia Initiative (APSWI), on the other hand, presents a creative and pragmatic right hook.

Born out of a desire to “deploy the power of Wikipedia to represent scientific psychology as fully and as accurately as possible and thereby to promote the free teaching of psychology worldwide” (“APS Wikipedia Initiative," n.d.), the APSWI serves to improve the very resource whose use psychology faculty routinely rail against.

For context, there are currently more than 8,500 articles on Wikipedia devoted to topics in psychology. At the time of this writing, only 63% of these have been assessed through Wikipedia’s peer assessment system. Far more terrifyingly, only 9% of these have achieved “good article” status while the
remaining lower quality articles are viewed in excess of 64,000 times every six months (“APS Wikipedia Initiative,” n.d.).

These sorts of numbers are why, in 2011, then-APS President Mahzarin Banaji called upon psychology faculty to participate in the APSWI as contributors, reviewers, and especially through adopting open pedagogy:

The likely most effective way to generate contributions, in my opinion, is to include writing for Wikipedia as part of college and graduate-level courses. In this way, professors and students in a class can begin to populate Wikipedia on the topic of the course, taking advantage of the built-in expertise that is contained in that collective, in a semester long time frame. Writing Wikipedia entries from scratch, editing entries, or evaluating them can be a worthwhile learning experience in a standard classroom. Such work can teach students so much — that even the simplest ideas are hard to communicate to general audiences; that logic, strength of argument, flow and clarity of writing, citations of the appropriate literature, and, above all, accuracy need to be mastered in order to be a member of this guild. My request is that for any course that you are about to teach this semester and beyond, that you consider adding contribution to Wikipedia as part of the course’s requirements. (para. 8)

Many faculty have since responded to Banaji’s call. During the Fall 2011 and Spring 2012 semesters alone, 640 students across 36 classes participated in the APSWI. Collectively, they edited 840 articles – “the rough equivalent of writing a 1,200 page textbook in psychology” (Farzan & Kraut, 2013, p. 5). Participating instructors have ranged from those completely new to Wikipedia (e.g., Hoetger & Bornstein, 2012) to those with extensive experience (e.g., Marentette, 2014), and the classes enrolled have ranged from small seminars (e.g., Karney, 2012) to enormous 1,700 student sections (Joordens, 2012). The APSWI has also been incorporated into courses at all levels, displacing a research paper in an introductory psychology course (Ibrahim, 2012), a literature review in a 200-level cognitive psychology course (Munger, 2012), a research article review in an upper level course on memory (Hoetger & Bornstein, 2012), an essay for a fourth-year course on the history of psychology (Reynolds, 2011), a 15-page paper in a graduate seminar in social psychology (Karney, 2012), and a traditional final paper in a graduate course on clinical neuropsychology (Silton, 2012).

Naturally, appropriate instruction and support must be provided and the specific assignment (e.g., adding citations, writing or revising articles, being granted “good article” status by the Wikipedia community on the basis of the quality of writing, neutrality, and appropriate sourcing, etc.) must be tailored to the level and ability of the class. For example, introductory psychology students might be best served by working in teams and focusing their efforts on a small number of articles, adding citations, images, and links where necessary, tagging them appropriately when problems are located, and incorporating feedback from their peers and the Wikipedia community. The potential benefits to students from participating in the APSWI include achieving a deeper understanding of the topic (Farzan & Kraut, 2013), learning to evaluate and defend the credibility of their sources (Marentette, 2014), learning to write more concisely and think more critically (Farzan & Kraut, 2013), collaborating with students from other universities and around the world (Karney, 2012), learning to provide as well as
receive constructive feedback (Ibrahim, 2012), enhancing digital literacy (Silton, 2012), and learning how to communicate ideas to a general audience (Association for Psychological Science, 2013).

Although some students begin a little wary of the assignment, they go on to derive excitement, meaning, and even pride from the open nature of their work, as the following instructor testimonials indicate:

The students also realized they were a valuable asset to Wikipedia. Their thinking and writing skills as well as their access to an extensive academic library were not broadly shared. As knowledge translators, they could also provide a service to the general public by clearly communicating basic concepts about language acquisition. They wondered who their readers might be: parents? teachers? students in developing countries? One thing that the students uniformly loved about this project was the possibility of other people seeing and recognizing their work. (Marentette, 2014, p. 37).

They felt their work was meaningful because their contributions are shared with the entire world, rather than just their instructor. They liked that their contributions will not end up in a drawer after the semester ends, but will continue to be available to many people as a useful resource. Some students even noted with pride that their contributions might have wider use than some articles published in academic journals. (Ibrahim, 2012, p. 29)

Of course, participating in the APSWI is not without its challenges, which include developing an appropriate rubric for grading (Silton, 2012), learning the writing style and referencing standards of Wikipedia (Reynolds, 2011), managing the time frame of the assignment (Marentette, 2014), and maintaining flexibility with the assignment guidelines (Hoetger & Bornstein, 2012). Some practical strategies for instructors considering participating in the APSWI include providing a list of topics not yet covered on Wikipedia, gaining experience with posting an article, looking through the sample Wikipedia assignments provided by the APS, making use of the many articles and step-by-step guides for editing Wikipedia articles and participating in the APSWI, and enlisting the help of a campus Wikipedia Ambassador (Hoetger & Bornstein, 2012; Ibrahim, 2012).

Concluding Thoughts

Adopting open pedagogy can seem daunting at first but does not have to mean designing an entirely new assignment or working with new media. All that is required is for the students to work towards producing a resource that others will find useful. This could include literature reviews, evidence-based policy recommendations, or practical guides for the application of psychological knowledge (e.g., promoting environmentally responsible behavior, parenting, etc.). However, if an assignment requires students to develop and exercise a new skill, instructors will need to plan to provide instruction and support throughout the process (e.g., it takes some practice to learn how to properly edit Wikipedia articles). Depending on the nature of the assignment, instructors may also have to develop or locate an appropriate grading rubric.
As mentioned earlier, adopting open pedagogy is simultaneously liberating and terrifying. With traditional (closed) assignments, vague guidelines, a poor design, unclear rubrics, and insufficient support remain hidden, with student evaluations and perhaps a few grey hairs being the only enduring record. With open pedagogy, on the other hand, both successes and failures with the assignment are much more public. But while this opens the instructor to more criticism, it is also an opportunity to share, collaborate, and receive constructive feedback. More importantly, it creates a foundation for our students to begin to invest more deeply, think more critically, work more collaboratively, and communicate more accessibly—exactly the skills needed to be able to “give psychology away.

References


Four Simple Strategies from Cognitive Psychology for the Classroom

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Christopher R. Madan  
*Boston College*  
Yana Weinstein  
*University of Massachusetts Lowell*

Scientists focusing on educational research questions have a great deal of information that can be utilized in the classroom. However, there is not often bidirectional communication between researchers and practitioners in the field of education as a whole (see Roediger, 2013). In this article, we describe the science behind four evidence-based teaching strategies: (1) providing visual examples, (2) teaching students to explain and to do, (3) spaced practice, and (4) frequent quizzing. Below, we provide concise overview of these strategies and examples of how they can be implemented in the classroom before describing the science behind each strategy:

1. **Providing visual examples**
   - Relevant cognitive concepts: Dual coding
   - Description: Combining pictures with words.
   - Application examples (using social psychology topics):
     - Students can draw examples of factors determining liking or loving. For example, two people who are close vs. far away, two people who are similar vs. different, or a visual depiction of reciprocity
     - Instructors can make sure to provide video depictions of experiments where available to go with verbal descriptions (e.g., Milgram, misattribution of arousal)

2. **Teaching students to explain and do**
   - Relevant cognitive concepts: Elaborative interrogation; Levels of processing; Enactment effect
   - Description: Asking and explaining why a factor or concept is true; asking students to perform an action.
Application examples (using social psychology topics):
- Students can ask and explain what factors contribute to whether one person helps another person.
- Instructors can provide students with example scenarios of a person in need of help and ask students to describe and explain why they think a passerby may or may not help.

3. Spaced practice
- Relevant cognitive concepts: Spacing; Interleaving; Distributed practice; Optimal lab
- Description: Creating a study schedule that spreads study activities out over time.
- Application examples (using social psychology topics):
  - Students can block off time to study for 30 minutes each day rather than only studying right before a test or exam.
  - Instructors can assign online quizzes that interleave questions from various chapters.

4. Frequent quizzing
- Relevant cognitive concepts: Testing effect; Retrieval practice; Retrieval-based learning
- Description: Bringing learned information to mind from long-term memory.
- Application examples (using social psychology topics):
  - Students can practice writing out everything they know about a topic, for example conformity, obedience, and bystander effects.
  - Instructors can give frequent low-stakes quizzes in the classroom or online to encourage retrieval practice.

Instructors can find free teaching materials for each of these strategies on the Learning Scientists website (www.learningscientists.org/downloadable-materials).

We focus on these strategies because they were highlighted in a recent policy report from the National Council on Teacher Quality (Pomerance, Greenberg, & Walsh, 2016), which identified key teaching strategies based on evidence from the science of learning. The report found that few of the 48 teacher-training textbooks they examined cover any of these learning principles well—and that none covered more than two of them (but see Thomas & Goering, 2016). These strategies also reiterate recommendations made in an earlier guide commissioned by the U.S. Department of Education (Pashler, Bain, Bottge, Graesser, Koedinger, McDaniel, & Metcalfe, 2007; also see Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). Thus, there seems to be a gap between the research—converging evidence from controlled laboratory studies and classroom studies—and practical use of the strategies in education. While there are in-depth reviews on each of these strategies, here we provide a concise, teacher-ready overview of these strategies and how they could be applied in the classroom.

1. Providing visual examples

Learning can be substantially enhanced if verbal information is accompanied by visual examples. This coupling of verbal and visual information is supported by the ‘dual-coding theory’ (Paivio, 1986). This theory attributes the mnemonic benefits of providing visual examples to different cognitive processes associated with processing words and images, or even words that describe concrete ideas.
This can be particularly useful when teaching abstract concepts (see Figure 1 for an example, http://www.learningscientists.org/dual-coding-example), as associating concrete and abstract terms can improve memory for the abstract information (Madan, Gla Holt, & Caplan, 2010).

Additionally, there is clear evidence that memory for pictures is superior to memory for words (Paivio & Csapo, 1969; 1973). However, this effect is fundamentally distinct from the notion of “learning styles”, where information to be learned is presented in a learner’s preferred modality. This type of differentiation is not supported by cognitive research (Rohrer & Pashler, 2012) and has often been described as a myth or urban legend (Coffield, Moseley, Hall, & Ecclestone, 2004; Hattie & Yates, 2014; Kirschner & van Merriënboer, 2013). Rather than diagnosing each student’s style and matching instruction for each individual, teachers can couple visual examples with text for all students.

2. Teaching students to explain and to do

One of the most effective methods to improve learning of information is to have students engage with the material more ‘deeply’, also known as elaboration (Craik & Lockhart, 1972; also see Lockhart & Craik, 1990). Elaboration has been defined in many ways, but most simply it involves connecting new information to pre-existing knowledge. Perhaps William James said it best: “The art of remembering is the art of thinking [...] our conscious effort should not be so much to impress or retain [knowledge] as to connect it with something already there. The connecting is the thinking; and, if we attend clearly to the connection, the connected thing, will certainly be likely to remain within recall” (James, 1899, p. 143). Two forms of elaboration are readily applicable to classroom learning: having students explain why something is the case, and having students perform actions.

Elaborative processing can be fostered by having students question the material that they are studying; for instance, by asking them to produce their own explanations for why a fact is true, rather than just presenting them with a complete explanation (Pressley, McDaniel, Turnure, Wood, & Ahmad, 1987). This elaboration technique is flexible enough to work in a variety of different learning situations (e.g., for students working alone or in groups, Kahl & Woloshyn, 1994). However, work on elaborative interrogation outside of the lab is just beginning (Smith, Holliday, and Austin, 2010) and we need stronger evidence from the classroom before we can confidently claim that this technique is helpful (Dunlosky et al., 2013). Another relevant technique is that of self-explanation, where students walk themselves through the steps they take during learning. This technique is helpful both when students engage in it spontaneously (Chi, Bassok, Lewis, Reimann, & Glaser, 1989), and also when teachers prompt students to produce the self-explanations (Chi, De Leeuw, Chiu, & LaVancher, 1994).

