

Teaching Dossier

David Murray-Stoker

Ph.D. Candidate

Department of Ecology & Evolutionary Biology

University of Toronto

September 2023

Table of Contents

| | |
|--|----|
| Teaching Philosophy | 2 |
| Professional Development | 4 |
| Education Courses | 4 |
| Teaching Workshops | 4 |
| Teaching Experience | 5 |
| Course Instructor | 5 |
| Teaching Assistantships | 5 |
| Administrative Assistantships | 6 |
| Guest Lectures | 6 |
| Mentoring Experience | 7 |
| Teaching Evaluations | 8 |
| Course Instructor Evaluations | 8 |
| Summary of Instruction and Lecture Design with Representative Comments | 9 |
| Summary of Laboratory Redesign with Survey Results and Representative Comments | 11 |
| Teaching Assistant Evaluations with Representative Comments | 13 |
| Course Supervisor Feedback | 14 |

Teaching Philosophy

I view learning as a mutualistic interaction within a dynamic ecosystem. Both teachers and students are involved in a mutually-beneficial transfer of knowledge: teachers provide guidance, support, and expertise to students through the learning process, and students inform teachers how to be more inclusive, effective, and impactful. Like all interactions, learning depends on the environmental context; therefore, it is important to understand how the learning process is affected by the environment and adapt to changing context. In other words, **learning is an ecology.**

CREATING A SUPPORTIVE, ACCESSIBLE, AND ENGAGING LEARNING ENVIRONMENT

I believe that universal design for learning provides the foundation for a positive learning environment. **Students should be engaged in learning**, so I try to make connections to their everyday lives, build a sense of community, and have students develop self-assessment and reflective skills. For students to be engaged in learning, **I am responsible for creating a learning environment that is inclusive and accessible.** It is essential that students are represented and included in the learning process. Engaged and represented students still need the opportunity to demonstrate their learning, so **I provide multiple means of assessment and expression.** I use low-stakes formative assignments, such as reflections, group worksheets, or lecture activities, to see what students are learning and if there are any gaps or misconceptions. Summative assignments, such as term tests, exams, lab reports, and group projects, allow students to show what they have learned and what skills they have developed.

I make every effort as an instructor to construct a supportive and accessible learning environment. I provide a space for students to express their curiosity and uncertainty without anxiety or judgement, which is essential to have a sense of belonging and community in STEM fields. The process of learning can bring about discomfort, but I want places of learning – lecture hall, classroom, laboratory, field course, online environment – to harness this discomfort and channel it towards learning. I know every student can grow and learn, and it is my role to provide a learning environment where this can become a reality.

To achieve this aim of supportive and accessible learning environments, I try to consider every aspect of the learning environment. **I design my lectures to be active and engaging**, with questions during the lecture using Mentimeter and additional activities that work through problems and case studies. I design the activities to make the best use of the physical space available for any activities. I also provide multiple means of engagement during lectures: some students prefer to work on their own, so I allow for group- and individual-based work. I also gather frequent feedback from students by using check-in and check-out questions to monitor student learning. If students are still struggling with a concept, I will revisit a topic so that they feel comfortable with their learning. Students are also able to submit questions anonymously at any point during lectures, so every student gets the support they need. I also record my lectures with captions, which contributes towards accessibility and allows students to continue learning at their own pace.

REFLECTIVE PRACTICES AND METACOGNITION

Reflection and metacognition are essential components of my pedagogy. I use reflections as a way to monitor student learning. I want to know what students learned, how they learned it, and what confusions remain. Not only does this provide me feedback about the efficacy of lecture content and activities, but I see how students will identify different aspects or find different topics exciting. **In a way, reflections demonstrate the diversity of learners and what and how they learn.**

Alongside reflection activities, **I implement metacognitive practices.** I have students document their learning process: what works, what does not work, how to make the learning process more effective, and time management. Documenting the learning process allows students to become more effective learners, and these skills are transferable to any course, job, or profession.

