Reflection of Teaching Experience and GAANN Activities
-Alvin Farrel-
Department of Bioinformatics and Genomics
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Introduction

Interdisciplinary research may arguably be the most effective research to address questions in biology. However, biologists are typically hesitant to learn computer programming, and computer scientists are sometimes hesitant to learn and understand the natural sciences. I am very interested in teaching students at both the undergraduate and graduate level to bridge the gaps between disciplines.

The GAANN Computing Scholars program

The Graduate Assistance in Areas of National Need (GAANN) Computing Scholars program at UNC Charlotte has a mission to increase the nation's capacity for research and education in computing and information sciences. As a participating fellow in this program I am being exposed to seminars, workshops, and other pedagogical activities that are helping me prepare for a career in academia. This semester I participated in a graduate teaching seminar course, attended various professional and teaching seminars, conducted peer mentoring sessions for bioinformatics students, worked as a teaching assistant, and observed the teaching technique and received great counsel from excellent teachers in the field.

Graduate Teaching Seminar

As part of the Graduate teaching seminar course we discussed various topics including different types of learning, Bloom's taxonomy, various techniques of active learning, ways of incorporating technology in the classroom, encouraging critical thinking, and class management topics such as curriculum design, transparency in the classroom, and designing grading systems. Some of the posted seminars in the class made me really think about having a teaching philosophy and the importance of it. I learned that having a teaching philosophy helps you select your style of course. My teaching mentor's teaching philosophy was two fold, "90% of learning happens outside of the classroom," and encouraging discussions and using real life examples helps cement concepts.

My Teaching Philosophy and Goals

My philosophy of teaching follows my personal philosophy of learning. My philosophy of teaching can be found in three quotes, which I personally think can be applied to many individuals who say "I can't" or "it's too hard":

(1) "Doubts in your mind are a much greater roadblock to success than obstacles on the journey." – Orrin Woodward.
(2) "Unleash the warrior within." – Prince of Persia: Warrior Within.
(3) "Knowledge is only powerful if you know how to use it." – Aaron Fox.

Expounding on these quotes, this is how I approach teaching:
(1) First I work with the students to identify their doubts or mental blocks toward a subject and overcome the idea that they cannot do a certain a task or a certain subject is too hard.
(2) Secondly I help them build confidence in the subject area until they feel that they can conquer any problem set before them.
(3) Finally, I help them understand how to identify real life applications where they can use their acquired skill set.

Peer Mentoring
       I applied that teaching philosophy when peer mentoring bioinformatics students with a biology background on computer programming and algorithm design. I helped three students with three different projects. Two students were in the introduction to programming class, had computational research projects and claimed to be struggling. One student was only working on a research project. Using active learning and encouraging critical thinking helped them achieve their goals and made them more proficient and independent in programming projects.

Teaching Assistantship
       I worked as a teaching assistant for my teaching mentor, Dr. Dennis Livesay. My responsibilities were to conduct the lab sessions, grade homework assignments, and guest lecture when he could not attend class. I also volunteered to conduct review sessions for exams. It was not mandatory for me to attend the classes, but I attended so I could observe how he teaches, answers questions, and encourages discussion. He was also a master teacher, which was great because we were able to discuss the purpose of certain assignments, and learning goals for the course. When I lectured in his absence I found myself adopting a few of his techniques. I grew comfortable teaching the material and encouraged discussion by creating connections to material covered previously in the class and topics that the students should be familiar with based on their academic backgrounds.

Professional Workshops
       I attended two professional workshops which I think fits in with my teaching goals. Mentee's Rights and Responsibilities was a workshop that discussed mentee-mentor relationships and the factors that come in to play including personalities, academic and cultural backgrounds, expectations, and understanding students workloads and learning curves. It was valuable because as I move into an academic position where I will be teachings students in a classroom as well as training students in a lab setting I need to mindful of various personalities, be patient, and have realistic expectations as every student will be different. Also, it reminded me that in both settings I must always have the students' best interest in mind. The second workshop was titled Embracing Change: Making the Most of Career Opportunities. This was very beneficial especially when encouraging students to do cross-platform or interdisciplinary work. These fit in perfectly with my goal to encourage natural scientists and pure computer scientists to explore and excel in new computational sciences.

<u>**Center of Learning and Teaching Workshops**</u>

I attended two teaching and learning workshops/discussions. The Center of Teaching and Learning (CLT) offered one workshop, and the other was offered by the HCI Reading/Learning Group. The CLT offered a workshop titled Designing and Facilitating Student Project Groups: Collaborative Writing workshop. This was a great discussion on the advantages and disadvantages of group work, the active learning, critical thinking, and problem solving skills that are achieved with group work. Group work is important because it encourages peer teaching in a collaborative project. The discussion on Bloom's Taxonomy from the HCI Reading/Learning Group was very useful. I've heard the term Blooms taxonomy before, but I did not fully understand what it was before I went to this discussion. I believe it is something that every educator should be aware of. I think an in-depth understanding of Bloom's taxonomy will increase one's ability to design quality well-rounded grading systems, courses, and curriculums.

<u>**Summary**</u>

The natural and computational sciences are geared toward problem solving and innovative research. This is why I plan on including active learning and critical thinking approaches to ensure the students have a good understanding and analytical skills needed in the field. The activities I participated in contributed to me expanding my skill set and introducing my mind to more pedagogical thought processes and strategies.

My teaching goal is to effectively teach the computational sciences to an interdisciplinary audience. I believe the best method of doing this is a combination of lecturing, active learning, and critical thinking exercises. The experience I have gathered thus far has helped me with the following:

- Gain experience formally teaching a small multi-background (academic background) group.
- Identify some struggles biologist have in learning the computational sciences
- Gain knowledge on various active learning techniques
- Learn how to set course objectives and design curriculums to achieve types of learning as classed by Blooms' Taxonomy
- Learn creative ways to stimulate learning and incorporate technology in the classroom
- Observe techniques of effective teaching, and put them into practice
- Gain better knowledge of the importance of individual attention in learning and the range of educational needs of individuals

As I continue to gain more experience and grow in the evolving discipline of pedagogy, I will seek opportunities to grow, both from experience and formal training. I have gained invaluable experience and I will build on it so that I can more effectively help train interdisciplinary computational scientists.

<u>Teaching Experience Plan for next Semester</u>

Next semester I plan to continue a similar trend as I did this semester to achieve my teaching goals.

- I plan to work with Dr. Mays as a Teaching Assistant for BINF217 Introduction to Bioinformatics. This course is typically a large class with undergraduate students from the Computer Science, Software and Information Systems, Mathematics, and Biology departments. I think it is the logical next step in learning how to introduce and train students from various backgrounds in the computational sciences.

- I will continue to serve as a peer mentor to help undergraduate and graduate students in algorithm design and computer programming. I will help students succeed in their classes and research projects as become acquainted with challenges people face with learning software development and computational techniques.

- I will attend master teacher lectures from the assigned list or see if Dr. Lawrence Mays and Dr. Jun-tao Guo are eligible master teachers for me to observe next semester.

- I will wait until next semester to choose Professional and CLT workshops to attend. This way I can choose from an updated list and avoid scheduling conflicts.

- I will keep an eye out for other opportunities including mentoring a student on a research project, setting learning objectives, goals, and helping him/her to achieve those objectives.