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Implementing EDIA: Building Belonging into the Laboratory Learning Environment

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Abstract

Laboratories are natural active learning environments where students are immersed in learning the cognitive and physical skills to apply the conceptual knowledge of the course. To create an inclusive environment that makes every student feel welcome and respected, we can use many methods to build a sense of belonging to a supportive learning environment that fosters their development as scientists. Introductory surveys based on the student's values and barriers they face gives students the message that they are considered individuals and their opinions are encouraged. A classroom culture that encourages group work, generating big questions that they want answered by the course, flipped classroom activities that generate collaborative problem solving, and a lab culture that encourages peer teaching all contribute to a supportive learning experience. Organization of students in diverse assigned pods of four students, group in-lab assignments, peer review of draft student research papers before assessment by markers improve every student's understanding and achievement. Additional benefits are the development of the student's ability to critically evaluate their own work, respect viewpoints and abilities outside of their usual peer group and sometimes make new friends. Learning management systems designed with Universal Design for Learning principles provides choices for student's pre-lab preparation and automatic marking of pre-lab quizzes frees TA time for assignment feedback and focusing on struggling students during laboratory sessions. Transformation of courses by small changes each term is possible with a phased-in approach of inclusive initiatives. Discussion and suggestions from participants were encouraged during the conference workshop and are included here.

Keywords: Belonging, inclusive, values, community, syllabus, group work, big questions, CURE.

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INTRODUCTION

Actively building a sense of belonging in students has been shown to increase engagement, retention, and enjoyment of students in courses, programs, and higher education in science. A recent meta-analysis of an early intervention tested in 45 American colleges and universities showed the power of creating a sense of normalcy that difficulties will arise when moving and making a new home to produce a growth mindset that these are common perceptions that can be resolved by persisting and trying again. Setting expectations of challenge and sharing the experiences of previous students helps to prepare a growth and resilience mindset in freshmen before they begin college or university (Walton et al. 2023). The journal Cell Biology Education has published a clear guide to evidence-based pedagogies that develop a sense of belonging in classes: https://lse.ascb.org/evidence-based-teaching-guides/inclusive-teaching/pedagogical-choices/#belonging. Groups of students with diverse perspectives have been shown to be better at problem solving than students who are only high

achievers (Hong & Page 2004). The complex nature of environmental and health-related problems faced by society require creative input from diverse thinkers. The continuing low proportion of students in higher education from diverse backgrounds has brought diversity and inclusion to the forefront of educator's concerns. Inclusive pedagogies complement high impact practices and CURES. This paper describes some inclusive strategies used by instructors of BIOL 2030, a large, second-year course in genetics and molecular biology taught at Dalhousie University, a medium-sized research/professional institution in Halifax, Nova Scotia, Canada.

At Dalhousie University, faculty in communities of practice in the Faculty of Science have been reading educational literature, discussing teaching pedagogy and sharing the impacts of inclusive practices they have tried in their classes for many years. One of those classes is BIOL 2030, Genetics and Molecular Biology, a core second-year biology credit required for undergraduate students who are majoring in Biology, Marine Biology, Microbiology and Immunology, Biochemistry and Biophysics or Medical Sciences (Figure 1). It has 256-304 students per term who attend 3 x 50-minute lectures a week for 13 weeks. We have weekly labs (11-13 sections, wet and dry) with weekly tutorials with undergraduate TAs. It is taught by lecturers, a lab instructor who also coordinates the whole class, TAs, markers, and technical staff.

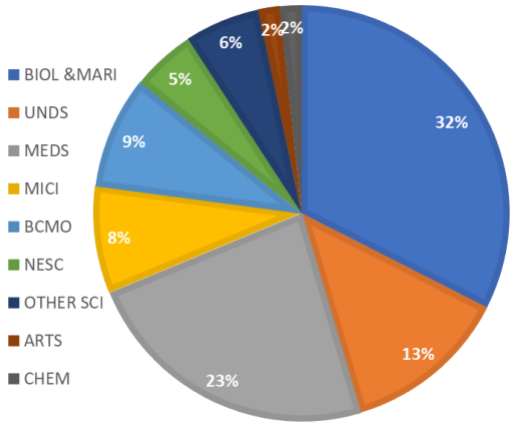

Figure 1: Composition of percentage enrolment in BIOL 2030 by declared major (January to April 2022 term). Largest proportion of students are Biology and Marine Biology (32%), Medical Sciences (23%) and undeclared science majors (13%).