I also engage in my own reflective practices. I reflect on each lecture, lab, and assignment. I ask myself: What worked well? What could be improved? What was most effective? What did I find challenging? I am connected to students in the mutualistic interaction of learning, and I view it as my responsibility to find ways to make a lecture, lab, or assignment more engaging and effective. **I am constantly trying to find ways to adapt my pedagogy in response to changing environments and to meet the needs and intersectional identities of students.**

HOLISTIC ASSESSMENT AND UNGRADING

When I evaluate student learning, I follow the principles of ungrading. I believe the most authentic and valuable assessment to involve self-evaluation by students and to be more of a discussion between teacher and student. **Learning is not just a letter or number on an assignment - learning is a process.**

I evaluate student work and provide feedback to students, but I also bring students into the conversation. I have students reflect on what they did, why they did it, and how they approached each question or assignment. I encourage students to 'think about thinking'. Students still receive a 'grade' at the end of the course, but my ungrading approach emphasizes reflection, metacognition, and embracing that learning is unique to each student.

MENTORING

I am responsible for teaching, training, and mentoring the next generation of scientists. **I know that research experiences are critical for recruiting and retaining undergraduate students,** particularly those from historically-excluded fields. It is therefore my moral and ethical obligation to provide as many opportunities as possible for students to gain these experiences.

I have had the privilege of mentoring three exceptional young scientists on different projects. Elana Maria tested for feedbacks between ecology and evolution in species interactions, where she took the experiment through the entire scientific process and presented the results in a poster presentation. I also mentored Fan Peng Kong and Fathima Amanat on a study in river and stream ecosystems, where both were essential to re-envisioning the analytical approach and interpreting the results. They were also co-authors on the published paper.

EXPANDING THE MUTUALISTIC NETWORK OF LEARNING

Moving forward, I want to build connections with local K12 schools. I have skills and expertise that would complement the knowledge and expertise of K12 biology teachers and get more students directly involved in science. I recognize that standards and initiatives can vary state-by-state and district-by-district, so I will be deliberate and patient to build connections with local educators to learn what would most benefit their students and curriculum. In discussion with local K12 educators, I will design classroom activities and research projects that align with their teaching standards while expanding what science instruction can be. I will also design the research projects to provide opportunities for K12 and undergraduate students to be directly involved in data collection, analysis, and publishing the work. I think this long-term collaboration would help to make STEM more diverse and inclusive by getting more students doing science and seeing themselves as scientists.

Professional Development

Education Courses

| | |
|---------------------------------------|------|
| Teaching in Higher Education (THE500) | 2022 |
|---------------------------------------|------|

Woodsworth College, University of Toronto

12-week course focused on the practice of teaching in higher education, with coverage and discussion on topics such as syllabus design, effective learning experiences, universal design for learning, teaching technologies, and accessibility. Included a peer observation and evaluation of teaching practices.

Teaching Workshops

| | |
|--|-----------|
| Advanced University Teaching Preparation Certificate | 2021-2023 |
|--|-----------|

Teaching Assistant Training Program, University of Toronto

Workshops (36 hours)

Equity & Access

- Identify, Assist, and Refer Plus (IAR+) Training
- Identifying and Addressing Microaggressions in the University Classroom
- Cultural Humility in Teaching
- Re-Envisioning Discomfort in the Classroom
- Contemplative Strategies in an Anti-Oppressive Classroom
- Personalizing Your Land Acknowledgement
- Dialoguing with Indigenous Perspectives on Reconciliation Education

Reflective Practice & Teaching Skills

- Fundamentals of Course and Assessment Design
- Avoiding Crickets: Discussion Strategies and Activities
- Undergraduate Mentorship and Training in the Research Laboratory
- Teaching and Learning in Uncertainty: Care and Kindness in the Classroom
- Personal and Pedagogical Value of Failure
- Building a Learning Community in Your Classroom

Educational Technology

- Engaging in Quantitative and Qualitative Data Interpretation
- Online, In-Person, and In Between: Navigating the Changing Educational Landscape
- Building Community in Online Learning Environments

Open Category

- Introduction to Active Learning: Theory and Strategy
- Grading Strategies for Teaching Assistants

Practicum (6 hours)

- Two sessions, each consisting of presenting a 10-minute lesson, listening to and participating in other lessons, and giving and receiving feedback.

| | |
|---|------|
| Ecological Society of America Short Courses | 2021 |
|---|------|