When feasible, the most elaborative way to process information is by ‘doing’. When information could either be learned by hearing about an action, watching someone else do the action, or having the student themselves perform the action, retention was best in cases where the student performed the action themselves (Cohen, 1981; Engelkamp & Cohen, 1991). This action component can build upon the previously described dual-coding theory (Engelkamp & Zimmer, 1984; Madan & Singhal, 2012). In the classroom, this type of learning could be supported by hands-on activities (e.g., science experiments, or getting students to draw their own diagrams; Wammes et al., 2016) or field trips to museums or nature sites.
3. Spaced practice

We often tell our students that cramming “doesn’t work”. That is good advice—but is not entirely true. As many students have discovered, “cramming”—an intense study period that occurs shortly before one’s memory is to be tested—sometimes does work. Cramming often produces adequate performance on an imminent exam (Roediger & Karpicke, 2006); unless the cramming is done instead of sleep, in which case the sleep deprivation outweighs any gains from cramming (Gillen-O’Neel, Huynh, & Fuligni, 2013). The information learned through cramming, however, will subsequently be rapidly forgotten (Bjork & Bjork, 2011). In order for information to be retained more sustainably and over longer periods of time, it needs to be revisited on multiple occasions spaced out over time. This is known as distributed practice, or the spacing effect, which has been in the literature since Ebbinghaus first discovered it in the late 19th century (Ebbinghaus, 1885/1913). Despite much converging evidence over the past 100 years (see Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006), this practice has not made its way into mainstream education (Kang, 2016).

In the cognitive literature, a distinction is made between spacing and interleaving, i.e., switching back and forth between different topics or question types within a topic (Rohrer & Taylor, 2007). That is, Storm, Bjork, and Storm (2010) showed that interleaving produces benefits that cannot entirely be accounted for by spacing. However, in practice, it is hard to imagine an educationally relevant situation in which spacing and interleaving would be dissociated. We propose, then, that the theoretical distinction between spacing and interleaving may not be critical in terms of practical applications. Instead, teachers can focus more generally on trying to provide students with opportunities to space their studying.

One implementation issue is that spacing hurts performance in the short-term, which makes it less appealing. Students typically feel overconfident when they cram, while spacing out learning leads them to feel relatively less confident (Bjork, 1999); but this is a “desirable difficulty”, which helps learning in the long-term (Bjork, 1994). When making predictions about future performance based on different study schedules, students tend to underestimate the benefits of spacing (Logan, Castel, Haber, & Viehman, 2012). Another reason why spacing might not be used by students as often as we’d like was recently suggested by Kang (2016): this strategy may require more advance planning than simply studying one topic until a saturation point is reached. More research is necessary to fine-tune implementation of spaced study schedules, and would preferably involve teachers in classrooms.

4. Frequent quizzing

The use of retrieval practice to aid learning has been a major focus of the applied cognitive literature in the past decade. As with spacing, the finding that testing strengthens memory is not new (Gates, 1917). However, the message that testing helps learning is somewhat politically charged and often lost when teachers hear the word “testing” because this activates ideas related to high-stakes standardized testing. It’s important to note that frequent testing does not have to be presented as a formal quiz; any activity that promotes retrieval of target information should help (e.g., Karpicke, Blunt, Smith, & Karpicke, 2014).
Although the mechanisms behind the retrieval practice effect are not yet fully understood, the findings are quite clear: when preparing for a test, practicing retrieving information from memory is a much more effective strategy than restudying that information (Roediger & Karpicke, 2006). This is true even when there is no opportunity to receive feedback on the quiz (Smith, Roediger, & Karpicke, 2013), as long as performance on the practice quiz is not too low (Kang, McDermott, & Roediger, 2007). The only notable exception to the retrieval practice effect is when the final test is occurring immediately after study, in which case restudying can sometimes be more effective than testing (Smith et al., 2013). However, unless students are reviewing their notes before walking into the exam room, in general it is quite rare for students to be anticipating an immediate test situation while studying. Thus, in regular exam preparation situations, a strong recommendation can be made from the literature: students ought to practice retrieval.

A good way to integrate quizzes into regular teaching is to provide opportunities for retrieval practice during learning; quiz questions interspersed during learning produce the same benefit to long-term retention as quiz questions presented at the end of a learning episode such as a lecture (Weinstein, Nunes, & Karpicke, 2016). In addition to providing retrieval practice, this method also boosts learning by maintaining test expectancy throughout the learning experience (Weinstein, Gilmore, Szpunar, & McDermott, 2014). A combined benefit of retrieval practice and spacing can be gained from engaging in retrieval practice multiple times. Creating the specific spacing schedule for a particular educational situation is tricky because it depends how strong the original memory is, and how quickly forgetting is going to happen for that information (Cepeda, Vul, Rohrer, & Wixted, 2008). Without the use of sophisticated software to schedule spacing, a more practical suggestion may be for teachers to include quiz questions from previous topics throughout the semester, in order to facilitate a reasonable amount of spaced practice.

**Conclusion**

There is an unending supply of suggestions on how students can learn information more effectively. Here we draw from established cognitive psychology research and distill four simple strategies to enhance classroom learning. These four strategies are: (1) providing visual examples, (2) teaching students to explain and to do, (3) spaced practice, and (4) frequent quizzing. More specifically: (1) Try to present information with both text and pictures; (2) Get students to explain the information they are learning, or if possible, have them act things out; (3) Create opportunities to revisit information over the course of a semester; and (4) Include low-stakes quizzes throughout learning to provide retrieval practice. Critically, each of these strategies is strongly supported by extant research and can be readily implemented in the classroom.

**References**


Chapter 4

Using Media in the Classroom:  
A Cautionary Tale and some Encouraging Findings

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Instructors should use caution when implementing new methods of teaching or assessments: just because students like it, doesn’t mean their learning necessarily benefits. This was recently revealed to me in one of my classes when I tried a new activity. However, as I discovered through student comments, there is a silver lining (read on!)

Background

One of the key skills that instructors in psychology try to develop in their students is the identification of independent variables (IV) and dependent variables (DV), which form the basis of research design and analysis. The very foundation of the scientific method includes identifying changes in one variable and how it relates to another variable. I wondered whether students would show a performance advantage (or any preference for) using media clips over written scenarios used for identifying IVs and DVs in experiments. So, I presented students with video clips from episodes of the television series MythBusters (Discovery Channel), audio clips from the National Public Radio’s Radiolab series, and my traditional written experiment scenarios.

Burkley and Burkley (2009) reported the benefits of using MythBusters clips to illustrate experimental designs. Students enjoyed the use of these clips in class, and performed better on MythBusters-related exam questions (compared to control questions). I suspected that students would prefer the video and audio scenarios for their entertainment value, but wondered whether their performance would actually benefit. Previous research suggested that students might both prefer and benefit from multimedia formats because it would stimulate interest and thus retention (Nowaczyk, Santos, & Patton, 1998). Media may also be more engaging than a written description, and engaging content leads to better learning of information (Tobias, 1994), and as we know, students put more effort into tasks they find interesting (Renninger, 1992).

However, it is also possible that the additional information provided by audio and video clips could distract students from the relevant information required to complete the task of identifying IVs and DVs (Walker & Bourne, 1961). This distracting information may come from the irrelevant “story-telling” details required to make these media commercially appealing (especially in the case of
MythBusters). Additionally, because the learner cannot as easily control the stream of information (i.e., the speed at which information is delivered), students may experience a cost when presented with media compared to the traditional written format.

**Method**

In two sections of my advanced cognitive psychology laboratory course (and following a brief review lecture on the topic of IVs and DVs), students were presented with traditional written scenarios, video clips, and audio clips and had to identify IVs and DVs. Students were assessed multiple times: immediately following the IV/DV review lecture (Time 1), during the second to last week of class (Time 2), and on the very last day of class (Time 3; here, I presented previously-encountered scenarios to measure retention, however this timepoint resulted in ceiling effects and was, therefore, difficult to analyze). At the end of the class, I also asked students (anonymously) some qualitative questions to obtain their perceptions of the three question types (e.g., which of the three were perceived easier).

**Results and Discussion**

After adjusting for final course grade, it is reassuring to have found that students improved over the course of the semester ($F(2, 252) = 50.87, p < .001, \eta^2 = .288$). Student performance on the three formats also differed ($F(2, 252) = 4.01, p = .019, \eta^2 = .031$), whereby students answered the traditional written scenarios more accurately than Radiolab questions ($M_{\text{written}} = 78\%, M_{\text{Radiolab}} = 68\%, p = .005$), but performance on the written scenarios did not differ from MythBusters questions ($p = .128$). What is perhaps even more interesting is that students perceived all three to be of similar difficulty, but indicated a preference for the MythBusters clips over the Radiolab audio clips. In addition, many students provided unsolicited feedback about how much “fun” the video and audio clips were and that these allowed them to finally “get” IV manipulation and DV measurement.

So, does showing students video and audio clips actually benefit learning or performance on assessments? My experience with this activity is particularly interesting because it taught me that using media or multimedia for classroom assessment may not necessarily lead to better understanding, even though students expressed a preference for these formats. Student preference for these formats does, however, suggest that instructors can use multimedia as a valuable tool because they increase student engagement with course material.

**Considerations**

Some of the factors that instructors should consider when contemplating the use of multimedia for teaching and assessment include:

*Familiarity:* the written format is a common way to expose students to IV and DV identification, which they may have encountered in previous courses. It is also the most common assessment method (tests and assignments), and therefore students are familiar with this format from high school. If planning to use multimedia for assessments, students should be given ample time to practice assessments using those less familiar formats.

*Superfluous information:* Both types of media clips contained additional details that were not directly relevant to the experiment. The presence of these extraneous details could distract students (especially those not sufficiently proficient in experimental design and unable to suppress this irrelevant
information). Walker and Bourne (1961) found a linear decline in performance on a problem-solving task with each added piece of irrelevant information (also see Mayer, Heiser, & Loan, 2001, for a more recent investigation).

Entertainment: Students’ previous experience with MythBusters, Radiolab, or both (or perhaps television and radio more generally) as entertainment may result in difficulty focusing on the relevant experimental features of the clips (i.e., IVs and DVs), leading to declines in performance than with the written experimental scenarios.

Concluding remarks

Instructors should use caution when implementing new technologies and new teaching strategies. As my recent experience has demonstrated, just because they like it, doesn’t mean they necessarily learn, perform, or retain it better. Similarly, these new techniques or formats (although interesting for students) may not be appropriate to use during assessments. However, it is encouraging to know that they can lead to increased student engagement (e.g., MythBusters) which can lead to increased learning while in class! Because student engagement is so important, instructors should use many tools to encourage student learning in their discipline, while keeping in mind the considerations outlined above.

References


don’t want to be a downer or anything, but I have a lot of problems in my teaching. Among them:

• Getting students to do the readings
• Getting students to think
• Getting students to think about the readings they do
• Wanting to have students write in meaningful ways
• Having too much work to do
• Getting bored reading papers that all say the same thing
• Having student read without being accountable until the test, which may be weeks away (Handelsman, 2016)

In this essay I describe an assignment that solves, or at least addresses, these problems. I have students write very short papers about their reading assignments in which they do more than summarize or question. To get a sense of the assignment, imagine that you are an introductory psychology student, and you read this in the syllabus:

**Processing and Reflecting on Psychology (PROPS)**

• Actors need props, right? If you want to act like a student, you need PROPS!

• PROPS are short reflections on—and explorations of—your reading. They can be as short as a few sentences and no longer than 1 page. You will process (do something with, reflect on) at least 2 major concepts or key terms from the material you read. Here’s what I mean by processing:
  • You can ask *and answer* a question about what you’ve read.
  • You can differentiate key terms from each other, or show how you might remember them.
  • You can generate a couple of new examples of a couple of key terms.
  • You can relate the concepts to material from other modules, courses, or experiences.
  • In general, you can do anything beyond just questioning (e.g., “What does the hindsight bias mean?”) or reporting (e.g., “The psychoanalytic approach deals with
unconscious material.”).

- I assign PROPS to encourage you to:
  - do the reading (Course Goals 1 and 2) and do it actively (Course Goal 3).
  - practice active learning skills (Course Goal 3), such as self-reflection, applying, and elaborating.
  - come to class, and come prepared to work (Good for ALL course goals!).

