

Taking Time to Think: Bringing Reflection and Discernment into the Freshman Biology Laboratory

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The Ignatian mentoring program gave me an opportunity to explore Ignatian pedagogy in an intentional way. I teach many freshmen in a difficult subject. Significant numbers of my students struggle, not just with passing, but also with making high enough grades to pursue their goals of medical school. Part of the reason I joined the mentoring program was in search of ideas that can help these students not just improve grades, but to also help them learn to deal with how their dreams might need to change. Working with my mentor, Rhonda Norman, I soon narrowed in on the Ignatian pedagogical concepts of reflection and discernment as a focus.

Rhonda shared with me that she incorporated reflection into her some of her counseling courses by requiring students to submit journal entries. These entries act as a form of self-care, helping students reflect on difficult cases, and to communicate these “softer” issues with their professor. She described how students learned to better deal with stresses by writing them down and processing them, as well as her ability to step in and give students additional support as needed.

This inspired me to begin to explore developing a Canvas based module that can be used in our introductory biology lab courses to help students practice the Ignatian values of reflection and discernment. I also gained inspiration from our science teaching book group led by the Center for Teaching Excellence. The modules would also incorporate a more deliberate exposure to learning skills and scientific thinking. By using Canvas, a course can easily modify the template as needed. I chose to develop this for lab because they have a little more time, and it will also reinforce some of the same skills and concepts students learn in their lecture course. The intent is that the reflection will take no more than 10-15 minutes a week for the students, with a few weeks requiring up to 30 minutes. Class time used will typically be no more than 5 minutes, with some exceptions.

I did pilot some of the material over the fall and spring. I started using exam wrappers and began providing more explicit instructions regarding the study aid materials I provided in class. I was satisfied with student reflection with the exam wrapper. I had the most engagement when students shared their plans for studying for the next test with another student. After years of suggesting it, I finally had a student tell me that the concept maps were really helping, so this made me hopeful that exploring this information more deliberately would help students navigate their first year successfully.

So far, I have been populating modules using materials I already provide and use in my course, while supplementing with further items as I find them. I was particularly pleased to discover information on self-compassion through an undergraduate student research project. Over the summer, I will flesh out the modules and work on the graphic design. By fall, I should be ready for a pilot project.

Each week will have an individual module. The module always has a reflection component. Students are asked to either purchase a composition notebook for their reflections, or to use a computer file. Their weekly reflections will be uploaded or read, and instructors will monitor on a regular basis to make sure they complete their reflection every week. Some modules will also contain material for students to explore and may require them to provide proof of their explorations. At the end of the semester, their reflections will either be part of their lab participation grade or part of their homework grade.

Module content is loosely divided into four areas: developing metacognition, exploring study skills and Xavier resources, discerning your future choices, and thinking scientifically.

Below is a screen shot of the Week 1 instructions to students.

Week 1

What are your goals for this course? Reflect on what your goals for this semester are. It shouldn't be just a grade or the best outcome-you can also consider interpersonal goals and minimal goals. Do you hope to learn more about what direction you wish to focus your major? Is there a specific topic you are excited about exploring? Do you want to get to know your instructors and fellow students? Do you want to learn more about experimental design? What is your top goal, and what is the minimal goal you hope to achieve?

This initial week is the start of introducing metacognition into the course. We are hoping to move them beyond the grade to thinking about what they are actually learning, and why it is important.

As students settle in, the next two weeks will focus on study skills and campus resources. Their study skills reflection will challenge them to compare high school to college, and how they might be different. We will follow up on this reflection after the first test and ask them to re-consider their study approaches. They are also challenged to find at least two people they can form a study group with, and actually talk to them.

These two modules contain video links (ASAP Science “9 Best Scientific Study Tips”), memorization tips, and advice on how to read a textbook. We will also consider different Xavier resources such as the academic support center, McGrath, success coaches, advisors, and instructors. They will be asked to screen shot their visits to these web pages and create a ranked list of places they will go in certain situations. Essentially, this reflection will be to create an action plan of what they will do when certain problems arise. They will be asked to share at least one plan with a fellow student during class.

We will wrap up the first month by considering the dreaded “What do I want to do with my life?” question. We will ask them to have multiple ideas. Biology has a Canvas page which explores various careers biologists can do, and we will send them there to explore. They will be asked to have at least two distinct career paths and explain what about those paths interest them.