Dr. Bryan Dewsbury (Florida International University and Gardner Institute) presented the keynote address at the Dalhousie Conference on University Teaching and Learning in 2021. In his talk entitled "The revolution will be backward designed-inclusive practices in the college classroom" he described the history of segregation and institutional barriers to racialized students and how he works to overcome those barriers. He began building an authentic relationship between himself and his students through admission essays they wrote before beginning the introductory biology section he taught at the University of Rhode Island. The admission essay used the guidelines from 'This I believe' https://thisibelieve.org/ The essays were values-based; many historical people as well as people from all cultures and backgrounds have contributed very personal essays over the decades, describing core values or beliefs that shape their existence. An excellent guide on how to teach the whole person and build belonging by creating a respectful class was published by Dewsbury and Brame (2019) and is available at https://lse.ascb.org/evidence-based-teaching-guides/inclusive-teaching

Inspired by his outreach to his students and supported by pedagogy of creating belonging and its impact on student's persistence in undergraduate studies (Walton et al. 2023), we decided to attempt an introductory survey. We currently send an email welcome to students two weeks before term begins to share advice about the course in general, including the syllabus. Rather than a full essay, we have used an easily configured introductory survey using Microsoft 365 Forms (available free to all Dalhousie University students) to collect responses about readiness for class and express their core values though a short essay responding to thematic prompts. We have also transformed our Faculty of Science traditional syllabus to a welcoming syllabus. Additionally, in that syllabus we prioritize student support, respect for the Mi'kmaq first settlers of our lands and the contributions of African Nova Scotians to the culture and development of Nova Scotia. We describe in positive terms how to contact the teaching team, the options available for how to learn the subject matter, how we plan to build a supportive learning community through discussion and group work and provide student choice whenever

possible including options for student absences. Student-facing information will be presented in the Student Outline section of this paper as examples. Please contact the author for discussion or more detail.

STUDENT OUTLINE

1. INTRODUCTORY SURVEY

Objectives

Recognize student individuality and signal acceptance of gender identity by asking preferred name and pronouns used.
Evaluate computer access for success in course; assist those who need access.
Initiate relationship between student and professor, and between student and peers, through core values statement.

Methods - Instructions

Requires an internet-connected device (computer, tablet, or phone). LMS survey tool (like Microsoft 365 Forms, or free survey tools like Google Forms, SurveyMonkey, Typeform, Jotform etc.).

In an email two weeks before first class:
We want you to know we have your back and want to get to know you a bit before classes start. We value building a relationship with each student and a supportive learning community to learn about genetics together! Please respond to this short survey as soon as you can:

In the survey header:
Please let us get to know you a bit to help us shape an enriching experience for you this term.

Survey Questions

1. What is your preferred name (first last) and pronouns (she/he/they/other)?
2. Do you own or have easy access to a good computer?
3. Please answer only ONE of the following questions by considering your core values or beliefs before you write your short paragraph (up to 300-400 words please).

- Are you from a background that has faced barriers to education? How has this affected you?
- With which community do you identify? What issues are important to that community? How do you hope that a better understanding of genetics will help you to solve those issues?
- If your dream career involves some kind of social improvement or advocacy, tell us about it. How does genetics tie into this?
- Describe why you are taking genetics other than it is a required course for your program.

Results

Students respond to questions with candid and sometimes heart-rending comments. Only lecturing professors and class coordinator read the responses. Anonymous excerpts are shared with the whole class, during the first lecture or lab, grouped into common themes (from JP Bielawski's Sept 2022 and RA Schofield's Jan 2022 lectures):

- Thirst for knowledge/curiosity that shows a genuine interest in genetics and how it explains the 'whys' of life.
- Personal interest, understanding heredity in human disease. in their families, some affected by a genetic disease, and they want to better understand the genetics behind it: neurodivergences such as ADHD; a rare blood disease caused by a yet-undiscovered gene mutation; arthritis; an auto-immune disease; Cystic Fibrosis
- Interest in healthcare. For example, genetic tests that predict the likelihood of someone developing a disease. Some of them have lost family members to cancer and are interested in how the genetic counselor interpreted the information provided by the test.
- Have experienced racism and am interested in social justice and social advocacy.
- Come from regions without support for higher education; feel pressure to succeed since they're representing their community.
- Want to make the most of this opportunity, be of value to society and their community.