- Logistics
  - You will write 15 PROPS this semester. At the top of each, put your name, the date, the module covered, and the number of the PROP (e.g., the first prop you submit will be “PROP 1”).
  - PROPS need to be typed, double-spaced, 12-point font, 1-inch margins, no longer than 1 page.
  - You can hand in a PROP any day for which there is a reading assignment. The 2 (or more) concepts you process must be from the reading assigned for that day.
  - You can only hand in 1 PROP per class.
  - You have some choice about when you hand in PROPS, but I encourage you to start soon!! If you wait until the beginning of March, for example, you will have to hand in a PROP every class period.

- Grading
  - You can earn 2 points for each of your PROPS. You will earn 2 points for showing that you’ve done the reading and are doing something more than reporting or questioning 2 concepts. You will earn 1 point if you hand in the PROP on time but have not processed or reflected actively upon 2 concepts.
  - I don’t grade PROPS on accuracy, but on activity! You are rewarded for taking risks and trying to learn.

- Hints
  - The best PROPS are those that help you answer test questions by going beyond simple, sweeping statements or stories about your life. Take risks to see if you understand.
  - Use the language of psychology. Show that you’ve done the reading (Course Goals 1, 2, and 4).
  - If you discuss personal experiences, do more than tell a story: show explicitly how the concepts apply your experience. For example: To say that you use coping strategies and tell a story about one of them is not enough. To show why some of your strategies are problem-focused and some emotion-focused is better. To relate your coping to some other information in the book, like speculating on some biological, social, or psychological factors in your coping, is wonderful!
  - PROPS can demonstrate that you appreciate the complexity of human behavior (Course Goal 2) by avoiding simplistic and extreme statements. For example, instead of, “I find it interesting that most fields of practice use the scientific method. This
means that psychology is no different than any of the other fields of study in the world,” this might be better: “Many fields of study use the scientific method. Thus, psychology shares one characteristic with fields like biology and physics. In other ways, of course, psychology is different from other fields.”

By the way, here are the course goals that the assignment refers to:

I teach this course so you can:
1. Learn major concepts and findings in psychology.
2. Appreciate the complexity of human behavior.
3. Develop and practice more active ways of studying and learning, including writing to learn, active reading, reflection, participating in class (individually and in groups), and more effective test-taking skills.
4. Appreciate how psychologists think; e.g., how they use scientific methods to study behavior.
5. Develop the ability to meet deadlines and follow directions.

Students can earn a total of 400 points in the course; thus, these papers represent 7.5% of the final grade. Of course, the relative weight of the assignment is up to you depending on your goals. In my course, students earn 300 points for test performance and the rest for two larger papers in which they process at least three concepts across at least two chapters. One of these papers can be revised, and one can be an expansion of a PROP.

I used to have students submit hard copies of their PROPS at the beginning of class, to encourage attendance. Recently I’ve been having students submit these types of papers on our LMS a few hours before class so I have the chance to read at least some of them before class (Handelsman, 2014). This gives me a chance to address misunderstandings and tailor exercises to incorporate students’ efforts.

You can adapt this assignment for other courses and purposes (Handelsman, 2014). For example, you can specify additional elements for one or more of the PROPs, such as having students apply concepts from the text to an outside reading, an upcoming presentation, or previous PROPS. You can increase the number of concepts as the semester goes on. In upper-division courses you might specify the type of higher-order thinking you want students to do.

Although the final product is short, I find it helpful to let students know that they may need to write much more than one page and then edit it to show me their best work. Here is the way I often explain it:

“A one-page paper is like a traditional five-page paper with the extra verbiage removed. In high school (or other college courses), you sometimes spend the first four of the five pages summarizing what you’ve read. Then, you have a page to go and you don’t have anything else to summarize, so you say to yourself, ‘Let me just mess around and throw in something from the previous unit that seems to relate.’ It’s on that last page that you actually do something with what you’ve read. That’s what I want! I don’t need the summary. So you may have to write all those pages, but cut out the first ones and polish up the part where you’re thinking!”
Of course, there are still problems with this assignment (What kind of academic would I be if I didn’t see problems?):

1. There is not enough opportunity for students to revise their work, and I do not spend enough time on grammar, style, and other aspects of writing. In my defense, I want freshmen to have ideas. Once they have something of their own to say, they may be more motivated to learn how to share their thoughts in effective ways.
2. I still have a lot of reading to do. However, PROP reading is more interesting than reading a bunch of summaries, and the short length makes grading easier. And, of course, the assignment fits my short attention span.
3. Students can still read the first paragraph, or any paragraph, of a chapter and write something that would work. But I figure that even a little effort is better than nothing! They still have more of an opportunity to think and read differently (Handelsman, 2016).

I hope you see some of the advantages of this assignment and ways to adapt it to your own course objectives. And forgive me for taking more than a page to explain it.

References


Chapter 6

Flipping the Classroom Improves Performance in Research Methods in Psychology Courses

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Despite having taught it many times Research Methods in Psychology remains one of the most challenging courses I teach. The difficulty arises primarily because Methods has two major goals: (1) to teach students the required concepts (2) to be able to understand, evaluate, design, and conduct research. In short—we must teach both content (what is a hypothesis?) and skill (where is the hypothesis in this article? Is it strong? What is my hypothesis?), usually in just one semester.

The first few times I taught Methods I tackled this problem by covering content in class and relying on a semester-long APA-style research proposal for students to practice. On the surface this worked modestly—students typically wrote interesting papers with at least superficially solid ability to apply their knowledge.

One semester I challenged my students to something new: I assigned a very short 2 page article (Kille, Forest & Wood, 2013) and asked questions about it (i.e., True or False. One of Kille and colleagues (2013) hypotheses was a rating of the likelihood that marriages of four well-known couples would break up in the next 5 years). This activity was a disaster. Although students readily defined a hypothesis or a dependent variable, almost none could correctly identify or differentiate them in the article. This revealed both a shallowness of understanding of the psychological concepts and a lack of practice applying and working with them.

I found this troubling not only for my students who would go on to graduate school or take upper level seminars, but perhaps most troubling for my students who would likely not receive more training in methods and might graduate without the ability to consume research critically. Successful consumers of research need to not only describe the concepts involved in research, but apply them readily to newspapers, blog posts, or Buzzfeed articles that they read. This is especially important in today’s age of ‘disinformation’ and false news.

In short, the problem with Research Methods is that to practice the skills involved in research, students first need to understand the concepts. And given the pressures of the semester we often don’t have enough time for them to do both.
This is hardly a new problem; others with similar difficulty have often turned to flipped classrooms (see, for example Peterson, 2016 and Wilson, 2013 who have used flipped courses for similar reasons in a statistics course). A typical flipped classroom involves presenting traditional lecture-based material (i.e., the foundational concepts) in an online video that students watch on their own before coming to class. During class students then work together under the guidance of the instructor to practice applying these concepts and honing skills (e.g., Lage, Platt & Treglia, 2000). This allows students to do the “easy” parts of learning—listening to a professor lecture, memorizing material, etc. —at home, while doing the hard parts—actually thinking about and applying the material—in the classroom with the professor’s help.

Flipped classrooms have many advantages. First, students can learn the content at their own pace because they can watch the lectures as often as they need to in order to understand the content. Second, through classroom activities, students can assess their own knowledge early, so they know what they don’t know before the exam, and target their practice accordingly. Third, because students practice their research skills in the classroom I can provide one-on-one time with them. I can offer instant feedback, can see where they struggle, and can scaffold them to success. I can correct their mistakes while they are making them, and adjust activities in the moment to ensure they fully meet my course goals. When students practice their skills at home I may have no idea where or how they struggle.

In effect, flipping the classroom allows me to move from a “sage on the stage” to a “guide on the side”, emphasizing the skill involved in assessing and designing research rather than providing definitions and rote memorization of the jargon.

Implementing a flipped classroom is very time consuming and difficult—for every 10-20-minute video I made, I spent at least 3 hours writing a script (don’t think you can do this on the fly—you hem and haw and students feel like you’re wasting their time), creating slides, recording the video, editing it, and posting it to our course management system. Sometimes I found other people’s work that was far better than what I could have done (see Ben Goldacre’s Battling Bad Science TED Talk) and that saved me hours, but for the most part I made my own lectures. I wrote online quizzes and discussion forums to ensure that students watched the lectures, and on top of all that I had to create an entirely new set of in-class activities to help my students practice their skills—the entire point of this exercise (The Society for the Teaching of Psychology (http://topix.teachpsych.org/w/page/19980993/FrontPage), Teach Psych Science (http://www.teachpsychscience.org/), and others have excellent resources for help on their websites). Each of these took at least another 2-3 hours to prepare, many of them much longer. In short, between making your own videos, exploring other people’s work, writing quizzes, and developing new in class exercises this is a daunting exercise, not to be assumed lightly.

However, despite the immense amount of time and effort it took to flip my course the outcomes were phenomenal and I hope that will be encouraging enough to motivate others to pursue it and, equally importantly, to motivate your students to give a flipped class a chance.

A brief word about what I will show you here—in the Fall of 2013 I taught Methods in a traditional lecture-based course and in the Fall of 2014 I taught the same course flipped with 16 video lectures spread throughout the semester. I chose to compare two fall semesters although my first time flipping the course occurred in the Spring of 2014. I did not examine this data as students in fall and spring typically differ in systematic ways (i.e., more first-semester juniors in the fall and more second-semester sophomores in the spring).
I assessed three measures over the course of both semesters: applied exam questions, a large APA style research paper, and student evaluations of instruction scores. I chose exam questions that focused on particularly difficult foundational questions and for which there were least two questions per topic. For the APA style research paper, I randomly selected 5 student papers per class for in-depth assessment. These were scored on a scale of 1 (absent) to 6 (exceeds expectations). There was a good correlation between these scorings ($r = .87$) and the grading rubric I had initially used to score the papers. Student evaluation of instruction scores ranged from 1 (strongly disagree) to 5 (strongly agree) and included a number of questions that I will discuss below. Finally, because the sample size was low I accepted alpha values of .10.

T-tests revealed that students in the flipped course (F) and the traditional course (T) scored fairly similarly on most applied exam questions (Design: F 88%, T: 90%, $p = .82$; Hypotheses: F 81%, T 76%, $p = .69$; Sampling/Assignment: F: 85%, T: 80%, $p = .38$; Reliability/Validity: F: 83%, T: 78%, $p = .39$) but for two of the hardest concepts, variables and causation, students in the flipped course greatly outperformed students in the traditional course (Variables: F: 90%, T: 79%, $p = .06$; Causation: F: 92%, T: 73%, $p = .015$).

Though this was impressive, the largest improvement showed in the APA style research papers. Interestingly students in the flipped course used evidence better (F: 5.2; T: 3.4, $p = .02$), had better argument organization (F: 4.8, T: 3.2, $p = .05$), stronger hypotheses (F: 6, T: 4.2, $p = .03$), better proposed methods (F: 5.13, T: 4.13, $p = .03$), were able to discuss their predicted findings in more profound ways (F: 5.6, T: 4.35, $p < .01$), and had overall better papers than students in the traditional course (F: 5.45, T: 4.5, $p = .06$). Students in the flipped course were also marginally better at synthesizing information across sources (F: 5, T: 3.8, $p = .11$). However, it wasn’t just that students in the flipped course were better writers (Writing style: F: 4.54, T: 4.47, $ns$) or better at following directions (APA Style: F: 5.13, T: 4, $ns$) so their improvements in these areas seems targeted and important.

Student evaluation of instruction scores also told an interesting tale—students in the flipped course were more likely to recommend the course (T: 4.13, F: 4.70, $p = .10$) even though they found it provided a greater intellectual challenge (T: 4.40, F: 4.90, $p = .06$) and they found the difficulty level less appropriate (i.e., they reported that the course was too hard: T: 4.67, F: 4.10, $p = .01$). So even though students found the course harder they were more likely to recommend the flipped class to others compared to those in the traditional course.

