

Title: Transforming a traditional lecture-based course to online and hybrid models of learning

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Summary: A professor re-designs her traditional lecture-based cognitive psychology course and creates two different kinds of courses: a fully online format and a hybrid format.

Background

PSYC 318 is an undergraduate cognitive psychology course that focuses on the scientific study of human cognitive processes. I have taught this course a number of times in a lecture format. In Spring 2012, I launched PSYC 318 as an online course for the first time. In Fall 2012, I retained the online version of the course as well as developed a hybrid version of the same course, teaching two different sections simultaneously. The current portfolio focuses on the two versions of Cognitive Psychology that I taught in Fall 2012.

There were approximately 30 students in the online course and 120 in the hybrid course (the latter met twice a week at the regularly scheduled lecture time). PSYC 318 is one of the core psychology courses required for majors and is an elective for minors. It also appeals to a wide range of students outside of psychology because it deals with human cognition. I often have a handful of students from architecture, engineering, journalism, and business enrolled in the course.

When I taught this course in the past in a lecture format, I typically had one large section, often with over 300 students. Due to the large class size and having only one teaching assistant, I did not incorporate a lot of writing assignments. I evaluated student learning using online Blackboard quizzes and multiple-choice exams administered during class time. I was troubled by the lack of writing in the course and wanted to re-design it to include more writing assignments. Students were also frustrated at not being able to express their knowledge and thoughts in multiple formats. Many students suffer from test anxiety and perform poorly when faced with a limited number of exams that carry a great deal of weight. Those same students might excel when asked to write about a topic, showing a deep understanding of the concepts. I believe that writing is an important part of a college education, not just for developing communication and writing skills, but also for working on critical thinking skills. With this in mind, I re-designed the course and developed new writing assignments for the initial online course (in Spring 2012), which I have incorporated into both Fall 2012 courses (online as well as hybrid versions).

I was very pleased with the end product of the initial online course. It was well-organized but had the potential to become even better. As I tried some of my new materials (e.g.,

weekly written assignments), I saw students struggle with questions that I thought were clear and straight-forward. I also witnessed students demonstrating a depth of understanding that I was never aware of when teaching a large lecture section. It was eye-opening and rewarding. Probably the biggest success to come from that first semester of teaching online was that it forced me to think about my course and the material differently. I tried to organize it in a way that would be more intuitive to the student so that the course content was easily navigated. This wasn't necessarily the way I thought about the material or how I had taught it for years, but rethinking that organization renewed my enthusiasm for some of the material, as well.

The move to a hybrid version for my lecture class in the Fall of 2012 was a natural one. I had improved the course greatly and had the foundation built for a hybrid version where students were responsible for some of the material outside the classroom, which would free up time during class meetings. I was excited to include more dynamic activities during class instead of simply lecturing. We could now do demonstrations so that students could see cognitive phenomena first-hand and understand why their minds work in certain ways. We could discuss these demonstrations, which meant my students were more actively involved in their learning as opposed to passively listening to me talk.

I (re)designed both versions—online and hybrid—of the course with the following goals in mind:

- Understand basics of Cognitive Psychology
- Spark an interest in Cognitive Psychology
- Connect course materials to everyday lives
- Foster critical thinking and writing skills
- Be a critical consumer of information

Implementation

I will first discuss some of the ways in which the online and hybrid courses differ, and then discuss common methods of evaluation used across both sections.

Online course

When I first began to develop the online course, I re-visited my course goals, and using a process of backward design, considered the course content and methods of evaluation that I needed to facilitate and measure students' achievement of those goals. I realized that I did not need to be completely exhaustive and cover *everything* in Cognitive Psychology. Instead, I decided to focus on the material that best aligned with my course goals. In doing so, I chose material that would offer the greatest diversity in representing Cognitive Psychology as a field and would spark student interest. Moreover, I needed to think about how to organize the course material in a way that would not be too overwhelming for students as they were no longer going to be led through it during class time. I worked with the Center for Distance and Online Learning and developed online lectures that students could navigate at their own pace.

****Please click here to view examples of my online lectures.****

Hybrid course

I used my online course as a starting point for developing the hybrid course. I already had all the material online, so I began by deciding what material I wanted to use in-class that would make for interesting discussion and group learning activities. I decided to use some of the online lectures to free up class time for those discussions and activities. For example, as part of a class on memory and mnemonic devices, we had our own memory competition during class. I had students read an article outside of class about the U.S. Memory Championships and then asked them to come to class with a detailed mental map of some location in which they could mentally store a list of words. In class I gave them five minutes to study and memorize a list of 40 unrelated words, presumably by mentally "placing" their words in the mental map. I then proceeded with my lecture, and after 10-15 minutes I asked students to recall the 40 words that they studied. They were amazed at their very high levels of performance and saw firsthand how they could organize, store and retrieve information effectively. A handful even had perfect performance! We then talked about the memory process and how elaboration and visualization can be used to improve recall. Since students had already come prepared to do this exercise, they were more engaged in class and actively participated in the class discussion on memory.