- Gender identity: responding to a trans student: You are a member of the LGBTQ+ community … and genetics has been misused to perpetuate hate against you and to undermine queer experiences. In class we discuss the difference between biological sex and gender. And we demonstrate the underlying genetics that is involved is very complex, with many interacting genes, and is therefore difficult to predict. And to the member of the LGBTQ+ community who is a self-described "wilting tree." I read your heartbreaking essay with tears in my eyes. You feel rejected by the folks of your town – even by your own family. I hope that you feel at home here at Dalhousie. I hope you find your community here. I hope that we, your classmates, and colleagues, can be your allies, your community, your family.

How do we respond to students? They can see we share many values. What kind of community would you like to support those values? Let's start here and now in BIOL2030! Let's actively support each other. Ask what they can do to build a better community.

The response to the dream job question can be shared also, or can be adapted as a fun, in-class ice breaker activity to help them know each other a little better, and spark discussions with the people they sit beside. Ask students to take 5 mins to talk to people next to them about their dream job, their vision for their future.

How will you translate your values into your vision, and your vision into a plan? You are not expected to have all the answers. Your university experience should help you figure out what and where you want to go.

How will this course address these things? Some things are in-depth part of the content. We will equip you with foundational knowledge. We will give you a chance to explore topics that interest you (blog posts, keystone lectures, guest speakers). We are here to offer help and advice… Just ask!

2. WELCOMING SYLLABUS – THE MENU

Objectives

Welcome students to your class even before the first meeting.
Set realistic expectations of how the class will be delivered.
Build interest and sense of personal responsibility for their learning by outlining options and choice.

Introduction

There is a large amount of information possible, and examples are linked to the descriptions in each point. These are the features I decided to highlight and felt were most important:

- **Engaging theme**; based on a party invitation, a menu, a special event! You should choose something that speaks to your passion, some positive thing to look forward to. Invite them to join your pleasurable event (Appendix A). Try https://clt.champlain.edu/kb/creating-an-engaging-syllabus/#htoc-making-a-syllabus-more-engaging
- Use **attractive graphic design**/highlights, tables, boxes rather than long paragraphs of regular text; make it easy for important details to be found quickly. Internal links from a front page? Images that are informative? Colors that are accessible to those with color vision deficiency (test using https://www.color-blindness.com/coblis-color-blindness-simulator/).
- **Why this course is important**/what should they be able to do upon completion. This is sometimes termed a "promising syllabus" and describes what a student could gain from the class upon completion and if open to learning. https://www.chronicle.com/article/the-promising-syllabus/
- Language should be **warm** and offer positive opportunities to learn and practice working with concepts. Traditional syllabi phrased with the negative 'must' and 'should' (in bolded or all caps text!) and describing negative consequences should be re-framed with choices and flexibility. For examples see https://www.brown.edu/sheridan/inclusive-teaching-newsletter-invitational-syllabi
- Personal appeal: what **big questions** will they be able to answer? You can do this yourself or ask your students to generate them. A colleague of mine used some big questions she knew were always raised in her class and used several images to link to a provocative article about each of them in her syllabus.

https://www.facultyfocus.com/articles/course-design-ideas/a-syllabus-tip-embed-big-questions/
I was inspired by an activity I did in a teaching workshop on the Question Formulation Technique: https://rightquestion.org/education/ , which was developed with an equity lens to help learners develop good questions. We have tried this in a limited way in our Big Questions activity(below) in our first lecture class.

- Highlight equity through **course design** that includes groupwork in diverse pods, support, flexibility, Universal Design for Learning (**UDL**) (https://udlguidelines.cast.org/)

Examples of a welcoming syllabus are provided in **Appendix A**.

Response by students:

I am confident that I will succeed in this class just by reading the syllabus, I can tell that the professors truly want each individual to succeed and enjoy the semester. I am excited to start on the 7th! (Fall 2022)

3. BIG QUESTIONS EXERCISE

Objectives

Recognize student individuality and gauge whole class interest in genetics topics.
Stimulate student curiosity and engagement with course topics in advance of lectures.
Make connections to prior knowledge and signal questions that will be answered in the course.
Demonstrate the importance of asking good, detailed scientific questions.

Instructions

You will need an internet-connected device (computer, tablet, or phone). We will be using Google Jamboard.