While we’re talking about student evaluation scores, I will point out that my evaluation scores suffered a little the first semester I flipped the course (Spring 2014). While they dropped in some areas (i.e., students found me less available for help; thought my comments were not as useful) their overall evaluation scores stayed fairly similar (4.58 vs 4.59). Further, this ‘hit’ to my evaluations disappeared after one semester. My interpretation here is that I was frantically writing lectures and prepping in-class activities and didn’t have as much time to spend with the students and on comments. Now that all that work is done I have more time than ever to spend on my students. Since then my evaluation scores have stayed the same or risen (average 2014/2015: 4.58, 2015-2016: 4.60, 2016-2017: 4.82). Open ended student evaluations indicate that they very much valued the flipped experience and used it just as I would hope. For example, one representative comment said:
Teaching this particular material in a “flipped course” was effective. The nature of the material is generally easy to understand with previous experience in psychology but it was not always as simple to apply it; therefore, practicing application in class was helpful. Overall this fostered the ability to apply the knowledge across useful areas both in this course and other courses.

In summary, flipping the course in Research Methods is hard, but it benefits the students. While this benefit may not necessarily show up on every exam it shows where it counts—when students use their knowledge of methods to evaluate articles or design their own research. They are better able to think about important scientific controls, to design better experiments, and to keep their interpretation within reach of their data set. In short, this improves their training as scientists and consumers of research which we hope will persist throughout their lives. Though this work is hard (for both you and the students), it pays off.

I’ll leave you here with a few quick words of advice about flipping your own course: First, you don’t need to flip your entire course all at once. Consider flipping one day this semester and see how it goes. Next semester, add another. Second, borrow from people who have done this already. Raid listservs and teaching websites. Email me and I will happily send you my materials (scripts, videos, quizzes, activities, etc.) or give you a pep talk. Talk to your colleagues and share with them. Third, tell your students they will be in a flipped course and, importantly, why. Give them the data I’ve given you—reassure them that their papers will be stronger, their grades will be better, and they will be happier. They will get on board. Fourth, and perhaps the scariest for junior faculty like myself, accept that the first semester you flip, your teaching evaluations may take a hit. Know that you’re gambling, yes, but it’s on a good bet—they will likely rise higher down the road once you’ve sold your students, once they know what they’re getting by enrolling in your course, and once you have mastered the flip.

References


Chapter 7

Flipped Out: Methods and Outcomes of Flipping Abnormal Psychology

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Abnormal psychology is taught in virtually every undergraduate psychology department across the country (Perlman & McCann, 1999). However, despite its popularity, the course is not immune from critiques. Like many college courses, abnormal psychology is often lecture-based (Benjamin, 2002). Although such a pedagogical approach is popular among faculty because of its effectiveness in maximizing content delivery (Kendra, Cattaneo, & Mohr, 2012), in some cases lectures also may be less effective than other methods for promoting learning (c.f., Halonen, 2005).

Abnormal psychology courses have also been critiqued as lacking both context and nuance. As Norcross, Sommer, and Clifford (2001) note, in abnormal psychology classes, “the painful human experience of psychopathology is frequently overshadowed by descriptions of disembodied symptoms and impersonal treatment” (p. 126). As a result, despite many professors’ intentions to use abnormal psychology courses to decrease stigma (Kendra et al., 2012) and increase student understanding of the contextual factors that shape psychiatric conditions (Lafosse & Zinser, 2002), courses may fall short of these desired outcomes. That was certainly my experience when I first taught abnormal psychology.

The Issue

Psychopathology I (PSY 233) is a core course for students who are majoring in psychology with a clinical/counseling concentration at my college. Because of this, as well as the content, the class is frequently filled to capacity (40 students). When I inherited the class in Fall 2014, I kept using what Benjamin (2002) refers to as “the Velveeta (cheese) of teaching methods” (p. 57), otherwise known as a lecture-centered approach (which is comparable to the cheesy foodstuff in that despite the fact that no one admits to liking it, it remains the most popular pedagogical approach; Halonen, 2005). I enhanced the class with media critiques, group projects, and in-class discussions, however class time remained lecture-driven.

According to my students the course was successful. Students gave high ratings on course evaluation items (rated from 1=strongly disagree to 5=strongly agree) such as “The use of teaching aids was effective” (μ=4.9) and “The instructor answered questions in class in a patient and helpful manner” (μ=4.9). Students’ qualitative feedback supported these ratings.

Despite this positive feedback, I was dissatisfied with several aspects of the course. For example, lower student ratings on items such as, “I learned a great deal in this class” (μ=4.6) and “The course
raised challenging questions or issues” (μ=4.6), led me to wonder if students were basing their assessments on how much they liked the course rather than their actual learning. What is more, at the end of the semester I didn’t feel confident that I’d met my objective of challenging students to consider how cultural norms and biases contribute to psychiatric conditions. As a result, I was left with the sense that, because of the format, I had reduced the course content to a list of diagnostic criteria, leaving little time for acknowledging symptom variation, challenging stereotypes, or encouraging the development of advocacy attitudes. To combat these shortcomings, I decided to change the class radically, and, with the support of a grant from my college’s Cromwell Center for Teaching and Learning, I flipped—or inverted—the class.

The Solution

There is no single definition of flipped instruction (He, Holton, Farkas, & Warschauer, 2016). However, the underlying intent of the approach is to move lecture-based material outside of class, leaving in-class time for “face to face engagement between students and teachers” (Forsey, Low, & Glance, 2013, p. 472). This is commonly achieved by delivering course content before class meetings using recorded lectures, podcasts, or videos. Material is then applied during face-to-face meetings through discussions, activities, and hands-on demonstrations.

To date, the research on flipped instruction is incomplete. As O’Flaherty and Phillips (2015) note, few studies have “actually demonstrated robust evidence to support that the flipped learning approach is more effective than conventional teaching methods” (p. 94). Despite this, anecdotal evidence is encouraging, with some studies claiming that flipped instruction results in greater student engagement (c.f., Jamaludin & Osman, 2014) and higher test scores and overall grades (c.f., Mason, Shuman, & Cook, 2013). Based on this available evidence, and the issues that I observed in the first iteration of Psychopathology I, flipping the class seemed a worthwhile venture.

The Implementation

Flipping Psychopathology I required me to create two sets of materials: out-of-class and in-class. The bulk of class content (i.e., diagnostic criteria, prevalence rates, treatment approaches, etc.) was delivered outside of class through video lectures that were uploaded to the course’s online learning platform. For the first iteration of the flipped course, these lectures were simple, with my voice recorded over PowerPoint slides using SnagIt. These videos were limited to ten minutes so students could easily review information. Prior to class students were required to watch between one and three videos and complete an online quiz. The quizzes were intended to encourage mastery, so students were able to repeat the quizzes multiple times.

In-class time was focused on application and discussion (Pluta, Richards, & Mutnick, 2012). This required me to create individual and group activities for each class meeting. Sample activities included having students evaluate media depictions of psychiatric disorders for accuracy, writing vignettes of imaginary clients, and discussing the systemic factors that affect how clients manifest symptoms.

I evaluated the effectiveness of the flipped versus traditional instruction based on data collected at two times: following a lecture-based course in Fall 2014 (N=27) and following a flipped-style course in Fall 2015 (N=34). Data I collected at both points in time included student test scores and grades, student
course evaluations, student responses to questions developed for the Web Learning Project (Calderon, Ginsberg, & Ciabocchi, 2012), and instructor reflections.

The Outcomes

Data from the traditional and flipped offerings of Psychopathology I suggested the pedagogical change affected outcomes in three domains: student learning, student engagement, and instructor experience.

Impacts on Student Learning

Researchers suggest that flipped instruction is successful because students are able to learn and review pre-class material on their own time and at their own pace (McDonald & Smith, 2013). Many of my students agreed with this assessment, sharing on course evaluations that, “I like how the videos were before class. It allowed for deeper understanding of the material because I can pause, write down questions, and review as needed.” Accordingly, students also rated the “adequacy of resources” as significantly higher than students in the lecture class ($t(54)=-2.11, p=.04$).

In opposition to the literature, the accessibility of material outside of class did not translate into higher grades for my students. In fact, although there were no significant differences in final grades between the two classes, students in the flipped class had significantly lower exam grades than students in the lecture-based class ($t(58)=2.42, p=.02$). What is more, student responses to the item “I learned a lot in this course” were lower in the flipped course ($μ=4.3$) than in the lecture course ($μ=4.6$).

It is possible that some of the student learning drawbacks of the flipped class were related to perceptions of the difficulty of the course. In comparison to students in the lecture class, students in the flipped class rated the course as having a significantly higher “workload” ($t(56)=-6.02, p=.00$) and being more “difficult” ($t(55)=-3.19, p=.00$). Further, student qualitative feedback reinforced these ratings, suggesting the flipped style made learning more difficult for some students.

This perception runs contrary to previous studies that have suggested students perceive flipped courses as less difficult than courses taught using traditional methods (He et al., 2016). However similar to previous research (c.f., O’Flaherty & Phillips, 2015), students in my flipped course suggested the difficulty predominantly stemmed from the increased responsibility they felt: “The flip style makes learning just a little bit harder because it puts all the responsibility on what you do outside of the classroom.”

Impacts on Student Engagement

The fundamental purpose behind flipped instruction is to use in-class time for active learning. Given this, some of the feedback from students in the flipped class led me to question the effectiveness of my in-class activities. For example, students in the flipped course rated the “learning value of in-class materials” significantly lower than students in the lecture course ($t(56)=2.326, p=.02$). These data were supported by comments such as, “class meetings are interesting but not necessarily informative.”

Based on these data, it seems that my implementation of flipped pedagogy may have fallen short because of how I structured face-to-face meetings. It may be that, similar to O’Flaherty and Phillips’ (2015) findings in their scoping review, I failed to explain the link between the pre-class
activities and the face-to-face sessions. As a result, the in-class material may not have engaged the students.

With that said, data also suggested students interacted more in the flipped class, which may have facilitated student engagement. For example, students in the flipped course rated the amount and quality of “interaction with other students” as significantly greater than students in the lecture course (t(56)=-6.06, p=.00). Student comments reinforced these data, with one student noting, “I like that we get more time to ask questions in class,” and another mentioning that “the interaction during class time helps to solidify the information.”

Impact on Instructor

Researchers who study flipped instruction routinely note how demanding it is on instructors. That was certainly my experience in flipping Psychopathology I. Similar to other instructors’ experiences, it took considerable planning and preparation for me to design engaging, interactive in-class activities (c.f., Mason et al., 2013). A great deal of lead-in time was also required to record and edit lectures in advance of class meetings.

The process of making the videos was also complicated by the limited technical support available to me. Although I consulted with members of the academic technology team at my institution, they did not have the time or resources to help me record or edit the videos. As a result, I had to learn how to use the software and troubleshoot issues on my own. Perhaps because of the amount of time and expertise required to create even simple videos, it is not surprising that researchers have recommended having a support staff or technical team available (c.f., Ferreri & O’Connor, 2013).

Despite these issues, I also found the flipped course had multiple strengths. Most importantly, because students could access and review the lectures before class meetings they were less concerned with taking notes in class. This freed up the students to listen to their classmates, contribute to discussions, and engage fully in activities. As a result, a greater proportion of students participated in the flipped versus the traditional class.

Finally, I also found the flipped class provided students with increased opportunities to consider more nuanced issues related to psychiatric disorders. In particular, because the students were introduced to diagnostic criteria and prevalence rates prior to class, they were more prepared to apply and critique that material in class, opening up discussions about stigma, social norms, and systemic forms of privilege and oppression that affect psychological health and illness.

The Conclusions

The flipped version of Psychopathology I had both strengths and weaknesses. Students appreciated the opportunities for review that the flipped style provided, were better able to consider the nuances of psychiatric conditions, and were more engaged during in-class meetings. On the other hand, some students reported the flipped style made learning more difficult and I found the flipped course took more time to prepare. Given these data, it is not possible to say flipping Psychopathology I improved the course as a whole, at least not after the first offering. However, with revision the flipped course could hold considerable promise to help students develop more critical perspectives on topics relevant to abnormal psychology.
References


Chapter 8

Supporting Students Using Balanced In-Class Small Groups

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Creating Small Groups in the Classroom

Student persistence has been one of the greatest challenges faced in higher education (Seidman, 2005; Tinto, 2006; Tinto 2010). While many researchers have identified students who are at risk of dropping out and proposed intervention strategies, few have looked at the effectiveness of balanced in-class small groups to promote peer networking and support. Conventionally, most instructors who use small groups in the classroom would form the groups by random selection or allow the students to form their own groups. The author of this essay proposes, instead, to form the small groups by first identifying students who have high risk of dropping out from college and group these students with those who are not at risk. These “balanced” small groups should provide students with greater peer support in the classroom.