At this point, students will have developed some routines in their study. The next rounds of reflection will focus on what they are currently doing. We will ask them to do a sleep journal, along with looking at how they are eating and exercising. We will challenge them to find their own research on how these habits affect learning. We may use the following quote to stimulate thought: “Judge your success by what you had to give up in order to get it.”- *Dalai Lama XIV*

Another module will ask the students to consider where they find answers to their questions. Too many students turn to Google for their answers, rather using their own knowledge, their books, instructors or fellow student. This assignment will have them try to Google an answer, and then reflect on where they should turn first when answering questions.

Our first exam would be coming up soon, and an exam wrapper will be provided. Below is the version that I have been using.

- When did you start studying for the exam?
- How many hours did you spend studying for the exam?
- What study techniques did you use?
- Did you come into open lab? Did you talk to your instructor? Did you attend SI sessions? Did you participate in study group?
- Did you answer the questions in the lab manual?
- How do you feel about your performance on the exam?
- What was the easiest part of the exam for you? Why?
- What was the hardest part of the exam? Why?
- What study technique do you think helped you the most? The least?
- What will be your study plan for the next test?

- Share your study plan with at least one other student.

This first exam is a rude awakening for many of them. So, for their next reflection we will ask them to find an instructor or staff member at the university and ask to share a story of how they dealt with failure.

After they explore the idea of coping with individual failure, we will ask them to explore the role of failure in science. Several quotes and possibly a story will be provided as source material for the reflection. For example:

- “Every detection of what is false directs us towards what is true: every trial exhausts some tempting form of error”-*William Whewell*
- “Every great improvement has come after repeated failures. Virtually nothing comes out right the first time. Failures, repeated failures, are finger posts on the road to achievement. One fails forward toward success.” - *Charles Kettering*

Following this exploration will be more chances at metacognition. After seeing work done by Zenab Saeed, an undergraduate researcher who studied self-compassion for her research, I incorporated a unit on self-compassion into our modules. Self-compassion involves treating ourselves and our struggles the same way we would treat others in the same situation. For this module, they will visit the website set up by Dr. Kristin Neff, and work through one of the exercises in self-compassion.

Before students get really tired, we will look at the idea of motivation. We will consider a video on motivation and ask them to develop activities that can motivate them, whether it is music or exercise or volunteer work. These activities will be there for them when they hit the doldrums after Thanksgiving break.

The labs in this section also lend themselves with discussing scientific thought and approaches. There is one lab in particular that rarely gives perfect results. We will ask them to reflect what this means for experimentation. Was the problem with the experiment? The implementation? What does this tell you about working with living things and what must be done to have confidence in your results?

We will also do a retrospective reflection on how well they are keeping up with the study plan, and any changes they had planned to make to their daily lives (like sleeping more). We will again ask them to verbally share information with a fellow student on either what they have been doing, or what they plan to change.

Before the end of the year, there will be another exam and a writing assignment. The exam will have another exam wrapper. Prior to the writing assignment, we will ask them to reflect on how scientific writing is different from the research papers they completed in high school. On another reflection, we will ask them to reflect on their experience of writing a methods section and comparing it to the student samples they were shown.

After their writing assignment is graded, we will also have them do a writing wrapper. Some of the questions asked will be:

- How much time did you spend writing?
- How much time did you spend doing research?
- Did you proofread your paper? Did anyone else proof your paper?
- Did you talk to a librarian? Did you go to a science specific database?
- Did you read the guidelines in your lab manual? Did you follow these guidelines?
- What was the strongest part of your paper? Why?
- What was the weakest part of your paper? Why?
- What steps can you do take to improve your paper next time?

At this point, we will be approaching the end of the semester. We will have at least two more discernment modules. One concerns the content of the course-which parts of the biology did they like/dislike? We can then connect this again to future plans. This time, we will ask them to look for activities that they can do over the

summer that link to activities they enjoyed as well as their eventual career. We will point out that January is the ideal time to start pursuing those opportunities. We will again refer them to the Biology Canvas site for ideas.

In addition, we will incorporate a module on how to approach the student evaluations. Students don't always have a good sense of how the student evaluations are used, and what kind of comments are useful. Particularly in multi-section lab courses where your instructor does not have control over the material, the students need a little more guidance on how to best evaluate their experience. The reflection will be the completion of their evaluation for the course.

The final reflection will involve discussing why we made them write the reflections, and explicitly discussing Ignatian pedagogy and metacognition. We will ask them to reflect on both the information they learned in lab, and what they might carry with them.

Ideally, by the time they work through these units, students will hopefully have developed a more consistent practice of self-reflection and discernment. We hope that these habits will stay with them, and that they will have also developed a tool kit of study habits and resources that will lead them to graduation and beyond.

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