Annual Meeting of the Ecological Society of America

- Incorporating Diversity, Equity, Inclusion, and Social Justice into Ecology Curricula
- Bringing Computational Data Sciences to Undergraduate Ecology Classroom

Teaching Experience

I have experience teaching ecology, evolutionary biology, and biological data analysis. I deliberately took on teaching and administrative assistant positions to develop my pedagogical skillset and build a well-rounded portfolio. Previous assistantship positions and additional pedagogical training were integral to my position as a course instructor.

| Course Instructor | | |
|----------------------------------|--|--|
| Course | Years & Course Size | Duties |
| Ecology (BIO205) | Summer 2023 90 students | <ul style="list-style-type: none"> - Lecture development and delivery - Facilitating active learning and reflective practices - Developing laboratory assignments and activities - Assisting students with data analysis in R - Evaluating student reflection assignments, lab reports, term tests, and final exams |
| Teaching Assistantships | | |
| Course | Years & Course Size | Duties |
| Ecology (BIO205) | Fall 2018 - 2020, 2023 24 students/lab | <ul style="list-style-type: none"> - Lab instruction - Facilitating lab and field exercises - Promoting group learning - Marking group worksheets - Marking term tests and exams - Providing constructive feedback on research papers - Answering student questions |
| Biometrics I (BIO360) | Winter 2019 - 2021 Fall 2023 48 students/lab | <ul style="list-style-type: none"> - Lab instruction - Promoting group learning - Supporting students with data analysis assignments in R - Marking individual worksheets - Evaluating lab reports - Answering student questions |
| Evolutionary Biology (BIO342) | Winter 2023 25 students | <ul style="list-style-type: none"> - Tutorial instruction - Developing questions for weekly paper quizzes - Answering student questions about assigned paper readings - Guiding students through a field lab - Reviewing homework assignments and term tests - Marking tutorial assignments - Marking term tests and exams - Answering student questions |

| Administrative Assistantships | | |
|---------------------------------|--------------------------------------|---|
| Course | Years & Course Size | Duties |
| Diversity of Organisms (BIO153) | Winter 2022 ca. 900 students | <ul style="list-style-type: none"> - Course management - Gradebook management - Extension requests - Liaising with the accessibility office - Developing term tests and the final exam - Answering student questions and emails |
| Ecology (BIO205) | Fall 2021 - 2022 ca. 300 students | <ul style="list-style-type: none"> - Course management - Gradebook management - Extension requests - Liaising with the accessibility office - Developing term tests and the final exam - Developing laboratory assignments - Updating teaching assistant resources |
| Guest Lectures | | |
| Course | Years & Course Size | Description |
| Ecology (BIO205) | Fall 2022 ca. 300 students | Lecture: "How communities change" Case study: "Looking back in time" |

Mentoring Experience

While the COVID-19 pandemic dramatically limited mentorship opportunities, I have had the privilege to mentor insightful, creative, and enthusiastic undergraduate students.

I worked with Elana Maria on a project testing for feedbacks between ecology and evolution in species interactions, where Elana took the experiment through the entire scientific process: conceptualization, experimental design, conducting the experiment, analyzing data, and presenting the results in a poster presentation. Elana is currently pursuing a master's in occupational therapy, and we intend to continue working on the project and publish the results in a peer-reviewed journal.

I also worked with Fan Peng (Maryanna) Kong and Fathima Amanat on a macroecological study in river and stream ecosystems. Maryanna and Fathima were working with me as work-study students, and they were going to continue working with me on experiments for my Ph.D. research until the COVID-19 shutdown. I asked if they would be interested in helping me work on a side project, and they did not hesitate to get involved. Both Maryanna and Fathima were essential to re-envisioning the analytical approach to the study and interpreting the results. We published the project in *Journal of Biogeography*, with the paper selected as Editor's Choice. Maryanna is currently an energy coach and client representative at an energy efficiency non-profit, and Fathima is pursuing a Master's in Environmental Applied Science and Management.