We have all encountered students who are underperforming in the classroom and are at risk of dropping out. Factors that include personal, cultural, economic, and social forces all affect a student’s ability to persist in college (Tinto, 2006). Strategies such as building learning communities and cohort systems have been implemented by many universities to improve student retention rate (Tinto, 2010). The problem with many of these retention strategies is that they generally require institutional support and substantial financial backing to ensure success and longevity. Is there a strategy that an instructor could easily implement in the classroom, does not require major course re-design and does not require financial support?

One strategy that only requires a small investment from the instructor is the usage of balanced small groups in the classroom. The usage of small groups in the classroom is not a new idea and it has proven to be an effective way of promoting learning (Johnson & Johnson, 2002, 2015). Past research has also shown that peer support would increase a student’s college persistence (Eckles & Stradely, 2012; Skahill, 2002). However, not much research has been done to address the usage of small groups to support students who are at risk of dropping out from college. When students are randomly grouped or form groups of their own, there will inevitably be a few groups that are comprised of students who are all at high risk of dropping out. The idea behind the balanced small groups is simple—students who are at high risk and low risk of dropping out should be evenly distributed across all groups. If the cognitive and social mechanisms behind the effectiveness of small groups hold true, then students who are at lower risk of dropping out should be able to support and anchor students who are at higher risk of dropping out. This idea is based on the social interdependence theory that people, when placed in cooperative groups with a positive environment, will help each other to achieve a common goal (Johsons & Johnson, 2015).
Implementing and Evaluating the Idea

The first step in creating balanced small groups is to identify and classify students who are at high risk, moderate risk, and low risk of dropping out. The author of this essay used a modified version of the College Persistence Questionnaire (CPQ) to gauge students’ likelihood of persisting in college at the beginning of the semester (Davidson, Beck & Milligan, 2009). The original CPQ by Davidson and colleagues was modified to fit the specific characteristics of the author’s home institution. The modified questionnaire was built in Qualtrics and distributed to the students at the beginning of the semester. It should be noted that the author of this essay adopted a “flipped classroom” teaching model, where at least half of the class period involved small group problem solving (Lage, Platt & Treglia, 2000). The students had to work together to solve short answer questions and multiple choice quizzes. Each group had to turn in one copy of the short answer worksheet and one copy of the multiple choice quiz at the end of every class period. The in-person class met twice a week for 75 minutes each. The first 30 minutes of the class was in the form of a lecture with interactive clicker questions. The other 45 minutes was used to solve an in-class worksheet and a multiple choice quiz question in groups of four. Students were allowed to use their notes while solving the worksheet but they were not allowed to use their notes while completing the multiple choice quiz during the final fifteen minutes of class. A total of four undergraduate teaching assistants who were not enrolled in the specific class assisted with the small group problem solving portion of the class.

After students’ response for the CPQ had been collected, the author calculated a cumulative score for each student based on the student’s response on the questionnaire. The students were then divided into four categories: those in the bottom 25th percentile, those in the 26th-50th percentile, those in the 51st to 75th percentile, and those in the top 76th percentile. Those in the top 76th percentile were students who were at very low risk of dropping out, those in the bottom 25th percentile were the ones who were at high risk of dropping out. The class had a total of 80 students; half of the students were put into balanced small groups using their CPQ scores and half of the students were placed into small groups randomly, regardless of their CPQ score. Each group had four students. The balanced groups one student from each of the four CPQ categories; the random groups were created based on student ID number. The students stayed in the same group throughout the semester and they were encouraged to collaborate with each other. The author of this essay used a variety of bonus points and team building tasks throughout the semester to help the students foster a positive and cooperative learning environment (Johnson & Johnson 2015).

This method of balanced small groups was first piloted during the Spring 2015 semester at a large state university. The results were inconclusive because the comparison between the random groups and the balanced groups did not yield any significant difference. The general trend of the means, however, seemed to show that students who were already at low risk of dropping out were benefitting more from the balanced small groups than students who were at high risk of dropping out. Future studies should probably compare balanced groups with students of varying risk levels, against matched groups where students of similar risk levels were grouped together. Qualitative data and survey data should also be gathered in addition to student performance data. There was also the concern that the balanced-group
manipulation appeared to benefit the higher performing students more than the lower performing students who were at high risk of dropping out. This was probably a result of social loafing effect where the high performing students were doing most of the work in the class. The worksheets and the quizzes were graded per group but they should have been issued and graded on an individual basis. Future studies should design the assessments such that every student is held equally responsible. This way, any effect of social loafing should be minimized.

Author’s note
This essay was based on a study presented at a poster session at the Society for the Teaching of Psychology’s 15th Annual Conference. Decatur, GA, October 2016.

References


Chapter 9

Technology Bans and Student Experience in the College Classroom

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Personal technologies, including laptops and cell phones, have infiltrated the college classroom. Instructors must now decide whether to implement a ban on the unsupervised use of personal technologies in their courses. Anecdotal evidence ("students always seem to be looking at their computer screens and not me during class"), and results from recent studies linking the unsupervised use of technology with reductions in academic performance, have led to declarations that the time to ban technology use in the classroom is now (Rosenblum, 2017). However, it is important for individual instructors to critically evaluate and understand the empirical evidence in favor of technology bans when deciding on the approach to take in their classroom. Moreover, the impact bans have on student’s experience within the course remains unknown. The purpose of this essay is to review the evidence in favor of a technology ban, to describe recent results, which suggest a ban can be harmful to students’ engagement and to provide recommendations for instructors to aid in the development of a technology policy for their classrooms.

Broadly speaking, two primary mechanisms have been proposed to explain the relationship between unsupervised technology use in the classroom and reduced academic performance: misdirection of cognitive resources and superficial encoding of information. First, the presence of personal technology in the classroom allows students a direct line to distracting information via social media, games, and the internet. Diverting cognitive resources towards online shopping or texting with friends necessarily draws resources away from what is happening in the classroom. This misdirection of resources means that students do not process the material presented during lecture and this can harm performance (Fried, 2008; Wood et al. 2012). Importantly, the use of technology may lead to the misdirection of resources, not only for the student using the technology, but for students sitting nearby, and even the instructor (Aguilar-Roca, Williams, & O’Dowd, 2012). Second, even when students are prevented from accessing the internet or other distractions, the use of laptops leads to a relatively superficial encoding of lecture information. Students randomly assigned to take lecture notes using a laptop perform worse on follow-up memory tests of lecture material compared to students randomly assigned to take lecture notes using paper and pencil (Hembrooke & Gay, 2003; Mueller & Oppenheimer, 2014). This finding has been explained by differences in note taking strategies. Specifically, students using a laptop appear to adopt a verbatim strategy in which they type everything that is said during the lecture. In contrast, students using paper and pencil reframe and write down the information from the lecture into their own words. This reframing requires deeper encoding of the information and leads to better retention of the material (Mueller & Oppenheimer, 2014). Thus, despite
successfully resisting temptation and devoting resources to the task of taking notes, the use of laptops is still harmful to the retention of material presented during a lecture.

However, there are three things to keep in mind when implementing the findings reviewed above as the basis for your personal classroom policy.

Broadly speaking, studies cited as evidence for the implementation of technology bans use either an experimental or correlational approach. In the typical experimental approach, participants are randomly assigned to use a laptop or paper and pencil to take notes while listening to a lecture. Learning is frequently assessed by a quiz on the material that is presented at the end of the lecture (Wood et al., 2012). Although students using laptops tend to perform worse than those who do not, this procedure is different from students learning the information over the course of a semester, as they likely enact strategies during studying to make up for distracted moments when using online resources, such as reading the textbook or asking a fellow student. The correlational approach collects various measures of student performance, such as GPA and exam grades, and correlates these with student’s reported cell phone and laptop usage. The negative correlation between GPA and frequency of technology use is commonly interpreted as technology usage causing a decrease in performance. However, due to the nature of correlational research, it could similarly be interpreted that weaker students tend to bring their laptops into the classroom (Fried, 2008). In other words, since a causal relationship cannot be drawn between the use of laptops and class performance, removing access to laptops might not lead to changes in performance.

The real-world impact of technology usage on student performance needs to be considered. What does a statistically significant reduction in performance for students using laptop mean for an individual student sitting in one of our classes? One illustrative example comes from a rigorous, large-scale study conducted at the United States Military Academy at West Point. For an entire semester, first year students enrolled in Principles of Economics were randomly assigned to take notes on either a laptop, tablet, or using paper and pencil. The results from this sample of over 700 students yielded a statistically significant impact on performance. Specifically, students in the laptop and tablet conditions performed worse on the final exam compared to students in the paper and pencil condition. Although a statistically significant reduction, the effect amounted to a decrease of 1.7% on the final exam for students in the laptop or tablet condition (Carter, Greenberg, & Walker, 2016). Thus, despite the presumed chronic misdirection of resources and the superficial encoding of information students experience when using technology, the real-world performance benefits are small. While any improvement in performance is welcome, there are many simple techniques that instructors can implement over the course of the semester which can show improved exam performance to a greater extent, including retrieval practice at the end of a lecture (e.g. Lyle & Crawford, 2011).

To date, little research has assessed the impact of a technology ban on student experience within the class. However, recent research conducted in my lab, which was presented at the Society for the Teaching of Psychology Annual Conference on Teaching (Hutcheon, Richard, & Lian, 2016), indicates that implementing a technology ban reduces student engagement. Specifically, using data from sixty-nine undergraduate students across four sections of Introduction to Psychology taught by the same instructor, students randomly assigned to a technology-ban section reported lower levels of engagement in the course compared to students randomly assigned to the technology-permitted section, as assessed by the student course engagement questionnaire (SSEQ) (Handelsman, Briggs,
Sullivan, & Towler, 2005). Interestingly, the students surveyed in our sample reported relatively low frequency of cell phone use during a typical class (mean = 2.38) and the vast majority reported a preference for taking notes using paper and pencil (N=61) compared to laptops (N = 8). In fact, looking at the data for the 61 students who reported a preference for taking notes using paper and pencil, we observed a significant reduction in engagement as a function of laptop ban. In other words, the technology ban impacted engagement of students who would not even have used technology in the classroom. These findings suggest that students are sensitive to the structure or rules within the classroom environment, and rules viewed as limiting their choices may impact how much students engage with the material and the instructor.

In contrast to reports of Carter et al. (2016), we observed a marginally significant reduction in end of year grades for students in the technology ban compared to the technology permitted condition. This suggests that the impact of a technology ban on student’s performance in the classroom may not be the same for all classroom environments. Specifically, students enrolled in a more traditional, small liberal arts environment (Bard College compared to West Point) may be more impacted by the implementation of such bans.

**Recommendations**

Consider the make-up of your class. If you are teaching a small class in which students might not spontaneously use technology, the implementation of a technology ban could negatively impact student experience and performance in the class. In contrast, if you are teaching a large lecture class in which students might feel less engaged to begin with, the ban might help their experience and performance.

Minimize the distraction of others. If you decide not to implement a ban, you should think about ways that you can prevent those students who chose to use laptops from distracting others who choose not to use a laptop. Methods to alleviate this concern include having specific sections of the classroom dedicated to laptop and technology users (Aguilar-Roca et al., 2012).

Provide rationale for your decision. If you decide to implement a technology ban, providing students with a clear explanation as to why the ban is in place, supported by relevant research is one potential method for reducing the impact of a ban on student engagement. In conclusion, there is little doubt that under certain situations, unsupervised technology usage can negatively impact academic performance. However, full consideration regarding the type of course and composition of students within the course is advised before implementing a blanket technology ban.

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Teachers whose different styles match with the pedagogical methods they use make for a more authentic and effective teaching and learning experience. There are a variety of strategies in the literature for teachers who would like to move away from a purely lecture format. One of those, Team-Based Learning (TBL), is a method I have been using for several years. TBL is a method to encourage students to be actively involved in their learning. Similar to the ideals associated with a flipped classroom (Jakobsen & Knetemann, in press), students learn primary course content outside of the classroom and work in permanent teams with the material during class (Michaelsen, Bauman, Knight, & Fink, 2004). Below, I outline the core components of TBL and share a few studies that my students and I have done examining the impact on student learning.