1. Introduce yourself to the person behind you.
2. Now introduce yourself to the 2 people beside you.
3. Go to jamboard: https://jamboard.google.com/d/ (provide as a link in Teams, a tinyURL or a QR code in the slide).
4. Read the guiding statement at the top of the page- if it doesn't provoke questions, move on to the next one. Quickly write down any questions you have as quickly as possible; you have 10 minutes
5. Can now change open-ended to close ended or the other way around.
6. Revise questions and pick your group's best one to share.

Each whiteboard was headed by a guiding statement to evoke a response or questions on topics we derived from the introductory survey questions. Example statements:

- Genes play a huge role in determining our health and the likelihood of someone developing a disease.
- The recent use of mRNA technology to develop the Covid-19 vaccine is an example of how genetics is transforming health care.
- Learning about my alleles will enable me to make beneficial choices about my lifestyle.
- Understanding genetic diversity can help protect ecosystems against climate change.

Results

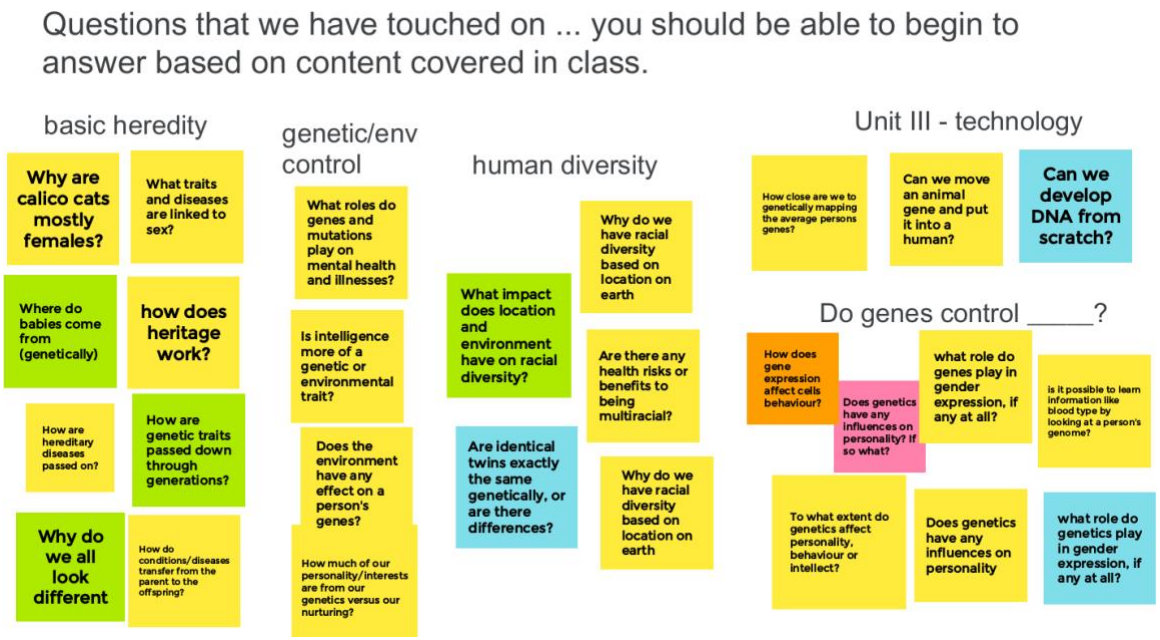

Figure 2 Student responses to Big Questions exercise from Fall 2021, BIOL 2030, second year students. Students worked in small groups to generate questions important to them that they would like to be answered by the course. Students were given about 10-15 minutes of class time to submit their questions.

Student questions are saved and shared as non-editable pdf with students (Figure 2). Lecturers presents summary slides grouping together similar questions and describe where or when those questions will be answered (which Unit or topic in the course). For some very specific questions outside the scope of the course (often specific questions about genetic diseases or the heritability of mental health) students are encouraged to explore that answer on their own as a topic for their blog post, a 350-word posting relating a genetic topic to society, in language suitable for the general public and explanatory graphic.

Cited References

Schuegraf M, Cardinal-Aucoin M 2021. How to ask meaningful questions (that you didn't know you had). Dalhousie Centre for University Teaching and Learning Conference 2021. Personal communication.

The Question Formulation Technique (QFT) was created by the Right Question Institute (rightquestion.org).

MATERIALS

Students will need a computer, iPad or phone with Internet access for each of these activities. Links to survey, syllabus and big questions Jamboard can be shared through email, Learning management system or through PowerPoint slides when presented.

