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Big Blue and You: An Interdisciplinary Look at Science and the Ocean, a Students Teaching Students Course

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Big Blue and You (BBAY) is the second course taught under the new Students Teaching Students program (STS) taught at URI, the first being LGBTQ History taught by Brian Stack in the fall of 2011. STS was brought to the URI Honors Program by Bridget Griffith in the spring of 2011 with the premise of "Changing the URI Honors Program pedagogy." She was inspired by similar programs at Williams College and the University of Vermont. STS is a way for students to be involved in a truly unique experience: developing and teaching a course in the Honors Program.

Students in this program develop their own syllabus, assignments, teaching style, lectures and discussion on a topic that they are truly passionate about. These topics may or may not necessarily be in their major, and can include a wide array of topics. Similar to all other faculty, students develop a course proposal and course syllabus in the fall of their junior year, one year prior to teaching. These materials, along with supplemental writings on why their topic would benefit from peer teaching, are presented to the Honors Program Faculty for selection. Students develop the whole course on their own, but also work closely with a team of faculty advisors that help them develop their teaching styles, ensure accuracy of data, and help them grow and learn through teaching. These advisors are Pedagogy Advisors, Content Advisors, and Personal Project Advisors. We chose our advisors from a myriad of departments, but every one of them had something different to offer. Our pedagogy advisor was Jane Murray of the Music Department and our content advisors were Dr. Patrick Logan of Communication Studies and Dr. Arthur Spivack of the Graduate School of Oceanography. We also kept in close contact with our personal advisors for the senior honors project: Dr. David Bengtson of Fisheries and Animal Veterinary Sciences, Dr. Charles Collyer of the Psychology Department, Dr. Ric McIntyre of the Honors Program, and Dr. Kathleen Torrens of Communication Studies.

One may ask, what do students enrolled in a STS course gain from being led by peers? Because the teachers leading the course are current undergraduates, this breaks down the initial instructor/student barrier that many entering freshmen and sophomores experience. Students feel more inclined to participate in class discussions and class presentations, which allows for a more interactive atmosphere in the classroom. In addition, the student teachers have taken a variety of courses and know which assignments are effective in engaging in the material. For our course, we incorporated assignments from courses we have taken, such as a documentary review, mock discussion and public awareness project. Lastly, student teachers are approachable through a

variety sources, including e-mails, office hours, peer interactions on campus and text messages. This helps to bridge the gap between the student and teacher barrier.

So, why teach a class? As student instructors, we gain a valuable experience in seeing a course from start to finish, as well as personal goals and achievements that we set with our own Personal Project Advisors. We were able to learn the technicalities, intricacies, and organizational strategies of putting together a course. We gained experience in teaching and developing pedagogical techniques throughout the semester. We also immersed ourselves in course content and research, which allowed us to master our information even further.

When deciding on a topic for STS, we were drawn to our topic by our love and passion for the ocean, and wanting to share that love and beauty with a new group of students from different majors. The ocean plays a big part in everyone's lives, whether they realize it or not. However, the importance of the ocean cannot simply be examined through a microscope. To truly see the subtle and complex effect the ocean has on Earth, it needs to be seen as a player in the dynamic relationship between man and nature. This relationship is of an interdisciplinary nature and affects us all, so what issues the ocean faces concerns everyone on many different levels. Pollution, climate change, coastal development, and overfishing are four such issues that we addressed in the classroom. We think it is important to educate our world's future leaders on not just ocean science, but the politics, the social implications, and the solutions for our future.

We prepared BBAY with a few purposes in mind. First and foremost, we wanted to create informed citizens and students because these upcoming youths will be the leaders in ocean action, decision, and policy. We wanted to take an interdisciplinary look at how people from all backgrounds interact with this resource and show that the ocean is not just a place for scientific research or leisure. We presented the ocean as a being in a relationship with every person. In this relationship, we wanted to address the issues, the positive steps and memories, and what we can do in this relationship without having to go to "couples therapy."

