

## Course Projects and Signature Work

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### Background on the Course and Assignment:

My PSYC 349 Physiological Psychology course is a requirement for Neuroscience majors and an upper division elective for Psychology majors. I teach the course as a student-led seminar where students read primary journal articles. The course is focused on learning skills and attitudes necessary to become an independent learner, rather than memorization of information. In particular, we focus on reading information critically, how to find answers when you encounter unfamiliar information, synthesizing new information with what is already known, and communicating about difficult material with peers.

The term project for the class is similar to a **grant proposal**. The paper has two parts: (1) a **background review** and (2) a **future directions** section. The background review describes what is currently known about the student's topic of interest. It should be focused and the information should lead directly to an important question that the student believes remains unanswered. In the future directions section, students state a hypothesis and propose experiments to investigate the question, describing the model system they would study (and why), the method(s) they would use to answer the question, and expected results.

Finally, students create a poster that summarizes the most important parts of their grant proposal project and present their work to other students, faculty, and guests at a poster session during finals week.

### Project Details:

#### Structuring experiences to prepare students for signature work

1. Give students opportunities to learn how to develop research questions and hypotheses and appropriate methods to test those hypotheses.
  - a. Students can be asked to explicitly outline the arguments made by researchers from the introductions of journal articles assigned for the class.
  - b. How do researchers use previous findings as premises for their own hypotheses?
  - c. This is the most challenging part of the assignment for students → using evidence to lead directly to a logical research question and hypothesis.
2. Incorporate low-stakes opportunities for students to communicate about their project.
  - a. The class is discussion-based and student-led, so students get a lot of practice, in general, using scientific terms as they talk about experiments with one another.
  - b. Students also engage in discussions specifically about their grant proposal project. In groups of ~3, they take turns describing the background research, hypothesis, and ideas for testing the hypothesis.

#### Give students ownership of the project

3. Students choose their topic and define the problem.
  - a. Don't do this too early in the term. Students learn *a lot* about how to think about the grant proposal assignment through the reading and outlining assignments that happen in the first few weeks of class.
  - b. Students choose a topic and initially provide 4 annotated sources. They can choose any topic as long as it relates the brain to cognition/behavior. I provide feedback – usually encouraging the student to narrow their topic so that the scope of the project is manageable.
  - c. Since this is a required course for NSCI majors, it is usually a topic that deeply interests them and/or relates to their future career plans.

- d. The only constraint on their research question and hypothesis are that they must be supported by the literature presented in the background section of the grant proposal.

### **Make the process authentic to tap into student motivation**

4. Format/Framing of the assignment
  - a. Describing the assignment as a grant proposal immediately presents it as a useful skill that students may need to use in their future careers.
5. Brainstorming with other students
  - a. I remind students that science is a very collaborative process. In the real world, researchers engage in discussions with lab mates and other colleagues to refine ideas and decide how to approach problems.
  - b. After students have written a draft of their background identifying previous literature and their research question, they explain their problem in small groups (~3 students) and brainstorm possible ways to test their hypothesis. Which model systems and methods would be appropriate?
  - c. These discussions bring multiple perspectives to the problem solving: ideas from students' experiences in other classes, internships, research or from their own personal reading.
  - d. Students often get new ideas for directions for their paper at this point. You might consider whether two brainstorming sessions would be appropriate/feasible. I may try to hold one of these feedback sessions asynchronously via a Moodle forum or Google Docs.
6. Poster presentation
  - a. Students present posters summarizing their project at a poster session during Finals Week. Other faculty, students, and guests are invited to attend. Prior to the final presentation, students bring drafts of their posters to class to present to other students. They can practice transitions and notice areas where important information is missing or their logic might not be clear. They also field questions from their classmates and get ideas for figures/images that might be helpful for their audience.
  - b. Poster presentations are a common way for sharing ideas in science, so this format is a very authentic way for students to present their work. Furthermore, research indicates that presentation of course work to an audience beyond the students and professor in the class raises the stakes and motivates students to produce higher quality work.

**Students are asked to reflect on their learning at the end of the term.** Here is an excerpt from one student's reflection. She was interested in a career in nursing and chose to study Complex Regional Pain Syndrome. Her comments suggest that course projects can serve as high-impact signature work for students:

*"Throughout my undergraduate career, I was asked to formulate hypothesis, collect data, and draw conclusions. ... Countless times I was asked to dress nice and speak in front of a group of fellow students to convey some type of message.*

*With all those experiences, I have never felt so challenged and accomplished in presenting my Grant Proposal Paper. My first run though was luckily with a student. I was so shaky and without confidence. Eventually, I realized that I had an amazing topic. I couldn't let my nervousness take away from this really interesting information I was so excited to talk to people about. After shaking off my first poster presentation, I got to talk to faculty about my ideas. Standing there with Dr. Rose and a prospective student—I brought myself back to freshman year. I would never have imagined... while dozing off in my Intro to Psych class... I would be able to find my passion in this field"*

*"... After giving my poster presentation to faculty and staff, I feel like I can communicate professionally. Even beyond what I did my Grant Proposal on. I was forced to reference my poster, maintain eye contact, and answer questions on the fly with sureness and good articulation. Through this course, and my experience at Augustana as a whole, I have matured so much as a student. I am excited to take all that I have learned here with me into the real world."*