NOTES FOR THE INSTRUCTOR

1. Introductory survey:

We recommend emailing the survey link to students at least two weeks before term begins. This will allow them the privacy and time to complete survey at home before the stress of moving and settling into a new home and routine. For our class size of approximately 260, we begin reading them and pulling memorable quotes almost as soon as they start arriving. Only the lecturer and class coordinator/instructor see the responses since the student names show. Students needing computers are sent information on how to borrow them from the library and all responses are read by one of the parties. We use actual short quotes but no identifying information (specific communities). We have recently added an option: "Please do not share my response in class even though it will be anonymous." This allows students to control whether their opinion or personal reaction will be shared widely. I consider this one small thing that's easy to implement if you can invest the reading time before term begins.

I feel the responses are a bit too personal to let teaching assistants or demonstrators read but would be good for small classes or lab sections where the instructor could read them and respond to the students.

If you feel your students need clearer instructions or a resource to help them identify values, I recommend https://www.taproot.com/live-your-core-values-exercise-to-increase-your-success/

Values exercise for instructors (from mini workshop)

Participants in the mini workshop responded to the following questions (thank you so much for your honest responses!):

a. Describe what drives you to improve your teaching other than it is required for your position.

- As a student early in my career, it was extremely rare for me to interact and engage with an instructor from my community and background. My instructors also seldom demonstrated a desire to include any diversity or appreciation for points of view that diverged from their own.
- I discovered a love of biology in college. Our course is the first time a lot of our students have been in a biology lab at the college level, and I want them to come out with a positive experience and to feel like they belong in both the course and in the field of biology as a whole.
- Ever since I have started adding in inclusion practices in my classroom, I'm amazed at how much deeper the connections are between me and my students. My students tell me they feel safe and appreciate the openness. I personally appreciate getting to know my students and shaping the class to meet them where they are at and what they aspire to do or be.
- I know I come from a place of privilege as a cis straight white person and so I feel that it is important to consider (and implement) strategies that will make my courses welcoming and accessible to all students who come into my classroom. I worry that most of the default teaching strategies I experienced and was mentored with do not serve BIPOC, first gen, and those with learning differences so I think changes are needed for my approaches.

b. Are you from a community/family that has faced barriers to education? How has this affected you?

- I am a first-generation college student. It definitely affected the application and decision-making process for which college I should attend (I chose one that was not a good fit for me). I definitely suffered from imposter syndrome while at my college and struggled a lot socially while there.

2. Welcoming syllabus – The menu

Syllabi should be sent to students at least two weeks before term begins to give them time to absorb the information and prepare them for term. Converting a traditional syllabus to be welcoming is a large project that should be carefully planned and implemented. See sources in Student Outline and examples in **Appendix A**.

3. Google Jamboard activity:

The instructor requires a Google account to set up the Jamboards, which are simply a whiteboard on which students can draw, write or place electronic 'Post It' Notes. Notes are repositionable, easily sorted and only allow short questions. You can provide the link code to the students in PowerPoint, Teams or through a QR code displayed on the screen at the front of the class, and they can be accessed through multiple platforms, although Chrome is the preferred browser. There was a limit to the number of students who could join one whiteboard, so it's good to have multiple boards in a large class. For lab sections of 24, one board would be sufficient. We used five boards for a class of 250, so about 50 people at once could work on the same board. This may have changed since we last used it. For help on using Google Jamboard:
https://support.google.com/jamboard/answer/9444874?hl=en&ref_topic=7383644&sjid=13244801769995352 49-NA

After the activity, we download them and save as pdfs for a 'permanent' record of their questions to share with students. The most difficult part is remembering to refer back to them when we address the questions- maybe once a week do a wrap up and address them then?

4. Other ways to build belonging:

a. Building personal relationships in small groups: In lab sections of 24 students we used icebreakers in the first lab to get to know each other:
   i. Music as they come in - upbeat and positive e.g. "About Damn Time" by Lizzo
   ii. Favourite memory from the previous break - draw it! (Jamboard again).
   iii. Introductions (small labs): preferred name, pronoun they use and best study secret, favourite way to de-stress, favourite sport or leisure activity, favourite band/book/show.
   iv. Large groups: response to the introductory survey. They are heard! There are many people like them here. Share values of creating a supportive learning community.

b. Remind them of ways to contact you, the TA and get extra support: Post names, remind them of Discussion Forum, email addresses and where to find them and student hours or drop-ins.

c. Arrange them in diverse groups and let them know why! Diversifying science matters as shown by Hong and Page's (2004) social sciences paper that demonstrated diverse groups of good problem solvers could outcompete groups of the highest ability problem-solvers. In BIOL 2030:
   i. Assigned pod membership before first lab; helped them find seats as they arrived. Seat in pods next to and across from each other for easy discussions.

