

BIOLOGY

Ignatian Pedagogy: Integration of Life Science into K-8 Classrooms

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Prior to beginning the Ignatian Mentoring Program (IMP) I knew very little about Ignatian pedagogy. Upon meeting with my mentor and doing research, I discovered that the pedagogy builds upon what many of us already do as educators. For this program, I decided to focus on a non-major biology course I teach, entitled "Introduction to Life Science for K-8 Education Majors" (BIOL130/131). I feel that working with future educators gives me a special platform to model skills that I hope they gain as they venture into their own classrooms. Elementary and middle school educators play an extremely important role in developing young scientists and a scientifically literate public. I believe it is especially important that my students come out of this course having the skills to reflect on prior knowledge and newly gained insights to put them into action in their lives and future classrooms.

This course runs in the fall every year and is a 2-credit lecture and 1-credit lab class that introduces the basic principles of biology that any K-8 teacher should know. When I took over the course, I started out by not changing the format from the prior year's instructor. From that experience, I felt I had a good grasp of the goal of the course and the following year I began making changes and implemented two new assignments: (1) lesson plans and (2) a project based on "Ishmael" by Daniel Quinn. After some self-reflection and student feedback, I opted to keep the lesson plans, but due to time constraints I removed the Ishmael Project.

Now that I've gone through the IMP and learned more about Ignatian pedagogy, I believe that for subsequent years the Ishmael Project is worth implementing again, in some format. Details of the lesson plans and Ishmael project are provided below.

Expanding on Lesson Plans

One of my major goals in this course is to show students how to apply this course material to their lives by creating life science-based lesson plans for K-8 students. Each student brings a different level of experience to the table, so a novice has the ability to learn from older students and older students can gain a different perspective. My expectation is that regardless of student experience all of them will be able to walk out of my class with three separate lessons that they can add to their teaching portfolios.

To maintain consistency, students use the XU lesson plan template (provided by the Education Department) to complete their lesson plans. The lesson plans utilize the "Ohio New Learning Standards: Science Standards." The first lesson plan is done individually and focuses specifically on "science inquiry and application" standards and asks students to utilize the scientific method to create a lesson specific to the grade level they want to teach. Once they receive feedback, they are asked to create a second lesson plan in groups of 2-3 people with the same grade-level of interest. This lesson plan focuses on grade-specific life

science topics, covered in BIOL130/131, using state standards. The third lesson plan is a non-traditional lesson where students work in grade-specific groups and create a field trip to the zoo to see how it is possible to teach beyond the classroom.

Expanding on Ishmael Project

Two additional learning outcomes for this course include being able to *evaluate the validity of the theory of evolution as a unifying principle in science* and to *identify how biology relates to every day life and sustainability*. To help students reach these goals, I have them read a piece of fiction, entitled “Ishmael” by Daniel Quinn. Even though this book is fictional, it is intended to make them think and reflect both intellectually and spiritually. Specific pages are assigned and due prior to in-class discussions. Upon completion of in-class discussions, students do a self-reflection. Once we have finished reading the book, students work as groups to design a project that focuses on sustainability and community outreach that is applicable to their own classrooms.

Student Feedback

To help me gauge how students responded to activities, assignments, and labs, I added two mandatory written questions on the CoursEvals starting in Fall 2016 for BIOL130/131. For this course I ask students the following two questions: (1) As I try to improve upon the course, I would like your constructive criticism. Please identify 2 activities/lessons, either in lab or lecture, you feel the class did benefit from and why I should keep them for future classes; and (2) Please identify 2 activities/lessons, either in lab or lecture, you feel the class did not benefit from and your reason why.

Thirty-one students responded in Fall 2016 and 39 students responded in Fall 2017. I have pulled out a sample of the feedback relevant to the Lesson Plans and Ishmael Project.

Feedback for Question #1:

- I think the group lesson plan and Zoos are Classrooms activity benefited the class. I think you should keep these activities in the class because the group lesson plan allowed us to work with others on a lesson plan and get tips from an older student about how to write effective lesson plans. The Zoos are Classrooms activity allowed us to go in groups to the Zoo to see the different animal exhibits and apply them to objectives.
- Group lesson plans; Learning and working with upperclassmen helped me tremendously
- I enjoyed completing the partner lesson plan, as well as, the Zoo is a Classroom project. Each of these activities focused on the material while also emphasizing the skills required to teach concepts associated with biology as future teachers. They were fun to complete and I feel that I learned a lot from them.
- I really liked the zoo project and I also liked the group lesson plans. I think the lesson plans were most beneficial in preparing us for teaching in the field.

- I really liked the zoo project- field trips are something I have never talked about in any of my education classes before.
- Well, I personally loved all of the Ishmael discussion. I just wonder if there's a better way to incorporate it into the course. I think it could also be related to teaching evolution in the classroom because I do feel as though the book deals with the origins of Christianity (i.e. Cain and Abel, etc.).
- I found Ishmael to be a very unusual and interesting book. Even if students did not like it, I think it helps students view conservation and sustainability from a perspective they may not have thought of before. This book could also be useful to tie into future teaching for older age groups. I would keep this book in the course.

Feedback for Question #2:

- Overall I enjoyed reading Ishmael, but I thought that it had little to do with the overall course. I thought it repeated a lot of other assignments that we had.
- I think that the Zoos are classrooms and Ishmael assignments were good ideas, however I struggled to relate it to my future career of being a Montessori teacher. A lot of the material in the course I was uncertain how it would relate to teaching in the 3-6 year old environment. Any instruction on how I could use this in my future career would have been really helpful. I did really enjoy getting to do lesson plans that related to my age group of choice.
- Although the "Ishmael" book was interesting, I did not feel that reading this book was necessary to understand the topic it sought to emphasize...I feel that I could have understood...the concepts that these projects/activities sought to teach without the stress of the extra work.
- I did not think the Ishmael reading was beneficial. As a future educator I want to effectively teach science to my younger students and I found the Ishmael reading and assignments un-beneficial. I do think the sustainability group project was great. To me making the lesson plans, videos, or books, was something I could see myself using in my future classroom and actually found that helpful. I just think the book was not completely necessary and did not help me when creating the group project.
- I think reading "Ishmael" was not the best use of our time to talk about the importance of conservation.
- While Ishmael had a valuable lesson, it was very dry and added more assignments and stress to this course.

Conclusion

Asking the students for their feedback was invaluable. I received overwhelming support for keeping the lesson plans because students could see the direct relationship between those and what their personal goals are. There were a few students that were opposed to the zoo field trip for logistical or personal reasons.

Regarding the Ishmael project, I received more negative responses from students than positive; however, the most common feedback involved workload complaints or how the assignment was incorporated

within the overarching course content. These are a few of the reasons I chose to eliminate the assignment during the 2017-2018 school year.

For future semesters, I'd like students to get more value out of the Ishmael project. Therefore, I plan to revisit and revise the course's schedule and the assignment itself. Typically, the concepts of ecology, sustainability, and conservation are covered towards the end of the semester, if time permits. If I start the semester focusing on the major themes of sustainability and evolution and intertwine them into the content regularly, students should be able to see the relevance of the assignment. Additionally, I plan on revising the assignment itself to focus on how to incorporate sustainability and conservation into K-8 classrooms.

The Ignatian Mentoring Program allowed me to see the importance of the assignments I have been trying to implement. The challenge now is refining them and implementing them with the best strategies possible.