The TBL Process

Readiness Assurance Process

The first steps in the TBL process involves ensuring that students understand course material; this process—the Readiness Assurance Process—includes preparation outside of class, quizzes in class, and a short lecture. Students prepare for class by reading the textbook, watching videos, and/or answering guided questions. When students come to class, they take a multiple-choice quiz individually, which assesses student’s understanding of the course material at various levels of Bloom’s taxonomy. The individual quiz holds students accountable for completing their out of class preparation. Next, students work in their teams to complete the same multiple-choice quiz again. Students receive immediate feedback on their team quiz using scratch-off IF-AT forms. After the team quiz, students have a chance to appeal any questions they miss, which requires them to revisit course materials and provides an opportunity to make a compelling case for alternate answers based on the course materials. Finally, teams submit any questions they still have about the material and the instructor gives a short “muddiest points” lecture. The Readiness Assurance Process takes 50-75 minutes to complete.

Application Exercises

After the completion of the Readiness Assurance Process, students should have the necessary knowledge to complete application exercises, which usually take 2-4 class periods. Depending on the complexity of the questions, students may complete 2-5 application exercise questions during a class period. The application exercises have a deliberate structure that allows for teams to focus on the relevant course material and facilitates team and class discussions. The keys to developing successful
application exercises involve having all teams work on the same questions, requiring teams to make a simple choice, and having teams report their answer choices simultaneously. To demonstrate the importance of the structure of the application exercises, think about the type and quality of discussions students may have with open-ended questions (Question 1 below) compared to more directed questions (Question 2 below).

**Question 1:** This class is structured using Team-Based Learning (TBL), in which you learn the primary course content outside of class and then work in permanent teams during class to get a deeper understanding of the material. Identify at least one way in which each of the theories below helps you understand why the TBL structure is an effective teaching method.

A. Operant conditioning  
B. Piaget’s theory  
C. Vygotsky’s theory  
D. Information processing theories

**Question 2:** This class is structured using Team-Based Learning (TBL), in which you learn the primary course content outside of class and then work in permanent teams during class to get a deeper understanding of the material. Decide which of the following theories is most prominent in the TBL structure. Be prepared to support your answer.

A. Operant conditioning  
B. Piaget’s theory  
C. Vygotsky’s theory  
D. Information processing theories

While Question 1 asks students to apply what they know about the theories to the structure of TBL, it may not generate much discussion. Question 2 meets the requirements of each of the deliberate components of the application exercises. All teams are presented with the same problem. Teams have to make a choice among options A-D. For this particular question, all of the answer choices are correct, so what will generate discussion among teams is the rationale behind their decisions. Finally, because the answer choices are very clear, it is easy for teams to simultaneously report their decisions by holding up cards, for example.
Does it Work?

Students generally have positive experiences with TBL. They also seem to enjoy the structure (e.g., Adelkhalek, Hussein, Gibbs, & Hamdy, 2010) and report perceiving TBL as an effective teaching method (e.g., Haberyan, 2007). The results are mixed in terms the impact of TBL on academic outcomes compared to more traditional teaching methods (e.g., Carmichael, 2009; Jakobsen, McIlreavy, & Marrs, 2014), and little work has been done regarding how TBL impacts retention (e.g., Emke, Butler, & Larsen, 2016). Over the years, I have worked with student research assistants to collect data in lab-based and classroom-based studies to examine the effectiveness of TBL in promoting recognition memory and retention compared to other pedagogical methods. Here, I present the results of two of those studies.

In a lab-based study, time-slots were randomly assigned to each of our conditions, as follows:

- Team-Based Learning: Participants read an article upon arrival to the session, then completed the Readiness Assurance Process and application exercises.
- Lecture: Participants received a lecture based on the content of the article and took notes during the lecture.
- Reading: Participants read the article and took notes as they read.
- Control: Participants completed an anagram.

One week later, all participants took a 10-item multiple-choice quiz to measure their retention of material from the week before. The results revealed that participants in the TBL and Lecture session did not differ on their scores ($p = .141$), but participants in the TBL session outperformed participants in the Reading ($p = .018$) and Control sessions ($p < .001$). The results of this study suggest that TBL and lecture are both effective ways of teaching, particularly in short-term sessions (e.g., workshops).

In a class-based study, two classes were randomly assigned to be taught using TBL or Lecture. During the semester, students in the TBL class completed the Readiness Assurance Process and application exercises, while students in the Lecture class received lectures with active learning components. Students’ understanding of course material was assessed at three time points: (1) pre-test at the beginning of the semester, (2) final at the end of the semester, and (3) post-test three months after the completion of the course. Students completed 28 multiple-choice questions at each of the three time points. We based our analyses on students who contributed data at all three time points (N = 34). Students in the TBL and Lecture class did not differ on their pre-test scores ($p = .052$) or their post-test scores ($p = .052$). Students in the TBL class performed better than students in the Lecture class on the final ($p = .021$), suggesting that TBL may enhance short-term retention of course material. The results of this class study are consistent with those of Emke et al. (2016), in which TBL led to better short-term, but not long-term, retention of course material.

Implementation and Conclusions

Implementing TBL as outlined above requires some upfront investment for organizing and creating preparatory materials, quizzes, and application exercises. The good news is that components of TBL can be implemented in nearly any class with relative ease. For example, it is easy to incorporate a team quiz to already existing individual quizzes, and once students have the content knowledge (e.g., through lectures), application exercises can be added a little at a time.
While there is likely no one pedagogical technique that will work for every instructor, data from the TBL literature and my research suggest that TBL is at least as good as other strategies. These results should encourage teachers to work in areas in which they are most comfortable and to cultivate skills they feel important, whether they are central to the course objectives or merely desirable.

Author’s note

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Resources

The following website offer wonderful resources for learning more about and getting started with TBL: Learntbl.ca and www.teambasedlearning.org/

References


Chapter 11

Do These Things Even Work? 
A Call for Research on Study Guides

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If one had to predict the most common question asked by students each semester, it would be: “What will be on the test?” Moreover, this question is frequently and predictably followed by requests for a study guide. As good, well-meaning instructors, many of us sigh (maybe cry a little) but ultimately provide them. In fact, many of us even include them in course materials prior to the actual request, just to avoid the conversation. Given how common these requests are, it is surprising that there is little actual research regarding the effectiveness of study guides. A quick search, using key terms such as study guides and exam guides, on Google Scholar leads to only a handful of results, many of which are dated and focused on creating study guides (as opposed to assessing them). Thus, we suddenly found ourselves asking: How much do we really know about study guides? Do these things even work?

Arguably, any strategy or aid should help students to perform better on exams than nothing. However, some of the resources that students prefer may actually hinder their performance rather than help it. For example, in a recent analysis of learning aid use and exam performance, Gurung (2004) found that students rate textbooks’ bolded key terms as the most helpful study aid to them, but that their perceived helpfulness of this resource negatively relates to exam performance. Conversely, what they rate as least helpful (i.e., active review practices) has the strongest evidence of improving exam performance (e.g. Dickson, Miller, & Devoley, 2005). In another example, a comparison of exam review styles found that, although students do not prefer traditional (i.e., student directed question and answer format) style exam reviews, their exam performance is highest when they use this style, as compared to other styles (Hackathorn, Cornell, Garczynski, Solomon, Blankmeyer, & Tennial, 2012). Ultimately, this suggests there is a mismatch between what we (perhaps both the learner and the instructor) prefer and what actually improves knowledge, understanding, and exam performance.
To increase our understanding of study guides, the authors of this essay, as well as other faculty members, recently conducted two separate studies (Cushen, et al., currently under review for publication), using the General Psychology population at Murray State University (MSU). In the first study, we conducted a small experiment using all of the sections of General Psychology offered during a single semester at MSU. Using counterbalancing and random assignment of sections, we compared exam performance following an instructor-provided concept list study guide to performance following student generated study guides. Then, at the end of the semester we queried students’ preferences and gave another brief quiz over material from the first two exams. Our results indicate that despite benefiting the most from creating their own study guides, students strongly prefer the instructor-provided guides.

In a second study, after we realized that we were making assumptions by limiting study guides to only concept lists and student generated guides, we simply asked our students to identify the types of study guides they prefer. In replication of the past studies that showed students tend to prefer the least helpful study tools, we found that students prefer that the instructor provide study guides that include a list of concepts, followed by definitions and examples of application. In other words, students prefer that the instructor create what ostensibly could be referred to as “their notes.” They prefer excerpts from the textbooks and simple concept lists the least, but prefer an instructor provided concept list style more than nothing at all or creating their own study guide. In examining their preferences, we realize that it is probably not happenstance that the least preferred study guide styles are also the styles that require the most effort from the student to actively summarize, organize, or synthesize course concepts.

Obviously, the next question is: What do we do with this information? We do not believe that we should “throw the baby out with the bathwater.” In Fall of 2016, the primary author of this essay attempted to explain to one class why she would no longer provide study guides, and she was almost the victim of a lynch mob. Perhaps that is hyperbole. Still, the students did not appear to believe that the lack of instructor-provided study guides was in their best interest. In hindsight, the instructor may have been too quick to implement this change. There is much more information needed in this regard.

In our initial experiment, we tested the efficacy of a concept-list style study guide. Basically, we used the style of study guide that answers the ever-present question: “What is on the test? What should I study?” Correctly using this style means that students have to then find definitions, create mental models, links, and organization, and create their own application examples. However, it is unclear how many actually do that. It is possible that, instead, students simply look at the list, recognize the terms, and think that they have studied enough to be prepared for the exam. Future research is needed to see exactly what students do with those study guides.

In that same vein, beyond not knowing how to properly use a study guide, it is also possible that students do not know how to create a study guide. Although it is important for
students to know how to facilitate their own learning, many students have defective study strategies (Bjork, Dunlosky, & Kornell, 2013). Our participants were students in a freshman-level course, with the vast majority being first-semester freshmen. Creating a study guide, especially an effective one, is hard work and takes a clear understanding of what type of information is important. Freshmen, specifically, may struggle with this skill. For example, in a recent General Psychology homework assignment, students were asked to create a mnemonic device related to neurotransmitters. The instructor was quite surprised when many of the students created an acronym depicting an arbitrary list of neurotransmitter names. Sadly, there were no exam questions that would ask them to provide a random list of neurotransmitters. Suffice it to say, freshmen may not have a strong understanding of what it takes to succeed on rigorous college-level exams.

Unfortunately, many new college students will find, perhaps too late, that their high school strategy of simply memorizing definitions will not be as successful in the college classroom. Thus, one of the first steps toward student success may involve taking time to teach them how to create good study aids. In our experiment, we do not report the types of study guides that students self-create. We can only imagine (and have discussed at great lengths) that they are probably terrible. A cursory review across a subsample of our students confirms that the vast majority of our students fail to consistently generate examples of course content and instead provide a simple list of terms and definitions or a chapter outline in their self-created guides. However, regardless of the quality of the study guides, their exam grades are still higher when they create their own study guides. As a result, even if the instructor gives students a foundation with the concept-list style, teaching them how to improve those study guides should prove fruitful. This assumes, of course, that we can convince students to try a new, potentially more intensive and effortful, study technique that they actually utilize rather than backtracking into old habits as the exam date looms closer (Dembo & Seli, 2004).

Unfortunately, it is still unclear which types of study guides are the most beneficial. Outside of the extensive work of Karen Wood (Wood, 1989; 1993), who outlines various types of study guides and their individualized purposes, there is a dearth of information regarding which types of study guides are the most effective and in which situations they are effective. The type of study guide one might use in an introductory course where students are being given a foundation for future classes is probably very different from the guide one might use in an applied research methods course in which students are practicing a skill. Thus, much more information is needed with regards to not only the general efficacy, but also the relevance and applicability of study guides across different courses and learners.

Finally, as tends to be the case in many of our classes, students sometimes appear to dislike assignments that really challenge or require effort of them. It is probably not a coincidence that students prefer the study aids that required less of their effort. And, before we all get migraines from rolling our eyes, it is important to consider that the students may not realize that this relationship exists. As an example, in a recent end-of-semester evaluation
comment a student requested the following: “I do not want to be spoon-fed the information, but it would be nice if we could be provided with a list of concepts, in order from the most important to the least important, to help us study for exams.” Clearly, this student fails to see the connection here between spoon-feeding and the study guide that they requested. Moreover, we doubt this student is alone in this desire. As such, asking students to create their own study guides may result in backlash. Importantly some, if not all, of this backlash can be reduced with transparency, communication, and rapport. However, instructors will need to assess the risk/benefit ratio of implementing a change like this.