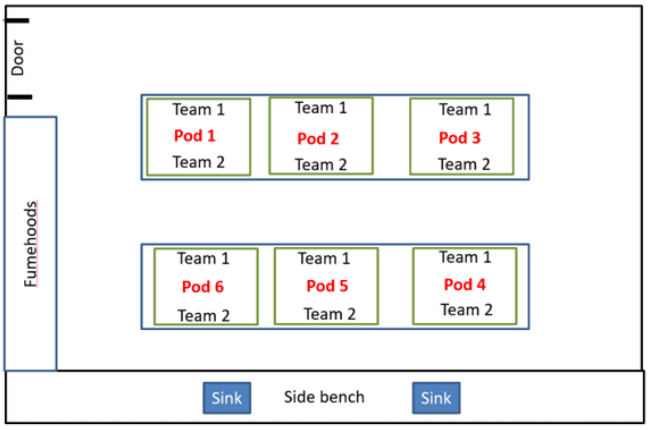

Figure 3 Students in Pods of four students (two teams of two) in BIOL 2030 lab space. Each pod had

a shared breakout room (channel) in the lab section Microsoft Team, and shared documents they were working on in the channel files for each lab session.

ii. Arranged in mixed pods of four students, based solely on declared major.
iii. Intention is to collaborate with new or different people outside of their program.
iv. Worked on collaborative assignments (one grade per pod) completed mostly during lab time.
v. Option to complete or revise after lab in person or through Microsoft Teams, due by noon the next day.
vi. If missed class because of illness, can still participate in group activities through Microsoft Teams.
vii. Advantage- get to know a trusted group of students well and participate in peer review of individual papers starting halfway through term (build ability to critically evaluate others and their own work based on a rubric and assignment guidelines).

Response by students:

I found that hearing that the struggles I was facing throughout the course were similar to my pod mates which helped me keep a positive attitude as the course went on.

…the small pods during the lab session had the greatest effect on my understanding of the course material as well kept me motivated and have a more positive outlook on the course in general.

ABLE participant comments on group work:

During the workshop, we had a great discussion on groupwork and assigning groups. I especially liked the suggestion to do a group preferences survey after the first couple of weeks of term to prevent dissatisfaction with group members. It was made clear at the beginning of term that the first groups might not be the final groups. Non-performers were placed together to get them to prepare better and contribute more to their new group. One question that occurred to me later: does this ever have the effect of causing them to stop coming to labs?

CONCLUSION

Small changes to the lab environment can make large differences to students who come from underserved populations who may not feel they are reflected in the class makeup. Asking them about themselves makes them realize you want to know them as individuals and respect all viewpoints. Fostering a sense of belonging in our classes helps students persist through challenges and stay in science (Walton et al. 2023). Giving choice, where you can, especially of topics related to learning content, lets students follow their own interests and goals, which signals respect in their opinions and interests. CUREs or authentic research allows students to build research skills and develop confidence in performing original research and is a high impact educational practice (Kuh, 2008). Discovering something new and unique by involving students in research may help them reach goals beyond our course learning objectives. Keep looking for ways to welcome your students and feel part of positive change!

CITED REFERENCES

Dewsbury B. 2021. “The revolution will be backward designed-inclusive practices in the college classroom” 2021 Dalhousie Conference on University Teaching and Learning keynote. April 28, 2021; Halifax, NS Canada.

Dewsbury B, Brame CJ. 2019. Inclusive Teaching. CBE-Life Sci. Educ. 18(2). https://doi.org/10.1187/cbe.19-01-0021

Hong L, Page SE. 2004. Groups of diverse problem solvers can outperform groups of high-ability problem solvers. PNAS 101 (46): 16385-16389. https://www.pnas.org/doi/full/10.1073/pnas.0403723101

Kuh GD. 2008. High-impact educational practices: What they are, who has access to them, and why they matter. Washington, D.C.: Association of American Colleges and Universities.