We wanted these students to walk away from this class with more than just an open mind and new outlook on the ocean. We wanted them to gain an appreciation for the ocean in their lives, and to learn about the political process and thought behind legislation, such as the dumping of trash in the ocean. In addition, we want them to improve their writing skills and presentation skills, as well as developing skills in research. This was accomplished by giving the students many opportunities to present information to their peers, discuss topics in class, and write out

many assignments. We wanted these students to be able to think critically of science or opinions that are offered in the public, or in scientific texts. Through all this we hoped that they would be able to communicate effectively, develop their own opinions, and think creatively in aesthetics and problem solving.

To prepare for this class, each of us contributed our own knowledge and experiences, especially in terms of teaching and speaking. Ben has been a teaching assistant for Quantitative Methods in Psychology, Megan was a URI 101 mentor, and Alexa has done much public speaking and outreach through various volunteer efforts.

Preparation began in the fall of 2010, when we first assembled a rudimentary syllabus, topical outline, and course objectives. Once the course application was accepted, we first created a schedule of when we wanted each task accomplished (reading list, assignment sheets, lectures written, guest speakers contacted). We met with our Students Teaching Students mentor, Bridget Griffith, weekly to finalize our syllabus and review different teaching styles and pedagogies that we can utilize in our course. Over this period, we also began researching our lectures and identifying guest speakers to contact and readings to assign. It was very convenient having a topic close to our own interests, as we had already built up an extensive knowledge base on each topic through our various majors and minors. Not only did we know and understand the topics, we also had readings in mind for most of the modules. We assembled the suggested reading list together, but sent students individual articles over the course of the semester.

Over summer and fall 2011, we each wrote our lectures, individually but with input from our mentors and each other. We also created our assignment list along with rubrics to help students understand what we wanted and so we could standardize grading across students and graders. Some projects were created individually, designed and graded by one instructor. Some were created collaboratively, designed together and after each instructor assigned a separate grade to the student, they were averaged for a final grade.

To address our different teaching styles and students' different learning styles, we adopted several pedagogical techniques to ensure each student got as much out of the material as they could. We mostly presented information through lectures. These were typically PowerPoint presentations, put together over the summer and fall before. Depending on the instructor and the material covered, some presentations were more image-based, while others presented information in bullet points. The topics were chosen by each instructor picking a module or part

of a module that they had more experience or interest in. Ben presented The Human Connection (the ocean in society, arts and media), Organisms, Environments, and Science Communication. Megan presented Marine Pollution, Climate Change, and Marine Bioresources. Alexa covered Climate Change and Politics, Coastal Development, and Fisheries. Whichever instructor was presenting a given module created the presentation and organized all supporting materials for that day.

This course was also meant to be discussion-based, to emphasize the points made and to develop critical thinking skills. The discussion would sometimes be between one student and the instructor, as if each student was answering a question in turn. Other times, students interacted with each other in dynamic conversation. We present here some discussion examples from this class. In the first lecture, The Human Connection, Ben played an excerpt from Debussy's La Mer and asked students to share what elements of the ocean they heard in the song and how it made them feel. During the climate change lectures, Megan asked the students to decide, using the collective choice model of politics, whether a measure to fund algae biofuel research would be passed. This was a very successful conversation, with students addressing each others' points and making arguments and counterarguments. During coastal development, students were asked what changes they have seen in their coastal communities due to coastal development. Some shared noticing houses being built closer to the beach, some have seen increased traffic and tourism. For the fisheries module there was a lot of discussion, sometimes on unrelated fisheries topics, but one activity was that students were asked to design the perfect fishery for an undeveloped island so as to protect the environment and the local economy. Across all the groups, the class put together a model for how to develop the island and the fishery, using concepts discussed in the previous lectures.