| Undergraduate Mentoring | | |
|---------------------------------|---|--|
| Fan Peng Kong Fathima Amanat | June 2020 - Dec. 2022 Independent Research | Project: "Environmental filtering and habitat (mis)matching of riverine invertebrate metacommunities." - Incorporated student ideas into the analytical approach - Involved students in the interpretation of results - Collaborated with students on manuscript writing and revisions - Demystified the scientific process for students |
| Elana Maria | Summer 2021 Research Opportunity Program | Project: "Evo-eco feedbacks in a legume-rhizobia mutualism" - Helped the student design and conduct a research experiment - Provided feedback and guidance on writing assignments - Evaluated communication of the research project through a poster presentation and a scientific paper |

Teaching Evaluations

Course Instructor Evaluations

My goal as an instructor is to provide a supportive and accessible learning environment with engaging lectures and activities. I also want to support students through the learning process with constructive feedback, reflective practices, and metacognition.

Table 1: Results of the University of Toronto course evaluation survey when I was the course instructor for Ecology (BIO205). I report the mean score for the course and the mean score for all courses in the Department of Biology at the University of Toronto Mississauga. Scores are rated 1 = strongly disagree and 5 = strongly agree (Q1-Q5 and Q7-Q12) and 1 = poor and 5 = excellent (Q6).

| Question | Course Mean | Department Mean |
|--|-------------|-----------------|
| Q1: I found the course intellectually stimulating. | 4.4 | 4.3 |
| Q2: The course provided me with a deeper understanding of the subject matter. | 4.5 | 4.4 |
| Q3: The instructor (David Murray-Stoker) created an atmosphere that was conducive to my learning. | 4.9 | 4.6 |
| Q4: Course projects, assignments, tests, and/or exams improved my understanding of the course material. | 4.7 | 4.4 |
| Q5: Course projects, assignments, tests and/or exams provided opportunity for me to demonstrate an understanding of the course material. | 4.7 | 4.5 |
| Q6: Overall, the quality of my learning experience in this course was: | 4.6 | 4.3 |
| Q7: The course inspired me to learn more about the subject matter. | 4.1 | 4.0 |
| Q8: The instructor (David Murray-Stoker) highlighted connections between theory, practice, and research in the course. | 4.8 | 4.5 |
| Q9: The instructor (David Murray-Stoker) encouraged students to draw knowledge from other courses to understand course material. | 4.6 | 4.4 |
| Q10: The course instructor (David Murray-Stoker) expressed interest in students' learning approaches (e.g. note-taking, study habits) throughout the course. | 4.7 | NA |
| Q11: The course instructor (David Murray-Stoker) encouraged students to be actively aware of their learning throughout the course. | 4.9 | NA |
| Q12: The course instructor (David Murray-Stoker) provided opportunity for group activity and discussion in class. | 4.9 | NA |

Summary of Instruction and Lecture Design with Representative Comments

As a course instructor for Ecology (BIO205), I made several changes to the course content and structure to align with my teaching philosophy. I want lectures to be supportive and accessible learning environments for all students, and I want the lectures to be engaging and active. I also think reflective practices and metacognition are essential for learning, so I encouraged students to get in the habit of monitoring their learning process and reflecting on what they learned and – importantly – how they learned. Most students in the course were in their first or second year, and I wanted to help students develop learning skills and time management.

“David ensured that we were truly learning all of the content, as opposed to passively listening and memorizing facts. He gave us many opportunities to practice applying the content to different scenarios through classroom activities and weekly reflections. In the reflections, David clarified any information that students described incorrectly. The lectures were fascinating, and the use of Mentimeter as a tool to gauge our comfort level with the content, as well as a channel for asking questions, was incredibly helpful. There are not many professors who would go to the lengths that David did to ensure that everyone was truly grasping the content and understanding the importance of studying ecology.”

Supportive and Accessible Learning Environment

I did my best to always be open and welcoming to students from the moment they walked into the lecture hall. I created a playlist for students to add some of their favourite music to, and I had the songs playing before the start of the lecture. I recorded all of my lectures and provided captions, so students could rewatch the lectures as needed to help study and review.

“I’ve never been in such an amazing learning environment. I really appreciated how difficult concepts were went over in detail until the majority of the class understood. Regarding the environment of the class, the class was so welcoming and provided students with a safe place to ask questions.”

“David was a great instructor. He allowed us to feel comfortable in this learning setting and he created an environment conducive to our learning.”