Walton GM, Murphy MC, Logel C, Yeager DS, Goyer JP, Brady ST, Emerson KTU. 2023. Where and with whom does a

brief social-belonging intervention promote progress in college? Science 380,499-505. https://doi.org/10.1126/science.ade4420

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Thank you very much to my colleagues who have been willing to change BIOL 2030 to be more inclusive (Dr. Joseph Bielawski, Dr. Julie LaRoche, Dr. Paul Bentzen and Dr. Andrew Schofield), my wonderful TAs who enthusiastically support our activities in every meeting, and the brave students who have opened themselves to others and created a supportive learning environment in our classrooms, tutorials, and laboratories. Also, thanks for the helpful discussion and suggestions from the participating ABLE members who came to the workshop and provided thoughtful feedback and encouragement- it was a pleasure meeting you and discussing this important topic.

Thank you to the Faculty of Science at Dalhousie University for supporting our innovations, my membership in ABLE and attendance at ABLE 2023.

About the Author

Debra Grantham is a microscopist and cell biologist who has been teaching at Dalhousie University in Halifax since 2011. She is currently a University Teaching Fellow who coordinates and teaches labs for a large (260 students a term), second-year genetics and molecular biology course, a core required and service course for several degree programs including Microbiology and Immunology, Medical Sciences, and Biochemistry and Biophysics. She values diversity, providing opportunities for all Biology majors to experience authentic research through the CURE in her labs, and giving students autonomy and choice.

APPENDIX A

Examples of welcoming syllabus

Figure 4. Example syllabus cover page from Fall 2022. Designed to appear as a menu for an appealing restaurant, with the course components matched to common components of a menu. It sets an expectation- this will not be a 'regular' class and reflects my interest as coordinator in creating an experience where students come to class and get enticing choices on how much/little they engage or consume. All content on the page is true for the course, but in an interesting/different way individual to me.

Examples of welcoming wording:

Inclusion statements on first page of formal syllabus at top of page:

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people. We acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.

Table 1: Complete instructor contact information and student hours for BIOL 2030

Instructors:	E-mail	LSC Office	Student Hours (in-person)
Dr. Joe Bielawski (Unit 1) he/him	J.xxxxx	7xxx	By appointment
Dr. Julie LaRoche (Unit 2) she/her	Jxxx	5xxx	Wed 1:35-2:35 PM or appt
Dr. Paul Bentzen (Unit 3) he/him	paul.xxxx	6xxx	Wed 1:35-2:35 PM or appt
Debra Grantham (Instruc.) she/her	grantham@dal.ca	6xxx	Tue & Thu, 9:35-10:35 AM

Details about the course are explained in positive language with links to resources within our Brightspace learning management system:

Technology BIOL 2030 will use Dalhousie-supported programs, mainly Brightspace and Microsoft Teams, and share files through Teams and Microsoft 365. All students have free access to Microsoft Office products and our assignment templates are all MS Word. A laptop or device with Teams, Word, Outlook, and Chrome installed will give you the best class experience! Bring them to every class and lab if possible. Talk to Debra about loaners.

Covid-19 Guidelines…What if I feel sick? As Dalhousie members, we all have to respect our classmates and follow the Dalhousie Code of Conduct to reduce the chance of spreading Covid-19 to those still vulnerable who couldn't be vaccinated- check the most recent guidelines here. In summary, BIOL 2030 will be asking everyone to wear masks when inside instructional classrooms or buildings and to stay home if you are sick. If you are well enough to work from home, you are expected to join class (labs or tutorials) through Teams. You have one SDA to use for any missed academic requirement throughout term (for a three-day extension or opportunity to makeup) so please file the SDA using the form and link on our homepage in Brightspace.

How will I be able to answer questions? Helpful resources are plentiful- the textbook, our recorded mini-lectures, animations, self-quizzes, and tutorial questions and solutions are all excellent sources of trusted information. You can earn credit by participating in tutorials, completing the Achieve homework every week and completing the laboratory exercises within a reasonable time. Problem-solving takes a lot of practice, so we have found problems in the text, tutorials and Achieve that allow you to struggle with important concepts and practice solving them while earning points for trying. This is called formative learning."

Mission, Review Process & Disclaimer

The Association for Biology Laboratory Education (ABLE) was founded in 1979 to promote information exchange among university and college educators actively concerned with teaching biology in a laboratory setting. The focus of ABLE is to improve the undergraduate biology laboratory experience by promoting the development and dissemination of interesting, innovative, and reliable laboratory exercises. For more information about ABLE, please visit https://www.ableweb.org/.

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