In addition to our prepared lectures, we invited in a variety of guest speakers to supplement the modules of the course. When we were putting together the list of lecture topics, we determined which modules should include a guest speaker. After determining this, we researched professors and other professionals who specialize in the topics relating to science communication, marine pollution, climate change and fisheries. Chip Young, senior editor at GoLocalProv and writer for the 41 N, was invited to talk about the importance of effectively communicating science to the general public. For the marine pollution, Scott Nixon, a senior researcher at the Graduate School of Oceanography, talked about the issue arising from too much

fertilizer running off into Narragansett, RI. After spring break and to conclude the climate change module, Pamela Rubinoff of RI Sea Grant discussed the impacts of climate change on coastal communities and mitigation strategies for these communities to apply. Lastly, Dr. Kathy Castro of RI Sea Grant, along with two local Point Judith fishermen, Mike Marchetti and Rodman Sykes, came in to share their experiences with fisheries in Rhode Island. There was no presentation prepared and instead, the students were prompted to ask questions for the guests to answer. Students heard a different point of view than the academic and were given the opportunity to connect what they were learning in the class to the real world. Originally, we planned a guest speaker for Coastal Development but we were not able to get anyone in. Instead, we showed a film entitled *Storm that Drowned a City*, which discussed how geography and coastal development contributed to the destruction of New Orleans, LA by Hurricane Katrina in 2005. This movie also tied into the climate change module and Pamela Rubinoff's presentation.

In order to prompt the students to engage in the course material, we developed the assignments and grading structure for the semester. Since a STS is a discussion-based class, we placed approximately 20 % of the grade on participating in class discussions and attendance. Throughout our presentations, we included discussion questions in order to prompt students to develop their own personal opinions and ideas. Students that were quiet during the first part of the semester were able to open up more by the end. The assignment that carried through the whole semester was on current events. Every Thursday, a student presented a current event they found through a credible news source related to ocean issues. Their presentation to the class was also accompanied by a paper, which tied in class materials and concepts and their own personal response to the article and the issue.

The first major course assignment was a documentary review. Ben compiled a list of documentaries relating to the ocean and assigned students to one of the selected eleven. Students were then asked to write a paper what they got out of the film and connect it to topics they were learning about in class and to their own backgrounds.

Tying in with climate change, Megan assigned and ran a mock discussion on wind power. Students were given a proposal for a wind farm off the coast of Delaware and had to present the arguments of their given party, which included the Obama administration, the local community, the local and federal ecologists and environmentalists, the North American - Platform Against Windpower (NA-PAW) and the NRG Blue waterwind wind power company. Students had to

research their position and present a 5 to 10 minute presentation on their position to the other "delegates". Throughout the discussion, students asked questions and were able to decipher the information presented by their fellow peers. Lastly, students wrote a paper summarizing their group's viewpoint, relevant points made by other groups and what they personally thought overall of the proposal. Since students were assigned their positions, there were some students who did not agree with being for offshore windpower and some who were.

The second group project was a public awareness project. For this, students took one of the concepts we covered this semester and creatively present it in a form that would raise awareness to the URI community. One group brought attention to water conservation through chalk writings around campus and even created a Twitter account with it, #TalkWithChalk, to use the social media scene of our generation. Two groups hand drew posters to post around campus; one was on garbage and recycling and was posted around trash cans and the other was on overfishing and choosing sustainable seafood. The fourth group wrote a letter to the Good Five Cent Cigar on mercury levels in seafood. Each group accounted for their target audience and tailored their message to raise awareness and understanding of ocean issues.

The final project tied all of our target messages together with a solution presentation. Students were asked to inform their classmates in detail about a possible solution to either an issue we went over in class or one they found independently. The main components included background on the issue, their proposed solution, whether that solution was feasible and what the pros and cons of the solution were. Students selected topics from mangrove restoration to switching to hybrid cars to limit CO_2 and presented in 12 minutes, with leaving 3 minutes for questions. This gave the students the opportunity to be creative in the solutions they put together from a variety of areas and what they personally felt passionate about.