“I always felt supported. From the first day, I could tell how much the instructor deeply cared for his students.”

Active and Engaging Lectures

I want every lecture to be active and engaging. I find Mentimeter to be a great tool for students to contribute to lectures in real time. I particularly found check-in and check-out questions to be helpful in gauging student understanding. If students were struggling with a concept, I would go back to it before moving forward. It was also a good measure of my teaching effectiveness.

I also encouraged students to work on activities during lectures, with students forming groups and working through the problems together; some students also elected to work on their own. These activities relied on students coming to lecture prepared and engaging in the lecture material, but they were also a way for students to demonstrate their knowledge and understanding.

"David ensured we were always engaged in the material and made the most of lecture time by providing a medium to ask questions, reviewing concepts we collectively struggled with, and used case studies and class activities to keep us engaged and allow us to apply our knowledge and share our ideas with each other."

"The interactive component really helped to enhance our learning and I think I would have learnt better this way than just standard lectures."

"There were daily/midway course check-ups that David did for all his lectures that actually helped my understanding when I was still confused about a topic and was afraid to ask."

Reflective Practices and Metacognition

Students completed directed reflections each week, where I wanted to monitor what they learned and how they learned it. I also include prompts related to metacognition, with a particular focus on having students identify what learning strategies they find successful, how to solve problems or challenges when learning, and how to develop time management and organization skills. I was able to not only monitor student learning through these reflection, but students were able to monitor their learning and build transferable metacognitive skills. I also reflected on my own teaching effectiveness and listened to student feedback to be more effective throughout the course.

"The instructor wanted to learn from the students to find the best way to help the students learn."

"You could really tell that they cared about the success of the students and really went above and beyond to make adjustments when needed to better help the students. The instructor not only cares about this subject, but also cares about the success of the students taking the course and what they can gain from the subject."

Summary of Laboratory Redesign with Survey Results and Representative Comments

I restructured and redesigned the laboratory component of the Ecology (BIO205) course. My main goal was to take students through the scientific research process during the labs, from reading papers for background information and developing a research question to data collection and analysis. I wanted students to grow as scientists.

Question, Hypothesis, and Prediction Workshop

Previous offerings of the course gave students a limited scope to develop their own hypotheses and predictions. To increase student engagement and allow students to explore ideas they found interesting, I gave students almost complete autonomy to create their own question, hypothesis, and prediction (QHP) to address in their lab report; the only real constraints were the data we could collect.

- 65% of students indicated they would prefer creating their own QHP.

The QHP workshop was led by the teaching assistants, where they guided students through examples of questions, hypotheses, and predictions and supported students as they developed their QHP.

- 88% of students thought the QHP workshop was a valuable learning experience.

"It was really helpful to know the distinction between hypothesis and prediction because I initially thought they were the exact same."

"This practical was extremely useful. The specific examples, as well as the do's and don'ts that we went through really helped me gain a better understanding as to how I should approach my own QHP for my research."

The lab component of the course has since been modified to incorporate the QHP workshop and give students the opportunity to explore ideas they find interesting.

Data Collection

Students sampled plants across four different habitats on the university campus, identifying and enumerating plant species. Students got outside and into the field for this lab, collecting their own data.

- 92% of students indicated this activity was a valuable learning experience.

"This lab allowed me to feel more accomplished and trust the data, rather than just be given the data for the report. It felt like we were doing a mini research project over a body of time."

"I enjoyed identifying the different types of plant species and the ones I didn't even know. It was a great learning experience and I enjoyed it with my group."

"Campus data collection was very interesting as I never looked at my campus on an ecological basis. These activities helped me to be involved into the environment, it also helped me to interact with my peers as it was a group-based activities."

Soil Analysis

Students had indicated they really enjoyed this lab, where they analyzed soil from different habitats for macronutrients, pH, salinity, and organic matter content. When I was an administrative assistant in fall 2022 – our first return to in-person instruction since the COVID-19 pandemic – many students indicated that they really enjoyed this lab and felt they were part of the scientific process. I wanted to continue this experience, so I made it a more central component of the laboratory investigation.

- 100% of students indicated this activity was a valuable learning experience.