The most surprising aspect of our research is that very few of us question our own use of study guides, even though, frankly, we tire of creating them. Many of us create these study guides because the students ask for them, or to avoid potential mutiny. Yet, as study guides have been around for so long and are so ubiquitous in higher education, very few of us inquire as to whether they work. It is important to note that this does not make us (or you) bad instructors. Care and efforts for students in any form should never be disregarded. In fact, we suspect that there are myriad instructors who have found ways to improve the effectiveness of study guides, but have yet to publish them. Thus, this essay is a mere call to action. Help us, help them; help us, help ourselves.

References


As part of a college-wide “theme semester” on mindfulness in spring 2016, we incorporated mindfulness into four psychology classes. Here we share our experiences with regard to course design, assignments and activities, and student feedback. For instructors who are considering including mindfulness and/or meditation in psychology courses, we conclude with a reflection and overall assessment of what went well and what could be modified for the future, integrated with the results of our research on mindfulness in the college classroom.

Defining Mindfulness and Its Relevance to Education

A prominent definition of mindfulness in contemporary psychology is “paying attention... on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 1994, p. 4). Mindfulness has received much attention recently, in the research literature and elsewhere (for an overview, see Curtiss & Hofmann, 2017). Studies have suggested benefits of mindfulness to physical health (e.g., pre-hypertension; Hughes et al., 2013), mental health (e.g., subjective well-being; Sedlmeier et al., 2012), and cognitive performance (e.g., working memory; Mrazrek, Franklin, Phillips, Baird, & Schooler, 2013).

Increasingly, researchers are studying mindfulness activities in elementary and secondary schools (e.g., Black & Fernando, 2014; Britton et al., 2014; Mindful Schools, 2017). Research is just beginning to emerge on the effects of mindfulness in the college classroom (e.g., Helber, Zook, & Immergut, 2012; Ramsburg & Youmans, 2014).

In the next two sections, each author provides a first-person narrative of her experiences integrating mindfulness into psychology courses.

Cognitive Psychology Courses (JM)

I approached this semester with enthusiasm about mindfulness, but a lack of experience. I decided to commit to a regular practice of mindfulness exercises (10 minutes daily) using Headspace (https://www.headspace.com/), which helped bring a degree of authenticity (and confidence) to my courses, and also personal benefit in terms of well-being and focus.

In integrating mindfulness into Cognitive Psychology, a mid-level undergraduate course, I added a section that defined mindfulness to my syllabus, connected mindfulness to other topics in the course (e.g., perception, attention, memory, decision-making), and invited students to engage in meaningful study and practice of mindfulness throughout the semester. I added a course learning objective connecting mindfulness to metacognition: “Improve your
metacognitive skills (knowing what you know, learning how to learn), through traditional book learning and through mindful practice and reflection.” (Syllabi for courses discussed in this essay are available by request.)

On the first day of class, I asked students questions about mindfulness to gauge pre-existing knowledge and practice, before their first mindful meditation exercise (Day 1 of Headspace). At least once per week, class included 5-10 minutes of guided mindfulness exercises. To prepare students, I asked them to arrive on time, to listen to instructions, and to be still and quiet during the meditation time. I assured them that it was okay not to engage in meditation. I emphasized that in addition to possible personal benefits, the exercises might provide insight into research we would read on mindfulness and cognition.

Throughout the semester, I chose short guided exercises for class use, including several from the UCLA Mindful Awareness Research Center (http://marc.ucla.edu/body.cfm?id=22) and Mindfulness for Teens (http://mindfulnessforteens.com/guided-meditations/). Some were sitting exercises and some were standing; some had longer periods of silence and some were narrated throughout. Whenever possible, I connected the mindfulness activity to the course topic (e.g., body scan meditation for Attention; guided visualization for Visual Imagery). One day we went outside and I guided students through an exercise to focus on aspects of the environment (e.g., colors, shapes, movement; from a training session with Dr. Philippe Goldin).

Regarding assessment, I revised my existing article summary and reflection assignment to focus on research that related mindfulness/meditation to course topics. For each article, students completed this form and engaged in group discussions during class. I quickly discovered that there were not many published articles about the impact of mindfulness on cognition that were appropriate for students in a mid-level undergraduate course.

For the topics Perception and Attention, I assigned half the students an article about enhancing visuospatial processing using varieties of meditation (Kozhevnikov, Louchakova, Josipovic, & Motes, 2009), and the other half an article about improvements in perceptual discrimination and sustained attention following meditation training (MacLean et al., 2010). With respect to Memory, I assigned half an article about how brief mindfulness training can improve verbal GRE performance as mediated by enhancing working memory (Mrazek et al., 2013), and the other half read about increases in false memory after meditation (Wilson, Mickes, Stolarz-Fantino, Evrard, & Fantino, 2015). For the final topics in the course, Reasoning and Decision-Making, students read an article about reductions in the sunk-cost bias after meditation (Hafenbrack, Kinias, & Barsade, 2014).

When I compared responses to mindfulness questions on the first and last days of class, the percentage of students providing a reasonably accurate definition of mindfulness jumped from 10% to 68%, and the percentage listing cognition-related benefits of mindfulness went from 17% to 59%. However, there was no change in the reported practice of mindfulness/meditation, nor in the perceived importance of the scientific study of mindfulness.

I also incorporated mindfulness into my upper-level course, Seminar in Cognition, Teaching, and Learning. I began this class with an assignment to watch Andy Puddicombe’s TED talk as an orientation to mindfulness (https://www.ted.com/talks/andy_puddicombe_all_it_takes_is_10_mindful_minutes?language=en); to watch the introductory Headspace video; and to complete Day 1 of Headspace’s free “Take 10” program. Students were asked to commit to 10 minutes of guided meditation per day for the next 10
days, then to submit a written reflection. In their reflections, every student expressed openness to the possibility of trying meditation, and for all but 2 students (out of 18), this would be their first experience with it. However, their reflections after 10 days were less encouraging – due perhaps more to time management issues than anything. Although it was a required assignment, many did not find time to complete the program.

Later in the course, I assigned articles focusing on mindfulness and meditation. Students read an article about the neuroscience of mindfulness and mind-wandering, with implications for education (Immordino-Yang, Christodoulou, & Singh, 2012). They also read and discussed the article on working memory and GRE performance used in Cognitive Psychology (Mrazek et al., 2013). This class day was purposefully scheduled to coincide with Mary-Helen Immordino-Yang’s on-campus lecture, which students were encouraged to attend.

About five weeks into the semester, we launched a collaborative class project to collect an annotated reference list of resources on mindfulness for educators. Students used library and web applications to search for resources, then built a shared document. The final product was a 16-page file containing primary research articles, review/critique articles, books and book chapters, popular press articles, and web sites relevant to the topic of Mindfulness and Education (http://blogs.goucher.edu/themesemester/files/2016/04/Mindfulness-and-Education-Resources-Sp16.pdf).

Though I did not collect formal data in this course, students generally demonstrated interest and enthusiasm. Even given the density of some of the readings on mindfulness, there was a good amount of energized discussion. Also, I was impressed by their active participation in the collaborative project and felt this was a meaningful and authentic learning experience.

Health and Clinical Psychology Courses (DFW)

Mindfulness seemed a natural fit for my mid-level course in health psychology. Indeed, the topic had come up organically in years past, through a project in which students choose a health behavior to change, using empirically-informed strategies – many students chose to adopt a meditation practice. Spring 2016 was no exception, as several students took on this challenge, availing themselves of tools and apps (e.g., Headspace, Calm) as part of their strategic behavior change project.

I incorporated a mindfulness-related learning objective into the course: by the end of the semester, students should be able to “describe mindfulness and its health-related benefits.” Mindfulness was woven into several sections of the course. At the start of the course, where we usually focus on what health psychology is, students also read a brief overview of mindfulness (Kabat-Zinn, 1994), allowing us to operate from a shared conceptualization of mindfulness and to relate it to mental and physical health.

The health psychology course includes a community-based learning component in which students work collaboratively with staff from Hopewell Cancer Support (a local organization providing psychosocial services to those affected by cancer – including some related to mindfulness), to address particular challenges faced by the non-profit. Because of this collaboration, we discuss cancer early in the class, as well as the research on psychosocial interventions for cancer. Here students read and discussed an article on Mindfulness-Based Cancer Recovery (Tamagawa et al., 2015). Later in the class, as part of our stress and coping
topic, we read and talked more broadly about mindfulness and health, reading a review article on mindfulness-based treatments (and research on their effectiveness) for a variety of health conditions (Carlson, 2015). These readings were brought into the classroom in a variety of ways: sometimes we would discuss the articles as a large group, or in small groups. Sometimes I would start class by projecting a short list of thought questions on the screen about the reading and would ask students to write for a minute or two about each question, before getting into groups to discuss one of the questions in more depth.

Throughout the semester, the mindfulness-related events on campus were brought into the class, through an “event-reporting” assignment. Specifically, students were asked to sign up to attend one of 6 events on campus or in the community during the semester (four of which were mindfulness theme semester speakers Mary-Helen Immordino-Yang, Omid Safi, Alicia Garza, and Dan Siegel), and to report back to the class about what they had heard. Their reports were informal and included (a) biographical information about the speaker (obtained from the event or through Internet research), (b) the main point or points of the talk, (c) the types of “evidence” used to make those points (case examples, personal experience, research...), and (d) how the event related to the field of health psychology or to specific topics covered in class.

I conceived of the “event reporting” assignment as a way to encourage attendance at these events without insisting that all students attend them all (unrealistic, given schedule constraints), and as a way for the whole class to get some benefit from each talk. In addition, I wanted students to think actively about the events they attended, including identifying the speaker’s main point(s) and the different types of arguments that can be made (based on different “ways of knowing”). I was so pleased with this assignment that I have used it again since.

During the theme semester I also taught an upper-level course, *Seminar in Clinical Psychology: Emotion Regulation*, which has always included readings about, experiential activities with, and discussion of mindfulness. During the mindfulness theme semester, I incorporated mindfulness into one of the existing learning objectives, stating that students would be able to “discuss a variety of emotion regulation strategies (including mindfulness) and evaluate their adaptive and maladaptive aspects.”

In previous iterations of the course, I had introduced students to the practice of mindfulness by conducting part of Jon Kabat-Zinn’s (2006) eating meditation (mindfully attending to a raisin). This semester, I increased the experiential coverage of mindfulness, inviting the class to engage in “Mindful Mondays,” a collection of activities that allowed us to try a variety of purported mindfulness inductions, and to compare and contrast them. I started a shared document and invited students to construct the list of activities collaboratively. Several students added activities but requested that I (or a guide on a video) lead the class through them (e.g., a brief chair-yoga routine intended for the workplace); others proposed activities that they led themselves (e.g., a walking meditation, based on an experience a student had had at a monastery while studying abroad). The ultimate list included activities from the more traditional raisin meditation and a body scan to “mindful creative expression” and coloring. We sometimes left our seats (to do yoga or sit on the floor), and we sometimes left the classroom (to do the walking meditation on the campus’s labyrinth).

These exercises were voluntary; students could arrive five minutes late to class on any given Monday, if they did not wish to participate in an activity. Generally, though, attendance
was excellent, and students seemed enthusiastic about Mindful Mondays (indeed, I proposed such a thing to my seminar the subsequent semester, and they, too, chose to partake). Discussions following the practice focused on topics such as whether or not the effects of the exercises felt subjectively like mindfulness (per the attentional and attitudinal components of the definition), whether or not there might be inadvertent harms associated with these activities, whether some people might benefit from some types of mindfulness more than others, and what characteristics might predict positive experiences with which activities.

During the theme semester, the class dug more deeply into the scholarly literature on mindfulness, as well. The class has long included a reading on third-wave cognitive behavioral interventions that provides a nice overview of mindfulness as it is incorporated into these treatments (Baer & Huss, 2008). This semester we also read pieces focused on the emotional benefits of mindfulness (Arch & Landy, 2015) and on mindfulness and emotion regulation (Corcoran, Farb, Anderson, & Segal, 2010; Leahy, Tirch, & Napolitano, 2011).

