

NSERC Grant Writing Initiative

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My goal was to provide a real-life research experience by having students construct an NSERC grant proposal. Following successful funding from the WDI, I employed a graduate student (Mr. Daniel Dick) for 32 hrs of TA time dedicated to helping with rubric construction, evaluation, and hands-on interactions between the students and the TA. This is the second year the project was implemented, and I am delighted by the results.

a) What did you do?

First off, I divided the project goal of writing a high-quality research proposal into a series of scaffolded activities that made the final goal more manageable. I kept the same peer-review exercises and project scaffolding from last year as they were effective in communicating my learning objectives. This included the production of 1) an Annotated Bibliography, 2) the NSERC first draft, 3) an NSERC peer-review, and 4) the final report. Each of these activities had an accompanying rubric that was thoroughly explained in class, and was provided well ahead of the due date for the assignments. New this year, I dedicated a lecture in order to form three break out groups to brainstorm on their research projects. Each group was equipped with a white board, and tasked with differentiating the following concepts: 1) a “research topic”, 2) a “research goal”, and 3) a “research hypothesis”. This might seem trivial, but this came as a reflection on last year’s project where I noticed students spent all their time attempting to develop a research hypothesis, when in reality what they were identifying were areas of research (i.e. fossil birds), not a direction of inquiry with the purpose of identifying a process operating on the system. By having students identify the differences between topics, goals, and hypotheses, they were able to better participate in their library exercise (lab 1). As mentioned by the WDI TA during his exit interview (summarized by Michael) *“the first meeting was going to the computer lab where they [students and faculty/librarian] talk about correct sources and they go through it and work on their own. He [TA] says that his mind was completely blown during that meeting when students actually sat down and work. From his [TA] previous experiences, that would never happen, students would immediately be doing strange things, so he was surprised that they were actually reading papers.”* I fully agree with this statement – the difference between the 2016 and 2017 groups (in the library) was staggering. The room was essentially silent, with nothing more than keyboard typing, and every student actively using the databases to find literature.

Throughout the term, I frequently broke the class up to update their project progress, and to use peer-support to move their projects forward. I also brought in several guest speakers, including Librarians and RGASC writing experts, to aid in research development and writing skills. Finally, I also had a peer-review exercise that allowed students to submit an initial draft of their work that got evaluated by myself, the TA, and one anonymous student. This allowed students to gain an appreciation for peer-review, experience both sides of a publication, gain a familiarity with how project success is judged, and also learn through their peers how to improve their writing. This year, I took a more hands-on approach for the peer review of their work by providing a much more thorough review of their proposals, often with line-by-line comments provided.

One activity I kept from the previous year was the student-led final rubric construction. This activity allowed student to highlight what they believed was the most important aspects of their proposal (by assigning a higher grade for a specific section, for instance), and broke down each section into the important components to achieve the best grade. This was also done as a group activity, so students learned

from their peers. This activity had a further goal as well – without the students even knowing it, they were constructing an outline of their research project, and populating it with the important factors leading to success. I noticed that students took responsibility for their decisions concerning the final rubric, and for the first time ever I didn't have a single student drop by my office for "clarification" on why they did not get the grade they thought they deserved.

b) How did it work (objective)?

I believe the migration in quality from first draft to final assignment was significant. Unfortunately, as with most student evaluations, the number of respondents was quite small, but students did specifically call out the importance of the NSERC project:

Student survey quotes:

1) *The term project, the NSERC assignment, was also a great component to the course. It really helped, both with my researching skills as well as my scientific writing skills. I would only recommend perhaps providing a list of optional topic areas for students to choose from; I find that as an undergrad student, it is difficult to feel out relevant directions for research.*

2) *The NSERC assignment is a fantastic element to this class.*

3) *Marc made sure we had above average support in terms of TA representation in this course. A class of 30 had 2 TA's which was very good. We had 1 TA specifically for sediments (Katey Malloney) and 1 TA specifically for our research NSERC assignment (Daniel Dick). Both TA's were fantastic and specialists in their field which made it very easy and streamlined the process of needing them. You would either need Katey for labs or questions regarding lecture, and Daniel for anything assignment related at all. This was a fantastic feature to have because every aspect of the course was covered in terms of aid.*

Question	Mean	Median
Course projects, assignments, tests, and/or exams improved my understanding of the course material	4.4	5.0
Course projects, assignments, tests and/or exams provided opportunity for me to demonstrate an understanding of the course material	4.2	4.0

c) How did it work (subjective)?

I think the proposals were objectively better this year. They represented a more complex thought process, from designing testable hypotheses, identifying proper means to test these hypotheses (i.e. appropriate methodology), and even placing their projects within a broader societal impact. The peer-reviews were also more detailed and, I believe, more useful for the students.

d) What have you learned?

Ultimately, I learned that even with scaffolded projects, students are still prone to cram before due dates. I will continue to try and showcase the benefits of continual (daily) work routines over start-and-stop approaches to meet deadlines, but this approach is so heavily engrained in their experiences that it is difficult to address. Having almost weekly deadlines helped, but it was still too much of a "roller coaster" for my liking. I have contemplated having weekly reflection pieces that would accentuate gradual learning over punctuated learning, but my experience with this approach is that students resent the constant monitoring/reporting, and view it as micromanaging. It is also quite time consuming.

I will also try to engage in more peer-to-peer learning, and more break-out sessions. These targeted initiatives really seemed to have helped the students.

e) What would you change?

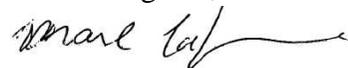
I don't expect too many changes since I really liked the results from last year. I did identify a few suggestions made by Daniel Dick (TA) in his exit interview with Michael that I will implement. I will bring the TA into the classroom more often, so that they can interact with the class more. I also really liked his idea (and echoed by Michael) of having students identify a well written article, and reflect on what made the article particularly effective. I would combine this with my "how to read a research article" session, which outlines the importance, and nuanced differences, between each section in a research article (and figures).

After attending the Teaching Learning Collaboration Group workshop on "*improving the effectiveness of feedback*", I plan on changing how I deliver comments to the students. Specifically, I will work on explaining *why* I have made those specific comments, and provide a detailed explanation within the context of how grant proposals are evaluated.

Comment on feedback: I cannot say that the comments provided by Mr. Singh were particularly useful, and I do not believe they will help me craft a better project next year. For example, spending almost half of my "summary" harping over two students using review articles does nothing to help me structure the writing assignment. Also, WRITING COMMENTS IN ALL CAPS is perceived as yelling, not emphasizing. I would recommend Mr. Singh attend Teaching Learning Collaboration Group workshop on "*improving the effectiveness of feedback*".

Should you or any member of the committee wish to speak with me personally, please do not hesitate to contact me.

Kindest regards,



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