“Personally, this was my favourite practical. I really enjoy lab work and so this practical was very fun to me.”

“It was fun to do that analysis ourselves. That way we are able to understand the process a bit better than if we were just told of the process and handed the results.”

Data Analysis

Students used R to analyze the data they collected and create figures for their lab reports. Previous courses used Microsoft Excel, but I think R is an essential skill for students in biology and related fields to develop. I provided students with template R scripts and instructional videos to help with the data analysis.

- 92% of students thought the data analysis activity was a valuable learning experience.

- 69% of students indicated R was an important skill to develop for their careers.

(Student comments were not submitted in the survey).

Literature Review

Students were led through the structure of a scientific article, and they also evaluated a scientific article for content and structure to help them prepare for their lab reports.

- 97% of students indicated this activity was a valuable learning experience.

“It was a good experience and extremely helpful as it showed the required format for the lab report with a professional example. Moreover, the dissection of the article with peers and the TA highlighted some further advice for writing my own report.”

“I really liked how we were not given instructions as to how we should write the lab report, but also given examples as to how the scientific literature applies these same techniques into their own writing. This really helped me to follow the triangle structures in my own writing as I could observe how these structures were implemented into other scientific writing.”

Teaching Assistant Evaluations with Representative Comments

I am always looking for ways to improve my teaching effectiveness. In addition to having more experience as a teaching assistant, I reflect on my practices and student evaluations to find ways to improve. Although the score increases may be modest, evaluations show that I respond to feedback and work to improve my pedagogy (Table 2).

Table 2: Teaching assistant evaluations were administered by the department upon request of the course instructor. Scores are rated on a five-point scale: 1 = strongly disagree and 5 = strongly agree. Survey evaluations were not offered for BIO360 or for administrative TA roles.

| Question | Course | Mean Rating |
|--|--------------------|-------------|
| My TA was well prepared and appeared to have a strong understanding of the practical material and techniques used. | BIO205 (Fall 2018) | 4.58 |
| | BIO205 (Fall 2019) | 4.78 |
| My TA demonstrated an enthusiasm for biology that had a positive effect on my experience during the practicals. | BIO205 (Fall 2018) | 4.50 |
| My TA included helpful comments/feedback on my marked assignments. | BIO205 (Fall 2019) | 4.67 |
| My TA had a positive effect on my experience during the practical activities. | BIO205 (Fall 2019) | 4.73 |
| Overall, I am happy with the performance of my practical TA. | BIO205 (Fall 2018) | 4.50 |
| | BIO205 (Fall 2019) | 4.64 |

Learning Environment

"He was very approachable, so I didn't feel intimidated when asking questions. His answers were always thorough and in-depth and answered my questions in an above and beyond kind of manner."

"I think he did a great job. He was very friendly and easy to talk to. I was felt comfortable and was encouraged to ask questions."

"David was very helpful and insightful, although he was a little tough on marking I believe it was for the best"

Supporting the Learning Process

"One of my previous T.As was very intimidating and at times made me feel stupid when I asked a question, but David could not have been more of the opposite. No matter how small the question was, or if the questions was already answered, or if the answer was right in front of me even, he answered politely and in instructive yet friendly manner."

"Great TA, his feedback was very intensive and helpful, would continue to explain until I fully understood the answer, overall, one of the most helpful TAs I have had in my university years."

Course Supervisor Feedback

"David was an excellent TA. He contributed to the preparatory meetings with ideas and feedback and was always on time, reliable and professional. He was an engaging and inspiring TA, interacting well with students. He cared about his students and about making this course a success."

- Dr. Christoph Richer (BIO205, Fall 2018)

"David was an integral member of the BIO205 teaching team. He showed excellent judgment when dealing with student questions and conflicts and was very communicative with his students. His experience teaching BIO205 was evident as he consistently contributed his opinions and experiences during our TA meetings. I very much appreciated this!"

- Dr. Christoph Richer (BIO205, Fall 2020)

"David is an experienced teaching and marking TA for BIO360. He is always professional, collaborative and dedicated to preparing extra course materials and completing tasks on time. It is always great to having him on the BIO360 team."

- Dr. Hossam Abdel Moniem (BIO360, Winter 2021)