In another class demonstration, I asked students to bring their wireless devices to class for data collection and reporting. I had them complete a classic experiment on the Stroop effect, which demonstrates the influence of an automatic cognitive process (reading a word) on a more controlled cognitive process (naming the color of the ink in which the word is printed). Students worked in small groups and took turns timing each other doing the task. They then posted their reaction times using their laptops, smart phones, or tablets to our class website. My teaching assistant compiled the data as it was being

reported, and we were able to immediately look at it during class and see their results. This led to a discussion about automaticity and cognitive resources, including the benefits and drawbacks of various tasks being automatic and not under our cognitive control.

Along with the lectures, in both hybrid and online versions, I provided students with links to Internet resources (some of which came with the textbook), such as online study materials, demonstrations of cognitive phenomena, and popular press reports that focused on some of the course concepts.

Methods of assessment

My course material is divided into 10 sections, and there is a written assignment, quiz, and lecture material for each section.

The grading system for both versions of the course is based on two areas: *Mastery* of concepts and *Effort* on the coursework. Students must do well in both categories to achieve a high grade. Mastery of concepts is measured using quiz and exam performance. Effort is based on pass/fail scoring of students' weekly written assignments.

As part of the Mastery grade for both courses, I created online quizzes that students had to complete for each chapter in order to evaluate their familiarity with concepts and to give students an opportunity to gauge their mastery of the material prior to taking an exam. The quiz is available to them the entire time we are covering a certain section of material, and students can take it as many times as they like in order to achieve a perfect score. The ten quizzes throughout the semester are equivalent to 25% of their Mastery grade, so students are encouraged to continue to interact with the material during each section until they master it. There are also three regular online exams throughout the semester, in addition to an optional comprehensive final exam that can replace a low regular exam score if students so choose. Exam performance makes up the other 75% of the Mastery grade.

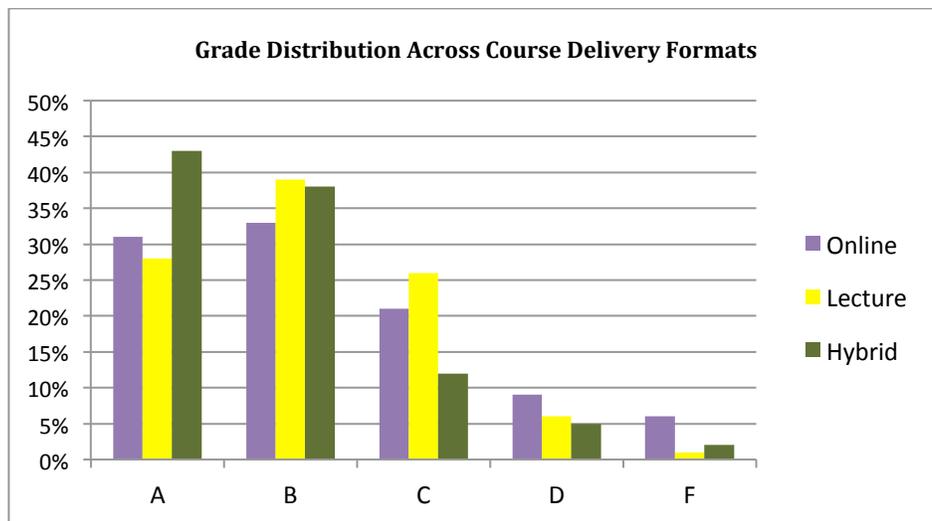
The Effort portion of the course involves the satisfactory completion of **weekly written assignments**. The assignments are intended to foster critical thinking and deeper analysis of the concepts discussed in each section of material. I developed detailed instructions that guided students in what was expected for each assignment. Not only did these detailed instructions help students achieve my expectations, but they made the objective evaluation of each student's work much easier and something that could be completed by a TA in the larger hybrid section of the course. Assignments were graded on a pass/fail basis, so students received credit if they met the objectives outlined in the assignment each week.

Student Performance

After teaching the online and hybrid versions simultaneously, it is interesting to look at the differences in performance between the two sections. The hybrid class resulted in **higher Mastery** scores compared to the online section. The Mastery score reflects performance on the quizzes and exams. The median Mastery for the hybrid class was 84%, whereas it was 80% for the online class. Differences also emerged between the classes when looking at the Effort score, which is the number of written assignments completed out of ten throughout the semester. Once again, the hybrid class had **higher Effort** scores compared to the online course. The median for the hybrid class was 9, whereas the median for the online class was 8.