Near the end of the semester, I asked students to create “concept maps” of mindfulness, in an attempt to integrate the varied aspects of mindfulness that we had read about, discussed, and experienced. Students worked on blank paper, and then volunteered to have their concept maps projected, so that the class could discuss the various components of mindfulness and associated constructs. While each of these concept maps was of course different, they all reflected the complexity of the concept, and I believe that by the end of the semester students showed substantial improvement in their understandings of the construct of mindfulness as used in contemporary clinical psychology.

Our Research, in Brief

Separate from the theme semester courses, we have conducted systematic research on mindfulness in the college classroom (importantly, no data were collected during the theme semester). In our study, students in psychology, chemistry, peace studies, and English classes followed a 5-minute guided meditation (an edited mp3 file; Kabat-Zinn, 2005, used with permission) at the start of class. Within-subjects analyses found no benefits for working memory, content retention, mindful awareness during class, or elaboration, at the end of a 4-week period in which students followed the guided meditation, as compared to a 4-week period in which they did not. While we refer interested readers to the full research report (Friedman-Wheeler et al., 2017), we want to share some thoughts about how such an exercise might be beneficial, with adjustments.

For one, it may be that students who weren’t interested in participating actively did not (although they did sit quietly during the meditation period). It may also be the case that five minutes is not the appropriate dose of meditation for the classroom. Perhaps one minute of silent meditation would be better-suited to the classroom setting (and feel more do-able to students). On the other hand, perhaps five minutes three times a week is an insufficient dose, though a larger dose would consume more class time than instructors might wish.

Perhaps student buy-in and benefit are enhanced when more context is provided, as was done in the theme semester courses described in this essay. There is an obvious risk of demand characteristics, but perhaps those with a greater understanding of mindfulness might
derive more benefit from it than those who participate in an exercise without fully understanding why.

**Conclusion: Opportunities and Challenges for Mindfulness in Psychology Courses**

From an academic perspective of encouraging undergraduate students to learn about the science of mindfulness, readers should bear in mind that the level and quality of available readings are varied. For example, while there is ample scholarly work on mindfulness in clinical and health psychology, there is less research suitable for undergraduates related to cognition. Overall, there is a need for more research on mindfulness and learning in higher education. As noted above, the results of our research study suggest no measurable impact of brief in-class interventions on variables related to academic performance, though others have found benefits (e.g., Helber, Zook, & Immergut, 2012; Ramsburg & Youmans, 2014).

From a class-time-management perspective, we experienced challenges balancing mindfulness exercises with other activities and content. We found that exercises between two and ten minutes long can work well—and incorporating mindfulness is made far easier by the availability of short mindful meditation exercises online, including those that can be guided by the instructor, and those that are pre-packaged to be presented in video and/or auditory format.

From a student-engagement perspective, we found that many students were “on board” with the idea of using a small amount of class time to practice mindfulness. However, some seemed disengaged.

From a student mental health perspective, though there is research suggesting mindfulness practice may lead to improved mental health, we also noted the potential for negative affect—irritation or boredom, or in some cases, perhaps feelings of being overwhelmed (as might happen to some survivors of trauma; Briere & Scott, 2012). We handled these possibilities in this several ways: (1) permitting students to not attend the mindfulness portion of class and/or to leave the room as needed; (2) reminding students that no one can be forced to meditate, and that they can choose to ignore the instructions and sit quietly during the exercises.

In sum, there are many opportunities for bringing the science and practice of mindfulness into the undergraduate classroom, and the potential seems great. There are, however, challenges to be explored and better understood, as we seek creative ways to connect our students with mindfulness so that they might benefit from it intellectually and personally.

**Authors’ note**

As noted above, copies of the syllabi mentioned may be obtained from Jennifer McCabe (jennifer.mccabe@goucher.edu).

**References**


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Peter Frost (Ph.D., Baylor University) is Professor of Psychology at Southern New Hampshire University (SNHU) and a Steering Committee member of the New England Psychological Association. He has been a recipient of the SNHU Excellence in Teaching Award and the SNHU President’s Merit Award. He is a firm believer that undergraduate Psychology majors should collaborate with faculty on original research projects. His current projects with students focus on the effects of using mobile devices on various aspects of higher cognition. Other studies have explored how personality relates to susceptibility to false memory and how faulty reasoning can alter autobiographical memory.

Ellen Furlong is an Assistant Professor in Psychology and Director of the Comparative Cognition Lab at Illinois Wesleyan University. She received her B.A. in Mathematics from Transylvania University and her Ph.D. in Psychology from The Ohio State University. Before joining the faculty at Illinois Wesleyan University in 2013, she served as a postdoctoral fellow at Yale University. Ellen has taught several courses with "flipped" components including a survey level fully online course, a writing intensive research methods course with flipped lectures, and a team-taught, cross-institution (Illinois Wesleyan and Transylvania Universities) May Term travel course with flipped lectures and skyped class sessions.

Dr. Jana Hackathorn, Dr. Amanda W. Joyce, and Dr. Michael J. Bordieri are all junior faculty at Murray State University in Murray, KY. Between them, they study everything from close relationships to inhibition in children, from sex to mindfulness, and of course from pedagogy to teaching effectiveness. Last year, the entire junior faculty in Psychology at Murray State (there
are a total of eight of them) pooled their efforts to conduct a study examining a topic for which they had all complained: student demands for study guides. As a result of the study, they bonded, resulting in much happier happy hours and a very functional, albeit odd, departmental atmosphere.

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Jennifer A. McCabe is an Associate Professor of Psychology, and director of the Center for Psychology, at Goucher College in Baltimore, MD. She earned her Ph.D. in Cognitive Psychology from the University of North Carolina at Chapel Hill. She teaches courses on human cognition, as well as introductory psychology. Her research focuses on memory strategies, metacognition, and the scholarship of teaching and learning. She has been recently published in Memory and Cognition, Psychological Science in the Public Interest, Teaching of Psychology, Instructional Science, and Psi Chi Journal of Psychological Research. Supported by Instructional Resource Awards from the Society for the Teaching of Psychology, she has also published two online resources for psychology educators on the topics of mnemonics and memory-strategy demonstrations. She is a consulting editor for Teaching of Psychology.

Amanda K. Sommerfeld, Ph.D. is an Assistant Professor of Psychology at Washington College in Chestertown, MD. She earned her doctorate in Counseling Psychology from University of Wisconsin-Madison, after which she was an Assistant Clinical Professor at Boston University and an Assistant Professor at Wayne State University. At Washington College Dr. Sommerfeld predominantly teaches courses that comprise the clinical/counseling concentration of the psychology major, including Theories and Processes of Counseling, Psychopathology I, Multicultural Counseling, and various special topics courses. Dr. Sommerfeld’s research examines the ways in which personal and contextual factors affect educational pathways and occupational outcomes, especially for lower income students. In particular, she examines how intra- and inter- personal factors are fostered within and outside of schools and how these factors lead to educational and occupational advancement.

Megan Sumeracki is an Assistant Professor at Rhode Island College. She received her Master’s in Experimental Psychology at Washington University in St. Louis and her PhD in Cognitive Psychology from Purdue University. Megan’s area of expertise is in human learning and memory, and applying the science of learning in educational contexts. Megan is passionate
about bridging the gap between research and practice in education. In an effort to promote more conversations between researchers and practitioners, she co-founded The Learning Scientists (www.learningscientists.org). Her research program focuses on retrieval-based learning strategies, and the way activities promoting retrieval can improve meaningful learning in the classroom. Megan addresses empirical questions such as: What retrieval practice formats promote student learning? What retrieval practice activities work well for different types of learners? And, why does retrieval increase learning?

**Yana Weinstein** is an Assistant Professor at University of Massachusetts, Lowell. She received her PhD in Psychology from University College London and had 4 years of postdoctoral training at Washington University in St. Louis. The broad goal of her research is to help students make the most of their academic experience. Yana's research interests lie in improving the accuracy of memory performance and the judgments students make about their cognitive functions. Yana tries to pose questions that have direct applied relevance, such as: How can we help students choose optimal study strategies? Why are test scores sometimes so surprising to students? And how does retrieval practice help students learn? She recently co-founded The Learning Scientists (www.learningscientists.org) with Megan Smith.
About the Editors

William S. Altman is a Professor in the Psychology and Human Services Department at SUNY Broome Community College. Dr. Altman earned Ph.D. and M.S. degrees in Educational Psychology and Measurement, and an M.P.S. in Communication Arts (Organizational Communication) from Cornell University, as well as a B.A. degree in History from the University of Pennsylvania. His research interests include effective teaching and learning, and creativity. He currently serves on APA’s Board of Educational Affairs General Psychology Summit Steering Committee. Beginning in January 2018, Bill began service as the Vice President for Resources for the Society for the Teaching of Psychology. He is about to complete six years of service as the Coordinator for STP Programming at NITOP (the National Institute on the Teaching of Psychology), and has just completed his service as the co-editor of STP’s *E-xcellence in Teaching*. He also served as chair of the STP Presidential Task Force on *Psychology in the Communities*, and as Co-Chair of the CABE Task Force on *Top 20 Principles Guide for Undergraduate Education*. Bill has also been the consulting editor for two introductory psychology textbooks, and has created numerous learning and teaching materials for several publishers. In addition to his scholarly publications and presentations, Dr. Altman has written for several non-scholarly publications, spent over a decade sharing information about education, technology, and psychological science on local radio, been a professional photographer, and photojournalist, and performed in theater and as a standup comic (ostensibly to work on classroom presentation skills, but mostly because it's fun). In addition to presenting many workshops and seminars about effective teaching and learning, he has also contributed over a dozen videos on effective teaching, as part of the *Wadsworth Guest Lecture Series*. Dr. Altman also consults on the development of effective teaching materials and techniques for applications in other fields. For example, he assisted the New York State Department of Environmental Conservation in developing their training manual for nuisance wildlife control operators (available online at [http://nwco.net](http://nwco.net)) and in creating and validating their statewide licensing test. Most recently, with award-winning science fiction author Jill Shultz, he has been offering workshops to train fiction writers and actors to use psychological science for character development. Bill Altman is driven by a wide and unpredictable curiosity, an almost pathological need to solve problems, and a sense that it all ought to be fun. More information about Bill Altman is available at his website, [williamaltman.info](http://williamaltman.info).

Lyra Stein is currently a faculty member in the Psychology department at Rutgers University. Dr. Stein earned a B.S. degree in Psychology and Biochemistry and Molecular Biology from Rutgers University, an M.S. in Neuroscience from Albert Einstein College of Medicine and an M.S. and Ph.D. in Social Psychology from Rutgers University. Her research interests include performance and learning in relation to personality orientation. Dr. Stein is currently the co-chair for the Society for the Teaching of Psychology’s (STP) early career psychologist committee, serves as a co-editor of STP’s *E-xcellence in Teaching* and is an associate editor for the journal *Current Psychology*. In addition to publications, presentations and advising student projects, Dr. Stein consults on instructor resource manuals and testing materials for a variety of psychology
textbooks. She is currently working to enhance online education and online course conversion, including the Rutgers University signature course Soul Beliefs. In 2012, Dr. Stein won the Rutgers University award for distinguished contributions to undergraduate education and, in 2016, she received the STP early career psychologist award for professional development. Dr. Stein has also developed many new classes including Psychosocial Foundations of Medicine, Myths and Misconceptions in Psychology and Psychological Themes in Modern Film.

Jonathan E. Westfall is an Assistant Professor of Psychology, the Coordinator of First Year Seminar, the Coordinator of the Psychology Program, and the Coordinator of Okra Scholars at Delta State University in Cleveland, Mississippi. A native of Ohio, Dr. Westfall earned his B.A. in Psychology at The University of Akron, and his M.A. and Ph.D. in Psychology at The University of Toledo. After finishing his Ph.D., he spent 3 years as the Associate Director for Research and Technology at The Center for Decision Sciences, at Columbia Business School in New York. Dr. Westfall’s research is centered around judgment and decision making, specifically individual differences and consumer financial decision making. In addition to his work in psychology, Dr. Westfall is also a Microsoft Certified Systems Engineer on the Windows 2000 platform, and an active writer and editor in the field of information technology. More information on his activities, both within psychology and technology, can be found on his blog at JonWestfall.com.