Overall, this STS course was an experience that we all found very rewarding. We all worked very hard on developing our materials since this course was first proposed. In order to analyze how the course went in the eyes of our students, we distributed an online survey that gave them the opportunity to provide anonymous feedback. Overall, 7 out of the 12 students took the survey. Most of the students said they took it in order to fulfill a general education requirement and because they enjoyed learning about the ocean. All of the students agreed that the material of this course will be relevant to their future, across a variety of majors (including business, pre-vet, film and English). A total of 6 out of 7 rated the discussion aspect of the course

was very important to their learning experience, hence why the participation section was allotted for 20% of the final grade. Lastly, a majority of the students would take another STS class and recommend one to their friends and classmates. In addition, these same students are interested in taking more honors courses and are considering completing the honors program.

With every large-scale project, there are always challenges you face along the way. We wanted to make sure this was a truly interdisciplinary course and therefore, we had to be able to translate the information in a way that the students could understand. For example, we could talk about the chemistry related to ocean acidification, but what would the English major or film major take away from that? We needed to be able to connect it to all aspects of the topic. To go along with this, we also needed to cram a big topic into just one semester. There were some major topics we only had one lecture slot to give a general background on, but still give students something to take away from the class. Another challenge was being able to incorporate discussion with our lecture material. We had a lot to cover in the short amount of time and we had to make sure we allowed students to really engage in the material during the presentation. Lastly, there were some bureaucracy challenges over what we were teaching and whether we were overlapping with other courses.

Overall, we each had similar goals for what we expected to gain from teaching the course. We all are planning to go to graduate school in the future and plan to be involved with some sort of public outreach within our own fields. Therefore, we all wanted to gain experience with this form of communication to a class of students. In addition, we all wanted to be able to translate complex science terminology into content that could be understood by an interdisciplinary audience. We can speak in science terms and about marine biology concepts amongst our peers, but what about other students? Lastly, we became more familiar with the material we were teaching and developed our research skills for relevant material.

To further show the differences between the beginning of the semester and the end, we asked the students at the beginning of the semester, “what does the ocean mean to you”? Most of the responses talked about the ocean being a source of entertainment and vacation. To illustrate this, we selected to student responses:

Student A: “The ocean means sunny weather, sand in between your toes, visually a tropical place involving vacation. Also, it means a vast array of unknown plants and animals”. – Sophomore, Business Administration

Student B: "Ocean = Vacations, since I don't live near one and swimming, boating, etc." – Freshman, Communication Studies

We then asked the students the same question on the last day of class in April. The same two students had incorporated ideas we emphasized in class, such as the ocean being sustainable and that everyone is a part of it even if they do not live nearby:

Student A: "The ocean to me means a sustainable source of both food and entertainment. The ocean serves as a commercial place, as well as, a place for solitude. The ocean is filled with so many different types of fish and organisms that serve specific purposes". - Sophomore, Business Administration

Student B: "The ocean is something that we have a say in and can take care of and change and preserve. I learned a lot of things about the ocean, but mostly, that we are a part of it. The ocean is a way bigger thing than I thought and so many things go into it and affect it". - Freshman, Communication Studies

Some other students expressed similar changes, including the following selected comments:

- "The ocean means diversity, as well as, unity – it's something that can be so vastly different from place to place but at the same time it's something we all have in common". - Freshman, Spanish and Film Studies
- "The ocean to me means life! It is probably one of the most diverse ecosystems that is not only interconnected to its species but to humans as well". – Sophomore, Animal Science
- "The ocean represents an area of both beauty and habitat battling the human race". – Sophomore, Anthropology and History

Overall, this STS experience was a positive experience and we gained valuable skills by teaching this course. This program is something we recommend to all upperclassmen students who are passionate about teaching a topic they find interesting.