Click here to look at examples of student work from the online and hybrid course (on a weekly assignment).

I also examined the final grade distribution between the two types of classes (hybrid versus online), as well as compared those grade distributions to one from the traditional lecture course I have taught in the past. The data are presented in Figure 1. I have taught the online version twice, so I added the two classes together to increase the number of observations (n=70 for the online sections in Spring and Fall 2012). I used the data from two large lecture classes in Spring 2010 and Spring 2011 (n=528 combined). And finally, I had a sample of 114 for the hybrid class (the Fall 2012 section). I first compared the percentage of students earning an A or B in the three class types. The online distribution showed 64% of students at this level, the traditional lecture had 67%, and the hybrid class was much higher at 81%. When looking at the other end of the distribution, the online classes had 14% of students who ended the semester with a D or F, the lecture version had 7%, and the hybrid class resulted in 7% of students at this level.



Clearly there are differences in performance among the various formats, with the hybrid version resulting in the best overall performance and not much difference, at least at the upper end of the spectrum, between online and traditional lecture formats. Differences do

exist, however, at the bottom of the distribution between online and lecture classes, with more online students scoring poorly. The cause of these differences is unclear. The Fall 2012 online course was originally supposed to be a small lecture section taught by another instructor who had to take a medical leave of absence. I picked up the course at the last minute and the Psychology department made it an online class to prevent a conflict in my schedule, to avoid cancelling it, and to continue to give students the option of taking it that semester. Therefore, the online students may not have really wanted or been prepared for the online experience, which requires a certain amount of self-motivation and planning. Their performance may have suffered as a result. Indeed, the performance of the Fall 2012 class (the impromptu online class) was lower (A&B=58%, D&F=19%) than the Spring 2012 class (the planned online class; A&B=68%, D&F=11%), which pulls down the combined distribution percentages reported above. I think the data from the two online sections must be interpreted with caution for this reason. As more students complete the online course, a better picture of typical performance from this format may emerge.

It is also possible that having regular contact with me and/or the TA resulted in better performance for the hybrid and lecture classes as compared to the online classes, because of reminders about due dates or interactions that helped to further understanding of the material. In comparing the hybrid and online versions, while the basic material and requirements were the same, the hybrid class got more opportunities to do interactive activities: more in-class exercises and demonstrations, in-class discussions, in-class exam review sessions, and opportunities to network during class to form study groups for out of class interaction.

Overall, I was very pleased with the results from the hybrid class but somewhat disappointed with the performance of online students, at least from the Fall 2012 semester. The process of putting the class online in Spring 2012 is what made the hybrid version possible, and I think that the online format definitely serves a certain population of students that it is important to reach. However, the learning environment that the hybrid students experienced and resulting depth of understanding that they displayed suggests that these two formats are unequal in terms of outcomes as well as student experience.

Reflections

In comparing the hybrid and online courses, I found that students had more content related questions in the hybrid and lecture courses. Students had a greater number of interactions with me and with their peers when there was a physical meeting. Based on this, I think I need to create more opportunities for students to interact in an online course. For instance, for the next round, I plan on using a discussion board. However, I am still unsure about how to use this. Students take online classes because they are convenient for a variety of reasons: location, schedule, etc. Requiring everyone to log on at a certain time so we can “mimic” the classroom experience is probably unrealistic. Yet, an online discussion board simply is not the same as the dynamic conversations you get from everyone being together at the same time.

I am teaching the same class as an online course in Spring 2013. I plan to incorporate some of the activities (e.g., class demos) that I did in the hybrid class in Fall 2012—where we collect class data and use web tools to compile it so that everyone can see the results. This might increase engagement and a connection that students feel to others who are enrolled. I also want to add discussion groups, but have not incorporated them into the regular grading requirement of the course because I first want to see how they work. I might use them as an extra credit opportunity or a way to make up a missed assignment. I am still mulling it over and will see where they might fit in well as the semester progresses.

For the hybrid class, I had several attendees who continuously participated and made the classroom environment inclusive and engaging. However, because so much material was online, there were some students who never attended class. Given that the classroom activities were designed to provide more in-depth understanding the course material, I believe that these students, ones who just relied on the online material, got only a superficial grasp of the course content. Since I did not take attendance, I do not have the data to show the association between attendance and level of understanding (demonstrated by performance in assignments and exams). For the next round, however, I am considering taking attendance to not only encourage students to come to class but also to have the data to demonstrate the relationship between attendance/participation and performance in class.